

December 2009  
Volume 1

**Engineering Report  
on the  
Construction & Testing  
of  
Deep Injection Well IW-1 and  
Dual Zone Monitoring Well MW-1  
J. Robert Dean WTP  
Florida City, FL**



Prepared for:



**The Florida Keys  
Aqueduct Authority**

Prepared by:

**AECOM**



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**Appendix A**

**FDEP Construction Permit No.  
62368-001-UC**



# Florida Department of Environmental Protection

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

Charlie Crist  
Governor

Jeff Kottkamp  
Lt. Governor

Michael W. Sole  
Secretary

## ELECTRONIC CORRESPONDENCE

May 21, 2008

In the Matter of an  
Application for Permit by:

Mr. James C. Reynolds, P.E.  
Exec. Dir., Florida Keys Aqueduct Authority  
1100 Kennedy Dr.  
P.O. Box 1239  
Key West FL 33041-1239

MIAMI-DADE COUNTY  
UIC – Fla. Keys Aqueduct Authority  
FILE: 62368-001-UC  
Class I Injection Well IW-1

## NOTICE OF PERMIT

Enclosed is Permit Number 62368-001-UC, to construct and operationally test a Class I, IW-1, 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, 62-600 and 62-601. The system will be constructed at the J. Robert Dean Water Treatment Plant, on 354<sup>th</sup> St. near SW 192<sup>nd</sup> Ave, Florida City.

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 Joseph R. May, P.G., of this office at 561-681-6691.

Executed in the City of West Palm Beach, Florida.

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION



Jack Long  
District Director

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

05/21/08

Date

JLLAB/jm

cc: Donnei McClaugherty, TLH  
Steve Anderson, SFWMD/WPB

Joe Haberfeld, FDEP/TLH  
Mike Bennett, LBF&H

Nancy Marsh, USEPA/ATL



CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this NOTICE OF DRAFT PERMIT and all copies were mailed before the close of business on 05/21/08 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.

Vanessa Delone

Clerk

05/21/08

Date



# Florida Department of Environmental Protection

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

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Secretary

PERMITTEE:  
Mr. James C. Reynolds, P.E.  
Exec. Dir., Florida Keys Aqueduct Authority  
1100 Kennedy Dr.  
P.O. Box 1239  
Key West FL 33041-1239

PERMIT/CERTIFICATION NUMBER: 62368-001-UC  
DATE OF ISSUANCE: May 21, 2008  
EXPIRATION DATE: May 20, 2013  
COUNTY: Miami-Dade  
POSITION: 25° 26' 17" N / 80° 30' 38" W  
PROJECT: FKA Class I R.O. Injection Well Class I, Group 9

PROJECT: Construction and Testing of a Class I, Group 9 Injection Well

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 and 62-550. The above named permittee is hereby authorized to perform the work and 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 CONSTRUCT AND TEST: The Class I, Group 9 Injection Well shall be constructed with a telescoped design with a 52-inch conductor casing to approximately 40 feet below land surface (bls), a 44-inch conductor casing to approximately 150 feet bls, a 38-inch outer casing to 900 feet bls, a 30-inch intermediate casing to approximately 1650 feet bls, and 20-inch final (0.50-inch wall thickness) steel casing to approximately 2900 feet bls. A nominal 12-inch injection tubing of fiberglass reinforced pipe (FRP) of a minimal thickness of 0.63 inches shall be cemented within the final casing to approximately 2890 feet bls. The total depth of the well is intended to be approximately 3300 feet bls. The injection interval shall be within the "Boulder Zone" of the Oldsmar Limestone from 2900 to 3300 feet bls. A dual zone monitoring well shall also be constructed in association with the injection well. All casing landings, monitoring interval selections and the injection zone interval are to be determined based upon data acquired in the field; and are subject to Department approval.

IN ACCORDANCE WITH: Application for a Class I, Group 9 Injection Well Construction and Testing Permit, received March 22, 2005; Request for Information One (RFI-1) dated June 22, 2006; Response to RFI-1 received July 13, 2006; Request for Information Two (RFI-2) dated August 10, 2006; Response to RFI-2 received August 21, 2006; the application was deemed complete as of -----, 2006; and publication of the Notice of Draft Permit 062368-001-UC in the ----- newspaper on -----, 2007; and Public Meeting held on -----, 2008 at -----.

LOCATED AT: J. Robert Dean Water Treatment Plant, on 354<sup>th</sup> St. near SW 192<sup>nd</sup> Ave, Florida City

TO SERVE: Florida Keys Aqueduct Authority.

SUBJECT TO: General Conditions 1-24 and Specific Conditions 1-10.



## 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 Department approves the transfer.
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.
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 construction of the well 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 that 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.

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 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.

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## SPECIFIC CONDITIONS

### 1. General Requirements

- a. This permit is to construct and test a Class I, Group 9 Exploratory Well and associated dual-zone monitoring well.
- b. This permit approval is based upon evaluation of the data contained in the application and the plans and specifications submitted in support of the application. Any changes, except as provided elsewhere in this permit, must be approved by the Department before implementation.
- c. The permittee shall be subject to all requirements and regulations of Miami-Dade County and the South Florida Water Management District regarding the construction and testing of these wells.
- d. Four surficial aquifer monitor wells, identified as Pad Monitor Wells (PMWs), shall be located near the corners of the pad to be constructed for the injection well, and shall be identified by location number and pad location, i.e. NW, NE, SW, and SE. If located in a traffic area the well head(s) must be protected by traffic bearing enclosure(s) and cover(s). Each cover must lock and be specifically marked to identify the well and its purpose. The PMWs shall be sampled as follows:
  - 1) During the construction and associated testing phases, the PMWs shall be sampled weekly for chlorides (mg/L), specific conductance ( $\mu\text{mho/cm}$  or  $\mu\text{S/cm}$ ), temperature and water level (relative to the North American Vertical Datum of 1988 [NAVD 88]).
  - 2) Initial PMW water quality analysis results shall be submitted prior to the onset of drilling activities.
  - 3) The PMWs shall also be sampled for total dissolved solids (mg/L) during the first four weeks of PMW sampling; prior to events as described under Item 4) below; and at all times when specifically requested by the Department.
  - 4) The PMWs shall be sampled 48 hours prior to any maintenance, testing (including mechanical integrity testing) or repairs to the system which represent an increased potential for accidental discharge to the surficial aquifer.

The results of the PMW analyses shall be submitted to the Department weekly along with the well construction report for the weekly activity. A summary sheet from the FDEP Southeast District is attached for use when reporting the above information. The PMWs shall be retained in service throughout the construction phase of the project.

- e. No fluid shall be injected without written authorization from the Department. The issuance of this construction and testing permit does not obligate the Department to authorize its operation, unless the well, monitoring system and surface appurtenances qualifies for an authorization.
- f. No underground injection is allowed that causes or allows movement of fluid into an underground source of drinking water if such fluid movement may cause a violation of any primary drinking water standard or may otherwise adversely affect the health of persons.
- g. If historical or archaeological artifacts, such as Indian canoes, are discovered at any time within the project site, the permittee shall notify the FDEP SED office in West Palm Beach and the Bureau of Historic Preservation, Division of Archives, History and Records Management, R. A. Gray Building, Tallahassee, Florida 32301, telephone number (850) 487-2073.

### 2. Construction and Testing Requirements

- a. Prior to the commencement of any work, the name of the Florida-licensed water well contractors supervising the drilling operations and the water well contractors' registration number shall be submitted to the Department. The permittee or the engineer of record shall provide the Department with copies of all required federal, state or local permits prior to spudding the injection well.



- b. Blow-out preventers shall be installed on the injection well prior to penetration of the Floridan aquifer system.
- c. The measurement points for drilling and logging operations shall be surveyed and referenced to the NAVD 88 prior to the onset of drilling activities for the injection well.
- d. No drilling operations shall begin without an approved disposal site for drilling fluids, cuttings, or waste. It shall be the permittee's responsibility to obtain any necessary Department and local agency approvals for disposal prior to the start of construction. Any formation waters discharged to surface or surficial aquifer waters during an aquifer performance test shall require an Industrial Wastewater permit from the Department, unless otherwise authorized.
- e. The Department shall be notified within forty-eight (48) hours after work has commenced.
- f. 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 fuels, lubricating oils, salts 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.
- g. Waters spilled during construction or testing of the exploratory well shall be contained and properly disposed.
- h. Department approval and UIC-TAC review is required prior to the following stages of construction:
  - 1) Spud date for the well
  - 2) The landing of the 30-inch diameter and 20-inch diameter steel casings
  - 3) Injection zone intervals
  - 4) Monitoring zone intervals
- i. The drilling and geophysical logging program, during the drilling of the injection and dual-zone monitoring well, shall at a minimum include:

Injection Well

- 1) Conventional mud-rotary method through setting of the surface casing; reverse-air rotary for the remainder of the drilling; no salt or brine may be used for weight control during any of the drilling operations above 2,000 feet bls. Drill a 12-inch diameter pilot-hole using the mud rotary method from pad level to approximately 175 feet bpl. Perform the following logging techniques from 0–150 feet bpl:
  - X-Y caliper
  - Natural gamma ray
  - Dual-induction
  - Compensated Sonic

- 2) Ream the 12-inch diameter pilot-hole to 50-inches and conduct the following logs prior to setting the 44-inch diameter steel conductor casing from 0 to 150 feet bpl.
  - X-Y caliper
  - Natural gamma ray
- 3) Drill a 12-inch diameter pilot hole using the mud rotary method from the landing of the conductor casing to approximately 925 feet bpl, conducting inclination surveys every 90 feet (1 degree maximum allowed). Perform the following logging techniques prior to subsequent reaming:
  - X-Y caliper
  - Natural gamma ray
  - Dual induction
  - Compensated sonic
- 4) Ream the pilot hole to a nominal 42-inch diameter borehole using the mud rotary method, conducting inclination surveys every 90 feet (1 degree maximum allowed), from bottom of conductor casing to approximately 900 feet bpl. Perform the following logging techniques:
  - X-Y caliper
  - Natural gamma ray
- 5) Install and cement a 38-inch diameter steel outer casing from pad level to approximately 900 feet bpl, and perform the following logging techniques:
  - Temperature log after each cement stage
- 6) Switch to reverse-air drilling operations. Drill a 12-inch diameter pilot hole using the reverse-air rotary method from the landing of the 38-inch diameter outer casing to approximately 1750 feet bpl, conducting inclination surveys every 90 feet (1 degree maximum allowed). Perform the following logging techniques prior to subsequent reaming:
  - X-Y caliper
  - Natural gamma ray
  - Dual induction
  - Borehole compensated sonic with VDL
  - Temperature (static and flowing)
  - Fluid resistivity (static and flowing)
  - Flowmeter (static and flowing)
  - Video survey (flowing)

A minimum of two packer-pumping tests shall be performed to determine the depth of the 10,000 mg/L TDS isopleths, which is anticipated to lie between 1450 and 1750 feet bpl, based upon field determined conditions. Note: Pumping logs shall be run to adequately stress the confining units to make them clearly identifiable. The upper monitoring zone for the subsequent dual-zone monitoring well may also be tentatively identified.

- 7) Ream the pilot hole to a nominal 38-inch diameter borehole using the reverse-air rotary method, conducting inclination surveys every 90 feet (1 degree maximum allowed), from bottom of conductor casing to approximately 1650 feet bpl. Perform the following logging techniques:
  - X-Y caliper
  - Natural gamma ray



- 8) Install and cement a 30-inch diameter intermediate steel casing from pad level to approximately 1650 feet bpl, and perform the following logging techniques:
  - Temperature log after each lift of cement
  - Conduct casing pressure test on 30-inch diameter intermediate steel casing.
- 9) Drill a 12-inch diameter pilot hole using the reverse air method from the landing of the 30-inch diameter steel intermediate casing to approximately 3300 feet bpl, conducting inclination surveys every 90 feet (1 degree maximum allowed). After logging and testing (specified below) set a double bridge plug of cement at approximately 2900 bpl and grout the 12-inch diameter pilot-hole back to the base of the 30-inch diameter casing.

Static conditions

- X-Y caliper
- Natural gamma ray
- Dual induction
- Borehole compensated sonic — VDL
- Temperature gradient with temperature differential
- Fluid resistivity
- Flowmeter
- Video survey

Dynamic (if necessary pumping) conditions

- Temperature gradient with temperature differential
- Fluid resistivity
- Flowmeter

Collect up to eight 4-inch full-diameter rock cores for testing. Additionally, an adequate number of straddle packer-pumping tests shall be performed between the depths of 1750 and 2900 feet bpl to assist in determining the 10,000 mg/L TDS isopleths, as needed, as well as determinations of potential confinement intervals based upon field determined conditions. Note: The logs conducted under dynamic conditions shall be pumped, if necessary at a rate to adequately stress the confining units to make them clearly identifiable.

- 10) Ream the 12-inch diameter pilot hole to a nominal 30-inch diameter borehole using the reverse air method, conducting inclination surveys every 90 feet (1 degree maximum allowed), from bottom of intermediate casing to approximately 2900 feet bpl. Perform the following logging techniques:
  - X-Y caliper
  - Natural gamma ray
- 11) Install and cement a 20-inch diameter steel final casing from 0 to approximately 2900 feet bpl, and perform the following logging and testing:
  - Temperature log after each cement stage
  - Cement Bond Log with VDL after casing installation
  - Video survey of cemented casing
  - Conduct 150 psi casing pressure test on the 20-inch diameter steel final casing.
- 12) Drill a 20-inch diameter borehole using the reverse air method from the landing of the final casing, through the bridge plug, to approximately 3300 feet bpl.

- 13) Develop well and collect background water samples. The background water samples shall be collected and analyzed, at a minimum, for: total dissolved solids, chlorides, specific conductance, sulfates, dissolved ammonia and total Kjeldhal nitrogen.
- 14) Obtain potentiometric head elevation within injection zone once well has stabilized in relation to NAVD 1988 to within a 0.10 foot or greater tolerance.
- 15) Install the 12-inch FRP injection tubing of 0.63 minimum wall thickness with cement packer from 0 to approximately 2890 feet bpl and conduct interim casing pressure test.
- 16) Cement the nominal 12-inch diameter fiberglass injection tubing from 0 to approximately 2890 feet bpl, and perform the following logging:
  - Temperature log after each cement stage
- 17) After a minimum of 96 hours has elapsed after the installation of the FRP injection tubing, the following logging and testing shall be accomplished:
  - Cement Bond Log (CBL)
  - Tubing pressure test
  - Video survey
  - Radioactive Tracer Survey (RTS)
  - X-Y caliper
  - Natural gamma ray
  - Fluid resistivity
- 18) Complete wellhead assembly.
- 19) Purge and sample final completed well for primary and secondary water quality parameters.
- 20) Demobilize injection well rig and move to dual zone monitor well site.

Dual Zone Monitoring Well Construction and Testing.

- j. Packer testing shall at a minimum include:
  - 1) At least one packer test from each monitoring zone.
  - 2) At least one packer test to reliably determine the base of the USDW.
  - 3) Water samples shall be collected from each packer test and analyzed, at a minimum, for: total dissolved solids, chlorides, specific conductance, sulfates, dissolved ammonia and total Kjeldhal nitrogen. Once completed the native potentiometric head elevation correlated to NAVD 1988 shall be recorded at each monitoring zone.
- k. The depth of the USDW and the background water quality of the monitoring zones shall be determined during drilling and testing. This determination shall be accomplished, analyzed, and interpreted using, at least, the following information:
  - 1) Water sample analysis results from packer testing.
  - 2) Geophysical logging data.

- 3) Plots of sonic porosity and apparent fluid resistivity ( $R_{wa}$ ). Interpretation shall also include calculations of the sonic porosity and the  $R_{wa}$  and the input parameters provided.

The lower monitoring zone shall be positioned in a suitably transmissive interval at an appropriate point above the injection interval, and the immediately overlying major confining unit, and have a TDS concentration significantly greater than 10,000 mg/L with regard to TDS. The upper monitoring interval shall be located in immediate proximity to the base of the USDW. Final hydrogeological evaluation shall be done once all pertinent data and results have been submitted and incorporated in the proposal.

- l. If effluent (e.g., uncharacteristic liquid waste components or odors) is encountered or suspected during drilling or testing, the Department shall be notified immediately by telephone, and subsequently in writing. Immediate precautionary measures shall be taken to prevent any upward fluid movement.
- m. Testing:
- 1) Injection of any wastewater is prohibited without specific authorization.
- 2) The Department shall be notified at least seventy-two (72) hours prior to all testing.
- n. 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.
- o. Department approval at a scheduled UIC-TAC meeting shall be based on the permittee's presentation that shows compliance with Department rules and this permit.
- p. No fluids shall be injected with the exception of fluids used while drilling operations are under way.

3. Quality Assurance/Quality Control Requirements.

- a. The permittee shall ensure that the construction of this facility shall be as described in the application and supporting documents. Any proposed modifications to this permit shall be submitted in writing to the Underground Injection Control program manager for review and clearance prior to implementation. Changes of negligible impact to the environment and staff time will be reviewed by the program manager, cleared when appropriate and incorporated into this permit. Changes or modifications other than those described above will require submission of a completed application and appropriate processing fee as per Rule 62-4.050, F.A.C.
- b. A Florida registered professional engineer, pursuant to Chapter 471, Florida Statutes (F.S.), shall be retained throughout the construction period and operational testing to be responsible for the construction and operation and to certify the application, specifications and completion report and other related documents, pursuant to Rule 62-528.440(5), F.A.C. A professional engineer or professional geologist, pursuant to Chapter 492, F.S., shall provide monitoring of the drilling and testing operations. The permittee shall notify the Department immediately of any change of the Engineer of Record or Geologist of Record.
- c. In accordance with Chapter 492, Florida Statutes, all documents prepared for the geological/hydrogeological evaluation of the exploratory well shall be signed and sealed by a Florida Licensed Professional Geologist or qualified Florida Licensed Professional Engineer.
- d. All water quality samples required in this permit shall be collected and analyzed in accordance with Department Standard Operating Procedures (SOP), pursuant to the FDEP Quality Assurance, Chapter 62-160, F.A.C. The various components of the collection of the FDEP SOPs are found in DEP-SOP-001/01 (Field Procedures) and DEP-SOP-002/-1 (Laboratory Procedures).



