

Miami-Dade Water and Sewer Department P.O. Box 330316 • 3071 SW 38th Avenue Miami, Florida 33233-0316 T 305-665-7471

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Carlos A. Gimenez, Mayor

March 14, 2014

Electronic Correspondence SFWMD eCompliance CCN: 58192 File Nos. 8DC.19.19

Ms. Stephanie Lancaster Environmental Resource Regulation Division South Florida Water Management District P.O. Box 24680 West Palm Beach, FL 33416-4680

Subject: Miami-Dade County Consolidated PWS, Water Use Permit No. 13-00017-W, Annual ASR (Aquifer Storage and Recovery) Cycle Testing Activities Summary Report, Limiting Condition 19

Dear Ms. Stephanie Lancaster:

In accordance with Limiting Condition 19 of Water Use Permit No. 13-00017-W, the following is a summary of ASR cycle testing activities for 2013:

MDWASD received written authorization from the Florida Department of Environmental Protection (FDEP) to begin operational cycle testing of the ASR wells located at the West Wellfield and Southwest Wellfield on May 15, 2013. Attached is a summary of the ASR cycle testing activities that were performed at the Southwest Wellfield during 2013. ASR cycling testing was not performed at the West Wellfield during 2013.

Should you have any questions regarding this submittal, please call me at (786) 552-8120 or Ms. Virginia Walsh, P.G. at 786-552-8266.

Sincerely,

Bertha M. Goldenberg, P.Ĕ. Assistant Director, Regulatory Compliance and Planning

BMG/ro

Attachment



L14030SFWMD-LC19



Miami-Dade Water and Sewer Department

Miami-Dade Consolidated PWS Water Use Permit No. 13-00017-W

Annual Status Report Southwest Wellfield Aquifer Storage and Recovery Cycle Testing Summary Limiting Condition # 19

Submittal date: March 15, 2014

Miami-Dade Water and Sewer Department P.O. Box 33-0316, Miami, FL 33233-0316

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1. Introduction

The South Florida Water Management District (SFWMD) issued Water Use Permit # 13-00017-W (WUP) to Miami-Dade Water & Sewer Department (MDWASD) on November 15, 2007. At the request of MDWASD, this permit was first modified and re-issued by the SFWMD on November 1st, 2010 and subsequently on July 16, 2012. Per Limiting Condition LC #19 the permittee is required to submit an annual Aquifer Storage and Recovery (ASR) cycle testing activities summary report. This annual report includes a summary of cycle testing activities at the Southwest Wellfield (SWWF), located at the corner of SW 79th St and W 123rd Ave, Miami-Dade County, FI (figure 1). Please refer to **Appendix A** for copy of the LC #19 in the Water Use Permit No. 13-00017-W. This report summarizes cycle testing activity at the SWWF ASR system that began in 2013.



The SWWF ASR system operates under Permit ID 0131773-010-011-UC/5Q from the Florida Department of Environmental Protection (FDEP) Underground Injection Control (UIC) program. The SWWF ASR system consists of a UIC Class V, Group 7 ASR Well System. FDEP UIC issued a Notice of Major Modification to Permit and Administrative Order on July 18, 2011 (under FDEP File #0131773-009-UC) authorizing MDWASD to activate operational testing of the SWWF ASR facility. Please refer to **Appendix B** for copies of the FDEP UIC Permit and Modification to Permit.

2. ASR System Summary

The SWWF ASR system consists of two (2) ASR wells (ASR-4-SW and ASR-5-SW), a dual zone monitoring well (MW-FA-1-SW) monitoring the Floridan aquifer, and a Biscayne aquifer monitoring well (MW-1). **Table 1** summarizes the construction of the ASR wells and dual zone MW.

Table 1 SWWF ASR System Well Summary					
Well Name	WACS Efluent Testsite ID	Total Well Depth*	Casing Diameter (inches)	Casing Type	Casing Interval Depth*
		Injectio	n Wells		
			42	Steel	180
ASR-4-SW	10896	1196	30	Steel	765
			Open hole		765-1196
			42	Steel	180
ASR-5-SW	10897	1200	30	Steel	760
			Open hole		760-1200
		Monitori	ng Wells		
			34	Steel	10
	23759A		24	Steel	200
			12.75	Steel	845
MW-FA-1-SW			Upper Monitoring zone	Open hole	800 - 880
			6.5	Steel	1100
	23759B		Lower monitoring zone	Open hole	1100 – 1200
MW-1	22392		2	PVC	155 – 190

*feet below land surface

Location of the ASR system and associated monitoring wells is included as Figure 2 below. Well construction details are included as Figures 3, 4, and 5. The maximum permitted flow for each ASR well is 5.04 million gallons per day (mgd). The maximum permitted wellhead pressure for ASR-4-SW is 67 psi and ASR-5-SW is 66 psi. The water source for the ASR system is from on-site Biscayne aquifer production wells. Biscayne aquifer water is pumped directly from the production transmission line to the ultraviolet disinfection system (UV system), where the water is treated prior to injection into the Floridan aquifer. Injected UV treated water is stored in the upper Floridan aquifer (Class G-II ground water). Injected water meets all primary and secondary drinking water standards prior to injection into the ASR wells.

AVE 133 S.W. 72 ST. (SUNSET DR.) S.W. 96 96 AVE AVE. 142 137 196 S.W. S.W. SOUTHWEST WELLFIELD ASR-4SW ASR-5SW 127 AVE. S.W. SWW ASR MW S.W. 88 ST. (KENDALL DR.) 36" PI 110

Figure 2. SWWF ASR system layout.













3. Cycle Testing

MDWASD received authorization from the FDEP to recommence cycle testing in correspondence dated May 15, 2013 (refer to Appendix B for copy of correspondence). The following was the proposed cycle testing schedule:

Table 2 SWWF ASR System Initial Cycle Testing Plan							
Cycle	CycleRecharge Duration*Recharge Volume (million gallons)Storage Duration*Recovery Duration*Recovery volume 						
1	7	105	1	10	150		
2	2 60 900 30 45 675						
3	3 60 900 60 45 675						
4	120	1800	60	120	1800		

*Approximate days

The operational testing cyclic plan included three relatively short cycle tests of recharge, storage, and recovery, and a fourth longer duration test to build up the Target Storage Volume (TSV) and extend the freshwater "bubble" throughout the site after completion of the first three shorter duration testing cycles. The duration of each of the three short cycles (Cycles 1, 2, and 3) was designed to provide a progressively larger volume of stored water in the aquifer and to enable the MDWASD to evaluate water quality changes of the stored water as it is progressively recovered. At the same time, the interval between cycles will enable MDWASD to evaluate the effects of increased length of time in storage on the quality of the stored water. Cycle 4 of the plan will provide a longer storage period, the length of which will be very similar to the actual operational storage cycle that will eventually become the standard long term ASR operational plan for this site.

Cyclic tests water quality results are tracked through the implementation of a comprehensive monitoring program per FDEP UIC permit requirements. The summary of the water quality monitoring requirements is included as Appendix C. Water quality samples are collected and analyzed by MDWASD personnel from the Alexander Orr Water Treatment Plant (AOWTP) Laboratory. Laboratory analyses are performed by a State of Florida certified laboratory. All sampling events and sample collections were conducted in accordance with Florida Department of Environmental Protection (FDEP) Standard Operating Procedures for Field Activities DEP-SOP-001/01, as revised March 31, 2008. All equipment used was cleaned following DEP-SOP-001/01, for equipment cleaning and decontamination. Before initiating field activities the groundwater sampling equipment was thoroughly decontaminated with a hot liquinox soap wash, cold tap water rinse, analyte-free water rinse, pesticide grade isopropyl alcohol rinse (additional acid rinse when metals were to be analyzed) and a final analyte-free water rinse. All equipment-cleaning activities were conducted in the AOWTP Laboratory. A YSI® multi-probe sensors and dataloggers were utilized to determine and record selected physicochemical parameters. Additionally, hand-held turbidi-meters (HACH) were also used. Following FDEP SOPs requirements, the YSI sondes and

the turbidity meter were calibrated in the morning of each day of sampling, and a calibration check was conducted at the end of the sampling day. Recalibration was required if readings were more than $\pm 5\%$ of the calibration standard.

3.1 Cycle 1

Cycle 1 recharge phase testing took place between July 29, 2013 and August 5, 2013, for a total of seven days. A total of 15.37 million gallons (mg) were injected, for an average injection flow rate of 3.8 mgd for ASR-4 and 5.1 mgd for ASR-5. Cycle 1 Storage phase was 1 day (August 6, 2013). Cycle 1 recovery phase took place between August 6, 2013 and August 12, 2013. Recovery stopped after 6 days as chlorides in the raw water entering the water treatment plant had increased to 163 mg/L, prompting the AOWTP Operational staff to stop recovery. Recovery rate for ASR-4 was 4.7 mgd, for ASR-5 5.0 mgd. Cycle 1 was designed to flush out the aquifer storage zones, and to check the ASR system equipment functionality. Recovery rate for Cycle 1 was 114%. Table 3 summarizes Cycle 1 results. Appendix D includes daily operational data. Water quality results are included as Appendix E.

dates					volume	Total volume	average rate	
. .			,			million		-
Cycle			from	to	days	gal	mil gal	mgd
	Recharge	ASR-4	7/29/2013	8/5/2013	7	15.37	50.8	3.8
	Recharge	ASR-5	7/29/2013	8/5/2013	7	35.38	50.0	5.1
1	Storage	ASR-4	8/5/2013	8/6/2013	1			
1	Storage	ASR-5	8/5/2013	8/6/2013	1			
	Recovery	ASR-4	8/6/2013	8/12/2013	6	28.12	58.0	4.7
	Recovery	ASR-5	8/6/2013	8/12/2013	6	29.85	56.0	5.0
	Recharge	ASR-4	8/19/2013	2/28/2014	193	155.00	384.2	4.0
	Recharge	ASR-5	8/16/2013	2/28/2014	196	229.15	504.2	4.2
2	Storage	ASR-4						
	Storage	ASR-5						
	Recovery	ASR-4						
	Recovery	ASR-5						

Table 3 SWWF ASR System Cycle Testing Summary

3.2 Cycle 2

Cycle 2 commenced on August 19, 2013. Maintenance was required on the pumps and SCADA systems after Cycle 1 was completed. Cycle 2 recharge phase was scheduled for 60 days, however, due to UV system and ASR injection pump maintenance issues, ASR-4 cycle 2 was suspended on October 8, 2013, and ASR-5 cycle 2 suspended on October 17, 2013. A total of 384.2 mg were injected during Cycle 2 recharge phase, however, the ASR system has been out of service (OOS) for 154 days for ASR-4 and 141 days for ASR-5 due to equipment procurement and installation. Cycle 2 Recharge Phase will restart with 60 days injection once the ASR and UV

systems are back in service (anticipated March 24, 2014). Table 3 summarizes Cycle 2 results. Appendix D includes daily operational data. Water quality results are included as Appendix E.