- e. Continuous on-site supervision by qualified personnel (engineer or geologist) is required during all drilling, testing, geophysical logging, casing installation, casing pressure tests, and cementing operations.
- f. The permittee shall calibrate all pressure gauge(s), flow meter(s) and other related measurement equipment associated with the exploratory well (system on a semi-annual basis). The permittee shall maintain all monitoring equipment and shall ensure that the monitoring equipment is calibrated and in proper operating condition at all times. Laboratory equipment, methods, and quality control will follow EPA guidelines as expressed in Standard Methods for the Examination of Water and Wastewater. The pressure gauge(s), flow meter(s) and other related measurement equipment associated with the exploratory well shall be calibrated using standard engineering methods.
- g. 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.

4. Reporting Requirements.

- a. This project shall be monitored by the Department and the UIC-TAC, which consists of representatives of the following agencies:
  - Department of Environmental Protection, West Palm Beach and Tallahassee.
  - South Florida Water Management District (SFWMD), West Palm Beach.
  - United States Geological Survey (USGS), Miami.
- b. The permittee shall provide copies of all correspondence relative to this permit to each member of the TAC (in this case not to include the EPA and only the Final Report to the USGS). Such correspondence includes but is not limited to reports, schedules, analyses and geophysical logs required by the Department under the terms of this permit. The permittee is not required to provide specific correspondence to any TAC member who submits to the permittee a written request to be omitted as a recipient of specific correspondence.
- c. Throughout the construction period allowed by this permit, daily progress reports shall be submitted to the Department and the TAC (not EPA) each week. The reporting period shall run Friday through Thursday and reports shall be mailed on Friday of each week. The weekly progress reports, certified by a Florida Licensed Professional Geologist or qualified Florida Licensed Professional Engineer, pursuant to S.C.s 3.b. and 7.a., and shall include at a minimum the following information:
  - 1) A cover letter summarizing each week's activities and a projection of activities for the next reporting period;
  - 2) Description of daily footage drilled by diameter of bit or size of hole opener or reamer being used;
  - 3) Description of work during installation and cementing of casing, including amounts of casing and cement used. Details of cementing operations shall include 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 physical 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;
  - 4) Daily engineers report and driller's log with detailed descriptions of all drilling progress, cementing, testing, logging, and casing installation activities;
  - 5) Lithologic log with cuttings description, formation and depth encountered;

- 6) Collection of drilling cuttings at least every 10 feet and at every formation change, with 5 foot sampling starting 100 feet above and continuing through the injection zone;
  - 7) Well development records;
  - 8) Water quality analyses, including but not limited to the weekly water quality analysis and water levels for the four PMWs;
  - 9) Description of work and type of testing accomplished including geophysical and video logs and pumping tests;
  - 10) Description of any construction problems that developed during the reporting period and current status;
  - 11) Copies of the driller's log;
  - 12) Description of any deviation survey conducted;
  - 13) Details of any packer tests, pump tests and core analyses; and
  - 14) Details of the additions of salt or other materials to suppress well flow, and include the date, depth and amount of material used.
- d. If any problem develops that may seriously hinder compliance with this permit, construction progress or good construction practice, the Department shall be notified immediately. The Department may require a detailed written report describing what problems have occurred, the remedial measures applied to assure compliance and the measures taken to prevent recurrence of the problem.
- e. Abnormal Events.
- 1) In the event the permittee is temporarily unable to comply with any conditions of this permit due to breakdown of equipment, power outages, destruction by hazard of fire, wind or by other cause, the permittee shall notify the Department. Notification shall be made in person, by telephone or by electronic mail within 24 hours of breakdown or malfunction to the UIC Program staff, SED office in West Palm Beach.
  - 2) A written report of any noncompliance referenced in Specific Condition (S.C.) 4.e above shall be submitted to the SED office within five days after discovery of the occurrence. The report shall describe the nature and cause of the breakdown or malfunction, the steps being taken or planned to be taken to correct the problem and prevent its reoccurrence, emergency procedures in use pending correction of the problem, and the time when the facility will again be operating in accordance with permit conditions.
- f. An interpretation of all test results must be submitted with all submittals.
- g. Within 30 days of well completion of the Exploratory Well, the permittee or the authorized representative shall submit to the Department the following information:
- 1) Certification of Class I Well Construction Completion, DEP Form 62-528.900(4);
  - 2) A copy of the SFWMD permit to construct a well.
  - 3) A copy of the SFWMD's Well Completion Report.

- h. Upon completion of construction of the well, a complete set of as-built engineering drawings (Florida registered P.E. signed and sealed) shall be submitted to the Department's SED office in West Palm Beach and Tallahassee UIC Program.
- i. After completion of construction and testing of the well, the following requirements shall apply:
  - 1) A final engineering report shall be submitted to the Department, the TAC (not EPA). The report shall include, but not be limited to, all information and data collected under Rules 62-528.605, 62-528.615, and 62-528.635, F.A.C., with appropriate interpretations. Mill certificates for the steel casings shall be included in the report. To the extent possible, the transmissivity and storativity of the injection zone and the maximum capacity within safe pressure limits shall be estimated. This report shall also be signed and sealed by a Florida licensed professional engineer and professional geologist.
  - 2) The permittee shall contact the UIC Section of the Department of Environmental Protection in Tallahassee to arrange for the transfer of the following items to the State Geologist at the Florida Geological Survey, 903 West Tennessee Street, Tallahassee, Florida 32304-7707:
    - a) Cuttings obtained during well construction;
    - b) Any cores obtained during well construction when no longer needed by the permittee;
    - c) Any water samples collected;
    - d) Any geophysical logs run during well construction; and
    - e) A copy of the final report described in S.C. 4.i.1) above.
- j. The Florida Geological Survey (FGS) is currently involved in a study that is investigating the upper Floridan aquifer. For this reason, it is requested that several 500ml samples of ambient ground water be collected from the monitoring zone intervals where the interval/packer tests will be conducted for FGS analyses. Dr. Jon Arthur at the FGS will arrange for the samples to be collected, and can be contacted at the Hydrogeological Investigations Section, Florida Geological Survey at 903 West Tennessee Street, Tallahassee FL 32304-7700, phone number (850) 488-9380. The samples may be delivered to the SED office's UIC program if not delivered directly to the FGS.
- k. A 2½ gallon sample of formation fluid may also be requested for collection from the completed well, or zones. Samples should be labeled with the well number, depth of sample, and collection method. Dr. Jon Arthur at the FGS will arrange for the samples to be collected and can be contacted at the Hydrogeological Investigations Program, Florida Geological Survey at 903 West Tennessee Street, Tallahassee FL 32304-7700, phone number (850) 488-9380. The samples may be delivered to the SED office's UIC program if not delivered directly to the FGS.
  - 1) Surface equipment completion certification or certification of interim completion for the purposes of testing by the injection well project Engineer of Record.
  - 2) Signed and sealed record (as-built) engineering drawings of all well construction, subsurface and surface equipment, and appurtenances. The drawings shall include but not be limited to the wellhead, subsurface well components, and the location of permanent sampling points for both the injectate and the recovered waters by the injection well project Engineer of Record;
  - 3) All other applicable permits;

## 5. Surface Equipment

- a. The well surface equipment and piping shall be kept free of corrosion at all times.
- b. Spillage onto the well pad during construction activities, and any waters spilled during testing, other maintenance, testing or repairs to the system shall be contained by an impermeable structure around the edge of the pad and disposed of via approved and permitted methods.
- c. The four surficial aquifer monitor wells installed at the corners of the well pad shall be secured, maintained, and retained in service throughout the construction phase of the project. The permittee may submit a request to the Department for cessation of sampling followed by capping, or plugging and abandonment of these wells.

## 6. Plugging and Abandonment and Alternate Use Plans.

- a. Permittees who are unable to operate the well to meet its intended purpose shall within 180 days of FDEP notification:
  - 1) Submit a plugging and abandonment permit application in accordance with Rules 62-528.625 and 62-528.645, F.A.C., or
  - 2) Submit an alternate use plan for the well. Alternate use may commence after the plan has been approved by the Department, including any necessary permit or permit modifications as required by the Department or any other agency, or
  - 3) Implement the plugging and abandonment plan.

## 7. Signatories

- 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 and submittals shall contain the following certification signed by a person authorized under Rules 62-528.340(1) or (2), F.A.C. or be included under such certification as may have been previously provided (i.e., responses to a Request for Information (RFI) which are simple clarifications are thereby certified):

"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."



8. Permit Extension(s) and Renewal(s).

- a. Pursuant to Rule 62-4.080(3), a permittee may request that a permit be extended as a modification of an existing permit. A request for an extension is the responsibility of the permittee and shall be submitted to the Department before the expiration of the permit. In accordance with Rule 62-4.070(4), F.A.C., a permit cannot be extended beyond the maximum 5-year statutory limit.

Issued this 21 day of May, 2008

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION



 Jack Long  
District Director  
Southeast District

  
JL/LAB/jrq

**Appendix B**

**Summary of Well Construction Activity**



## Summary of Construction and Testing Activities

<b>Date:</b>	<b>Florida Keys Aqueduct Authority</b>
<b>Well Number: IW-1</b>	<b>J. Robert Dean Water Treatment Plant</b>
<b>Permit Number: 62368-001-UC</b>	<b>Florida City , Florida</b>
<b>Job Number: 28824.03</b>	<b>Deep Injection Well IW-1</b>

Date	Milestone
8/7/08	Began drilling a nominal 72" borehole via mud-rotary from pad level to 37' bpl
8/8/08	Install and cement 66" pit casing to approximately 36' bpl
8/9/08	Began drilling a nominal 64" borehole via mud-rotary from approximately 70' bpl to 215' bpl
8/13/08	Conduct caliper/gamma log; Install and cement 54" steel casing to approximately 210' bpl
8/15/08	Begin drilling a nominal 52" borehole via mud-rotary from approximately 206' bpl to 915' bpl
8/23/08	Conduct caliper/gamma log; Install and cement 44" steel casing to approximately 910' bpl
8/27/08	Begin drilling a nominal 12¼" pilot hole via reverse-air from approximately 910' bpl to 1,950" bpl
8/29/08	Conducted the following geophysical logs: Caliper/Gamma, Fluid Conductivity & Temperature, Compensated Sonic with VDL and TDS, Dual Induction with SP, Flowmeter and Borehole Televiewer
8/31/08	Conducted Packer Test #1 from 1,875' to 1,950' bpl
9/3/08	Conducted Packer Test #2 from 1,406' to 1,428' bpl
9/4/08	Conducted Packer Test #3 from 1,248 to 1,270 and Packer Test #4 from 1,528 to 1,550
9/5/08	Backfill pilot hole with cement to approximately 890' bpl
9/7/08	Begin drilling a nominal 42.5" borehole via reverse air from 890' bpl to 1,606' bpl
9/16/08	Conduct caliper/gamma log; Begin Installation of 34" inch steel casing.
9/18/08	Finish Installing 34" steel casing to 1,600' bpl and begin cementing activities
9/22/08	Completed a satisfactory casing pressure test on the 34" steel casing.
9/23/08	Begin drilling a nominal 12¼" pilot hole, via reverse air, from approximately 1,600' bpl to 3,300' bpl collecting core samples throughout
9/24/08	Retrieve Core Interval #1 (2,050-2,065)
9/26/08	Retrieve Core Interval #2 (2,140-2,154)
9/27/08	Retrieve Core Interval #3 (2,287-2,298)
9/29/08	Retrieve Core Interval #4 (2,497-2,512)
9/30/08	Retrieve Core Interval #5 (2,650-2,658)
10/2/08	Retrieve Core Interval #6 (2,825-2,837)

<b>Date:</b> <b>Well Number: IW-1</b> <b>Permit Number: 62368-001-UC</b> <b>Job Number: 28824.03</b>		<b>Florida Keys Aqueduct Authority</b> <b>J. Robert Dean Water Treatment Plant</b> <b>Florida City , Florida</b> <b>Deep Injection Well IW-1</b>
Date	Milestone	
10/3/08	Retrieve Core Interval #7 (2,892-2,903)	
10/4/08	Retrieve Core Interval #8 (2,926-2,936); Continue drilling a nominal 12¼" pilot hole, via reverse air, to 3,300' bpl	
10/8/08	Advanced pilot hole to 3,300' bpl	
10/9/08	Conducted the following geophysical logs: Caliper/Gamma, Fluid Conductivity & Temperature, Compensated Sonic with VDL, Dual Induction with SP, Flowmeter	
10/10/08	Conducted Packer Test #5 from 3,210' to 3,305' bpl	
10/11/08	Conducted Packer Test #6 from 2,998.5' to 3,018.5' bpl	
10/12/08	Conducted Packer Test #7 from 2,713' to 2,733' bpl	
10/13/08	Conducted Packer Test #8 from 2,636' to 2,656' bpl	
10/14/08	Conducted Packer Test #9 from 2,266' to 2,284' bpl	
10/15/08	Conducted Packer Test #10 from 2,202' to 2,220' bpl	
10/18/08	Conducted Packer Test #11 from 2,048' to 2,066' bpl	
10/20/08	Begin Installing a cement bridge plug at 2,655" bpl within the nominal 12¼" borehole and back plugging to 2,390' bpl using 12% bentonite/cement slurry	
10/24/08	Conducted Packer Test #12 from 2,293' to 2,390' bpl	
10/26/08	Continue back-plugging the nominal 12¼" diameter pilot hole from 2,390' bpl to the base of the 34-inch diameter intermediate casing set at 1,600' bpl	
10/28/08	Begin reaming a nominal 32" borehole from 1590' to 2668' bpl	
11/5/08	Begin drilling a nominal 28" diameter borehole from 2,668' to 2,772' bpl to accommodate the stepped landing joint to be installed onto the base of the 22" diameter steel injection casing	
11/6/08	Begin drilling a nominal 20" diameter borehole (the injection interval) from 2,672' to 3,310' bpl	
11/17/08	Conduct caliper/gamma log and begin installation of 22" steel casing.	
11/20/08	Finish Installation of 22" steel casing to 2,670' bpl and begin grouting.	
11/29/08	Conduct cement bond log and video survey on 22" diameter steel casing	
12/1/08	Completed a satisfactory casing pressure test on the 22" steel injection casing.	
12/4/2008	Begin Installing 12" diameter Fiberglass Reinforced Pipe (FRP)	
12/7/2008	Begin grouting 12" diameter FRP	
12/10/2008	Conduct video survey of 12" FRP and open hole section of borehole to 3,305' bpl	
12/20/2008	Conduct cement bond log (CBL) on 12" FRP liner	
12/23/2008	Conduct casing pressure test on 12" FRP liner	
2/12/09	Conduct final geophysical logging at IW-1 and MW-1 including: Caliper/Gamma, Temperature/Fluid Resistivity, Video Survey.	
2/19/2009	Conduct Radioactive Tracer Survey (RTS) at IW-1	



**Date:**

## **Florida Keys Aqueduct Authority**

**Well Number:** IW-1

**J. Robert Dean Water Treatment Plant**

**Permit Number:** 62368-001-UC

**Florida City , Florida**

**Job Number:** 28824.03

**Deep Injection Well IW-1**

<b>Date</b>	<b>Milestone</b>
3/17/2009	Conduct Injection Test at IW-1

## Summary of Construction and Testing Activities

Date:

**Florida Keys Aqueduct Authority**

Well Number: MW-1

**J. Robert Dean Water Treatment Plant**

Permit Number: 62368-001-UC

**Florida City, Florida**

Job Number: 28824.03

**Dual Zone Monitor Well MW-1**

Date	Milestone
12/16/08	Began drilling a nominal 48" borehole via mud-rotary from pad level to 39' bpl
12/17/08	Install and cement 44" pit casing to approximately 38' bpl
12/18/08	Began drilling a nominal 42.5" borehole via mud-rotary from approximately 37' bpl to 215' bpl
12/20/08	Conduct caliper/gamma log; Install and cement 34" steel casing to approximately 212' bpl
12/22/08	Begin drilling a nominal 32½" borehole via mud-rotary from approximately 200' bpl to 915' bpl
1/1/09	Conduct caliper/gamma log; Begin installing 24" diameter steel casing to 910' bpl
1/2/09	Finish installing 24" steel casing and cement to surface in one stage.
1/4/09	Began drilling a nominal 12.75" pilot hole via reverse air from approximately 911' bpl to 1,550' bpl
1/9/09	Conduct packer test #1 at MW-1 from 1,302' - 1,338' bpl
1/10/09	Conduct packer test #2 at MW-1 from 1,451' - 1,487' bpl
1/11/09	Conduct packer test #3 at MW-1 from 1,385' - 1,421' bpl
1/15/09	Begin backfilling the nominal 12.75" pilot hole from 1,550' bpl to approximately 907' bpl
1/19/09	Began drilling a nominal 24" diameter borehole, via reverse air, from approximately 907' bpl to 1,450' bpl
1/22/09	Begin installing 14" diameter steel casing to 1,450' bpl
1/24/09	Finish installing 14" steel casing to 1,450' bpl and begin cementing to surface.
1/29/09	Conduct geophysical logging including: Caliper/Gamma, Dual Induction, Sonic, Flow Meter, Temperature/Fluid Resistivity, Video Survey.
1/31/09	Conduct packer test #4 at MW-1 from 1,750' - 1,802' bpl
2/1/09	Conduct packer test #5 at MW-1 from 1,594' - 1,634' bpl
2/6/09	Install 6 5/8" Fiberglass Reinforced Pipe at MW-1 to approximately 1,754' bpl and
2/8/09	Cement the last 300' (Stage 4) of the annulus between the 22" and the 14" steel casing.
2/10/09	Perform satisfactory casing pressure test on 6 5/8" Fiberglass Reinforced Pipe at MW-1
2/12/09	Conduct final geophysical logging at IW-1 and MW-1 including: Caliper/Gamma, Temperature/Fluid Resistivity, Video Survey.
2/20/09	Completed well head; remaining work to be completed by others

**Appendix C**

**Weekly Summary Reports**

August 20, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.1 – August 7, 2008 through August 16 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well IW-1  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the first 10 days of construction on the Deep Injection Well identified as IW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

The first 10-days of construction and related activities for IW-1 are summarized below;

- Drilled pad monitor wells and purged wells for initial water quality analysis.
- Completed mobilization of drill rig and support equipment.
- Drilled a nominal 72-inch diameter borehole from land surface to 37 feet below pad level (bpl) via the mud rotary method. Minor loss of drilling fluids at 26 feet bpl.
- Installed 66-inch diameter, A-139 Grade B carbon steel pit casing to a depth of 37 feet bpl and cement casing from 37 feet bpl to land surface via the pressure grouting method.
- Drilled a nominal 65-inch diameter borehole from 37 to 210 feet bls via the mud rotary method.
- Loss mud circulation between 62 and 70 feet bls. Installed loss circulation material (straw) and bentonite gel (high viscosity, low weight material) to re-gained mud circulation.
- Circulated the nominal 65-inch diameter borehole for approximately 1 hour and conducted 4-arm caliper and natural gamma logs from land surface to 210 feet bls. Based on the lithologic and geophysical log data, the casing setting depth for the 54-inch diameter casing was selected at 210 feet bpl.
- Continued to condition nominal 65-inch diameter borehole before installing the 54-inch diameter steel surface casing.
- Installed 54-inch diameter, A-139 Grade B carbon steel casing to a depth of 210 feet bpl.
- Conducted pre-flush and cemented the 54-inch diameter in place using 340 barrels (70.7 cubic yards) of ASTM Type II neat cement.
- Installed rotating head on 54-inch diameter steel surface casing to control potential artesian flow conditions while advancing the borehole through the intermediate confining unit (Hawthorn Group) and into the Floridan Aquifer System.
- Drilled out cement plug at the base of the 54-inch diameter steel casing.
- Drilled a nominal 54-inch diameter borehole from 210 to 559 feet bpl via the mud rotary method.

Work scheduled for next week:

The Contractor will continue to drill a nominal 54-inch diameter borehole from 559 feet bpl to an anticipated depth of 900 feet bpl and will then conducted 4-arm caliper and natural gamma ray logs from land surface to the base of the completed borehole at 900 feet bpl. Based on the drilling, lithologic and geophysical log data, the 44-inch diameter steel casing will be set at approximately 900 feet bpl and cement back to surface using ASTM Type II cement.

If you have any questions or concerns based on the information provided above, please contact the undersigned at 561-684-3375.

Sincerely:

Michael W. Bennett, P.G.  
Senior Hydrogeologist  
Boyle/AECOM

FPL-006B-088



Distribution to Interested Parties – Weekly Summary Report No. 1

Enclosures:     Engineer's Daily Field Reports  
                     Lithologic Log  
                     Pad Monitor Well Water Quality Summary  
                     54-inch diameter Steel Casing Tally Sheet  
                     54-inch diameter Steel Casing Cementing Summary

Distribution     Joe May, FDEP/ WPB w/enclosures  
                     Joe Haberfeld, FDEP/TLH w/enclosures  
                     Donnei McClaugherty, FDEP/ TLH w/ enclosures  
                     James C. Reynolds, P.E. /FKAA w/o enclosures  
                     Tom Walker, P.E. /FKAA w/o enclosures  
                     Ray Shimokubo, P.E. /FKAA w/o enclosures  
                     Mike Furdock, CH2MHill / DFB w/o enclosures  
                     Pam Hill, CH2MHill/ DFB w/o enclosures  
                     Mario Garza, CH2MHill /DFB w/o enclosures  
                     Larry Lardeiri, P.E., Boyle – Palm City w/o enclosures  
                     File w/enclosures

August 26, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.2 – August 17, 2008 through August 23, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well IW-1  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the second week of construction on the Deep Injection Well identified as IW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period. It should be noted that due to Tropical Storm Fay activities were halted on Sunday, August 17 and resumed on Wednesday, August 19 in accordance with the approved Hurricane Preparedness Plan.

The second week of construction and related activities for IW-1 are summarized below;

- The Contractor drilled a nominal 54-inch diameter borehole from 559 to 915 feet bpl via the mud rotary method.
- Conducted a 4-arm caliper and natural gamma ray log within the 54-inch diameter borehole from land surface to 915 feet bpl.
- Began to install the 44-inch diameter steel casing to a depth of 910 feet bpl.

Work scheduled for next week:

The Contractor will complete the installation and cementing of the 44-inch diameter casing and will begin to set-up for reverse-air drilling operations. Once completed, the Contractor will drill a nominal 12-inch pilot hole from 915 feet bpl to approximately 1,750 feet bpl via the reverse-air method. A full suite of geophysical logs will be conducted as per the FDEP-issued permit on the pilot hole from 915 to 1,750 feet bpl. Based on the geophysical log data, a minimum of two packer tests will be conducted to verify the base of the Underground Source of Drinking Water (USDW). A casing seat request will be submitted to the Department, based on the compiled site data for the intermediate casing, which will be set at a depth below the identified base of the USDW.

If you have any questions or concerns based on the information provided above, please contact the undersigned at 561-684-3375.

Sincerely:

Michael W. Bennett, P.G.  
Senior Hydrogeologist  
Boyle|AECOM

Distribution to Interested Parties – Weekly Summary Report No. 2

Enclosures:     Engineer's Daily Field Reports  
                     Lithologic Log  
                     X-Y Caliper/Natural Gamma Logs  
                     Pad Monitor Well Water Quality Summary

Distribution     Joe May, FDEP/ WPB w/enclosures  
                     Joe Haberfeld, FDEP/TLH w/enclosures  
                     Donnei McClaugherty, FDEP/ TLH w/enclosures  
                     James C. Reynolds, P.E. /FKAA w/o enclosures  
                     Tom Walker, P.E. /FKAA w/o enclosures  
                     Ray Shimokubo, P.E. /FKAA w/o enclosures  
                     Mike Furdock, CH2MHill / Naple w/o enclosures  
                     Pam Hill, CH2MHill/ Key West w/o enclosures  
                     Mario Garza, CH2MHill /FTL w/o enclosures  
                     Larry Lardieri, P.E., Boyle – Palm City w/o enclosures  
                     File w/enclosures

September 1, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.3 – August 24, 2008 through August 30, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well IW-1  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the third week of construction on the Deep Injection Well identified as IW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

The third week of construction and related activities for IW-1 are summarized below;

- The Contractor completed the installation and cementing of the 44-inch diameter steel casing (ASTM A-139 Grade B) to 906 feet bpl. The entire annular space of the 44-inch diameter casing was pressure grouted to surface. The bottom 300 feet of the 44-inch diameter steel casing was cemented using ASTM Type II neat cement (211 barrels) with the remaining portion of the annulus cemented using 4% bentonite|cement slurry (452 barrels). The shut-in pressure upon completion of cementing operations was 220 psi.
- The Contactor finished setting-up for reverse-air drilling and completed a nominal 12-inch diameter pilot hole to 1,950 feet bpl. The pilot hole was to be drilled to 1,750 feet bpl but based on field determined water quality data from the reverse-air returns it was extend an additional 200 feet to ensure the base of the Underground Source Drinking Water (USDW) was transect and the transition in water quality could be captured by the dual-induction log.

Work scheduled for next week:

The Contractor will complete a full set of geophysical logs, which includes both formation evaluation and production type logs from 900 to 1,950 feet bpl and will begin packer testing operations within the nominal 12-inch diameter borehole to gain water quality and hydraulic characteristics of the drilled section. Boyle|AECOM will submit a casing setting depth request for the 34-inch diameter intermediate casing to the Department for review and approval. Concurrently, the Contractor will begin to back-plug the nominal 12-inch diameter pilot hole using 12% bentonite|cement slurry from 1,950 back to the base of the 44-inch casing at 906 feet bpl. Once back-plugging operations are completed, the Contractor will begin to ream the nominal 12-inch diameter borehole to 44-inches. Reaming operation will continue to within 100 feet of the proposed casing setting depth until the request is formally approved by the Department. Reaming operations will then resume to the specified depth. The 44-inch diameter borehole will be geophysically logged (X-Y caliper and natural gamma) to confirm the geometry of the borehole and drilled depth. The Contractor will then begin installation of the 34-inch diameter ASTM A-139 steel casing to the approved setting depth.

If you have any questions or concerns based on the information provided above, please contact the undersigned at 561-684-3375.

Sincerely:

Michael W. Bennett, P.G.  
Senior Hydrogeologist  
Boyle|AECOM



Distribution to Interested Parties – Weekly Summary Report No. 3

Enclosures:     Engineer's Daily Field Reports  
                     Lithologic Log  
                     Casing Tally – 44-inch diameter casing  
                     Cement Pumping Report - 44-inch diameter casing  
                     Pad Monitor Well Water Quality Summary

Distribution     Joe May, FDEP/ WPB w/enclosures  
                     Joe Haberfeld, FDEP/TLH w/enclosures  
                     Donnei McClaugherty, FDEP/ TLH w/enclosures  
                     James C. Reynolds, P.E. /FKAA w/o enclosures  
                     Tom Walker, P.E. /FKAA w/o enclosures  
                     Ray Shimokubo, P.E. /FKAA w/o enclosures  
                     Mike Furdock, CH2MHill / Naples w/o enclosures  
                     Pam Hill, CH2MHill/ Key West w/o enclosures  
                     Mario Garza, CH2MHill /FTL w/o enclosures  
                     Larry Lardieri, P.E., Boyle – Palm City w/o enclosures  
                     File w/enclosures

September 9, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.4 – August 31, 2008 through September 5, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well IW-1  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the fourth week of construction on the Deep Injection Well identified as IW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

The fourth week of construction and related activities for IW-1 are summarized below;

The Contractor completed a full set of geophysical logs in the nominal 12-inch diameter pilot-hole from 900 to 1,950 feet bpl. The geophysical logs conducted included; a 4-arm caliper, natural gamma ray, spontaneous potential, dual-induction, borehole compensated sonic, fluid conductivity, temperature, flow meter, and a borehole televiewer.

Straddle packer testing was conducted on the pilot hole on specific intervals of 1,248 to 1,270; 1,406 to 1,428; 1,528 to 1,550 and 1,875 to 1,950 feet bpl to determine water quality and hydraulic characteristics of the tested interval. A water sample was collected at the end of the packer test and submitted to a Florida certified laboratory for specific conductance, TDS, major cat ions, ammonia, and TKN analyses. **Table 1** provides a summary of packer test pumping rates, drawdown data and calculated specific capacity to show relative production capacity/permeability of the tested intervals.

**Table 1. Packer Test Performance Data Summary**

Test #	Test Interval (ft. bpl)	Pumping Rate (gpm)	Drawdown (feet)	Footage of Borehole Tested	Specific Capacity (gpm/foot/foot)
IW-1-3	1,248 – 1,270	104	45.6	22	0.103
IW-1-2	1,406 – 1,428	34	75.5	22	0.020
IW-1-4	1,528 – 1,550	71	143.5	22	0.022
IW-1-1	1,875 – 1,950	85	94.3	75	0.012

Specific capacity in gpm /foot of drawdown/foot of borehole tested

**Table 2** provides a summary of laboratory determined specific conductance and chloride and TDS concentrations from water samples obtained during individual packer tests.

**Table 2. Packer Test Water Quality Data Summary**

Test #	Test Interval (feet bpl)	Specific Conductance (umhos/cm)	Chloride (mg/L)	Calculated TDS (mg/L)	Lab Determined TDS (mg/L)
IW-1-3	1,248 – 1,270	7,750	2,260	4,805	4,732
IW-1-2	1,406 – 1,428	18,600	6,680	11,532	11,620
IW-1-4	1,528 – 1,550	31,050	NYD	19,251	NYD
IW-1-1	1,875 – 1,950	52,200	22,400	32,365	34,800

Calculated TDS in milligrams per liter = Specific Conductance in umhos/cm \* 0.62 (Hem 1992); NYD = Not Yet Determined

Once all hydrogeologic and UIC permit required information was obtained, the entire length of the 12 ¼ inch diameter pilot hole was back-plugged using a 12% bentonite/cement slurry. With the data collection phase completed Boyle/AECOM submitted the casing setting depth request to the Department and TAC for the 34-inch diameter steel intermediate casing.

Work scheduled for next week:

The Contractor begin will begin to ream the back-plugged nominal 12-inch diameter borehole to 44-inches. Reaming operation will continue to within 100 feet of the proposed casing setting depth until the request is formally approved by the Department. Reaming operations will then resume to the specified depth of approximately 1,600 feet bpl. The 44-inch diameter borehole will be geophysically logged (X-Y caliper and natural gamma) to confirm the geometry of the borehole and drilled depth. The Contractor will install the 34-inch diameter ASTM A-139 steel casing to the approved setting depth and will begin to cement the casing to surface via pressure and tremie grouting methods. Each cement stage will be physically tagged using collarless Hydril tubing with the tagged depth confirmed by temperature logs. Once the 34-inch casing is installed and cement to surface, the Contractor will begin to advance a nominal 12-inch diameter pilot-hole from the base of the 34-inch casing to 2,900 feet bpl.

If you have any questions or concerns based on the information provided above, please contact the undersigned at 561-684-3375.

Sincerely:

Michael W. Bennett, P.G.  
Senior Hydrogeologist  
Boyle/AECOM

Distribution to Interested Parties – Weekly Summary Report No. 4

Enclosures:      Engineer's Daily Field Reports  
                         Lithologic Log  
                         Pad Monitor Well Water Quality Summary  
                         Water Quality Results for Individual Packer Test

Distribution      Joe May, FDEP/ WPB w/enclosures  
                         Joe Haberfeld, FDEP/TLH w/enclosures  
                         James C. Reynolds, P.E. /FKAA w/o enclosures  
                         Tom Walker, P.E. /FKAA w/o enclosures  
                         Ray Shimokubo, P.E. /FKAA w/o enclosures  
                         Mike Furdock, CH2MHill / Naples w/o enclosures  
                         Pam Hill, CH2MHill/ Key West w/o enclosures  
                         Mario Garza, CH2MHill /FTL w/o enclosures  
                         Larry Lardieri, P.E., Boyle – Palm City w/o enclosures  
                         File w/enclosures

September 15, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.5 – September 6, 2008 through September 13, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well IW-1  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the fifth week of construction on the Deep Injection Well identified as IW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

The fifth week of construction and related activities for IW-1 are summarized below.

The requested casing setting depth of 1,600 feet below pad level for the 34-inch diameter steel intermediate casing was formally approved by Department on Thursday September 11, 2008. Based on the approved setting depth, the Contractor began and completed reaming a nominal 42-inch diameter borehole from the base of the 44-inch diameter steel casing at 906 to 1,605 feet bpl.

Work scheduled for next week:

The completed nominal 42-inch diameter borehole will be geophysically logged (X-Y caliper and natural gamma) to confirm the geometry of the borehole and drilled depth. The Contractor will install the 34-inch diameter ASTM A-139 (Grade B) steel casing to the approved setting depth of 1,600 feet bpl and will begin to cement the casing to surface via pressure and tremie grouting methods. Each cement stage will be physically tagged using collarless Hydril tubing with the tagged depth confirmed by temperature logs. Once the 34-inch diameter steel casing is installed and cement to surface, the Contractor will begin to advance a nominal 12-inch diameter pilot-hole via reverse air rotary method from the base of the 34-inch diameter intermediate casing to 2,900 feet bpl.

If you have any questions or concerns based on the information provided above, please contact the undersigned at 561-684-3375.

Sincerely:

Michael W. Bennett, P.G.  
Senior Hydrogeologist  
BOYLE | AECOM

Enclosures: Engineer's Daily Field Reports  
Pad Monitor Well Water Quality Summary

FPL-006B-096

Distribution to Interested Parties – Weekly Summary Report No. 5

Distribution      Joe May, FDEP/ WPB w/enclosures  
Joe Habermeld, FDEP/TLH w/enclosures  
James C. Reynolds, P.E. /FKAA w/o enclosures  
Tom Walker, P.E. /FKAA w/o enclosures  
Ray Shimokubo, P.E. /FKAA w/o enclosures  
Mike Furdock, CH2MHill / Naples w/o enclosures  
Pam Hill, CH2MHill/ Key West w/o enclosures  
Mario Garza, CH2MHill /FTL w/o enclosures  
Larry Lardieri, P.E., Boyle – Palm City w/o enclosures  
File w/enclosures



September 24, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.6 – September 14, 2008 through September 20, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well IW-1  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the sixth week of construction on the Deep Injection Well identified as IW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

The sixth week of construction and related activities for IW-1 are summarized below.

The Contractor completed the nominal 42-inch diameter borehole and geophysically logged it (X-Y caliper and natural gamma) to confirm the geometry of the borehole and drilled depth. The first caliper log did not reach the total drilled depth, so the Contractor re-entered the nominal 42-inch borehole to ensure it was clear to 1,605 feet bpl. The Contractor then installed the 34-inch diameter ASTM A-139 (Grade B) steel casing to the approved setting depth of 1,600 feet bpl. – see attached casing tally. The 34-inch diameter casing was cemented to surface via pressure and tremie grouting method, which included the initial pressure grouting stage and four (4) tremie grouting stages. The volume of cement pumped was 30% over theoretical volume based on a nominal 43-inch diameter borehole. Each cement stage was physically tagged using collarless Hydril tubing with the tagged depth confirmed by temperature logs. Table 1. shows the cement stage and associated physical hard tag and temperature log determined depths.