3.3 Water Quality

All injected and recovered water quality has met primary and secondary drinking water standards. Chlorides concentrations for raw water collected at the AOWTP raw water venturi at the start of Cycle 1 Recovery Phase were 39 mg/L. After 6 days of recovery, chlorides increased to 163 mg/L, below the secondary drinking water standard of 250 mg/L. Once recovery stopped, chlorides returned within a day to 38 mg/L. Conductivity probes are currently being installed on the ASR Recovery pipelines which will continuously take conductivity readings and alert MDWASD staff via SCADA if conductivity measurements go above a certain threshold (yet to be determined with plant personnel). Analysis of samples collected from the Upper and Lower MW-FA1 indicated that the injected freshwater did not yet reach the MW location (figure 6). Chloride concentrations for both zones have remained fairly consistent.

Figure 6. Dual zone monitoring well chloride concentrations.



4. Summary

- Cycle 1 started on July 29, 2013 at SWWF, and concluded on August 15, 2013. A total of 50.8 MG were injected into ASR-4 and ASR-5.
- Cycle 1 recovered 58.0 MG.
- Cycle 2 has injected to date 384.2 MG into ASR-4 and ASR-5. Currently the ASR is out of service for maintenance issues for the pumps and UV, and is scheduled to be back in service by the end of March 2014. Cycle 2 recharge Phase will then start again with 60 days recharge.
- Recovery efficiencies are not yet able to be calculated. To date ASR-4 and ASR-5 have been injecting at volumes designed for.
- Water quality of injected and recovered water is within primary and secondary drinking water standards.

APPENDIX A

SFWMD WUP #13-00017-W Limiting Conditions



SOUTH FLORIDA WATER MANAGEMENT DISTRICT WATER USE PERMIT NO. RE-ISSUE 13-00017-W NON-ASSIGNABLE

Date Issued: July 16, 2012

Expiration Date: December 16, 2030

Authorizing: THE INCREASED USE OF GROUND WATER FROM THE UPPER FLORIDAN AQUIFER AND BISCAYNE AQUIFER FOR PUBLIC WATER SUPPLY FOR COUNTY WIDE SYSTEM SERVING 2,787,451 PERSONS IN THE YEAR 2030 WITH AN AVERAGE PER CAPITA USE RATE OF 147 GALLONS PER DAY AND A MAXIMUM MONTHLY TO AVERAGE MONTHLY PUMPING RATIO 1.06 WITH AN ANNUAL ALLOCATION OF 149,906.00 MILLION GALLONS.

Located In: Miami-Dade County,

S-/T53S/R39E (SEE ATTACHED FOR ADDITIONAL SECTIONS, TOWNSHIPS S-/T53S/R40E AND RANGES)

Issued To: MIAMI-DADE WATER AND SEWER DEPARTMENT (MIAMI-DADE CONSOLIDATED PWS) P O BOX 330316, MIAMI, FL 33233-0316

This is to notify you of the District's agency action concerning Permit Application No. 110511-6, dated May 3, 2011. This action is taken pursuant to the provisions of Chapter 373, Part II, Florida Statutes (F.S.), Rule 40E-1.603 and Chapter 40E-2, Florida Administrative Code (F.A.C.). Based on the information provided, District rules have been adhered to and a Water Use Permit is in effect for this project subject to:

- 1. Not receiving a filed request for an administrative hearing pursuant to Section 120.57 and Section 120.569, or request a judicial review pursuant Section 120.68, Florida Statutes.
- 2. The attached 52 Limiting Conditions.
- 3. The attached 37 exhibits.

Permittee agrees to hold and save the South Florida Water Management District and its successors harmless from any and all damages, claims or liabilities which may arise by reason of the construction, maintenance or use of activities authorized by this permit. Said application, including all plan and specifications attached thereto, is by reference made a part hereof. Upon written notice to permittee, this permit may be temporarily modified, or restricted under a Declaration of Water Shortage or a Declaration of Emergency due to Water Shortage in accordance with provisions of Chapter 373, Fla. Statutes, and applicable rules and regulations of the South Florida Water Management District. This Permit may be permanently or temporarily revoked, in whole or in part, for the violation of the conditions of the permit or for the violation of any provision of the Water Resources Act and regulations thereunder. This Permit does not convey to the permittee any property rights nor any privileges other than those specified herein, nor relieve the permittee from complying with any law, regulation, or requirement affecting the rights of other bodies or agencies.

Should you object to these conditions, please refer to the attached "Notice of Rights" which addresses the procedures to be followed if you desire a public hearing or other review of the proposed agency action. Should you wish to object to the proposed agency action or file a petition or request, please provide written objections, petitions, requests and/or waivers to:

Elizabeth Veguilla, Deputy Clerk, MSC2440 South Florida Water Management District Post Office Box 24680 West Palm Beach, FL 33416-4680

Please contact this office if you have any questions concerning this matter. If we do not hear from you in accordance with the "Notice of Rights", we will assume that you concur with the District's action.

CERTIFICATION OF SERVICE

I HEREBY CERTIFY that the Staff Report, Conditions and Notice of Rights have been mailed to the Permittee (and the persons listed on the attached staff report distribution list) no later than 5:00 p.m. on this 17th day of July, 2012, in accordance with Section 120.60(3), Florida Statutes, and a copy has been filed and acknowledged with the Deputy District Clerk.

a Bγ DEPUTY CLERK

DEPUTY CLERK SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Attachments

1. This permit shall expire 18.42 years from final action date.

2. Application for a permit modification may be made at any time.

3. Water use classification:

Public water supply Aquifer storage and Recovery

4. Source classification is:

Ground Water from: Biscayne Aquifer Upper Floridan Aquifer

5. Annual allocation shall not exceed 149906 MG.

Maximum monthly allocation shall not exceed 13117 MG.

The following limitations to the average annual withdrawals from specific sources are applicable through December 31, 2021: Biscayne aquifer: 127,568 MG Floridan aquifer: 17,031 MG

The following limitations to the average annual withdrawals from specific sources are applicable from January 1, 2022 through December 31, 2026: Biscayne aquifer: 135,233 MG Floridan aquifer: 17,031 MG Reuse offset: 7,665 MG (21 MGD SWWF recharge)

The following limitations to the average annual withdrawals from specific sources are applicable from January 1, 2027 through December 31,2030: Biscayne aquifer: 141,073 MG Floridan aquifer: 17,009 MG Reuse offset: 13,505 MG (37 MGD SWWF recharge)

The allocations are further constrained by the wellfield operational plan described in Limiting Condition 27. Reuse offsets are required for withdrawals above 109.4 MGD at the SWWF. The offset reuse volumes do not include other reuse projects outlined in Limiting Condition 39, which are in addition to the wellfield recharge project.

6. Pursuant to Rule 40E-1.6105, F.A.C., Notification of Transfer of Interest in Real Property, within 30 days of any transfer of interest or control of the real property at which any permitted facility, system, consumptive use, or activity is located, the permittee must notify the District, in writing, of the transfer giving the name and address of the new owner or person in control and providing a copy of the instrument effectuating the transfer, as set forth in Rule 40E-1.6107, F.A.C.

Pursuant to Rule 40E-1.6107 (4), until transfer is approved by the District, the permittee shall be

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liable for compliance with the permit. The permittee transferring the permit shall remain liable for all actions that are required as well as all violations of the permit which occurred prior to the transfer of the permit.

Failure to comply with this or any other condition of this permit constitutes a violation and pursuant to Rule 40E-1.609, Suspension, Revocation and Modification of Permits, the District may suspend or revoke the permit.

This Permit is issued to:

Miami-Dade Water and Sewer Department 3071 Sw 38th Ave Miami, FL 33146 Attn: Utility Director

7. Withdrawal Facilities:

Ground Water - Proposed:

3 - 24" X 72' X 1400 GPM Wells Cased To 45 Feet 1 - 24" X 50' X 1400 GPM Well Cased To 45 Feet 7 - 24" X 1200' X 2430 GPM Wells Cased To 1100 Feet 1 - 24" X 50' X 2800 GPM Well Cased To 45 Feet 7 - 17" X 1490' X 1400 GPM Wells Cased To 1080 Feet

Ground Water - Existing:

20 - 14" X 115' X 2500 GPM Wells Cased To 80 Feet 4 - 24" X 100' X 4900 GPM Wells Cased To 35 Feet 2 - 24" X 100' X 7500 GPM Wells Cased To 50 Feet 1 - 24" X 70' X 3470 GPM Well Cased To 35 Feet 1 - 18" X 65' X 1500 GPM Well Cased To 50 Feet 1 - 12" X 35' X 800 GPM Well Cased To 30 Feet 1 - 18" X 55' X 1500 GPM Well Cased To 42 Feet 6 - 42" X 107' X 7000 GPM Wells Cased To 66 Feet 1 - 18" X 55' X 1500 GPM Well Cased To 45 Feet 1 - 42" X 68' X 8500 GPM Well Cased To 60 Feet 2 - 24" X 70' X 6945 GPM Wells Cased To 35 Feet 1 - 16" X 50' X 1600 GPM Well Cased To 40 Feet 4 - 24" X 108' X 8300 GPM Wells Cased To 50 Feet 2 - 12" X 40' X 1600 GPM Wells Cased To 35 Feet 1 - 16" X 100' X 7500 GPM Well Cased To 40 Feet 3 - 48" X 88' X 7500 GPM Wells Cased To 33 Feet 6 - 17" X 1490' X 1400 GPM Wells Cased To 1080 Feet 1 - 48" X 80' X 10416.67 GPM Well Cased To 46 Feet 1 - 30" X 1200' X 3500 GPM Well Cased To 760 Feet 1 - 30" X 1250' X 3500 GPM Well Cased To 845 Feet 1 - 30" X 1210' X 3500 GPM Well Cased To 835 Feet 4 - 24" X 104' X 6940 GPM Wells Cased To 54 Feet 6 - 20" X 100' X 4900 GPM Wells Cased To 40 Feet 1 - 18" X 50' X 500 GPM Well Cased To 40 Feet

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- 1 12" X 40' X 800 GPM Well Cased To 35 Feet 1 - 18" X 66' X 1500 GPM Well Cased To 53 Feet 1 - 42" X 107' X 7000 GPM Well Cased To 69 Feet 1 - 42" X 68' X 10000 GPM Well Cased To 60 Feet 1 - 42" X 68' X 8500 GPM Well Cased To 54 Feet 7 - 16" X 100' X 4170 GPM Wells Cased To 40 Feet 1 - 42" X 68' X 10000 GPM Well Cased To 54 Feet 1 - 14" X 115' X 3800 GPM Well Cased To 80 Feet 1 - 30" X 1300' X 3500 GPM Well Cased To 850 Feet 1 - 17" X 1490' X 1400 GPM Well Cased To 1150 Feet 1 - 6" X 30' X 400 GPM Well Cased To 25 Feet 1 - 30" X 1200' X 3500 GPM Well Cased To 765 Feet 4 - 40" X 100' X 10420 GPM Wells Cased To 57 Feet 1 - 30" X 115' X 4170 GPM Well Cased To 80 Feet 1 - 30" X 115' X 2500 GPM Well Cased To 80 Feet 1 - 12" X 35' X 1200 GPM Well Cased To 30 Feet 10 - 48" X 80' X 10420 GPM Wells Cased To 46 Feet
- 8. Permittee shall mitigate interference with existing legal uses that was caused in whole or in part by the permittee's withdrawals, consistent with the approved mitigation plan. As necessary to offset the interference, mitigation will include pumpage reduction, replacement of the impacted individual's equipment, relocation of wells, change in withdrawal source, or other means.