Table .1

Cement Stage	Date	Physical Hard Tag Depth	Temperature Log Depth
1	9/18/2008	1292	1253
2	9/19/2008	985	978
3	9/19/2008	666	668
4	9/20/2008	343	340
5	9/20/2008	Surface	Surface

Work scheduled for next week:

The Contractor will drill-out the back-plug material from the initial pilot hole from 1,600 to 1,950 feet bpl. Once completed the Contractor will begin to advance a nominal 12-inch diameter pilot-hole via reverse air rotary method from 1,950 to 2,900 feet bpl with up to eight full-diameter cores – 15 feet in length obtained from this interval.

If you have any questions or concerns based on the information provided above, please contact the undersigned at 561-684-3375.

Sincerely:

Michael W. Bennett, P.G.  
Senior Hydrogeologist  
BOYLE | AECOM

FPL-006B-098

Enclosures:     Engineer's Daily Field Reports  
                     34-inch diameter Casing Tally Sheet  
                     34-inch diameter Casing Cementing Reports  
                     Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 6

Distribution     Joe May, FDEP/ WPB w/enclosures  
                     Joe Haberfeld, FDEP/TLH w/enclosures  
                     James C. Reynolds, P.E. /FKAA w/o enclosures  
                     Tom Walker, P.E. /FKAA w/o enclosures  
                     Ray Shimokubo, P.E. /FKAA w/o enclosures  
                     Mike Furdock, CH2MHill / Naples w/o enclosures  
                     Bill Beddow, CH2MHill/Naples w/o enclosures  
                     Pam Hill, CH2MHill/ Key West w/o enclosures  
                     Mario Garza, CH2MHill /FTL w/o enclosures  
                     Larry Lardieri, P.E., Boyle – Palm City w/o enclosures  
                     File w/enclosures

September 30, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.7 – September 21, 2008 through September 27, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well IW-1  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the seventh week of construction on the Deep Injection Well identified as IW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

The seventh week of construction and related activities for IW-1 are summarized below.

After cementing the 34-inch steel casing to surface the Contractor flushed the casing with potable water to remove the residual completion fluids. Once the cement within the annulus had stabilized, the Contractor began to set-up for the hydrostatic casing pressure test. On Monday August 22, 2008, the Contractor successfully conduct a 150 psi hydrostatic casing pressure test on the 34-inch diameter intermediate casing set at 1,600 bpl. During the course of the 1-hour test, the pressure inside the 34-inch casing dropped 3.2 psi or 2.1 % well below the +/- 5% limit stated in the construction permit. A total of 67 gallons of water was bleed off from inside the casing after the test was completed.

Once the casing pressure test was complete, the Contractor drilled-out the cement at the bottom of the casing at 1,590 feet bpl using a nominal 34-inch diameter bit. YBI then began to drill-out the back-plug material from the initial pilot hole from 1,600 to 1,950 feet bpl using a nominal 12-inch diameter bit and continued to advance the pilot-hole via the reverse air rotary method from 1,950 to 2,050 feet below pad level (bpl). The first core interval was selected at 2,050 bpl. YBI began coring operations on 9/25/08 at a depth of 2,050 and continued to core to 2,065 feet bpl. The core barrel was returned to surface where 7 feet of core was retrieved. On 9/25/08, YBI continued to advance the nominal 12-inch diameter pilot hole from 2,065 to 2,140 feet bpl. Based on the lithology and drilling characteristics, the second core point was selected at 2,140 feet bpl. On 9/26/08, YBI cored the interval from 2,140 to 2,154 feet and brought the core barrel to surface with 14 feet of rock core – 100 % core recovery. YBI continued to advance the nominal 12-inch pilot-hole from 2,140 to 2,287 feet bpl where a hard dolomitic limestone was encountered. Based on the formation samples, the third core point was selected at 2,287 feet bpl. At the end of this reporting period, YBI ended coring operations at 2,298 feet bpl and began to trip the core to surface.

Work scheduled for next week:

The Contractor will continue to advance the nominal 12-inch diameter pilot-hole via reverse air rotary method from 2,298 to 3,330 feet bpl with additional full-diameter rock cores taken in representative interval within the confining and injection horizons. Once the nominal 12-inch diameter pilot hole is completed to an anticipated total depth of 3,300 feet bpl it will be geophysically logged with a borehole video survey conducted.

If you have any questions or concerns based on the information provided above, please contact the undersigned at 561-684-3375.

Sincerely:

Michael W. Bennett, P.G.  
Senior Hydrogeologist  
BOYLE | AECOM

FPL-006B-100

Enclosures:     Engineer's Daily Field Reports  
                     34 inch Steel Casing Pressure Test Summary  
                     Lithologic and Core Descriptions  
                     Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 7

Distribution     Joe May, FDEP/ WPB w/enclosures  
                     Joe Haberland, FDEP/TLH w/enclosures  
                     James C. Reynolds, P.E. /FKAA w/o enclosures  
                     Tom Walker, P.E. /FKAA w/o enclosures  
                     Ray Shimokubo, P.E. /FKAA w/o enclosures  
                     Mike Furdock, CH2MHill / Naples w/o enclosures  
                     Bill Beddow, CH2MHill/Naples w/o enclosures  
                     Pam Hill, CH2MHill/ Key West w/o enclosures  
                     Mario Garza, CH2MHill /FTL w/o enclosures  
                     Larry Lardieri, P.E., Boyle – Palm City w/o enclosures  
                     File w/enclosures

October 7, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.8 – September 28, 2008 through October 4, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well IW-1  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the eighth week of construction on the Deep Injection Well identified as IW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

The eighth week of construction and related activities for IW-1 are summarized below.

At the beginning of this reporting period, YBI ended coring operations at 2,298 feet bpl and began to trip the core to surface. The Contractor continued to advance the nominal 12-inch diameter pilot-hole via reverse air rotary method from 2,298 to 2,926 feet bpl with additional full-diameter rock cores taken in representative intervals within the confining and injection horizons. Table 1 shows the core intervals and other pertinent information related to the full-diameter coring activity at this site. At the end of this reporting period, YBI began coring operations at 2,926 feet bpl.

FKAA IW-1 Core No.	Core Interval (feet bls)	Samples sent to Core Laboratory	Core Footage (feet)	Core Recovered (feet)	Percent Recovery
1	2,050 - 2,065		15	7.0	46.7
2	2,140 - 2,154		14	14.0	100.0
3	2,287 - 2,298		11	6.0	54.5
4	2,497 - 2,512		15	11.5	76.7
5	2,650 - 2,658		8	7.0	87.5
6	2,825 - 2,837		12	0.5	4.2
7	2,892 - 2,903		11	5.5	50.0
<b>Totals:</b>			<b>96</b>	<b>60.0</b>	<b>62.5</b>

Table 1 - FKAA IW-1 Coring Summary for the Deep Injection Well

Work scheduled for next week:

Once the full diameter core at 2,926 feet bpl is retrieved back to land surface, the Contractor will continue to advance the nominal 12-inch diameter pilot-hole via reverse air rotary method from 2,926 to 3,330 feet bpl with an additional full-diameter rock cores taken in a representative interval within the injection horizon. Once the nominal 12-inch diameter pilot hole is completed to the anticipated total depth of 3,300 feet bpl it will be geophysically logged with a borehole video survey conducted. After geophysical logging is completed, packer testing operations will begin with up to 8 packer tests conducted in the interval from 2,000 to 3,300 feet bpl.

If you have any questions or concerns based on the information provided above, please contact the undersigned at 561-684-3375.

Sincerely:  
Michael W. Bennett, P.G.  
Senior Hydrogeologist  
**BOYLE | AECOM**



Enclosures:     Engineer's Daily Field Reports  
                     Lithologic Descriptions  
                     Full Diameter (4-inch) Core Descriptions  
                     Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 8

Distribution     Joe May, FDEP/ WPB w/enclosures  
                     Joe Haberfeld, FDEP/TLH w/enclosures  
                     James C. Reynolds, P.E. /FKAA w/o enclosures  
                     Tom Walker, P.E. /FKAA w/o enclosures  
                     Ray Shimokubo, P.E. /FKAA w/ enclosures  
                     Mike Furdock, CH2MHill / Naples w/o enclosures  
                     Bill Beddow, CH2MHill/Naples w/o enclosures  
                     Pam Hill, CH2MHill/ Key West w/o enclosures  
                     Mario Garza, CH2MHill /FTL w/o enclosures  
                     Larry Lardieri, P.E., Boyle – Palm City w/o enclosures  
                     File w/enclosures

October 15, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.9 – October 5, 2008 through October 11, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well IW-1  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the ninth week of construction on the Deep Injection Well identified as IW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

The ninth week of construction and related activities for IW-1 are summarized below.

At the beginning of this reporting period, YBI completed coring operations from 2,926 to 2,936 feet bpl and retrieved 8.5 feet of core at land surface (85% recovery). On October 9, 2008, YBI completed the nominal 12-inch diameter pilot-hole via reverse air rotary method to the total specified depth of 3,330 feet bpl. The nominal 12-inch from 1,600 feet (base of the 34-inch casing) to 3,300 feet bpl was then reverse-air developed for a period of 4 hours. Once reverse-air development was completed YBI began geophysical logging operations in the open section from 1,600 to 3,300 feet bpl. The logging suite conducted included the following formation evaluation-type logs; 4-arm caliper, natural gamma ray, dual-induction with shallow resistivity and spontaneous potential (SP), and a compensated sonic log. Production-type logs were conducted under static and dynamic conditions and included a high resolution temperature, fluid resistivity and impeller-type flow meter. For convenience, a composite of the geophysical log data from the 1,600 to 3,300 foot interval is provided as an attachment. A borehole video survey was also completed under pumped conditions over the entire open-hole section. The geophysical logs and video survey were then reviewed and evaluated with eight (8) representative intervals selected for packer testing. Packer testing operations begin on October 10, 2008 by setting a single packer at 3,210 feet to test the lowermost section of the injection horizon from 3,210 to 3,300 feet bpl. The results from this test produced a correct specific capacity of 2.93 gpm per foot of drawdown with a field determined specific conductance of 60,600 micro ohms per centimeter.

Work scheduled for next week:

Packer testing will continue with up to 7 additional packer tests conducted in the interval from 2,000 to 3,300 feet bpl.

If you have any questions or concerns based on the information provided above, please contact the undersigned at 561-684-3375.

Sincerely:  
Michael W. Bennett, P.G.  
Senior Hydrogeologist  
BOYLE | AECOM

Enclosures:     Engineer's Daily Field Reports  
                    Lithologic Descriptions  
                    Full Diameter (4-inch) Core Descriptions  
                    Composite of Geophysical Logs (1,500 to 3,300 feet bpl)  
                    Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 9

Distribution     Joe May, FDEP/ WPB w/enclosures  
                    Joe Haberfeld, FDEP/TLH w/enclosures  
                    James C. Reynolds, P.E. /FKAA w/o enclosures  
                    Tom Walker, P.E. /FKAA w/o enclosures  
                    Ray Shimokubo, P.E. /FKAA w/ enclosures  
                    Mike Furdock, CH2MHill / Naples w/o enclosures  
                    Bill Beddow, CH2MHill/Naples w/o enclosures  
                    Pam Hill, CH2MHill/ Florida City w/o enclosures  
                    Mario Garza, CH2MHill /FTL w/o enclosures  
                    Larry Lardieri, P.E., Boyle – Palm City w/o enclosures  
                    File w/enclosures

October 23, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.10 – October 12, 2008 through October 18, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well IW-1  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the tenth week of construction on the Deep Injection Well identified as IW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

The tenth week of construction and related activities for IW-1 are summarized below.

During this reporting period, YBI successfully completed seven packer tests on specific intervals from 2,000 to 3,300 feet bpl to determine water quality and hydraulic characteristics of the tested interval. A water sample was collected at the end of each packer test and submitted to a Florida certified laboratory for specific conductance, TDS, major cat ions, ammonia, and TKN analyses. The water samples were also field analyzed for temperature, pH, and specific conductance. The laboratory results for the individual packer tests are provided in the Attachments. Three packer tests were completed in the proposed injection horizon from 2,670 to 3,300 feet bpl to gain water quality and production capacity data. Four additional packer tests were completed in the overlying confining interval between 2,000 to 2,660 feet bpl to confirm total dissolved solids concentrations were greater than 10,000 mg/L and the production capacity were confining in nature. Straddle packer tests could not be conducted between 2,300 and 2,600 feet bpl due to the size and geometry of the pilot-hole, which exceeded the expansion limit of 20 inches for the 11.4-inch inflatable packer elements. Four (4) separate attempts to conduct packer tests within this interval failed with pump rates and drawdown values not representative of the high carbonate mud content of the limestone unit being tested. Test data indicated additional water was entering the testing interval due to incomplete seals of the packers.

**Table 1** provides a summary of water sample analysis results from the packer tests within the confining units above and within the proposed injection horizon.

**Table 1. Packer Test Water Quality Data Summary**

Test #	Test Interval (feet bpl)	Specific Conductance (umhos/cm)	Chloride (mg/L)	Lab Determined TDS (mg/L)
IW-1-11	2,048 – 2,066	49,500	19,100	27,333
IW-1-10	2,202 – 2,220	51,800	18,700	33,900
IW-1-9	2,266 – 2,286	52,500	20,400	34,333
IW-1-12	2,293 – 2,390	NYD	NYD	NYD
IW-1-8	2,636 – 2,654	51,800	20,800	30,867
IW 1-7	2,712 - 2,730	54,000	19,800	34,700
IW-1-6	2,998 - 3,018	60,900	25,300	39,100
IW-1-5	3,210 - 3,305	60,500	24,600	37,900

NYD = Not Yet Determined.

**Table 2** provides a summary of packer test's pumping rate and water level drawdown data and calculated specific capacity to show relative production capacity/permeability of the tested intervals within the confining unit and proposed injection horizon (2,000 to 3,300 feet bpl).

**Table 2. Summary of the Packer Test Hydraulic Performance Data**

Test #	Test Interval (ft. bpl)	Pumping Rate (gpm)	Drawdown (feet)	Footage of Borehole Tested	Specific Capacity (gpm/foot/foot)
IW-1-11	2,084 – 2,104	26	34.8	20	0.042
IW-1-10	2,196 – 2,214	21	119.0	18	0.010
IW-1-9	2,276 – 2,294	10.5	130.9	18	0.004
IW-1-12	2,293 – 2,390	NYD	NYD	97	
IW-1-8	2,636 – 2,654	27	75.5	18	0.020
IW-1-7	2,703 – 2,723	101	2.5	20	2.02
IW-1-6	2,998 – 3,018	102	15.7	20	0.32
IW-1-5	3,210 – 3,305	91	75	95	0.013

Specific capacity in gpm /foot of drawdown/foot of borehole tested

Work scheduled for next week:

A cement bridge plug will set at 2,650 feet bpl within the nominal 12-inch borehole and back plugged to 2,390 feet bpl using a 12% bentonite/cement slurry. A single packer will be set a 2,293 feet bpl and a drawdown and recovery test completed for the interval from 2,293 to 2,390 feet bpl. After completing the 12<sup>th</sup> packer test, the nominal 12-inch pilot hole will be back-plugged from 2,390 feet bpl to the base of the 34-inch diameter intermediate casing set at 1,600 feet bpl. A casing setting depth recommendation for the final injection casing will be submitted to the Department for approval. During the approval process, YBI will begin to ream/drill a nominal 32-inch diameter borehole from 1,600 to within 100 feet of the proposed casing setting depth of 2,670 feet bpl.

If you have any questions or concerns based on the information provided above, please contact the undersigned at 561-684-3375.

Sincerely:

Michael W. Bennett, P.G.  
Senior Hydrogeologist  
BOYLE | AECOM

Enclosures: Engineer's Daily Field Reports  
Laboratory Water Quality Data – Packer Test No.5 -11  
Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 10

Distribution Joe May, FDEP/ WPB w/enclosures  
Joe Habermeld, FDEP/TLH w/enclosures  
James C. Reynolds, P.E. /FKAA w/o enclosures  
Tom Walker, P.E. /FKAA w/o enclosures  
Ray Shimokubo, P.E. /FKAA w/ enclosures  
Mike Furdock, CH2MHill / Naples w/o enclosures



Bill Beddow, CH2MHill/Naples w/o enclosures  
Pam Hill, CH2MHill/ Florida City w/o enclosures  
Mario Garza, CH2MHill /FTL w/o enclosures  
Larry Lardieri, P.E., Boyle – Palm City w/o enclosures  
File w/enclosures

October 31, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.11 – October 19, 2008 through October 26, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well IW-1  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the eleventh week of construction on the Deep Injection Well identified as IW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

The eleventh week of construction and related activities for IW-1 are summarized below.

During this reporting period, YBI installed a cement bridge plug at 2,655 feet bpl within the nominal 12-inch borehole and back plugged it to 2,390 feet bpl using 12% bentonite/cement slurry. A single packer was set at 2,293 feet bpl and a drawdown and recovery test completed for the interval from 2,293 to 2,390 feet bpl in an effort to determine water quality and hydraulic characteristics of the tested interval. A water sample was collected at the end of each packer test and submitted to a Florida certified laboratory for specific conductance, TDS, major cat ions, ammonia, and TKN analyses. The water samples were also field analyzed for temperature, pH, and specific conductance. The laboratory results for the individual packer test will be provided upon receipt.

**Table 1** provides a summary of water sample analysis results from the packer test within the confining units above the proposed injection horizon.

**Table 1. Packer Test Water Quality Data Summary**

Test #	Test Interval (feet bpl)	Specific Conductance (umhos/cm)	Chloride (mg/L)	Field Determined TDS (mg/L)
IW-1-12	2,293 – 2,390	52,300	NYD	33,995

**Table 2** provides a summary of packer test's pumping rate and water level drawdown data and calculated specific capacity to show relative production capacity/permeability of the tested interval within the confining unit.

**Table 2. Summary of the Packer Test Hydraulic Performance Data**

Test #	Test Interval (ft. bpl)	Pumping Rate (gpm)	Drawdown (feet)	Footage of Borehole Tested	Specific Capacity (gpm/foot/foot)
IW-1-12	2,293 – 2,390	85	26	97	0.038

Specific capacity in gpm /foot of drawdown/foot of borehole tested

Work scheduled for next week:

After completing the 12<sup>th</sup> packer test, the nominal 12-inch pilot hole will be back-plugged from 2,390 feet bpl to the base of the 34-inch diameter intermediate casing set at 1,600 feet bpl. A casing setting depth recommendation for the final injection casing will be submitted to the Department for approval. During the approval process, YBI will begin to ream/drill a nominal 32-inch diameter borehole from 1,600 to within 100 feet of the proposed casing setting depth of 2,670 feet bpl.

If you have any questions or concerns based on the information provided above, please contact the undersigned at 561-684-3375.

Sincerely:

Michael W. Bennett, P.G.

Senior Hydrogeologist

**BOYLE | AECOM**

Enclosures: Engineer's Daily Field Reports  
Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 11

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Larry Lardieri, P.E., Boyle – Palm City w/o enclosures  
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November 6, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.12 – October 26, 2008 through November 1, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well IW-1  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the twelfth week of construction on the Deep Injection Well identified as IW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

The twelfth week of construction and related activities for IW-1 are summarized below.

During this reporting period, YBI completed back-plugging the nominal 12-inch diameter pilot hole from 2,390 feet bpl to the base of the 34-inch diameter intermediate casing set at 1,600 feet bpl. A casing setting depth recommendation for the final injection casing was submitted and awaiting approval by the Department. During the approval process, YBI began to ream/drill a nominal 32-inch diameter borehole from 1,600 feet bpl and by the close of this report period the borehole was advanced to 2,337 feet bpl.

Work scheduled for next week:

YBI will continue to ream/drill a nominal 32-inch diameter borehole to 2,666 feet bpl. The borehole diameter will be stepped down by drilling a 28-inch diameter borehole from 2,666 to 2,670 feet bpl with a 20-inch diameter borehole drilled from 2,670 to 3,300 feet bpl (proposed injection horizon). YBI will then install the 22-inch diameter injection casing (API 5L Grade B – 0.5 inch wall) to 2,670 feet bpl and will cement it back to land surface in multiple stages. A temperature log will be conducted to locate the top of each cement stage verified by a physical (hard) tag using 2 7/8 inch diameter Hydril steel tubing. Once the injection casing is fully cemented to surface, a casing pressure test (150 psi) will be conducted to verify its internal mechanical integrity.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:  
Michael W. Bennett, P.G.  
Senior Hydrogeologist  
BOYLE | AECOM

Enclosures: Engineer's Daily Field Reports  
Pad Monitor Well Water Quality Summary

FPL-006B-111

Distribution to Interested Parties – Weekly Summary Report No. 12

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November 11, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.13 – November 2, 2008 through November 8, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well IW-1  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the thirteenth week of construction on the Deep Injection Well identified as IW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

The thirteenth week of construction and related activities for IW-1 are summarized below.

During this reporting period, the Department approved the casing setting depth recommendation for the final injection casing for the deep injection well (IW-1). YBI continued to ream/drill a nominal 32-inch diameter borehole from 2,337 feet to 2,666 feet below land surface (bpl). YBI then drilled a nominal 28-inch diameter borehole from 2,666 feet to 2,770 feet bpl to accommodate the stepped landing joint to be installed onto the base of the 22-inch diameter steel injection casing. The injection interval was then drilled from 2,670 feet bpl and by the close of the report period the nominal 20-inch diameter borehole was advanced to 2,909 feet bpl.

Work scheduled for next week:

YBI will continue to ream/drill a nominal 20-inch diameter borehole to 3,300 feet bpl. Once completed, YBI will install the 22-inch diameter injection casing (API 5L Grade B – 0.5 inch wall) to 2,670 feet bpl and begin to cement it back to land surface in multiple stages. A temperature log will be conducted to locate the top of each cement stage, verified by a physical (hard) tag using 2 7/8 inch diameter Hydril steel tubing. Once the injection casing is fully cemented to surface, a casing pressure test (150 psi) will be conducted to verify its internal mechanical integrity.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:  
Michael W. Bennett, P.G.  
Senior Hydrogeologist  
BOYLE | AECOM

Enclosures: Engineer's Daily Field Reports  
Pad Monitor Well Water Quality Summary

FPL-006B-113

Distribution to Interested Parties – Weekly Summary Report No. 13

Distribution     Joe May, FDEP/ WPB w/enclosures  
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November 20, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.14 – November 9, 2008 through November 15, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well IW-1  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the fourteenth week of construction on the Deep Injection Well identified as IW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

The fourteenth week of construction and related activities for IW-1 are summarized below.

YBI continued to ream/drill a nominal 20-inch diameter borehole from 2,909 to 3,188 feet bpl. YBI had some problems with their reverse-air drilling equipment, which slowed drilling operations during this report period.

Work scheduled for next week:

YBI will continue to ream/drill a nominal 20-inch diameter borehole to 3,300 feet bpl. Once completed, YBI will install the 22-inch diameter injection casing (API 5L Grade B – 0.5 inch wall) to 2,670 feet bpl and begin to cement it back to land surface in multiple stages. A temperature log will be conducted to locate the top of each cement stage, verified by a physical (hard) tag using 2 7/8 inch diameter Hydril steel tubing. Once the injection casing is fully cemented to surface, a casing pressure test (150 psi) will be conducted to verify its internal mechanical integrity. FDEP staff will be notified 72 hours in advance, to make proper arrangements to witness the casing pressure test for the installed injection casing.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:  
Michael W. Bennett, P.G.  
Senior Hydrogeologist  
AECOM Water

Enclosures: Engineer's Daily Field Reports  
Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 14

Distribution     Joe May, FDEP/ WPB w/enclosures  
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December 1, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.15 – November 16, 2008 through November 22, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well IW-1  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the fifteenth week of construction on the Deep Injection Well identified as IW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

YBI completed the reaming/drilling of the nominal 20-inch diameter borehole from 3,188 to 3,310 feet bpl. YBI had some problems with their reverse-air drilling equipment, which slowed drilling operations.

Once the borehole was completed to a depth of 3,310 feet bpl, natural gamma ray and 4-arm caliper logs were completed on the interval from 1,500 to 3,310 feet bpl. The caliper log was conducted to verify the borehole dimensions before installation of the 22-inch diameter steel injection casing to a depth of 2,670 feet bpl. On November 16<sup>th</sup>, YBI began to install the 22-inch diameter steel injection casing and completed installation to a depth of 2,670 feet bpl on November 20<sup>th</sup> in accordance with the FDEP-approved casing seat request. Cementing operations to seal the annulus of the 22-inch injection casing consisted of pumping small volumes of neat cement ranging between 3 and 13 barrels (bbs) via the tremmie method to establish a firm cement plug on top of the landing joint. A total of 22.1 bbls of neat cement were used to bring cement levels to 2,644 feet bpl. Once the cement plug was established, the first cement stage consisted of 229 bbls of neat cement placed downhole via the tremmie method. The first cement stage was later hard tagged at a depth of 2,365 feet bpl and confirmed by the temperature log (cement top log) at 2,368 feet bpl. The second cement stage was installed during the latter part of November 22<sup>nd</sup> and consisted of pumping 246 bbls of 4% bentonite/cement slurry. After 12 hours, the second cement stage was hard tagged at 2,190 feet bpl, which equates to a cement lift of 175 feet above the previously identified depth of 2,365 feet related to the first cement stage.

Work scheduled for next week:

YBI will continue to cement the annulus of the installed 22-inch diameter injection casing (API 5L Grade B – 0.5 inch wall) to 225 feet bpl in multiple stages. Temperature logs (cement top logs) will be conducted to locate the top of each cement stage, verified by a physical (hard) tag using 2 7/8 inch diameter Hydril steel tubing. Once the injection casing is fully cemented to surface, a cement bond log and downhole video survey will be conducted along with a casing pressure test (150 psi) to verify its internal and external mechanical integrity. FDEP staff will be notified 72 hours in advance, to make proper arrangements to witness the casing pressure test on the installed injection casing.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:  
Michael W. Bennett, P.G.  
Senior Hydrogeologist  
AECOM Water

FPL-006B-117

Enclosures: Engineer's Daily Field Reports  
Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 15

Distribution Joe May, FDEP/ WPB w/enclosures  
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Larry Lardieri, P.E., Boyle – Palm City w/o enclosures  
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December 5, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.16 – November 23, 2008 through November 29, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well IW-1  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the sixteenth week of construction on the Deep Injection Well identified as IW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

During this report period, YBI continued cementing operations, via the temmie method, to seal the annulus of the 22-inch injection casing. The top of each cement stage was verified by a cement top log (temperature log) and a physical (hard) tag using 2<sup>7</sup>/<sub>8</sub>-inch diameter Hydril steel tubing. The third through ninth cement stages were completed with a total of 2,019 barrels of Type II neat cement and 4% bentonite/cement slurry pumped during the course of grouting operations.

A cement bond log (CBL) was performed on the 22-inch diameter casing of IW-1 on November 29, 2008. The CBL was conducted to assess the quality of the cement-to-casing bond of the injection casing of IW-1. The upper 240 feet of 22-inch diameter casing was left un-cemented to calibrate the cement bond signal to a free pipe – un-cemented pipe signature. A summary of stage cementing operations related to the 22-inch steel injection casing is provided as an attachment.

The cement bond log demonstrated an adequate cement bond around the final 22-inch diameter casing from 240 feet bpl to the base of the 22-inch diameter casing. Above a depth of 240 feet bpl, the cement bond log shows that the casing is un-cemented as expected. The interval from land surface to 240 feet bpl will be fully cemented following completion of the casing pressure test.

A video survey was also conducted on November 29, 2008. The video survey allowed an evaluation of the 22-inch diameter steel injection casing and cement shoe at the base of the casing. The color camera assembly was equipped with centralizers to keep it centered in the well, and its elevation was “zeroed” at pad level. The video survey showed no inconsistencies, and the steel casing and welds appeared in good condition. The base of the 22 inch-diameter tubing was identified at a depth of 2,672 feet bpl. The video survey was terminated at the 2,680 feet bpl due to an obstruction that blocked the open-hole section.

Work scheduled for next week:

A casing pressure test (150 psi) will be conducted on December 1, 2008 to verify the internal mechanical integrity of the 22-inch diameter injection that will be witnessed by FDEP staff. Following the casing pressure test, the final cement lift will be performed until cement returns are visibly observed at surface. The obstruction near the base of the 22-inch diameter casing will be cleared. The Fiberglass Reinforced Pipe (FRP), which is 13<sup>5</sup>/<sub>8</sub>-inch OD Series 1500 (rated to 1500 psi of line pressure) will then be installed to a depth of 2,660 feet bpl or 10 feet above the 22-inch steel injection casing currently set at 2,670 feet

bpl using a YBI mechanical packer. The FRP will be installed by the manufacturer's representative to ensure compliance with specific installation protocols. Once the FRP is installed to a depth of 2,660 feet bpl, it will be pressure tested at a 150 psi to ensure a leak proof – closed system prior to the start of cementing operations. The 13<sup>5</sup>/<sub>8</sub>-inch FRP will be cemented back to 250 feet bpl in multiple stages via the tremmie method with the elevation of each cement stage verified by cement top log and confirmed by conducting a physical (hard) tag using the 2<sup>7</sup>/<sub>8</sub>-inch diameter cement tubing. A final set of geophysical logs and video survey will be conducted followed by the second casing pressure (150 psi) on the fully cement FRP injection liner.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:

Michael W. Bennett, P.G.  
Senior Hydrogeologist  
AECOM Water

Enclosures:     Engineer's Daily Field Reports  
                     Stage Cementing Summary – 22-inch Diameter Injection Casing  
                     Cement Bond Log  
                     Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 16

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                     Bill Beddow, CH2MHill/Naples w/o enclosures  
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December 11, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.17 – November 30, 2008 through December 6, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well IW-1  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the seventeenth week of construction on the Deep Injection Well identified as IW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

During this report period, YBI successfully completed a pressure test (150 psi) on December 1, 2008 to verify the internal mechanical integrity of the 22-inch diameter steel injection that was witnessed by FDEP staff. The results of the pressure test on the 22-inch injection casing are provided as an attachment. Following the casing pressure test, the final cement lift on the 22-inch injection casing was performed until cement returns were visibly observed at land surface (see attached cementing summary). The obstruction near the base of the 22-inch diameter casing identified during a previous video survey was cleared and drill pipe tripped to the bottom of the injection horizon at 3,300 feet bpl. The Fiberglass Reinforced Pipe (FRP), which is 13<sup>5</sup>/<sub>8</sub>-inch OD Series 1500 (rated to 1500 psi of line pressure), was installed to a depth of 2,664 feet bpl using a YBI mechanical packer. The Contractor and manufacturer's representatives completed the installation of the FRP liner within the 22-inch injection casing on December 5, 2008. Once the FRP liner was installed to a depth of 2,664 feet bpl, a preliminary pressure test was conducted prior to fully cementing it back to land surface. The preliminary pressure test on the un-cemented FRP liner was successfully completed on December 6, 2008. During this test, the FRP liner was pressurized to 161 psi with no pressure change over the 1-hour test period. At the end of this report period, the Contractor began to set-up to install the first stage of cement grout related to the FRP liner.

Work scheduled for next week:

The 13<sup>5</sup>/<sub>8</sub>-inch FRP liner will be cemented back to 225 feet bpl in multiple stages via the tremmie method with the elevation of each cement stage verified by a cement top log and confirmed by conducting a physical (hard) tag using the 2<sup>7</sup>/<sub>8</sub>-inch diameter cement tubing. A video survey of the FRP liner and injection horizon will be conducted to visually inspect the FRP liner and to ensure that there are no obstructions within the injection horizon. In addition, a final set of geophysical logs and cement bond log will be conducted followed by the second casing pressure (150 psi) on the fully cement FRP injection liner.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:  
Michael W. Bennett, P.G.  
Senior Hydrogeologist

FPL-006B-121

Attachments: Engineer's Daily Field Reports  
Stage Cementing Summary – 22-inch Diameter Steel Injection Casing  
Pressure Test Results – 22-inch Diameter Steel Injection Casing  
Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 17

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Bill Beddow, CH2MHill/Naples w/o enclosures  
Larry Lardieri, P.E., Boyle – Palm City w/o enclosures  
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December 17, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.18 – December 7, 2008 through December13, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well IW-1  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the eighteenth week of construction on the Deep Injection Well identified as IW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

During this report period, YBI successfully completed the cementing of the 13<sup>5</sup>/<sub>8</sub>-inch FRP liner to 225 feet bpl in multiple stages via the tremmie method using 12% bentonite/cement slurry. The elevation of each cement stage was verified by a cement top log and confirmed by conducting a physical (hard) tag using the 2<sup>7</sup>/<sub>8</sub>-inch diameter cement tubing. A summary of stage grouting operations is provided as an Attachment. On December 10<sup>h</sup>, a video survey of the FRP liner and injection horizon was conducted to visually inspect the newly installed FRP injection liner and to ensure that there were no obstructions within the injection horizon. A summary of the video survey of the FRP liner and injection horizon is provided as an Attachment. During the remaining part of this report period, YBI dismantled the drill rig and moved it to begin drilling the dual-zone monitor well located 145 feet southeast of the injection well. The surveyed distance between the injection and monitor wells was confirmed with a physical measurement.

Work scheduled for next week:

YBI will continue to set-up the drill rig and support equipment to begin drilling the dual-zone monitor well identified as MW-1. Once set up is completed, YBI will drill a nominal 54-inch diameter borehole from land surface to approximately 40 feet bpl, install 40 feet of 44-inch diameter steel pit casing and cement it back to surface using Type II neat cement. The Contractor will then drill a nominal 42-inch borehole from the base of the pit casing to 210 feet bpl. A 4-arm caliper log and natural gamma log will be conducted within the completed 42-inch diameter borehole. The 34-inch diameter steel surface casing will be installed to 210 feet bpl and cemented (Type II neat cement) back to surface to seal-off the Surficial aquifer system.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:

Michael W. Bennett, P.G.  
Senior Hydrogeologist  
AECOM Water

Attachments: Engineer's Daily Field Reports  
Stage Cementing Summary – 13 5/8-inch Diameter FRP Injection Liner  
Summary of the Video Survey – 13 5/8-inch Diameter FRP Injection Liner and Injection Horizon

Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 18

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December 23, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.19 – December 14, 2008 through December 20, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well Project  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the nineteenth week of construction on the Deep Injection Well identified as IW-1 and the Dual Zone Monitor Well identified as MW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

During this report period, YBI successfully completed setting-up the drill rig and support equipment to begin drilling operations for the dual-zone monitor well identified as MW-1. YBI then completed a nominal 48-inch diameter borehole from land surface to approximately 40 feet bpl, install 38 feet of 44-inch diameter steel pit casing and cemented it back to surface via pressure grouting method using ASTM Type II neat cement. Next, the Contractor drilled a nominal 42-inch borehole from the base of the pit casing to 215 feet bpl and completed an X-Y caliper and natural gamma log within the drilled section. The 34-inch diameter steel surface casing was installed to 212 feet bpl and cemented back to surface via the pressure grouting method using Type II neat cement. The 34-inch diameter steel surface casing effectively isolated the Surficial aquifer system from any further influences related to the drilling of MW-1. Also during this report period, YBI successfully completed a cement bond log on the entire section (0 to 2,660 feet bpl) of the installed 12-inch diameter FRP injection tubing of IW-1.