Interference to an existing legal use is defined as an impact that occurs under hydrologic conditions equal to or less severe than a 1 in 10 year drought event that results in the:

(1) Inability to withdraw water consistent with provisions of the permit, such as when remedial structural or operational actions not materially authorized by existing permits must be taken to address the interference; or

(2) Change in the quality of water pursuant to primary State Drinking Water Standards to the extent that the water can no longer be used for its authorized purpose, or such change is imminent.

9. Permittee shall mitigate harm to existing off-site land uses caused by the permittee's withdrawals, as determined through reference to the conditions for permit issuance. When harm occurs, or is imminent, the District will require the permittee to modify withdrawal rates or mitigate the harm. Harm caused by withdrawals, as determined through reference to the conditions for permit issuance, includes:

(1) Significant reduction in water levels on the property to the extent that the designed function of the water body and related surface water management improvements are damaged, not including aesthetic values. The designed function of a water body is identified in the original permit or other governmental authorization issued for the construction of the water body. In cases where a permit was not required, the designed function shall be determined based on the purpose for the original construction of the water body (e.g. fill for construction, mining, drainage canal, etc.)

(2) Damage to agriculture, including damage resulting from reduction in soil moisture resulting from consumptive use; or

(3) Land collapse or subsidence caused by reduction in water levels associated with consumptive

use.

10. Permittee shall mitigate harm to the natural resources caused by the permittee's withdrawals, as determined through reference to the conditions for permit issuance. When harm occurs, or is imminent, the District will require the permittee to modify withdrawal rates or mitigate the harm. Harm, as determined through reference to the conditions for permit issuance includes:

(1) Reduction in ground or surface water levels that results in harmful lateral movement of the fresh water/salt water interface,

(2) Reduction in water levels that harm the hydroperiod of wetlands,

(3) Significant reduction in water levels or hydroperiod in a naturally occurring water body such as a lake or pond,

- (4) Harmful movement of contaminants in violation of state water quality standards, or
- (5) Harm to the natural system including damage to habitat for rare or endangered species.
- 11. If any condition of the permit is violated, the permit shall be subject to review and possible modification, enforcement action, or revocation.
- 12. Authorized representatives of the District shall be permitted to enter, inspect, and observe the permitted system to determine compliance with special conditions.
- 13. The Permittee is advised that this permit does not relieve any person from the requirement to obtain all necessary federal, state, local and special district authorizations.
- 14. The permit does not convey any property right to the Permittee, nor any rights and privileges other than those specified in the Permit and Chapter 40E-2, Florida Administrative Code.
- 15. Permittee shall submit all data as required by the implementation schedule for each of the limiting conditions to: SFWMD, Regulatory Support Division, MSC 9611, P.O. Box 24680, West Palm Beach, FL 33416-4680.
- 16. In the event of a declared water shortage, water withdrawal reductions will be ordered by the District in accordance with the Water Shortage Plan, Chapter 40E-21, F.A.C. The Permittee is advised that during a water shortage, pumpage reports shall be submitted as required by Chapter 40E-21, F.A.C.
- 17. Prior to the use of any proposed water withdrawal facility authorized under this permit, unless otherwise specified, the Permittee shall equip each facility with a District-approved operating water use accounting system and submit a report of calibration to the District, pursuant to Section 4.1, Basis of Review for Water Use Permit Applications.

In addition, the Permittee shall submit a report of recalibration for the water use accounting system for each water withdrawal facility (existing and proposed) authorized under this permit every five years

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from each previous calibration, continuing at five-year increments.

18. Monthly withdrawals for each withdrawal facility shall be submitted to the District quarterly. The water accounting method and means of calibration shall be stated on each report. The permittee shall report injection/withdrawals from the ASR wells in the following manner:

Biscayne aquifer water injected Biscayne aquifer water recovered Floridan aquifer withdrawal

- The Permittee shall provide annual status reports to the District that summarize the ASR cycle testing activities. The first report shall be submitted by: March 15, 2013
- 20. The Permittee shall notify the District within 30 days of any change in service area boundary. If the Permittee will not serve a new demand within the service area for which the annual allocation was calculated, the annual allocation may then be subject to modification and reduction.
- 21. The Permittee shall submit to the District an updated Well Description Table (Table A) within one month of completion of the proposed wells identifying the actual total and cased depths, pump manufacturer and model numbers, pump types, intake depths and type of meters.
- 22. Permittee shall secure a well construction permit prior to construction, repair, or abandonment of all wells, as described in Chapters 40E-3 and 40E-30, Florida Administrative Code.
- 23. Every ten years from the date of permit issuance, the permittee shall submit a water use compliance report for review and approval by District Staff, which addresses the following:

1. The results of a water conservation audit that documents the efficiency of water use on the project site using data produced from an onsite evaluation conducted. In the event that the audit indicates additional water conservation is appropriate or the per capita use rate authorized in the permit is exceeded, the permittee shall propose and implement specific actions to reduce the water use to acceptable levels within timeframes proposed by the permittee and approved by the District.

2. A comparison of the permitted allocation and the allocation that would apply to the project based on current District allocation rules and updated population and per capita use rates. In the event the permit allocation is greater than the allocation provided for under District rule, the permittee shall apply for a letter modification to reduce the allocation consistent with District rules and the updated population and per capita use rates to the extent they are considered by the District to be indicative of long term trends in the population and per capita use rates over the permit duration. In the event that the permit allocation is less than allowable under District rule, the permittee shall apply for a modification of the permit to increase the allocation if the permittee intends to utilize an additional allocation, or modify its operation to comply with the existing conditions of the permit.

3. Summary of the current and previous nine years progress reports for implementation of the Alternative Water Supply Plan and any modifications necessary to continue to meet the Plan requirements and conditions for issuance.

4. Information demonstrating that the conditions for issuance of the permit are being complied with, pursuant to Limiting Condition # 51 and Section 373.236, F.S.

- 5. Updates or amendments to the County's reuse plan.
- 24. In order to promote use of alternative water supplies, pumpage from Floridan aquifer wells and from those Biscayne aquifer wells whose use is offset by reclaimed water will be conducted on a priority basis, referred to as a "first on, last off" priority. Changes to wellfield operations must be approved via modification of the approved Wellfield Operation Plan by District staff prior to implementation.
- 25. The permittee shall operate surface water control structure known as the Mid-canal structure and bridge in accordance with the approved operational plan included in Exhibit 22. In addition, whenever this structure is opened for the purpose of raising water in the Wellfield Protection Canal down stream of the structure, the upstream structure that delivers water from the L-30 canal shall be opened in a manner to deliver equal volumes to those passed through the Mid-canal structure and bridge. The permittee shall submit operation and flow data logs regarding both structures to the District quarterly.
- 26. The Permittee is authorized to exercise the emergency wells at the Medley Wellfield for a total of two hours per month as needed for bacterial clearance and pump maintenance. Operation of the emergency wells at the Medley Wellfield for more than this amount shall require prior approval from SFWMD. Pumpage data shall be collected and report in accordance with Limiting Condition 18.
- 27. Permittee shall implement the wellfield operating plan described in District staff report prepared in support of recommendation for permit issuance. See Exhibit 10
- 28. No more than 15 MGD shall be withdrawn from the West Biscayne aquifer Wellfield on any given day.
- 29. No more than 25,550 MGY shall be withdrawn during any 12 month consecutive period from the combined Hialeah, Preston and Miami Springs Biscayne aquifer wellfields
- 30. No more than 7,993 MGY shall be withdrawn during any 12 month consecutive period from the Snapper Creek Wellfield unless reclaimed water recharge is implemented in locations and amounts necessary to offset the impact of the increase to Everglades water bodies per limiting conditions 39 and 41.
- 31. No more than 39,931 MGY shall be withdrawn during any 12 month consecutive period from the Southwest Biscayne aquifer Wellfield unless reclaimed water recharge is implemented in locations and amounts necessary to offset the impact of the increase to Everglades water bodies per limiting conditions 39 and 41.
- 32. No more than 67,999 MGY shall be withdrawn during any 12 month consecutive period from the combined West, Southwest Snapper Creek and Alexander Orr Biscayne aquifer wellfields unless reclaimed water recharge is implemented in locations and amounts necessary to offset the impact of the increase to Everglades water bodies per limiting conditions 39 and 41.
- 33. No more than 1,095 MGY shall be withdrawn during any 12 month consecutive period from the South Miami Heights Wellfield.
- 34. No more than 1,752 MGY shall be withdrawn during any 12 month consecutive period from the combined Everglades Labor Camp and Newton wellfields.
- 35. No more than 1,571 MGY shall be withdrawn during any 12 month consecutive period from the combined Elevated Tank, Leisure City and Naranja wellfields.
- 36. The Permittee shall continue to submit monitoring data in accordance with the approved water level monitoring program for this project.

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The existing monitoring program is described in Exhibits 30 and 32B.

- 37. The Permittee shall continue to submit monitoring data in accordance with the approved saline water intrusion monitoring program for this project.
 See exhibits 28A and 32B for a list of monitor wells and and required sampling schedule.
 The permittee shall submit annual Monitoring Program summary reports. The annual report will summarize the status of the project to update the salt front and install new monitor wells.
- 38. Within six months of permit issuance, an executed large user water agreement with the City of Hialeah shall be submitted to the District. In the event that the final agreement is for volumes less than those used in the formulation of the allocations in this permit, the allocations shall be reduced through a letter modification.
- 39. The permittee shall implement a minimum of 170 MGD of reuse projects as set forth in Projects 1-8 of Exhibit 14 on or before the deadlines provided therein. The exact volume of reclaimed water applied will depend on the treatement losses resulting from the process that are implemented. In the event any of these projects do not require or allow as much reuse as anticipated, the County shall identify and implement other reuse projects that will provide provide beneficial reuse of water by the deadlines set forth in Exhibit 14. Any changes to Exhibit 14 must be reviewed and approved by the District in consultation with the FDEP in accordance with Parts I & II of Chapter 373, Florida Statutes, and District rules governing consumptive uses of water in Chapter 40E-2, F.A.C., and FDEP rules governing the treatment and use of reclaimed water in Chapter 62-610, F.A.C.
- 40. The permittee will develop alternative water supplies in accordance with the schedules described in Exhibit 13.

The permittee will provide annual updates of the status of all alternative water supply projects (per the timeframes contained in Limiting Condition 50). The status report shall include work completed to date, expenditures and any anticipated changes in the timelines.