Work scheduled for next week:

YBI will continue to drill a nominal 34-inch diameter borehole from the base of the surface casing at 212 feet to 910 feet bpl. A 4-arm caliper log and natural gamma log will be conducted within the completed 34-inch diameter borehole. A pressure test (150 psi) will also be completed on the cemented FRP liner installed into IW-1.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:  
Michael W. Bennett, P.G.  
Senior Hydrogeologist  
AECOM Water

Attachments: Engineer's Daily Field Reports  
Casing Talley – 34 -inch Diameter Surface Casing \_MW-1  
Cementing Summary – 34 -inch Diameter Surface Casing \_MW-1  
Pad Monitor Well Water Quality Summary

FPL-006B-125

Distribution to Interested Parties – Weekly Summary Report No. 19

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                     Bill Beddow, CH2MHill/Naples w/o enclosures  
                     Larry Lardieri, P.E., AECOM Water – Palm City w/o enclosures  
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December 31, 2008

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.20 – December 21, 2008 through December 27, 2008  
Florida Keys Aqueduct Authority, Florida City Injection Well Project  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the twentieth week of construction on the Deep Injection Well identified as IW-1 and the Dual Zone Monitor Well identified as MW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

During this report period, YBI successfully completed a hydrostatic pressure test on the cemented 12-inch diameter FRP injection liner. The pressure test was conducted on Monday 12/23/08 at a 161 psi with no decrease in pressure during the 1-hour test period; well within the FDEP established test limits of +/-5%. After the pressure test was completed, approximately 12 gallons of water was removed from the pressurized 12-inch diameter FRP liner. That same day, YBI began to drill-out the grout plug from the installed 34-inch diameter surface casing for MW-1. Drilling operations were shut down on 12/24/08 and 12/25/08 with work resuming on 12/26/08. By the end of this report period, the nominal 34-inch diameter borehole for MW-1 was advanced to a depth of 456 feet below pad level.

Work scheduled for next week:

YBI will continue to drill a nominal 34-inch diameter borehole from 456 feet to 910 feet bpl. A 4-arm caliper and natural gamma log will be conducted within the completed 34-inch diameter borehole. Once completed, approximately 905 feet of 24-inch diameter (ASTM A-139 Grade B) steel casing will be installed and cemented back to surface using ASTM Type II neat cement via the pressure grouting method.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:  
Michael W. Bennett, P.G.  
Senior Hydrogeologist  
AECOM Water

Attachments: Engineer's Daily Field Reports  
Tubing and Packer Tally for Casing Pressure Test on IW-1  
Pressure Gauge Certificate for Casing Pressure Test on IW-1  
Casing Pressure Test Results – 12 -inch Diameter FRP Injection Tubing \_IW-1  
Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 20

Distribution     Joe May, FDEP/ WPB w/enclosures  
                     James Alexander, FDEP/TLH w/enclosures  
                     James C. Reynolds, P.E. /FKAA w/o enclosures  
                     Tom Walker, P.E. /FKAA w/o enclosures  
                     Ray Shimokubo, P.E. /FKAA w/ enclosures  
                     Mike Furdock, CH2MHill / Naples w/o enclosures  
                     Bill Beddow, CH2MHill/Naples w/o enclosures  
                     Larry Lardieri, P.E., AECOM Water – Palm City w/o enclosures  
                     File w/enclosures

January 6, 2009

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.21 – December 28, 2008 through January 3, 2009  
Florida Keys Aqueduct Authority, Florida City Injection Well Project  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the twenty-first week of construction on the Deep Injection Well identified as IW-1 and the Dual Zone Monitor Well identified as MW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

During this report period, YBI successfully completed drilling the nominal 34-inch diameter borehole to 910 feet below pad level (bpl). A 4-arm caliper and natural gamma log was conducted within the completed 34-inch diameter borehole which showed a relatively gauged borehole throughout the logged section. Once completed, the 24-inch diameter (ASTM A-139 Grade B) steel casing was installed to a depth of 911 feet bpl (see attached casing tally). The 24-inch diameter steel casing was then cemented back to surface using ASTM Type II neat cement and 4% bentonite/cement slurry via the pressure grouting method and completed in one (1) cement stage. YBI then discontinued construction activity related to the monitor well (MW-1) while the cement was allowed to cure for a 24-hour period.

Work scheduled for next week:

YBI will drill out the cement plug at the base of the 24-inch diameter steel casing and will begin to drill a nominal 12-inch diameter borehole from 911 feet to 1,550 feet bpl. A suite of geophysical logs will be completed in the open-hole section from 911 to 1,550 feet bpl. The geophysical logging suite will include 4-arm caliper and natural gamma, dual induction, compensated sonic, fluid resistivity, temperature, flowmeter and borehole video survey conducted under static and dynamic conditions. Once completed two (2) packer tests will be completed with one packer test completed within the proposed upper monitor interval of the dual-zone monitor well (MW-1).

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:  
Michael W. Bennett, P.G.  
Senior Hydrogeologist  
AECOM Water

Attachments: Engineer's Daily Field Reports  
Lithologic Log – MW-1 (0-910 feet bpl)  
Casing Tally – 24-inch Diameter Casing for MW-1  
Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 21

Distribution     Joe May, FDEP/ WPB w/enclosures  
                     James Alexander, FDEP/TLH w/enclosures  
                     James C. Reynolds, P.E. /FKAA w/o enclosures  
                     Tom Walker, P.E. /FKAA w/o enclosures  
                     Ray Shimokubo, P.E. /FKAA w/ enclosures  
                     Mike Furdock, CH2MHill / Naples w/o enclosures  
                     Bill Beddow, CH2MHill/Naples w/o enclosures  
                     Larry Lardieri, P.E., AECOM Water – Palm City w/o enclosures  
                     File w/enclosures

January 14, 2009

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.22 – January 4, 2008 through January 10, 2009  
Florida Keys Aqueduct Authority, Florida City Injection Well Project  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the twenty-second week of construction on the Deep Injection Well identified as IW-1 and the Dual Zone Monitor Well identified as MW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

During this report period, YBI successfully completed drilling the nominal 12-inch diameter pilot hole from 911 to 1,550 feet below pad level (bpl) for the dual-zone monitor well (MW-1). Once completed, the open hole section was geophysically logged. The geophysical logging suite included 4-arm caliper and natural gamma, dual induction and compensated sonic logs. The production-type logs included a fluid resistivity, temperature, and flowmeter conducted under both static and dynamic conditions with a borehole video survey completed under pumped conditions. After logging was completed, three (3) packer tests were completed between 1,302 and 1,487 feet bpl. The field determined water quality and hydraulic data are provided in Table 1 and 2, respectively.

**Table 1. Packer Test Water Quality Data Summary**

Test #	Test Interval (feet bpl)	Field Specific Conductance (umhos/cm)	Lab Chloride (mg/L)	Calculated TDS (mg/L)	Laboratory Determined TDS (mg/L)
MW-1-1	1,302 – 1,338	13,580	NYD	8,420	NYD
MW-1-3	1,385 – 1,421	17,540	NYD	10,875	NYD
MW-1-2	1,451 – 1,487	23,980	NYD	14,868	NYD

Calculated TDS in milligrams per liter = Specific Conductance in umhos/cm \* 0.62 (Hem 1992); NYD = Not Yet

**Table 2. Packer Test Performance Data Summary**

Test #	Test Interval (ft. bpl)	Pumping Rate (gpm)	Drawdown (feet)	Footage of Borehole Tested	Specific Capacity (gpm per foot)	Specific Capacity (gpm/foot/foot)
MW-1-1	1,302 – 1,338	77	82.0	36	0.94	0.026
MW-1-3	1,385 – 1,421	35	71.0	36	0.49	0.014
MW-1-2	1,451 – 1,487	94	30.0	36	3.13	0.087

Work scheduled for next week:

YBI will submit the water quality samples from reverse-air drilling and the three packer tests to an FDEP-approved laboratory. Based on the lithologic, geophysical and water quality data, a request will be compiled and submitted by Boyle|AECOM to the Department identifying the proposed upper monitor intervals for MW-1. Once concurrence is gained from the Department related to the proposed monitor interval, YBI will back-plug the lower portion of the pilot hole, install temporary fill material through the proposed upper monitor zone and continue to back-plug the pilot hole from the top of the upper monitor zone to the base of the 24-inch diameter casing at 911 feet bpl. Once back-plugging operations are



completed, YBI will begin to drill a nominal 24 inch diameter borehole from 911 feet bpl to the top of the upper monitor interval at 1,450 feet bpl.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:  
Michael W. Bennett, P.G.  
Senior Hydrogeologist  
AECOM Water

Attachments: Engineer's Daily Field Reports  
Lithologic Log – MW-1 (0-1,550 feet bpl)  
Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 22

Distribution Joe May, FDEP/ WPB w/enclosures  
James Alexander, FDEP/TLH w/enclosures  
James C. Reynolds, P.E. /FKAA w/o enclosures  
Tom Walker, P.E. /FKAA w/o enclosures  
Ray Shimokubo, P.E. /FKAA w/ enclosures  
Mike Furdock, CH2MHill / Naples w/o enclosures  
Bill Beddow, CH2MHill/Naples w/o enclosures  
Larry Lardieri, P.E., AECOM Water – Palm City w/o enclosures  
File w/enclosures

January 22, 2009

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.23 – January 11, 2008 through January 17, 2009  
Florida Keys Aqueduct Authority, Florida City Injection Well Project  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the twenty-third week of construction on the Deep Injection Well identified as IW-1 and the Dual Zone Monitor Well identified as MW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

During this report period, the water quality analyses of the reverse-air drilling returns and the three packer test samples were successfully completed. Based on the lithologic, geophysical, drilling and water quality data, a casing setting depth request for the upper monitor zone of MW-1 was compiled and submitted by Boyle|AECOM to the Department on Wednesday 1/14/09. Approval from the Department related to the proposed monitor interval was gained on Thursday 1/15/09. Once approval was gained, YBI was notified and they began to back-plug the lower portion of the pilot-hole, install temporary fill material through the proposed upper monitor zone and continued to back-plug the pilot hole from the top of the upper monitor zone to the base of the 24-inch diameter casing at 911 feet bpl. By end of the report period, YBI installed the 12% bentonite cement grout from 1,485 to 1,550 feet bpl; installed the limestone gravel with a fine-sand cap from 1,442 to 1,485 feet bpl; and installed 12% bentonite grout from 907 to 1,442 feet bpl.

Work scheduled for next week:

YBI will drill a nominal 24-inch diameter borehole from 907 feet bpl to the top of the upper monitor interval at 1,450 feet bpl. Once the nominal 24-inch diameter borehole is completed, it will be geophysically logged to ensure the depth and geometry are determined before casing installation begins. If the results from the 4-arm caliper and natural gamma logs are as expected, YBI will install the 14-inch diameter (API – 5L Grade B) seamless steel casing to the FDEP approved casing setting depth of 1,450 feet bpl. The 14-inch diameter casing will then be cemented in place via the pressure grouting method using ASTM Type II neat cement. The remaining portion of the annulus back to land surface will be cemented in multiple stages by the tremie method using 4% bentonite/cement slurry. YBI will perform physical tags ("hard tag") using 2 7/8-inch Hydrid steel tubing and temperature logs to verify the elevation of each cement stage. Once the 14-inch diameter steel casing is fully cemented to surface; a cement bond log and a hydrostatic casing pressure test (at 100 psi) will be conducted to verify its internal and external mechanical integrity.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:  
Michael W. Bennett, P.G.  
Senior Hydrogeologist  
AECOM Water

Attachments: Engineer's Daily Field Reports  
Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 23

Distribution Joe May, FDEP/ WPB w/enclosures  
James Alexander, FDEP/TLH w/enclosures  
James C. Reynolds, P.E. /FKAA w/o enclosures  
Tom Walker, P.E. /FKAA w/o enclosures  
Ray Shimokubo, P.E. /FKAA w/ enclosures  
Mike Furdock, CH2MHill / Naples w/o enclosures  
Bill Beddow, CH2MHill/Naples w/o enclosures  
Larry Lardieri, P.E., AECOM Water – Palm City w/o enclosures  
File w/enclosures

January 28, 2009

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.24 – January 18, 2008 through January 24, 2009  
Florida Keys Aqueduct Authority, Florida City Injection Well Project  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the twenty-fourth week of construction on the Deep Injection Well identified as IW-1 and the Dual Zone Monitor Well identified as MW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

During this report period all work focused on completing the dual-zone monitor well identified as MW-1. YBI drilled a nominal 24-inch diameter borehole from 907 feet bpl to the top of the upper monitor interval at 1,450 feet bpl. Once the nominal 24-inch diameter borehole was completed, it was geophysically logged to verify that the depth and geometry of the drilled section were accurate. YBI then installed the 14-inch diameter (API – 5L Grade B) seamless steel casing to the FDEP-approved casing setting depth of 1,450 feet bpl (see attached casing tally). By the end of the report period, the 14-inch diameter steel casing was installed to 1,450 feet bpl and cemented in place via the pressure grouting method using ASTM Type II neat cement bringing cement levels to 1,198 feet bpl (see attached cementing summary).

Work scheduled for next week:

The annulus of the 14-inch diameter steel casing will be grouted to approximately 250 feet bpl in three (3) subsequent stages via the tremie method using 4% bentonite/cement slurry. YBI will perform physical tags ("hard tag") using 2 7/8-inch diameter Hydril steel tubing and temperature logs to verify the elevation of each cement stage. Once the 14-inch diameter steel casing is fully cemented to approximately 250 feet bpl, a cement bond log and a hydrostatic casing pressure test (at 100 psi or above) will be conducted to verify its internal and external mechanical integrity. YBI will then advance a nominal 12-inch diameter borehole from 1,450 to 1,800 feet bpl. The drilled borehole will be geophysically logged and a borehole video survey conducted within the cased and open hole sections. Based on the lithologic and geophysical logs, packer tests will be conducted on two (2) intervals of the drilled borehole between 1,600 and 1,800 feet bpl.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:  
Michael W. Bennett, P.G.  
Senior Hydrogeologist  
AECOM Water

Attachments: Engineer's Daily Field Reports  
Pad Monitor Well Water Quality Summary  
Casing Tally – 14-inch Diameter Steel Casing  
Cementing Summary – Pressure Grout – 1<sup>st</sup> Stage

Distribution to Interested Parties – Weekly Summary Report No. 24

Distribution     Joe May, FDEP/ WPB w/enclosures  
                     James Alexander, FDEP/TLH w/enclosures  
                     James C. Reynolds, P.E. /FKAA w/o enclosures  
                     Tom Walker, P.E. /FKAA w/o enclosures  
                     Ray Shimokubo, P.E. /FKAA w/ enclosures  
                     Mike Furdock, CH2MHill / Naples w/o enclosures  
                     Bill Beddow, CH2MHill/Naples w/o enclosures  
                     Larry Lardieri, P.E., AECOM Water – Palm City w/o enclosures  
                     File w/enclosures

February 2, 2009

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.25 – January 25, 2008 through January 31, 2009  
Florida Keys Aqueduct Authority, Florida City Injection Well Project  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the twenty-fifth week of construction on the Deep Injection Well identified as IW-1 and the Dual Zone Monitor Well identified as MW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

During this report period all work focused on completing the dual-zone monitor well identified as MW-1. The annulus of the 14-inch diameter steel casing was grouted to approximately 300 feet below pad level (bpl) in two (2) subsequent stages via the tremie method using 4% bentonite/cement slurry (see attached Cement Summary Report). YBI performed physical tags ("hard tag") using 2 7/8-inch diameter Hydril steel tubing and temperature logs to verify the elevation of each cement stage. Once the 14-inch diameter steel casing was cemented to approximately 300 feet bpl, a cement bond log and a hydrostatic casing pressure test was successfully completed. The pressure test was conducted at 133 psi and at the end of the 1-hour test period there was a 5 psi increase in pressure, meeting the +/- 5 % requirement. The results of the cement bond log were sent to the Department via electronic mail on January 30<sup>th</sup>. The casing pressure test and cement bond log verified the internal and external mechanical integrity of the installed 14-inch steel casing. YBI then completed the drilling of the nominal 12-inch diameter pilot hole from 1,450 to 1,800 feet bpl (see attached lithologic log). The open-hole section of the borehole from 1,450 to 1,800 feet was geophysically logged. The geophysical logging suite included 4-arm caliper and natural gamma ray, dual-induction and compensated sonic logs. The production-type logs included a fluid resistivity, temperature, and flowmeter conducted under both static and dynamic conditions with a borehole video survey completed under pumped conditions. The above mentioned geophysical logs were transmitted to the Department electronically on January 30, 2009. After logging was completed, two (2) packer tests were completed between 1,594 and 1,800 feet bpl. The field determined water quality and hydraulic data are provided in Table 1 and 2, respectively.