- 41. In the event that a milestone specified in the alternative water supply schedule and plan contained in Exhibit 13 is going to be missed, the permittee shall notify the Executive Director of the District in writing explaining the nature of the delay, actions taken to bring the project back on schedule and an assessment of the impact the delay would have on the rates of withdrawals from the Everglades water bodies and associated canals as defined in SFWMD consumptive use permitting rules. The District will evaluate the situation and take actions as appropriate which could include: a.) granting an extension of time to complete the project (if the delay is minor and doesn't affect the Everglades Waterbodies or otherwise violates permit conditions), b.) take enforcement actions including consent orders and penalties, c.) modify allocations contained in this permit from the Biscayne aquifer including capping withdrawal rates until the alternative water supply project(s) are completed (in cases where the delay would result in violations of permit conditions) or d.) working with the Department of Community Affairs to limit increase demands for water until the alternative water supply project is completed.
- 42. The Permittee shall provide the District with annual updates by March 15th each year describing the activities associated with the implementation of their approved reuse feasibility plan including the following information: (1) the status of distribution system construction, including location and capacity of a) existing reuse lines b) proposed reuse lines to be constructed in the next five years; (2) a summary of uncommitted supplies for the next five years; (3) the status of reuse plan implementation including status of pilot projects, plan design construction, volume of reuse available, volume of wastewater disposed of; and (4) the status/copies of any ordinances related to reuse (5) any proposed changes to the reuse plan set forth in Exhibit 14. The first annual update is due March 15,

2013.

- 43. Reuse Project numbers 5 and 6 in Exhibit 14 for wellfield recharge, which must be in place and operating prior to any additional withdrawals from the wellfield over the base condition water use as identified in Exhibit 10.
- 44. July 1, 2013, the Permittee shall submit a report for District review and approval identifying the location, treatment, timing and volume for Reuse Projects 5 & 6 on Exhibit 14 which provide groundwater recharge for the Southwest Wellfield. The report shall demonstrate that the proposed recharge sites and operations shall at a minimum prevent increased withdrawals from the C-4, C-2 and eastward groundwater seepage from Everglades National Park over the base condition water use and is otherwise a beneficial reuse of water per Chapter 62-610, F.A.C.
- 45. For Reuse Project number 4 of Exhibit 14 for rehydration of Biscayne Coastal Wetlands, in consultation with the District, the FDEP and Biscayne Bay National Park, upon completion of the pilot testing program, the parties shall agree on the water quality treatment required and the feasibility, as defined in Section 3.2.3.2 of the Basis of Review for Water Use, of this project on or before January 15, 2014. Extension of this deadline may be issued in writing by the District upon demonstration of good cause such as events beyond the control of the permittee or after consideration of the results/data collected, the District determines that additional testing is necessary. In determining the water quality needed, the parties will consider State and Federal water quality discharge standards, the volume and timing of water to be delivered to Biscayne Bay and the location of delivery. In the event the parties do not reach agreement on the feasibility by January 15, 2014, the Permittee shall begin development of an alternate reuse project from the South District wastewater facility and shall provide the District with a proposal for an alternate project including a conceptual design and schedule for implementation on or before December 15, 2014.
- 46. The permittee may request temporary authorization from the District to capture and store stormwater via withdrawals from the permitted Biscayne aquifer production wells, for storage within the Floridan aquifer system consistent with their FDEP issued Underground Injection Control permits. The District will consider the availability of stormwater that is not otherwise needed for environmental protection or enhancement and is in no way bound to authorize such requests. All such requests shall be made in writing to the Director of Water Use Regulation.
- 47. Permittee shall maintain an accurate flow meter at the intake of the water treatment plant for the purpose of measuring daily inflow of water.

Permittee shall maintain a calibrated flow meter(s) at the intake (raw water) and discharge (treated water) points within the Hialeah/Preston, Alexander Orr, and proposed Hialeah RO and South Miami Heights water treatment plants for the purpose of measuring treatment losses and shall submit monthly data quarterly as required pursuant to Limited Condition 18.

48. The Water Conservation Plan required by Section 2.6.1 of the Basis of Review for Water Use Permit Applications within the South Florida Water Management District, must be implemented in accordance with the approved implementation schedule.

The Water Conservation Plan is contained in Exhibit 18. The permittee shall submit an annual report covering water conservation activities during the prior calendar year by March 15 of each year describing water conservation activities for the year including expenditures, projects undertaken and estimated water savings.

49. Permittee shall determine unaccounted-for distribution system losses on a quarterly basis and report the findings on an annual basis. The losses shall be determined for the entire system and for each of

the water treatment plants (comparing water pumped from the wells compared to the volume into and out of the treatment plant), utilizing the most recent, approved water accounting and International Water Association / American Water Works Association (IWA/AWWA) water audit methodologies. The permittee shall verify the IWA/AWWA water audit methods to be used with the District for the subsequent year in each annual report. The annual report shall cover activities during the prior calendar year and be submitted on April 15 of each year. In addition to the unaccounted-for loss data, the report shall include the status of the activities (actions and expenditures along with the associated water savings) completed during the year to implement the approved water loss reduction plan (Exhibit 17).

In the event that the water losses, as defined by the AWWA method (Exhibit 16B), exceed 10 percent, the permittee shall include in the annual report a description of additional actions which will be implemented the following year(s) to reduce the losses to less than ten percent. If the District concludes that the progress towards achieving losses of less than 10 percent as identified in the unaccounted for losses plan is inconsistent with the plan schedule, the Permittee shall be required to revise the plan, to be approved by the District.

- 50. All annual reports required in these limiting conditions shall address activities that occurred during a calendar year and shall be submitted to Water Use Compliance on or before April 15th of the following year.
- 51. If it is determined that the conditions for permit issuance are no longer met for the 20 year permit duration, the permittee shall obtain a modification of the Permit from the District as necessary to come into compliance with the conditions for permit issuance. Such conditions for permit issuance include minimum flows and levels, water reservations, and other conditions ensuring the use does not cause water resource harm and is consistent with the objectives of the District, including implementation of the Comprehensive Everglades Restoration Plan.
- 52. The permittee shall operate the West Wellfield in accordance with the Memorandum of Understanding between the U.S. Department of the Interior, the Governor of the State of Florida, Miami Dade County and the District incorporated in Exhibit 35.

APPENDIX B

FDEP UIC PERMITS AND CORRESPONDENCE



FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

BOB MARTINEZ CENTER 2600 BLAIR STONE ROAD TALLAHASSEE, FLORIDA 32399-2400 RICK SCOTT GOVERNOR

HERSCHEL T. VINYARD JR. SECRETARY

Mr. John Renfrow, Director Renfrj@miamidade.gov

Miami-Dade Water and Sewer Department 3071 SW 38th Avenue Miami, Florida 33169 Dade County UIC Permit ID Number: 0131773-010 - 011-UC /5Q WACS ID Number: 089804

Miami-Dade Southwest Well Field Class V, Group 7, ASR Well System Construction and Testing Permit

NOTICE OF PERMIT

Enclosed are Permit Numbers 0131773-010 - 011-UC /5Q and an associated Administrative Order to allow operational testing of a Class V, Group 7, Aquifer Storage and Recovery (ASR) injection well system at the Miami-Dade Southwest Well Field (MDSWWF) ASR facility, using ultraviolet (UV) disinfection. The water source for the ASR system, for this testing, will be from Biscayne aquifer wells. The disinfected water from the Biscayne aquifer will be stored underground in the upper Floridan aquifer (Class G-II ground water) during times of excess supply and will be withdrawn from the upper Floridan aquifer storage zone when potable water demand is high. The injected water will meet all the primary drinking water standards and all the secondary drinking water standards before it is injected into the ASR wells. An Administrative Order (AO) is being issued with this permit because testing of this ASR system may result in exceedances of some ground water standards such as arsenic.

The MDSWWF ASR system consists of two ASR wells (ASR-4-SW and ASR-5-SW), one on-site dual-zone ASR Floridan Aquifer monitor zone well (MW-FA-1-SW), and one single-zone Biscayne aquifer monitor well MW-BA-1-SW (formerly named MW-1-SW or BA-1L). The MDSWWF ASR system wells are located near the corner of SW 79th Street and SW 123rd Avenue (ASR-4-SW - latitude 25°41'39.2"N and longitude 80°23'40.8"W; ASR-5-SW - latitude 25°41'32.4"N and longitude 80°23'47.6"W) in unincorporated Miami-Dade County, Florida. This facility is located near the corner of SW 79th Street and SW 123rd Avenue, in unincorporated Miami-Dade County, Florida.

The maximum permitted flow for each ASR well is 5.04 MGD. The maximum permitted wellhead pressure for ASR-4-SW is 67 psi, and ASR-5-SW is 66 psi.

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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 rules 9.110 and 9.190, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 3900 Commonwealth Boulevard, Mail Station 35, 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.

Executed in Leon County, Florida.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Juph Hebbeld

Joseph Haberfeld Aquifer Protection Administrator

WACS ID Number: 089804 Permit Number: 0131773-010 - 011-UC /5Q Date: December 19, 2013

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this NOTICE OF PERMIT and all copies were mailed before the close of business on Thursday, December 19, 2013, to the listed persons.

FILING AND ACKNOWLEDGMENT

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

Maryfarker.

December 19, 2013 Date

Copies Furnished To: Joseph Haberfeld, FDEP/TLH Neil Campbell, FDEP/TLH Cathleen McCarty, FDEP/TLH Joe May, FDEP/WPB Richard O'Rourke, MDWSD/MIA Nancy Marsh, USEPA/ATL

joe.haberfeld@dep.state.fl.us neil.i.campbell@dep.state.fl.us cathleen.mccarty@dep.state.fl.us joseph.may@dep.state.fl.us rorou01@miamidade.gov marsh.nancy@epa.gov



FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

BOB MARTINEZ CENTER 2600 BLAIR STONE ROAD TALLAHASSEE, FLORIDA 32399-2400 RICK SCOTT GOVERNOR

HERSCHEL T. VINYARD JR. SECRETARY

Underground Injection Control Class V Injection Well System Construction Permit

Permittee: Miami-Dade Water and Sewer Department

Responsible Official: Mr. John Renfrow, Director 3071 SW 38th Avenue Miami, Florida 33146 Renfrj@miamidade.gov

Facility

Miami-Dade Southwest Well Field Corner of SW 79th St. & SW 123rd Ave. Miami, Florida 33169 Permit ID Number: Facility ID Number: WACS ID Number: Date of Issuance: Date of Expiration: Permit Processor:

Permit/Certification

Location County: Latitude: Longitude: 0131773-010 - 011-UC/5Q N/A 089804 December 19, 2013 December 18, 2018 Neil I. Campbell

Miami-Dade 25° 41' 39.2" North 80° 23' 40.8" West

Project: Class V, Group 7, ASR Well System

This permit is issued under the provisions of Chapter 403, Florida Statutes, and the rules adopted thereunder. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows.

TO OPERATIONAL TEST: A Class V, Group 7, Aquifer Storage and Recovery (ASR) injection well system at the Miami-Dade Southwest Well Field (MDSWWF) ASR facility, using ultraviolet (UV) disinfection. The water source for the ASR system, for this testing, will be from the Biscayne aquifer wells. The disinfected water from the Biscayne aquifer will be stored underground in the upper Floridan aquifer (Class G-II ground water) during times of excess supply and will be withdrawn from the upper Floridan aquifer storage zone when potable water demand is high. The injected water will meet all the primary drinking water standards and all the secondary drinking water standards before it is injected into the ASR wells. An Administrative Order (AO) is being issued with this permit because testing of this ASR system may result in exceedances of some ground water standards such as arsenic.

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The MDSWWF ASR system consists of two ASR wells (ASR-4-SW and ASR-5-SW), one onsite dual-zone ASR Floridan aquifer monitor well (MW-FA-1-SW also known as MW-2-SW or W 864), and a single-zone Biscayne aquifer monitor well (MW-BA-1-SW {also known as MW-1-SW or BA-1L}). The MDSWWF ASR wells location are ASR-4-SW - latitude 25°41'39.2"N and longitude 80°23'40.8"W and ASR-5-SW - latitude 25°41'32.4"N and longitude 80°23'47.6"W, in unincorporated Miami-Dade County, Florida. The ASR wells at this facility were constructed under a previous permit; however these wells were to begin operational testing on July 29, 2013.

The maximum permitted flow for each ASR well is 5.04 million gallons per day (MGD). The maximum permitted wellhead pressure for ASR-4-SW is 67 psi and ASR-5-SW is 66 psi. Recovered ground water is to be treated at the Alexander Orr Jr, Water Treatment Plant.

IN ACCORDANCE WITH: The Application to Construct DEP Form No. 62-528.900(1) received June 24, 2013, and technical specifications, drawings, plan of study and addenda submitted to this agency.

LOCATION: The Miami-Dade Water and Sewer Department Southwest Well Field ASR facility is located near the corner of SW 79th Street and SW 123rd Avenue, in unincorporated Miami-Dade County, Florida.

The ASR and monitoring wells at this facility are designated as follows:

Injection Well(s):

Well Name	WACS Effluent Testsite ID	Total Well Depth*	Casing Diameter (inches)	Casing Type	Casing or Interval Depth*
		1196	42	steel	180
ASR-4-SW	10896		30	steel	765
			Open hole		765-1196
			42	steel	180
ASR-5-SW	10897	1200	30	steel	760
	- C C C C		Open hole		760-1200

*Feet Below Land Surface

PERMITTEE:	Mr. John Renfrow, Director
	Miami-Dade Southwest Well Field
	Class V, Group 7, ASR Well System

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Monitoring Wells

Well Name	WACS Testsite ID	Casing Diameter (inches)	Casing Type	Casing or Interval Depth*
		34	steel	10
		24	steel	200
		12.75	steel	845
MW-FA-1-SW	23759A	Upper Monitor Zone		845-900
	1	6.5	steel	1110
	23759B	Lower Monitor Zone		1100-1200
MW-1	22392	2	PVC	155-190

*Feet Below Land Surface

SUBJECT TO: Specific Conditions I-IV and General Conditions 1-24.

Specific Conditions

I. GENERAL REQUIREMENTS

A. General

- 1. This permit is for Miami Dade to operationally test two ASR wells and corresponding monitor wells at their Southwest Well Field. This permit does not authorize the construction or operational testing of any other well or wells. [62-528.440(2)(a)]
- In the event a well must be plugged or abandoned, the permittee shall obtain a permit from the Department as required by Chapter 62-528, Florida Administrative Code (F.A.C.). When no longer used for their intended purpose, these wells shall be properly plugged and abandoned. Within 180 days of well abandonment, the permittee shall submit to the Department the proposed plugging method, pursuant to Rule 62-528.460, F.A.C. [62-528.460(1) and 62-528.435(6)]
- 3. If injection is to continue beyond the expiration date of this permit the permittee shall apply for, and obtain an operation permit. If necessary to complete the operational testing period, the permittee shall apply for renewal of the construction permit at least 60 days prior to the expiration date of this permit. [62-528.307(3)(a)]
- 4. Hurricane Preparedness: Preparations to be made by permittee upon issuance of a "Hurricane Watch" by the National Weather Service include, but are not limited to:
 - a. Secure all onsite salt and other stockpiled additive materials to prevent surface and/or ground water contamination.

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b. Properly secure equipment to prevent damage to well(s) and onsite treatment process equipment.

[62-528.307(1)(f)]

B. Surface Equipment

- 1. The integrity of the monitoring zone sampling systems shall be maintained at all times. Sampling lines shall be clearly and unambiguously identified by monitoring zone at the point at which samples are drawn. All reasonable and prudent precautions shall be taken to ensure that samples are properly identified by monitoring zone and that samples obtained are representative of those zones. Sampling lines and equipment shall be kept free of contamination with independent discharges and no interconnections with any other lines. [62-528.307(1)(f) and 62-528.307(3)(b)]
- 2. The surface equipment and piping for the ASR and monitoring wells shall be kept free of corrosion at all times. [62-528.307(1)(f) and 62-528.307(3)(b)]
- 3. The ASR well pads shall be maintained and retained in service for the life of the ASR wells. The ASR well pads are not, unless specific approval is obtained from the Department, to be used for storage of any material or equipment at any time. [62-528.307(1)(f) and 62-528.307(3)(b)]

II. QUALITY ASSURANCE/QUALITY CONTROL

- 1. The permittee shall ensure that the operation of this ASR well system shall be as described in the application and supporting documents. Any proposed modifications to the permit shall be submitted in writing to the Underground Injection Control Program for review and clearance prior to implantation. 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. *[62-528.100 and 62-4.050]*
- 2. Proper operation and maintenance include effective performance and appropriate quality assurance procedures; adequate operator staffing and training; and adequate laboratory and process controls. [62-528.307(2)(b)]
- 3. All water quality samples required by this permit shall be collected in accordance with the appropriate Department Standard Operation Procedures (SOP), pursuant to Chapter 62-160, Quality Assurance, Part II, Field Procedures, F.A.C. A certified laboratory shall conduct the analytical work, as provided by Chapter 62-160, Quality Assurance, Part III, Laboratory Certification and Procedures, F.A.C. Department approved test methods shall be utilized, unless otherwise stated in this permit. All calibration procedures for field testing and laboratory equipment shall follow manufacturer's instrumentation manuals and satisfy the requirements of the Department SOPs. A listing of the SOPs pertaining to

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field and laboratory activities is available at the FDEP website at: http://www.dep.state.fl.us/water/sas/sop/sops.htm. [62-4.246 and 62-160]

- 4. All indicating, recording and totalizing devices associated with the ASR well system shall be maintained in good operating condition and calibrated annually at a minimum. The pressure gauges, flow meter, and chart records shall be calibrated using standard engineering methods. [62-528.307(1)(f) and 62-528.307(2)(b)]
- 5. All reports submitted to satisfy the requirements of this permit shall be signed by a person authorized under Rule 62-528.340(1), F.A.C., or a duly authorized representative of that person under Rule 62-528.340(2), F.A.C. All reports required by this permit which are submitted to the Department shall contain the following certification as required by Rule 62-528.340(4), F.A.C.:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based 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.

[62-528.340(1), (2), and (4)]

6. Analyses shall be conducted on unfiltered samples, unless filtered samples have been approved by the Southeast District, 400 North Congress Avenue, West Palm Beach, Florida 33401 as being more representative of ground water conditions. [62-520.310(5)]

III. OPERATIONAL TESTING AND MONITORING REQUIREMENTS

A. General

- 1. The permittee shall conduct operational testing of the ASR well system prior to submittal of an operating permit application to demonstrate that the system will operate consistently with Department rules. [62-528.450(3)(a)]
- 2. Prior to operational testing, the permittee shall comply with the requirements of rule 62-528.450(3) (a), (b) and (c), F.A.C. [62-528.307(2)(e)]
- 3. Prior to the authorization of operational testing by the Department, the permittee shall contact the Southeast District office to arrange a site inspection. The inspection will determine if the conditions of the permit have been met and to verify that the ASR well system is operational. During the inspection, emergency procedures and reporting requirements shall be reviewed. [62-528.450(3)(c)]

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4. The Engineer of Record or designated qualified representative must be present for the start-up operations and the Department must be notified in writing of the date operational testing commenced for the subject well. [62-528.440(5)(b)]

B. Monitoring

The ASR system shall be monitored in accordance with Rules 62-528.425(l)(g) and 62-528.430(2), F.A.C. The following ASR well performance data and monitor zone data shall be recorded and reported in the Monthly Operating Report (MOR) as indicated below during each recharge, storage and recovery phase. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. [62-528.307(2)(d), 528.430(2) and 62-528.450(3)(b)5.]

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PARAMETER	UNIT	RECORDING FREQUENCY	FREQUENCY OF ANALYSES				
			ASR Wells ^a	MW-FA-1- SW Upper Zone A	MW-FA-1- SW Lower Zone B	MW-BA 1-SW	
Flow Rate, max.	gpm	continuous	D/M				
Flow Rate, min.	gpm	continuous	D/M				
Flow Rate, avg.	gpm	continuous	D/M			V	
Total Volume Recharged	MG	daily	D/M				
Total Volume Recovered	MG	daily	D/M				
Net Storage-per well & total	MG		М				
Injection Pressure, max.	psi	continuous	D/M			L	
Injection Pressure, min.	psi	continuous	D/M				
Injection Pressure, avg.	psi	continuous	D/M		house a second b	1	
Water Level, max.	ft (NAVD 88)	continuous		D/M	D/M		
Water Level, min.	ft (NAVD 88)	continuous		D/M	D/M		
Water Level, avg.	ft (NAVD 88)	continuous		D/M	D/M	S	
Arsenic	µg/L		W	W	M	M	
Bicarbonate (HCO ³)	mg/L		W	W	M	M	
Calcium	mg/L		W	W	M	M	
Chloride	mg/L		W	W	M	M	
Coliform, fecal	cts/100ml		W	W	M	M	
Coliform, total	cts/100ml		W	W	M	M	
Color	c.u.		W	W	M	М	
Dissolved Oxygen ^b	mg/L		W	W	M	М	
Magnesium	mg/L		W	W	M	М	
Odor	otn			W	M	М	
Oxidation-Reduction Potential ^b	mV		W	W	M	М	
pH ^b	std. units		W	W	M	М	
Radium ^{226/228}	pCi/L		Q*	Q*			
Sodium	mg/L		W	Ŵ	M	М	
Specific Conductivity ^b	µmhos/cm		W	W	M	М	
Sulfate	mg/L		W	W	M	М	
Temperature ^b	°C		W	W	M	М	
Total Alkalinity	mg/L		W	W	M	М	
Total Dissolved Solids	mg/L		W	W	M	М	
Total Iron	mg/L		W	W	M	М	
Total Manganese	mg/L		W	W	M	М	
Total Nitrate	mg/L		W	W	M	M	
Total Organic Carbon, (TOC)	mg/L		W	W	M	М	
Total Sulfide	mg/L		W	W	M	М	
Total Suspended Solids	mg/L	5	W	W	M	M	
Turbidity	NTU		W	W	M	М	
Dissolved Iron	mg/L		W	W	M	M	
Gross Alpha	pCi/L		Q	Q		11	
Primary and Secondary stds c			A			1.	

See ASR well and monitoring well tables on pages 2 and 3 of the permit for more information.