**Table 1. Packer Test Water Quality Data Summary**

Test #	Test Interval (feet bpl)	Field Specific Conductance (umhos/cm)	Lab Chloride (mg/L)	Calculated TDS (mg/L)	Laboratory Determined TDS (mg/L)
MW-1-5	1,594 – 1,634	45,300	NYD	28,086	NYD
MW-1-4	1,750 – 1,802	53,500	NYD	33,170	NYD

Calculated TDS in milligrams per liter = Specific Conductance in umhos/cm \* 0.62 (Hem 1992); NYD = Not Yet

**Table 2. Packer Test Performance Data Summary**

Test #	Test Interval (ft. bpl)	Pumping Rate (gpm)	Drawdown (feet)	Footage of Borehole Tested	Specific Capacity (gpm per foot)	Specific Capacity (gpm/foot/foot)
MW-1-5	1,594 – 1,634	100	11.6	40	8.62	0.215
MW-1-4	1,750 – 1,802	96	2.6	52	36.9	0.710

Work scheduled for next week:

YBI will submit the water quality samples from reverse-air drilling and the two packer tests to an FDEP-approved laboratory. Based on the lithologic, geophysical and water quality data, a request will be compiled and submitted by Boyle|AECOM to the Department identifying the proposed lower monitor intervals for MW-1. After concurrence is gained from the Department related to the proposed monitor interval, YBI will begin to install the 6 5/8-inch diameter Fiberglass Reinforced Pipe and casing packer to a depth of 1,750 feet bpl. Once the installation of the 6 5/8-inch diameter Fiberglass Reinforced Pipe is completed, YBI will begin to cement the annulus back to 1,485 feet bpl, which will form the base of the upper monitor zone for MW-1.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:

Michael W. Bennett, P.G.  
Senior Hydrogeologist  
AECOM Water

Attachments: Engineer's Daily Field Reports  
Lithologic Log – MW-1 (0 to 1,800 feet bpl)  
Cementing Summary Report – Stages No. 1 thru 3  
Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 25

Distribution Joe May, FDEP/ WPB w/enclosures  
James Alexander, FDEP/TLH w/enclosures  
James C. Reynolds, P.E. /FKAA w/o enclosures  
Tom Walker, P.E. /FKAA w/o enclosures  
Ray Shimokubo, P.E. /FKAA w/ enclosures  
Mike Furdock, CH2MHill / Naples w/o enclosures  
Bill Beddow, CH2MHill/Naples w/o enclosures  
Larry Lardieri, P.E., AECOM Water – Palm City w/o enclosures  
File w/enclosures



February 10, 2009

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.26 – February 1, 2008 through February 7, 2009  
Florida Keys Aqueduct Authority, Florida City Injection Well Project  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the twenty-sixth week of construction on the Deep Injection Well identified as MW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

During this report period all work focused on completing the dual-zone monitor well identified as MW-1. YBI submitted the water quality samples obtained during reverse-air drilling and the two packer tests and submitted them to an FDEP-approved laboratory. Based on the lithologic, geophysical and water quality data, Boyle|AECOM compiled and submitted a request to the Department identifying the proposed lower monitor interval for MW-1. Concurrence was gained from the Department on Thursday 2/5/09 related to the proposed monitor interval of 1,750 to 1,802 feet below pad level (bpl). On Friday 2/6/09, YBI began and completed installation of the 6 5/8-inch diameter Fiberglass Reinforced Pipe and casing packer to a depth of 1,750 feet bpl (see attached casing tally). Once the 6 5/8-inch diameter Fiberglass Reinforced Pipe was completed, YBI installed five (5) barrels of Type II neat cement with a theoretical lift of 50 feet to form a cement plug above the stainless steel packer. On Saturday 2/7/09, YBI hard tagged the top of the neat cement plug at 1,701 feet bpl then set the cement tubing to 1,690 feet bpl and began to pump the second cement stage which consisted of 12 barrels of Type II neat cement. Later that same day, YBI hard tagged the top of the second stage of cement at 1,530 feet bpl with the depth confirmed by a temperature log. At the close of this report period, the top elevation of the second stage was confirmed and the third cement stage was pumped consisting of 8.5 barrels of Type II neat cement with a theoretical lift to 1,490 feet bpl (see attached cementing summary report).

Work scheduled for next week:

YBI will perform a physical hard tag and temperature log to confirm the elevation of the third cement stage and if necessary will pump additional cement to bring cement levels to 1,500 feet bpl. YBI will then perform a casing pressure test on the installed 6 5/8-inch diameter FRP, run a cement bond log and conduct a video survey of the FRP and lower monitor interval. Once completed, YBI will develop the two monitor interval via air-lift and pump development methods and retrieve water samples for analysis of primary and secondary drinking water constituents.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:  
Michael W. Bennett, P.G.  
Senior Hydrogeologist  
AECOM Water

Attachments: Engineer's Daily Field Reports  
Installation Summary & Pipe Tally - 6 5/8-inch diameter FRP  
Cementing Summary Report – Stages No. 1 thru 3  
Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 26

Distribution Joe May, FDEP/ WPB w/enclosures  
James Alexander, FDEP/TLH w/enclosures  
James C. Reynolds, P.E. /FKAA w/o enclosures  
Tom Walker, P.E. /FKAA w/o enclosures  
Ray Shimokubo, P.E. /FKAA w/ enclosures  
Mike Furdock, CH2MHill / Naples w/o enclosures  
Bill Beddow, CH2MHill/Naples w/o enclosures  
Larry Lardieri, P.E., AECOM Water – Palm City w/o enclosures  
File w/enclosures

February 17, 2009

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.27 – February 8, 2008 through February 14, 2009  
Florida Keys Aqueduct Authority, Florida City Injection Well Project  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the twenty-seventh week of construction on the Deep Injection Well identified as MW-1 at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

During this report period testing was completed on both the injection and the dual-zone monitor wells. On 2/8/09, YBI performed a physical hard tag and temperature log to confirm the elevation of the third cement stage at 1,500 feet bpl on MW-1. That same day, YBI cemented the upper 300 feet of the 14-inch steel casing of MW-1 via the tremie method with cement returns visually noted at land surface. On 2/10/09, YBI successfully conducted a casing pressure test (at 140 psi) on the installed 6 5/8-inch diameter Fiberglass Reinforced Pipe (FRP) used to construct the lower monitor zone of MW-1 (see attached casing pressure test results). The following day (2/11/09), YBI conducted a 4-arm caliper and temperature log within the injection horizon of IW-1 then they set-up on MW-1 and ran a cement bond log in the cemented portion of the FRP (1,500 to 1,700 feet bpl) and conducted a 4-arm caliper and temperature log. The 4-arm caliper and temperature log however could not reach the bottom 30 feet of the open-hole section of the lower monitor zone due to the presence of kill (barite) material so YBI ceased logging operations and began to develop the open-hole section of MW-1. YBI resumed logging on 2/13/09 and successfully completed the 4-arm caliper and temperature log and video survey of the 6 5/8-inch FRP and open-hole section of the lower monitor interval of MW-1.

Work scheduled for next week:

YBI will develop the two (2) monitor zones via air-lift and over-pumping methods and will complete the wellhead of the dual-zone monitor well identified as MW-1. YBI will then obtain water samples from the upper and lower monitor zones of MW-1 for analysis of Primary and Secondary Drinking Water constituents. In addition, YBI will conduct the radioactive tracer survey on the injection well (IW-1) and will begin to set-up equipment and start to collect background data from the dual-zone monitor well related to the large-scale injection test.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:

Michael W. Bennett, P.G.  
Senior Hydrogeologist  
AECOM Water

Attachments: Engineer's Daily Field Reports  
MW-1 Cementing Summary Report 14-inch Steel Casing – Stages No. 4  
MW-1 Casing Pressure Test Results – 6 5/8-inch FRP  
Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 27

Distribution Joe May, FDEP/ WPB w/enclosures  
James Alexander, FDEP/TLH w/enclosures  
James C. Reynolds, P.E. /FKAA w/o enclosures  
Tom Walker, P.E. /FKAA w/o enclosures  
Ray Shimokubo, P.E. /FKAA w/ enclosures  
Mike Furdock, CH2MHill / Naples w/o enclosures  
Bill Beddow, CH2MHill/Naples w/o enclosures  
Larry Lardieri, P.E., AECOM Water – Palm City w/o enclosures  
File w/enclosures

February 17, 2009

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.28 – February 15, 2008 through February 21, 2009  
Florida Keys Aqueduct Authority, Florida City Injection Well Project  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the twenty-eighth week of construction on the Deep Injection Well System at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

During this report period, YBI developed the two (2) monitor zones via air-lift and over-pumping methods and completed the wellhead of the dual-zone monitor well identified as MW-1. YBI obtained water samples from the upper and lower monitor zones of MW-1 and submitted them to a FDEP-approved laboratory for analysis of Primary and Secondary Drinking Water constituents. In addition, YBI pumped three borehole volume of freshwater from the FKAA Water Treatment plant then successfully completed the radioactive tracer survey (RTS) on the injection well (IW-1). Copies of the RTS and temperature logs are provided as an Attachment.

Work scheduled for next week:

YBI will start to demobilize the drill rig and support equipment from the site and will ensure all formation and groundwater samples collected during the construction of both the injection and monitor well are transported and delivered to the Florida Geological Survey. In addition, YBI will start to collect background data from the dual-zone monitor well related to the large-scale injection test.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:

Michael W. Bennett, P.G.  
Senior Hydrogeologist  
AECOM Water

Attachments: Engineer's Daily Field Reports  
Pad Monitor Well Water Quality Summary  
Radioactive Tracer Survey and Temperature Logs

Distribution to Interested Parties – Weekly Summary Report No. 28

Distribution     Joe May, FDEP/ WPB w/enclosures  
                     James Alexander, FDEP/TLH w/enclosures  
                     James C. Reynolds, P.E. /FKAA w/o enclosures  
                     Tom Walker, P.E. /FKAA w/o enclosures  
                     Ray Shimokubo, P.E. /FKAA w/ enclosures  
                     Mike Furdock, CH2MHill / Naples w/o enclosures  
                     Bill Beddow, CH2MHill/Naples w/o enclosures  
                     Larry Lardieri, P.E., AECOM Water – Palm City w/o enclosures  
                     File w/enclosures

March 4, 2009

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.29 – February 22, 2008 through February 28, 2009  
Florida Keys Aqueduct Authority, Florida City Injection Well Project  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the twenty-ninth week of construction on the Deep Injection Well System at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

During this report period, YBI began to disassemble and remove the drill rig and support equipment from the site. In addition, YBI coordinated the pick-up and delivery of all formation and groundwater samples collected during the construction of both the injection and monitor wells to the Florida Geological Survey (see attached delivery form). No testing and/or construction activities were conducted related to the deep injection well system.

Work scheduled for next week:

YBI will continue to demobilize the drill rig and support equipment from the site. In addition, YBI will start to collect background data from the dual-zone monitor well related to the large-scale injection test.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:

Michael W. Bennett, P.G.  
Senior Hydrogeologist  
AECOM Water

Attachments: Engineer's Daily Field Reports  
Pad Monitor Well Water Quality Summary  
Shipping and Delivery Form – Formation & Water Samples to the FGS



Distribution to Interested Parties – Weekly Summary Report No. 29

Distribution     Joe May, FDEP/ WPB w/enclosures  
                     James Alexander, FDEP/TLH w/enclosures  
                     James C. Reynolds, P.E. /FKAA w/o enclosures  
                     Tom Walker, P.E. /FKAA w/o enclosures  
                     Ray Shimokubo, P.E. /FKAA w/ enclosures  
                     Mike Furdock, CH2MHill / Naples w/o enclosures  
                     Bill Beddow, CH2MHill/Naples w/o enclosures  
                     Larry Lardieri, P.E., AECOM Water – Palm City w/o enclosures  
                     File w/enclosures

March 17, 2009

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.31 – March 8, 2008 through March 15, 2009  
Florida Keys Aqueduct Authority, Florida City Injection Well Project  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the thirtieth-first week of construction on the Deep Injection Well System at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

During this report period, YBI continued to disassemble and remove the drill rig, support and miscellaneous equipment from the site. On Friday 3/13/09, the preliminary injection test was conducted and successfully completed using multiple injection rates ranging between 800 and 3,500 gallons per minute. At the design injection rate of 3,500 gallons per minute there was an increase in wellhead pressure of 26 pounds per square inch at the injection well, which is significantly below the upper limit of 107 psi above background for the injection well system.

Work scheduled for next week:

YBI will continue to demobilize the drill rig and support equipment from the site. In addition, YBI will start to collect background data from the injection and dual-zone monitor well and will conduct the final full-scale injection test on Tuesday 3/17/09. Once completed, all remaining components related to testing and previous drilling operation will be removed from the site.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:

Michael W. Bennett, P.G.  
Senior Hydrogeologist  
AECOM Water

Attachments: Engineer's Daily Field Reports  
Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 31

Distribution     Joe May, FDEP/ WPB w/enclosures  
                     James Alexander, FDEP/TLH w/enclosures  
                     James C. Reynolds, P.E. /FKAA w/o enclosures  
                     Tom Walker, P.E. /FKAA w/o enclosures  
                     Ray Shimokubo, P.E. /FKAA w/ enclosures  
                     Mike Furdock, CH2MHill / Naples w/o enclosures  
                     Bill Beddow, CH2MHill/Naples w/o enclosures  
                     Larry Lardieri, P.E., AECOM Water – Palm City w/o enclosures  
                     File w/enclosures

March 17, 2009

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.31 – March 8, 2008 through March 15, 2009  
Florida Keys Aqueduct Authority, Florida City Injection Well Project  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the thirtieth-first week of construction on the Deep Injection Well System at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

During this report period, YBI continued to disassemble and remove the drill rig, support and miscellaneous equipment from the site. On Friday 3/13/09, the preliminary injection test was conducted and successfully completed using multiple injection rates ranging between 800 and 3,500 gallons per minute. At the design injection rate of 3,500 gallons per minute there was an increase in wellhead pressure of 27.5 pounds per square inch at the injection well, which is significantly below the upper limit of 107 psi above background for the injection well system.

Work scheduled for next week:

YBI will continue to demobilize the drill rig and support equipment from the site. In addition, YBI will start to collect background data from the injection and dual-zone monitor wells and will conduct the final full-scale injection test on Tuesday 3/17/09. Once completed, all remaining components related to testing and previous drilling operations will be removed from the site.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:

Michael W. Bennett, P.G.  
Senior Hydrogeologist  
AECOM Water

Attachments: Engineer's Daily Field Reports  
Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 31

Distribution    Joe May, FDEP/ WPB w/enclosures  
                  James Alexander, FDEP/TLH w/enclosures  
                  James C. Reynolds, P.E. /FKAA w/o enclosures  
                  Tom Walker, P.E. /FKAA w/o enclosures  
                  Ray Shimokubo, P.E. /FKAA w/ enclosures  
                  Mike Furdock, CH2MHill / Naples w/o enclosures  
                  Bill Beddow, CH2MHill/Naples w/o enclosures  
                  Larry Lardieri, P.E., AECOM Water – Palm City w/o enclosures  
                  File w/enclosures

March 25, 2009

Dear Interested Parties:

**SUBJECT:** Weekly Summary Report No.32 – March 16, 2008 through March 23, 2009  
Florida Keys Aqueduct Authority, Florida City Injection Well Project  
FDEP UIC Well Construction Permit Number 0623868-001-UC

The purpose of this letter is to inform the Florida Department of Environmental Protection (Department) of events that transpired during the thirty-second week of construction on the Deep Injection Well System at the J. Robert Dean Water Treatment Plant and those activities anticipated for the next report period.

During this report period, YBI successfully completed the large-scale injection testing on the injection well system. On Friday 3/13/09, the preliminary injection test was conducted and successfully completed using multiple injection rates ranging between 800 and 3,500 gallons per minute. On Tuesday, 3/17/09, YBI started the 12-hour injection test to ensure the deep injection well system operated effectively as designed and constructed related to the potential upward migration of injected fluids or excessive pressure build-up at the injection well. The injection test was conducted using multiple injection rates ranging between 1,006 and 3,757 gallons per minute with injection maintained for 3 hours related to each injection rate. Below is a summary of the preliminary results from the 12-hour injection test:

- At an average injection rate of 1,006 gpm – the injectivity index = 168 gpm/psi
- At an average injection rate of 1,965 gpm – the injectivity index = 157 gpm/psi
- At an average injection rate of 2,791 gpm – the injectivity index = 147 gpm/psi
- At an average injection rate of 3,757 gpm – the injectivity index = 135 gpm/psi

At the highest injection rate of 3,757 gallons per minute there was an increase in wellhead pressure of 27.8 pounds per square inch at the injection well, which is significantly below the upper limit of 107 psi above background for the injection well system.

Work scheduled for next week:

YBI will conclude demobilization and site restoration activities at the site. This will be the final weekly summary report provided to the Department related to the construction and testing of the deep injection well system. A request for operational testing will be forwarded to the Department to allow the FKAA to operate the deep injection well system under the construction permit.

If you have any questions or concerns based on the information provided above, please contact me at 561-684-3375.

Sincerely:

Michael W. Bennett, P.G.  
Senior Hydrogeologist  
AECOM Water

Attachments: Engineer's Daily Field Reports  
Pad Monitor Well Water Quality Summary

Distribution to Interested Parties – Weekly Summary Report No. 32

Distribution Joe May, FDEP/ WPB w/enclosures  
James Alexander, FDEP/TLH w/enclosures  
James C. Reynolds, P.E. /FKAA w/o enclosures  
Tom Walker, P.E. /FKAA w/o enclosures  
Ray Shimokubo, P.E. /FKAA w/ enclosures  
Mike Furdock, CH2MHill / Naples w/o enclosures  
Bill Beddow, CH2MHill/Naples w/o enclosures  
Larry Lardieri, P.E., AECOM Water – Palm City w/o enclosures  
File w/enclosures



**Appendix D**

**Pad Monitor Well Completion Reports and  
Water Quality Summaries**



## WELL COMPLETION REPORT

FORM 0124

Rev. 11/80

WELL PERMIT NO.

SFWMD WATER USE PERMIT NO.

Robert Dean WTP 192 SW 35-4 St Florida City FL 33034  
 SWD 11244 7-14-08 City 10' State 20' Zip SW

TYPE OF WORK: Construct ( ) Repair ( ) Abandon ( )  
 WELL USE: Domestic Well ( ) Public ( ) Monitor ( ) Test ( )  
 Irrigation ( ) FireWell ( ) Other \_\_\_\_\_  
 METHOD: Rotary with MUD ( ) or Air ( ) Cable Tool ( ) Jet ( )  
 Casing Driven ( ) Other Auger  
 STATIC WATER LEVEL 5 Ft. below top of casing  
 PUMPING WATER LEVEL 3.5 Ft. after 15 Hrs. at 8 GPM  
 PUMP SIZE 5.5 H.P. CAPACITY 180 GPM  
 PUMP TYPE Semi Fresh INTAKE DEPTH 20'  
 From top of ground

## LOCATION

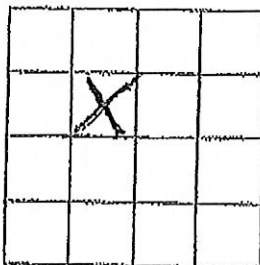
Located Near Robert's Fruit  
Stand  
 County \_\_\_\_\_

SE NW 26 57 S 38 E  
 1/4 1/4 Section Township Range

Latitude-Longitude

Cuttings sent to District? ( ) Yes  
 ( ) No

Note: PWS Wells attach a site map if well location is different  
 from site location on permit application.