7 www.dep.state.fl.us

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W - Weekly; D/M - daily and monthly; M - monthly; Q - Quarterly; A - annually.

^a – For the ASR wells, samples shall be collected from sampling tap after the UV disinfection system (for recharge), and from each of the ASR wells (Wells ASR-4-SW and ASR-5-SW) during recovery.

^b – Field samples.

^c – Injectate only.

* - Analyzed only if Gross Alpha exceeds 15 pCi/L.

MONI	TORING SO	CHEDULE FO	R STORAGE	CYCLES	2
PARAMETER	UNIT	RECORDING FREQUENCY	FREQUE	ENCY OF ANA	ALYSES
			MW-FA-1-SW Upper Zone A	MW-FA-1-SW Lower Zone B	MW-BA-1-SW
Water Level, max.	ft (NAVD 88)	continuous	D/M	D/M	
Water Level, min.	ft (NAVD 88)	continuous	D/M	D/M	
Water Level, avg.	ft (NAVD 88)	continuous	D/M	D/M	
Arsenic	μg/L		М	Q	Q
Bicarbonate (HCO ³)	mg/L		М	Q	Q
Calcium	mg/L		М	Q	Q
Chloride	mg/L		М	Q	Q
Coliform, fecal	cts/100ml	II	М	Q	Q
Coliform, total	cts/100ml		М	Q	Q
Color	c.u.		М	Q	Q
Dissolved Oxygen ^b	mg/L		М	Q	Q
Magnesium	mg/L		М	Q	Q
Odor	otn	1	М	Q	Q
Oxidation-Reduction Potential ^b	mV		М	Q	Q
pН ^b	std. units		М	Q	Q
Radium ^{226/228}	pCi/L		Q*		
Sodium	mg/L		М	Q	Q
Specific Conductivity ^b	µmhos/cm		М	Q	Q
Sulfate	mg/L		М	Q	Q
Temperature ^b	°C		М	Q	Q
Total Alkalinity	mg/L		М	Q	Q
Total Dissolved Solids	mg/L		М	Q	Q
Total Iron	mg/L	1	М	Q	Q
Total Manganese	mg/L		W	М	М
Total Nitrate	mg/L		W	М	М
Total Organic Carbon, (TOC)	mg/L		W	М	М
Total Sulfide	mg/L		М	Q	Q
Total Suspended Solids	mg/L		М	Q	Q
Turbidity	NTU		М	Q	Q
Dissolved Iron	mg/L		М	Q	Q
Gross Alpha	pCi/L		Q		

See ASR well and monitoring well tables pages 2 and 3 of the permit for more information. D/M – daily and monthly; M – monthly; Q – Quarterly; W – Weekly.

^b - Field samples.

* - Analyzed only if Gross Alpha exceeds 15 pCi/L.

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- 2. The permittee shall submit monthly to the Department the results of all injection well and monitoring well data required by this permit no later than the last day of the month immediately following the month of record. The report shall include:
 - a. A cover page summarizing the current status of all monthly activities, including the certification and signature required in condition II.5.
 - b. Operational and water quality data in a tabular format. The following indentifying information must be included on each data sheet:
 - i. Facility Name
 - ii. Well Name
 - iii. UIC Permit Number
 - iv. WACS Facility ID
 - v. WACS Testsite ID (on appropriate data sheet) as provided on the Injection Well and Monitoring Well tables on pages 2 and 3 of this permit.
 - c. Laboratory pages and supporting documentation.

[62-528.307(3)(d)]

3. The report may be sent via electronic mail in Adobe[™] (.pdf) format to the following Program e-mail addresses:

Southeast District	Tallahassee—UIC Program		
Joseph.May@dep.state.fl.us	Tal UIC@dep.state.fl.us		

If a paper copy of the report is submitted, it should be sent to Department staff at the following addresses:

Southeast District	Tallahassee— UIC Program
400 North Congress Avenue	2600 Blair Stone Road, MS 3530
West Palm Beach, Florida 33401	Tallahassee, Florida, 32399-2400
500 205 (2) (1) 3	

[62-528.307(3)(d)]

- Pertaining to the evacuation (purging) of monitoring wells, which is required prior to the collection of samples for the MORs, the facility may elect to follow either one of the following two purging protocols:
 - a. <u>The protocol stated below:</u>

A minimum of three well volumes of fluid shall be evacuated from the monitoring systems prior to sampling for the chemical parameters listed above. Sufficient purging shall have occurred when either of the following has occurred:

- 1) pH, specific conductance <u>and</u> temperature when sampled, upon purging the third or subsequent well volume, each vary less than 5% from that sampled upon purging the previous well volume; or
- 2) Upon purging the fifth well volume.
- b. The following protocol taken from DEP-SOP-001/01(Field Procedures):
 - Purge until the water level has stabilized (well recovery rate equals the purge rate), then purge a minimum of one well volume, and then collect the first set of stabilization parameters, namely pH, specific conductance and temperature;
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- 2) Thereafter, collect stabilization parameters \geq every $\frac{1}{4}$ well volume;
- 3) Purging shall be complete when either of the following have occurred:
 - a) 3 consecutive readings of the parameters listed below are within the following ranges^[1]:
 - pH ± 0.2 Standard Units
 - Specific Conductance \pm 5.0% of reading
 - Temperature ± 0.2 °C
 - b) Upon purging the fifth well volume.

[62-160.210(1) and 62-528.430(2)]

5. The flow from the monitoring zones during well evacuation and sampling shall not be discharged to surface waters or aquifers containing an Underground Source of Drinking Water (USDW). Waters purged from monitoring wells in preparation for sampling shall be diverted to the ASR well head via the pad drainage system, wet well, or treatment plant. 162-4.030 and 62-620.3201

IV. ABNORMAL EVENTS

- 1. In the event the permittee is temporarily unable to comply with any of the conditions of a permit due to breakdown of equipment, power outages or destruction by hazard of fire, wind, or by other cause, the permittee of the facility shall notify the Southeast District office. [62-528.415(4)(a)]
- 2. Notification shall be made in person, by telephone, or by electronic mail (e-mail) within 24 hours of breakdown or malfunction to the Southeast District, 400 North Congress Avenue, West Palm Beach, Florida 33401. [62-528.307(1)(x)]
- 3. A written report of any noncompliance referenced in Specific Condition (1) above shall be submitted to the Southeast District office and the Tallahassee office within five days after its occurrence. The report shall describe the nature and cause of the breakdown or malfunction, the steps being taken or planned to be taken to correct the problem and prevent its reoccurrence, emergency procedures in use pending correction of the problem, and the time when the facility will again be operating in accordance with permit conditions. [62-528.415(4)(b)]

¹¹¹ Provided dissolved oxygen in the groundwater of the zone being monitored is \leq 20% of saturation for the measured temperature and turbidity is \leq 20 NTUs. This assumption holds true for groundwater in most zones of the Floridan aquifer.

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General Conditions

- 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. [62-528.307(1)(a)]
- 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. [62-528.307(1)(b)]
- 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. [62-528.307(1)(c)]
- 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. [62-528.307(1)(d)]
- 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 there from; 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. [62-528.307(1)(e)]
- 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. [62-528.307(1)(f)]
- 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

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

d. Reasonable time will depend on the nature of the concern being investigated. [62-528.307(1)(g)]

- 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.

[62-528.307(1)(h)]

- 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. [62-528.307(1)(i)]
- 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. [62-528.307(1)(j)]
- This permit is transferable only upon Department approval in accordance with rules 62-4.120 and 62-528.350, F.A.C. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department. [62-528.307(1)(k)]
- 12. This permit or a copy thereof shall be kept at the work site of the permitted activity. [62-528.307(1)(l)]
- 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

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permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.

- c. Records of monitoring information shall include:
 - i. the date, exact place, and time of sampling or measurements;
 - ii. the person responsible for performing the sampling or measurements;
 - iii. the dates analyses were performed;
 - iv. the person responsible for performing the analyses;
 - v. the analytical techniques or methods used;
 - vi. the results of such analyses.
- d. The permittee shall furnish to the Department, within the time requested in writing, any information which the Department requests to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit.
- e. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

[62-528.307(1)(m)]

- 14. All applications, reports, or information required by the Department shall be certified as being true, accurate, and complete. [62-528.307(1)(n)]
- 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. [62-528.307(1)(o)]
- 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. [62-528.307(1)(p)]
- 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. [62-528.307(1)(q)]
- 18. The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit. [62-528.307(1)(r)]
- 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. [62-528.307(1)(s)]

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- 20. The permittee shall retain all records of all monitoring information concerning the nature and composition of injected fluid until five years after completion of any plugging and abandonment procedures specified under rule 62-528.435, F.A.C. The permittee shall deliver the records to the Department office that issued the permit at the conclusion of the retention period unless the permittee elects to continue retention of the records. *[62-528.307(1)(t)]*
- 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. [62-528.307(1)(u)]
- 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). [62-528.307(1)(v)]
- 23. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or injection activity which may result in noncompliance with permit requirements. [62-528.307(1)(w)]
- 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
 - 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. [62-528.307(1)(x)]

Issued this 19th day of December 2013

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

And the file

Joseph Haberfeld Aquifer Protection Program Administrator Division of Water Resource Management

14 www.dep.state.fl.us



Florida Department of Environmental Protection

Southeast District Office 400 N. Congress Avenue, Suite 200 West Palm Beach, FL 33401 Rick Scott Governor

Jennifer Carroll Lt. Governor

Herschel T. Vinyard Jr. Secretary

July 18,2011

NOTICE OF MAJOR MODIFICATION TO PERMIT AND ADMINISTRATIVE ORDER

Mr. John Renfrow Director Miami-Dade Water and Sewer Department 3071 SW 38th Ave. Miami, Florida 33146 Miami-Dade County UIC - M-DWASD SW Wellfield (ASR) FILE: 0131773-009-UC (ASR-4-SW & ASR-5-SW)

Dear Mr. Renfrow:

Enclosed are a Major Modification to Permit (under FDEP File # 0131773-009-UC) and an associated Administrative Order (AO # 11-0456), to allow a request for Department authorization to activate the operational testing of a Class V, Group 7 aquifer storage and recovery (ASR) well system at the M-DWASD Southwest Wellfield Facility, located north of Kendall Drive (SW 88th Street) and just east of Belen Saborido Avenue (also known as SW 127th Avenue) in unincorporated Miami-Dade County, Florida. The major modification to permit and associated administrative order are issued pursuant to Section(s) 403.087, Florida Statutes and Florida Administrative Codes 62-4, 62-520, 62-528 and 62-550.

Any party to this Order (major modification to permit and associated administrative order) has the right to seek judicial review of the major modification to permit and administrative order 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.

Mr. Alan Garcia, P.E. Page 2 of 2 July 15 , 2011

Should you have any questions, please contact Mark A. Silverman, P.G., or Joseph R. May, P.G., of this office at (561) 681-6778 or (561) 681-6691, respectively.

Executed in West Palm Beach, Florida.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

sec)

Jill S. Creech, P.E. Southeast District Director Date

JSC/LAB/JRM/mas

Copies furnished to: Rafael Terrero, M-DWASD Nancy Marsh, USEPA/ATL Cathy McCarty, FDEP/TLH Richard O'Rourke, M-DWASD Agustin Socarras, M-D DERM Jack Epaves, M-DWASD Clint Oakley, M-DWASD Eduardo Vega, M-DWASD

Joe Haberfeld, FDEP/TLH Bertha Goldenberg, M-DWASD Steve Anderson, SFWMD/WPB John Armstrong, FDEP/WPB Virginia Walsh, M-DWASD Patricia Anderson, FDOH/TLH Samir Elmir, M-DCHD

CERTIFICATE OF SERVICE

This is to certify that this NOTICE OF MAJOR MODIFICATION TO PERMIT AND ADMINISTRATIVE ORDER and all copies were mailed before the close of business on $\frac{7}{18}$ 1 to the listed persons.

Clerk Stamp

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



Florida Department of Environmental Protection

Southeast District Office 400 No. Congress Avenue, Suite 200 West Palm Beach, FL 33401 (561) 681-6600 Rick Scott Governor

Jennifer Carroll Lt. Governor

Herschel T. Vinyard Jr. Secretary

PERMITTEE: Mr. John Renfrow Director Miami-Dade Water and Sewer Dept. 3071 SW 38th Ave. Miami, Florida 33146 PERMIT NUMBER: 0131773-009-UC DATE OF ISSUANCE: July 18, 2011 EXPIRATION DATE: August 20, 2013 COUNTY: Miami-Dade PROJECT: **M-DWASD Southwest Wellfield (ASR)**

PROJECT: Major modification to the construction and testing permit (No. 0131773-005-UC) allowing for a request for Department authorization to activate the operational testing of a Class V, Group 7 aquifer storage and recovery (ASR) well system that includes two ASR wells (ASR-4-SW and ASR-5-SW); a dual zone Floridan aquifer monitoring well, MW-FA-1-SW (previously referred to — in the permit being modified — as MW-2-SW); a Biscayne aquifer monitoring well for additional monitoring, MW-BA-1-SW (previously referred to — in the permit being modified — as MW-2-SW); and associated surface facilities at the Miami-Dade Water and Sewer Department (M-DWASD) Southwest Wellfield Facility. An associated administrative order, entailed below, is included with the major modification to permit.

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

TO ALLOW A REQUEST FOR OPERATIONAL TESTING ACTIVATION OF: A Class V, Group 7 aquifer storage and recovery (ASR) well system. The system includes two Class V, Group 7 ASR wells located at the M-DWASD Southwest Wellfield Facility. This major modification to permit includes provisions that when addressed will allow a resumption of operational testing. The permit being modified (FDEP Permit # 0131773-005-UC, issued August 21, 2008), had allowed the injection of limited quantities of potable water for maintenance purposes only, sufficient to preserve well integrity (prevent internal corrosion of the ASR wells' final casings), while M-DWASD addressed permitting requirements to allow for the activation of ASR operational testing.

During the operational testing that is planned, groundwater from the Biscayne aquifer will be stored underground in the upper Floridan aquifer receiving (storage) zone (Class G-II groundwater) during times of excess supply, and will be withdrawn from the upper Floridan aquifer storage zone when potable water demand is high. The operational testing will occur using an ultraviolet (UV) disinfection system that has been installed to treat the injectate prior to its injection. Mr. John Renfrow Director M-DWASD Page 2 of 32

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The two ASR wells located at M-DWASD's Southwest Wellfield ASR Facility were installed under previously issued construction and testing permits; however, these wells have never been operationally tested. Each of the ASR wells is constructed with 30-inch outside diameter (O.D.), 0.5-inch thick seamless steel final casing completed into the upper Floridan aquifer. The final casing extends to a depth of 765 below land surface (ft bls) in ASR-4-SW and 760 ft bls in ASR-5-SW. Each well has an open borehole in the storage interval, constructed from 765 feet to 1,196 ft bls in ASR-4-SW and 760 to 1,200 ft bls in ASR-5-SW.

The ASR monitoring system includes one dual zone Floridan aquifer monitoring well, MW-FA-1-SW (previously referred to — in the permit being modified — as MW-2-SW). The upper monitor zone of MW-FA-1-SW is completed from 845 to 900 ft bls, and is positioned within the upper Floridan aquifer storage interval. The lower monitor zone of MW-FA-1-SW is completed from 1,110 to 1,200 ft bls, and is positioned below the storage interval. The ASR monitoring system also includes monitoring of the Biscayne aquifer utilizing a Biscayne aquifer monitoring well, MW-BA-1-SW (previously referred to — in the permit being modified — as MW-1-SW). The monitor zone of MW-BA-1-SW is completed from 155 to 160 ft bls.

To address reasonable assurance concerns of meeting primary drinking water standards for bacteria, it was intended to obtain a Limited Aquifer Exemption (LAE) as a relief mechanism to allow operational testing to occur. After it became apparent that issuance of a LAE was not forthcoming, M-DWASD conceptually proposed the use of ultraviolet (UV) light disinfection to treat the injectate prior to injection, as a means of providing reasonable assurance that primary bacteriological water quality standards would be met prior to injection.

FDEP issued M-DWASD Construction Permit No. 0131773-007-UC on October 17, 2002 to install a UV disinfection system to treat Biscayne aquifer well water with a minimum UV light dosage of 40 mJ/cm2. The permit was later renewed (on April 4, 2008) under FDEP Construction Permit No. 0131773-008-UC. The installation of this UV disinfection system for the treatment of the raw Biscayne aquifer water has been completed.

Under the major modification to permit, each of the two ASR wells will be used to recharge up to 5.04 million gallons per day (MGD) of groundwater from the Biscayne aquifer, treated using an ultraviolet (UV) disinfection system prior to its injection into the Floridan aquifer system (FAS), and will be used to recover up to 5.04 MGD of groundwater from the FAS. Recovered groundwater will be treated at the Alexander Orr, Jr. Water Treatment Plant (WTP) to augment potable water supply. The design rate of 5.04 MGD is equivalent to a continuous pumping rate of approximately 3,500 gallons per minute (gpm). During the operational testing, water quality of injected and recovered water will be monitored, in addition to the groundwater monitoring to be conducted on the Floridan aquifer monitoring well and a Biscayne aquifer well.

Mr. John Renfrow Director M-DWASD Page 3 of 32 PERMIT NUMBER: 0131773-009-UC DATE OF ISSUANCE: July 18, 2011 EXPIRATION DATE: August 20, 2013

All primary and secondary drinking water standards will be required to be met prior to injection using the ASR wells.

As mentioned at the beginning of this cover letter, an associated draft administrative order is included with the draft major modification to permit. The administrative order is necessary so that this aquifer storage and recovery system may be tested, although exceedances of some groundwater standards may occur, for parameters such as arsenic. While laboratory analysis of samples collected from the Biscayne aquifer (the source water) have demonstrated that arsenic in the source water complies with groundwater quality standards, arsenic may be mobilized by oxidation reactions between minerals in the formation (such as pyrite) and the relatively oxidized recharge water injected into the naturally reduced groundwater environment. The order allows such testing to determine if operation is viable without further measures taken by the facility, or to allow time for those measures to be completed. This order shall be attached to the Major Modification to Permit (FDEP File No. 0131773-009-UC), the referenced major modification to permit, and to Permit No. 0131773-005-UC, the referenced permit.

IN ACCORDANCE WITH: Application for major modification to the construction and testing permit, for a Class V, Group 7 ASR well system received January 6, 2010; meeting between M-DWASD and FDEP staff held at FDEP's Southeast District office on January 22, 2010; Request for Information (RFI) dated April 6, 2010; response to RFI received May 7, 2010; RFI dated June 18, 2010; response to RFI received July 28, 2010; supplementary information received electronically August 31, 2010, February 25, 2011 and March 28, 2011; comments from the Underground Injection Control - Technical Advisory Committee (TAC); publication of the Notice of Draft Major Modification to Permit 0131773-009-UC and Draft Administrative Order AO # 11-0456 in the Miami Daily Business Review on April 8, 2011; in consideration of receipt of public comment received as a result of a public meeting held on May 16, 2011; and publication of the Notice of Intent to Issue Major Modification to Permit 0131773-009-UC and Administrative Order AO # 11-0456 in the Miami Daily Business Review on June 14, 2011.

LOCATED AT: The M-DWASD Southwest Wellfield Facility, near the intersection of SW 79th Street and SW 123rd Avenue, in unincorporated Miami-Dade County, Florida. The facility is north of Kendall Drive (SW 88th Street) and just east of Belen Saborido Avenue (also known as SW 127th Avenue).

TO SERVE AS: The M-DWASD service area.

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

Mr. John Renfrow Director M-DWASD Page 4 of 32 PERMIT NUMBER: 0131773-009-UC DATE OF ISSUANCE: July 18, 2011 EXPIRATION DATE: August 20, 2013

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.

Mr. John Renfrow Director M-DWASD Page 5 of 32 PERMIT NUMBER: 0131773-009-UC DATE OF ISSUANCE: July 18, 2011 EXPIRATION DATE: August 20, 2013

GENERAL CONDITIONS:

- 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.

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GENERAL CONDITIONS:

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

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GENERAL CONDITIONS:

- 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 nature and composition of injected fluid until five years after completion of any plugging and abandonment procedures specified under Rule 62-528.435, F.A.C. The permittee shall deliver the records to the Department office that issued the permit at the conclusion of the retention period unless the permittee elects to continue retention of the records.
- 21. All reports and other submittals required to comply with this permit shall be signed by a person authorized under Rules 62-528.340(1) or (2), F.A.C. All reports shall contain the certification required in Rule 62-528.340(4), F.A.C.

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GENERAL CONDITIONS:

- 22. The permittee shall notify the Department as soon as possible of any planned physical alterations or additions to the permitted facility. In addition, prior approval is required for activities described in Rule 62-528.410(1)(h).
- 23. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or injection activity which may result in noncompliance with permit requirements.
- 24. The permittee shall report any noncompliance which may endanger health or the environment including:
 - a. Any monitoring or other information which indicates that any contaminant may cause an endangerment to an underground source of drinking water (USDW); or
 - b. Any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water.

All information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 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 permitting 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 major modification to permit, must be approved by the Department before implementation.
 - b. The permittee shall be subject to all requirements and regulations of the Miami-Dade Environmental Resources Management Department (DERM) and the South Florida Water Management District (SFWMD) regarding the construction and testing of this ASR well system. Those conditions imposed by the SFWMD in this project's Water Use Permit(s) regarding the testing of the ASR well system remain in effect.
 - c. No fluid shall be injected without written authorization from the Department. The issuance of this major modification to the 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.
 - d. 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.
 - e. If historical or archaeological artifacts, such as Indian canoes, are discovered at any time within the project site, the permittee shall notify the FDEP Southeast District 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.