LOCATE IN SECTION

Grout	Casing & Screen	Depth (ft)		DRILL CUTTINGS LOG Examine cuttings every 20 ft. or at formation changes. Give color, grain size, and type of material. Note cavities, depth to producing zones.
		From	To	
Thickness & Depth	Diameter & Depth			
2"	3"	0'		
7'	2"		20'	
1 1/2	20'			

Casing: Black Steel ( ) Galv. ( ) PVC ( ) Fiberglass ( )  
 Screen: Type PVC Slot size 0.20  
 Screened from 10 (ft.) to 20 (ft.)  
 Type of grout with % additives Neat Type II  
 Water: Clear ( ) Colored ( ) Sulphur ( ) Salty ( ) Iron ( )  
 Conductivity \_\_\_\_\_ Chlorides \_\_\_\_\_ mol/l

## WELL COMPLETION REPORT

FORM 0124

Rev. 11/80

WELL PERMIT NO.

SFWMD WATER USE PERMIT NO.

J. Robert Dean WTP 192 SW 35-4 St Florida City FL 33034  
 SWD 11244 7-14-08 City 10' State 20' Zip SE

TYPE OF WORK: Construct ( ) Repair ( ) Abandon ( )  
 WELL USE: Domestic Well ( ) Public ( ) Monitor ( ) Test ( )  
 Irrigation ( ) FireWell ( ) Other \_\_\_\_\_  
 METHOD: Rotary with MUD ( ) or Air ( ) Cable Tool ( ) Jet ( )  
 Casing Driven ( ) Other Auger  
 STATIC WATER LEVEL 5 Ft. below top of casing  
 PUMPING WATER LEVEL 3.5 Ft. after 15 Hrs. at 8 GPM  
 PUMP SIZE 5.5 H.P. CAPACITY 180 GPM  
 PUMP TYPE Semi Fresh INTAKE DEPTH 20'  
 From top of ground

## LOCATION

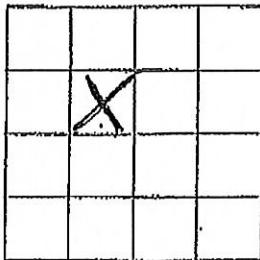
Located Near Robert's Fruit  
Stand  
 County \_\_\_\_\_

SE NW 26 57 S 38 E  
 1/4 1/4 Section Township Range

Latitude-Longitude

Cuttings sent to District? ( ) Yes  
 ( ) No

Note: PWS Wells attach a site map if well location is different  
 from site location on permit application.



LOCATE IN SECTION

Grout	Casing & Screen	Depth (ft)		DRILL CUTTINGS LOG Examine cuttings every 20 ft. or at formation changes. Give color, grain size, and type of material. Note cavities, depth to producing zones.
		From	To	
Thickness & Depth	Diameter & Depth			
2"	3"	0'		
7'	2"		20'	
1 1/2	20'			

Casing: Black Steel ( ) Galv. ( ) PVC ( ) Fiberglass ( )  
 Screen: Type PVC Slot size 0.20  
 Screened from 10 (ft.) to 20 (ft.)  
 Type of grout with % additives Neat Type II  
 Water: Clear ( ) Colored ( ) Sulphur ( ) Salty ( ) Iron ( )  
 Conductivity \_\_\_\_\_ Chlorides \_\_\_\_\_ mol/l

**AECOM**

**Florida Keys Aqueduct Authority**  
**J. Robert Dean Water Treatment Plant**  
**Florida City , Florida**

**Pad Monitor Well**  
**Water Quality Data**  
**Northwest Monitor Well**  
**(NW)**

Date	Time Hour	Water Level (ft-DTW)	Specific Conductance umhos/cm	Chloride (mg/l)	Temperature (degree C)	pH (S.U.)	TDS (mg/L)	Remarks	Sampled By
07/29/08	9:20	6.58	568	29.6	25.2	6.8	374		WMD
08/06/08	9:30	5.98	618	29.4	25.5	6.8	374		WMD
08/14/08	12:15	6.85	687	37.0	25.1	7.0	400		BM
08/20/08	9:00	4.48	610	32.4	25.8	7.0	370		WMD
08/29/08	12:12	6.95	696	37.0	25.0	7.1	392		AH
09/04/08	9:50	6.46	532	35.0	24.8	6.7	354		WMD
09/10/08	10:00	6.32	546	34.0	25.9	7.0	370		WMD
09/18/08	10:00	7.26	521	37.0	25.0	6.6	400		WMD
09/22/08	10:30	7.40	586	36.0	25.0	6.6	412		WMD
09/30/08	8:47	6.90	685	29.2	25.5	6.6	398		AP
10/08/08	9:01	6.80	691	34.0	25.2	6.4	400		AP
10/14/08	9:30	7.32	530	35.0	26.3	6.5	390		WMD
10/21/08	11:31	7.10	698	42.0	25.7	7.0	400		AP
10/28/08	11:31	6.90	692	34.0	24.6	7.1	366		AP
11/05/08	10:11	7.20	690	38.0	24.7	6.9	374		AP
11/10/08	11:20	6.98	685	35.0	25.0	7.0	372		AP
11/18/08	9:31	7.50	680	34.0	24.4	7.0	330		AP
11/24/08	10:40	7.40	681	36.0	24.8	6.9	418		AP
12/01/08	11:50	7.45	676	38.0	24.7	7.0	392		AP
12/08/08	10:20	7.50	681	36.0	24.3	7.0	370		AP
12/15/08	9:43	7.40	684	33.4	24.9	6.9	386		AP
12/24/08	9:40	7.51	685	77*	23.9	6.9	386		AP
12/30/08	7:40	7.68	760	35.0	22.0	7.0	292		AP
01/05/09	9:50	7.51	663	35.0	24.7	7.2	356		AP
01/12/09	9:20	7.70	1521*	38.0	24.6	7.1	390		AP
01/19/09	10:00	7.70	681	35.0	24.3	7.1	410		AP
01/26/09	8:00	7.70	693	36.0	24.0	7.1	358		AP
02/02/09	9:50	7.91	670	36.0	24.1	6.9	460		AP
02/09/09	9:50	7.91	646	40.0	24.3	7.2	372		AP
02/16/09	10:30	8.10	628	40.0	24.5	7.1	432		AP
02/24/09	9:50	8.21	392	44.0	23.8	7.0	464		AP
03/04/09	9:20	8.25	661	43.0	24.2	7.3	382		AP
03/11/09	9:00	8.45	652	43.0	24.1	7.1	390		AP
03/16/09	8:20	8.35	653	41.0	24.2	7.1	384		AP

ft-ngvd water-levels referenced in feet to NGVD, 1929

umhos/cm micro-mhos per centimeter

mg/l: milligram per liter

C: Celsius

S.U. Standard Unit

Top of Casing Elevation = feet (NGVD, 1929)

ft- DTW = Depth to Water from top of casing in feet

\* - Data appears to be laboratory/field equipment error



# AECOM

## Florida Keys Aqueduct Authority J. Robert Dean Water Treatment Plant Florida City , Florida

### Pad Monitor Well Water Quality Data Northeast Monitor Well (NE)

Date	Time Hour	Water Level (ft-DTW)	Specific Conductance umhos/cm	Chloride (mg/l)	Temperature (degree C)	pH (S.U.)	TDS (mg/L)	Remarks	Sampled By
07/29/08	9:55	6.52	540	27.2	25.0	7.0	380		WMD
08/06/08	10:05	6.10	668	28.5	25.2	6.7	356		WMD
08/14/08	13:53	6.78	683	36.0	25.0	7.1	380		BM
08/20/08	9:30	4.38	600	31.7	26.0	7.0	366		WMD
08/29/08	12:10	6.46	688	40.0	24.8	7.4	352		AH
09/04/08	10:30	6.35	468	32.0	24.8	6.4	370		WMD
09/10/08	10:25	7.00	548	31.0	26.2	7.0	378		WMD
09/18/08	10:05	7.20	518	39.0	25.2	6.7	394		WMD
09/22/08	11:00	7.30	506	35.0	25.2	6.6	410		WMD
09/30/08	9:21	6.80	693	29.8	24.8	6.7	410		AP
10/08/08	9:33	6.90	691	35.0	25.0	6.5	404		AP
10/14/08	10:00	7.22	552	37.0	26.0	6.3	392		WMD
10/21/08	12:11	7.10	705	32.0	26.0	7.1	374		AP
10/28/08	12:01	6.80	692	35.0	25.0	7.1	364		AP
11/05/08	10:40	7.10	690	37.0	25.2	7.0	386		AP
11/10/08	11:45	7.40	680	37.0	25.3	7.0	370		AP
11/18/08	10:01	7.50	664	34.0	24.6	7.0	362		AP
11/24/08	11:10	7.40	657	32.0	24.7	6.9	408		AP
12/01/08	12:20	7.39	680	37.0	24.7	6.9	274		AP
12/08/08	10:50	7.40	688	33.0	24.6	7.0	372		AP
12/15/08	10:20	7.40	689	34.0	24.9	7.2	390		AP
12/24/08	10:20	7.60	688	47.0	24.0	7.0	408		AP
12/30/08	8:10	7.58	684	34.0	24.0	7.1	354		AP
01/05/09	10:20	7.42	665	34.3	25.1	7.2	364		AP
01/12/09	9:50	7.60	1436*	36.0	24.5	7.1	350		AP
01/19/09	10:30	7.60	690	41.0	24.6	7.1	382		AP
01/26/09	8:30	7.60	693	37.0	24.1	7.1	370		AP
02/02/09	10:20	7.83	651	37.0	24.0	7.0	426		AP
02/09/09	10:20	7.82	644	39.0	24.4	7.2	374		AP
02/16/09	11:10	8.04	608	42.0	24.5	7.1	440		AP
02/24/09	10:30	8.10	388	43.0	24.6	7.1	452		AP
03/04/09	10:00	8.00	655	42.0	24.5	7.4	394		AP
03/11/09	9:26	8.36	656	40.0	24.0	7.2	344		AP
03/16/09	8:57	8.30	650	42.0	24.3	7.1	360		AP

ft-ngvd water-levels referenced in feet to NGVD, 1929

umhos/cm micro-mhos per centimeter

mg/l: milligram per liter

C: Celsius

S.U. Standard Unit

Top of Casing Elevation = feet (NGVD, 1929)

ft- DTW = Depth to Water from top of casing in feet

\* - Data appears to be laboratory/field equipment error

# AECOM

## Florida Keys Aqueduct Authority J. Robert Dean Water Treatment Plant Florida City , Florida

### Pad Monitor Well Water Quality Data Southeast Monitor Well (SE)

Date	Time Hour	Water Level (ft-DTW)	Specific Conductance umhos/cm	Chloride (mg/l)	Temperature (degree C)	pH (S.U.)	TDS (mg/L)	Remarks	Sampled By
07/29/08	10:25	7.16	586	30.0	25.2	7.1	364		WMD
08/06/08	10:40	6.60	635	29.6	25.2	7.0	384		WMD
08/14/08	12:48	6.32	674	37.0	25.3	6.6	380		BM
08/20/08	10:00	5.02	620	29.1	25.8	7.1	366		WMD
08/29/08	12:35	6.47	688	40.0	25.2	7.3	328		AH
09/04/08	11:00	7.04	520	29.0	25.2	6.7	360		WMD
09/10/08	11:10	7.12	550	30.0	26.0	7.0	372		WMD
09/18/08	10:40	6.68	496	42.0	24.8	6.6	382		WMD
09/22/08	10:00	6.76	500	39.0	25.2	6.6	406		WMD
09/30/08	10:50	6.30	690	33.1	25.3	6.7	416		AP
10/08/08	8:21	6.10	710	45.0	25.0	6.9	416		AP
10/14/08	10:30	6.70	542	46.0	26.2	6.5	408		WMD
10/21/08	10:59	6.50	695	43.0	26.5	7.0	386		AP
10/28/08	11:01	6.30	703	45.0	24.6	7.1	412		AP
11/05/08	8:51	6.60	725	50.0	24.6	7.3	400		AP
11/10/08	10:51	6.90	725	46.0	25.0	7.0	386		AP
11/18/08	9:02	6.90	696	46.0	24.3	7.1	398		AP
11/24/08	10:11	6.90	699	42.0	24.7	7.0	420		AP
12/01/08	11:21	6.82	673	44.0	24.8	7.0	400		AP
12/08/08	9:41	6.90	701	41.0	24.5	7.1	382		AP
12/15/08	9:04	6.90	697	39.8	24.9	7.1	374		AP
12/24/08	9:11	6.83	698	42.0	23.9	7.0	380		AP
12/30/08	8:51	7.00	684	37.0	24.1	7.1	348		AP
01/05/09	10:51	6.90	664	40.5	25.0	7.3	358		AP
01/12/09	10:31	7.00	1543*	39.0	24.5	7.1	290		AP
01/19/09	11:00	7.20	691	37.0	24.7	7.1	394		AP
01/26/09	9:10	7.20	698	40.0	24.2	7.1	378		AP
02/02/09	11:00	7.35	647	40.0	24.4	7.0	438		AP
02/09/09	11:00	7.41	640	44.0	24.5	7.1	380		AP
02/16/09	11:40	7.51	603	42.0	24.7	7.1	390		AP
02/24/09	11:00	7.63	432	45.0	24.6	7.0	448		AP
03/04/09	10:40	7.65	643	40.0	24.6	7.4	384		AP
03/11/09	10:10	7.85	642	40.0	23.4	7.3	366		AP
03/16/09	9:40	7.85	639	39.0	24.6	7.2	418		AP

ft-ngvd water-levels referenced in feet to NGVD, 1929

umhos/cm micro-mhos per centimeter

mg/l: milligram per liter

C: Celsius

S.U. Standard Unit

Top of Casing Elevation = feet (NGVD, 1929)

ft- DTW = Depth to Water from top of casing in feet

\* - Data appears to be laboratory/field equipment error

**AECOM**

**Florida Keys Aqueduct Authority  
J. Robert Dean Water Treatment Plant  
Florida City , Florida**

**Pad Monitor Well  
Water Quality Data  
Southwest Monitor Well  
(SW)**

Date	Time Hour	Water Level (ft-DTW)	Specific Conductance umhos/cm	Chloride (mg/l)	Temperature (degree C)	pH (S.U.)	TDS (mg/L)	Remarks	Sampled By
07/29/08	10:55	7.10	600	30.9	24.7	7.1	368		WMD
08/06/08	11:15	6.54	640	30.5	25.2	7.0	386		WMD
08/14/08	13:17	6.26	674	37.0	25.1	6.8	360		BM
08/20/08	10:30	4.96	622	29.8	25.6	7.0	380		WMD
08/29/08	12:20	6.84	692	38.0	25.1	7.2	376		AH
09/04/08	10:00	6.98	520	31.0	25.4	7.0	370		WMD
09/10/08	11:45	6.40	540	35.0	26.0	6.9	372		WMD
09/18/08	11:15	6.46	500	42.0	24.3	6.5	374		WMD
09/22/08	9:30	6.40	488	39.0	25.0	6.5	396		WMD
09/30/08	10:04	5.90	617	29.5	25.3	6.8	368		AP
10/08/08	7:52	5.10	660	42.0	25.1	7.0	362		AP
10/14/08	11:00	6.40	536	43.0	26.2	6.7	378		WMD
10/21/08	10:21	6.00	617	30.0	26.5	7.2	328		AP
10/28/08	10:22	5.90	698	43.0	24.6	7.1	394		AP
11/05/08	9:31	6.10	749	62.0	24.7	7.2	390		AP
11/10/08	10:20	6.40	728	48.0	25.0	6.9	406		AP
11/18/08	8:29	6.30	618	45.0	24.6	6.9	316		AP
11/24/08	9:31	6.40	704	41.0	24.8	7.2	420		AP
12/01/08	10:40	6.40	691	47.0	24.6	6.9	414		AP
12/08/08	9:10	6.40	694	41.0	24.5	6.9	404		AP
12/15/08	8:29	6.40	692	39.5	24.6	7.1	382		AP
12/24/08	8:40	6.30	693	45.0	23.7	6.9	368		AP
12/30/08	9:30	6.58	689	38.0	24.4	7.1	354		AP
01/05/09	11:30	6.71	664	40.0	25.0	7.3	344		AP
01/12/09	11:00	6.40	1696*	41.0	24.7	7.2	340		AP
01/19/09	11:30	6.70	668	50.0	24.8	7.2	428		AP
01/26/09	9:50	6.70	698	42.0	24.3	7.2	366		AP
02/02/09	11:30	6.91	655	42.0	24.1	7.1	416		AP
02/09/09	11:30	6.91	645	43.0	24.4	7.2	380		AP
02/16/09	12:10	7.00	654	52.0	24.5	7.2	392		AP
02/24/09	11:40	7.21	384	49.0	24.4	7.1	461		AP
03/04/09	11:10	7.22	646	42.0	24.5	7.4	386		AP
03/11/09	10:26	7.40	642	38.0	24.0	7.3	392		AP
03/16/09	10:06	7.53	641	40.0	24.3	7.2	390		AP

ft-ngvd water-levels referenced in feet to NGVD, 1929

umhos/cm micro-mhos per centimeter

mg/l: milligram per liter

C: Celsius

S.U. Standard Unit

Top of Casing Elevation = feet (NGVD, 1929)

ft- DTW = Depth to Water from top of casing in feet

\* - Data appears to be laboratory/field equipment error





**The Florida Keys  
Aqueduct Authority**

**AECOM**

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