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- 2. Construction and Testing Requirements
 - a. Based on the operational testing results, M-DWASD may propose modifying the injection interval of the ASR wells, by either casing off or plugging back the 431 ft open zone in ASR-4-SW and the 440 ft open zone in ASR-5-SW to a smaller interval, in order to potentially optimize ASR use by reducing mixing losses and increasing the recovery of fresh water during recovery mode operations. If submitted, a request to modify injection interval(s) shall be submitted to the Department as a request for minor modification to permit. The request shall be accompanied by technical justification, including a presentation of water quality and physical data compiled to date, presented in tabular and graphical format, along with plan diagrams and technical specifications for the proposed modifications.
- 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 major modification to 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 major modification to permit. Changes or modifications other than those described above will require submission of a completed application and appropriate processing (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 operation and to certify the application, specifications and completion report and other related documents, pursuant to Rule 62-528.440(5), F.A.C. The Florida registered professional engineer or professional geologist shall provide monitoring of the drilling and testing operation. The permittee shall notify the Department immediately of any change of the Engineer of Record.

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- c. All water quality samples required in this major modification to permit shall be collected and analyzed in accordance with Department (or NELAP approved) Standard Operating Procedures (SOPs), 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).
- d. The permittee shall calibrate all pressure gauge(s), flow meter(s) and other related measurement equipment associated with the ASR 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 ASR well system shall be calibrated using standard engineering methods.
- e. Continuous on-site supervision by qualified personnel (engineer and/or geologist) is required during all testing, geophysical logging and cementing operations, with the exception of cycle testing.
- f. 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, which consists of representatives at the following offices:
 - Department of Environmental Protection, Southeast District office (West Palm Beach); and
 - Department of Environmental Protection, Tallahassee

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- b. The permittee shall provide copies of all correspondence relative to this major modification to permit to both offices of the Department, as indicated above. Such correspondence includes but is not limited to reports, schedules, analyses and geophysical logs required by the Department under the terms of this major modification to permit.
- c. In accordance with Section 492, Florida Statutes, all documents prepared for the geological/hydrogeological evaluation of the ASR well system shall be signed and sealed by a Florida Licensed Professional Geologist or qualified Florida Licensed Professional Engineer.
- d. If any problem develops that may seriously hinder compliance with this major modification to 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 major modification to 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 Underground Injection Control (UIC) Program staff, S.E. District office in West Palm Beach.
 - 2) A written report of any noncompliance referenced in **Specific Condition** (S.C.) 4.e.1) above shall be submitted to the Southeast District office within five days after discovery of the occurrence. The report shall describe the nature and cause of the breakdown or malfunction, the steps being taken or planned to be taken to correct the problem and prevent its reoccurrence, emergency procedures in use pending correction of the problem, and the time when the facility will again be operating in accordance with permitted conditions.
- f. An interpretation of all test results must be submitted with all submittals.

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- g. Reports on cycle testing progress are required as follows:
 - Within one year of the Department's prospective authorization to recommence cycle testing, a report shall be submitted to FDEP's Southeast District and Tallahassee offices, regarding the results of water quality monitoring for fecal and total coliform, This report shall include professionally rendered opinions, appropriately signed and sealed, with regard to the following:
 - a) Results of water quality monitoring for fecal and total coliform completed to date, including a tabular presentation/graphical evaluation of monitoring well data over the previous one-year period (for all the ASR wells, monitoring wells and zones).
 - b) A summary of all lamp failures, including for each failure identification of the lamp that failed and the associated bank, the date the lamp failed, and the date of return to service for that lamp.
 - c) Interpretation and analysis of the monitoring results for coliforms.
 - 2) The need for additional periodic reports regarding compliance with the standard for total coliform, as entailed above, will be determined by the Department based on review of the report that will be submitted to the Department near the completion of the first year of cycle testing.
 - 3) A report evaluating the system's progress shall also be submitted to the Department's Southeast District office in West Palm Beach/UIC Program and to the Tallahassee UIC Program office within one month of completion of the last planned cycle. A written, detailed evaluation of the ASR system performance shall be included with that report.
- 5. Pre-Operational Testing Requirements
 - a. The operational testing (cycle testing) of the ASR well system under this major modification to permit, with groundwater from the Biscayne aquifer treated by UV disinfection, shall not recommence without written authorization from the Department.

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- b. Prior to Department authorization to activate the operational testing, the permittee shall submit at a minimum the following information (with a request for operational testing authorization) to the Department's Southeast District office in West Palm Beach/UIC Program and to the Tallahassee UIC Program office, for review:
 - 1) Draft Operation and Maintenance (O&M) Manual for the ASR system including the associated UV disinfection system;
 - 2) Results of water quality analyses obtained per a source water analysis of the groundwater from the Biscayne aquifer, sampled at the sampling tap located after the UV disinfection system, within twelve months of submission of the request for operational testing, for:
 - a) Primary and secondary drinking water standards established in Chapter 62-550, Part III, F.A.C., (excluding asbestos, butachlor, acrylamide, epichlorohydrin, and dioxin), see **Attachment**;
 - b) Specific conductance and temperature (field measurements);
 - c) Ammonia, total Kjeldahl nitrogen (TKN) and total nitrogen (TN);
 - d) Total phosphorous (TP) and orthophosphate;
 - e) Fecal coliform and total coliform (cfu/100 mL);
 - f) Giardia lamblia and Cryptosporidium (count and viability testing, where applicable), Escherichia (E.) coli, and Enterococci;
 - g) Turbidity (NTU);
 - h) Total suspended solids, TSS (mg/L);
 - i) Dissolved oxygen (mg/L);
 - j) Oxidation-reduction Potential (ORP; mV);
 - k) Total sulfide (mg/L);
 - 1) Total organic carbon (TOC; mg/L); and
 - m) Total alkalinity (mg/L as CaCO3);
 - n) Radium ^{226/228} (ρCi/L);
 - o) Calcium (mg/L);
 - p) Bicarbonate (mg/L);
 - q) Carbonate (mg/L);
 - r) All other parameters not listed above, but required of a permitted drinking water treatment facility, shall also be submitted.

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SPECIFIC CONDITIONS:

- 3) Results of background groundwater analyses from the upper zone of dual-zone Floridan aquifer monitor well (ASR MW-FA-1-SW-U). The samples shall be analyzed for all the discrete parameters listed in the table entitled 'Initial Monitoring Schedule for Recharge & Recovery Phases' – shown on Pages 22 and 23 of this major modification to permit (under S.C. 6.a.10) – excluding the last row of this table. Hence, referring to this table, the background parameters to be sampled starts with Specific Conductance (first row of the table) and ends with Total Kjeldahl Nitrogen (second to last row of the table).
- 4) Submittal of a plugging and abandonment plan;
- 5) Site plan for M-DWASD's Southwest Wellfield ASR Facility, including a scale (with the locations of the two ASR wells and two monitoring wells); and
- 6) The following additional items for the UV disinfection system:
 - a) UV reactor validation report duly reviewed by the National Water Research Institute (NWRI) or the California Department of Health Services for an identical reactor to the reactor installed;
 - b) An engineering report that addresses the procedure used in scaling up from the identical reactor to the reactor installed; and
 - c) Application of the following equation to calculate the 'reduction equivalent dose' (RED) value for actual installations, developed during the validation test from the California Department of Health letter dated December 15, 2008:

 $RED_{calc} = 10 [1.4766 - 0.7733 \times \log (Q) + 1.0571 \times \log (S)]$

where:

S = Measured UV sensor value (mW/cm²). RED = RED calculated with the UV dose-monitoring equation (mJ/cm²). Q = Flow rate (gallons per minute [gpm]). Mr. John Renfrow Director M-DWASD Page 16 of 32 PERMIT NUMBER: 0131773-009-UC DATE OF ISSUANCE: July 18, 2011 EXPIRATION DATE: August 20, 2013

- c. Pressure gauges must be installed on the two ASR Wells (ASR-4-SW and ASR-5-SW) and all monitor wells prior to initiating ASR activities using the ASR wells at the site. Additionally, flow meters must be installed on ASR Wells ASR-4-SW and ASR-5-SW prior to initiating ASR activities at the site.
- d. The Florida Geological Survey (FGS) is currently investigating the effects of ASR systems on storage zones. The Department requests that the permittee contact the Hydrogeology Program at the FGS (850-488-9380) at least 30 days prior to operational testing to allow the Survey to coordinate a sampling schedule during the operational testing phase of this project.
- e. Before authorizing operational testing the Department shall conduct an inspection of the facility to determine if the conditions of this major modification to permit have been met. The M-DWASD will contact the Underground Injection Control Section of the Department, Southeast District, to arrange for the site inspection. The inspection will determine if all equipment necessary to operate and monitor the ASR wells in compliance with the major modification to permit and Department rules has been installed. During the inspection, reporting requirements shall be reviewed.
- 6. Operational Testing Conditions
 - a. The operational testing of the ASR well system shall be subject to the following conditions:
 - 1) A qualified representative of the Engineer of Record must be present for the start-up operations and the Department must be notified in writing of the date that the operational testing begins for the subject well.

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SPECIFIC CONDITIONS:

- 2) The Department will monitor the progress of the operational testing phase of this project. Meetings shall be held if necessary to aid the Department in determining if it may be necessary to modify the operational testing conditions. If requested by the Department, reports evaluating the system's progress shall be submitted to the Department's Southeast District office in West Palm Beach/UIC Program and to the Tallahassee UIC Program office at least two weeks prior to a scheduled meeting. The Department at each of these review intervals may modify the conditions for the operational testing period.
- 3) The cycle testing program shall initially follow the schedule indicated below:

CYCLE	RECHARGE	RECHARGE	STORAGE	RECOVERY	RECOVERY
	DURATION	VOLUME	DURATION	DURATION	VOLUME
	(APPROX.	(APPROX. MG)	(APPROX.	(APPROX. DAYS)	(APPROX. MG)
	DAYS)		DAYS)		
1	7	105	1	10	150
2	60	900	30	45	675
3	60	900	60	45	675
4	120	1800	60	120	1800

INITIAL CYCLE TESTING PLAN

4) After the first three cycles have been completed, M-DWASD shall review the cycle testing data compiled to date, and shall prepare a proposed cycle testing plan for subsequent cycles. The proposed plan shall be submitted to the Department's Southeast District office in West Palm Beach/UIC Program and to the Tallahassee UIC Program office for review and Department approval. The request for Department authorization of the plan submitted for the subsequent cycles shall be accompanied by information supporting the request. The following plan (for the subsequent cycles) is preliminary only and is subject to modification:

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SPECIFIC CONDITIONS:

PRELIMINARILY PLANNED CYCLE TESTING PLAN FOR SUBSEQUENT CYCLES

CYCLE	RECHARGE	RECHARGE	STORAGE	RECOVERY	RECOVERY
	DURATION	VOLUME	DURATION	DURATION	VOLUME
	(APPROX.	(APPROX. MG)	(APPROX.	(APPROX. DAYS)	(APPROX.
	DAYS)		DAYS)		MG)
5	153	2295	30	151	2265
6	153	2295	30	151	2265
7	153	2295	30	151	2265

- 5) M-DWASD may submit a request to the Department for authorization to modify the cycle testing plan based on prevailing site conditions. A request for modification will be considered only for the intermediate and longer duration cycles, and shall be accompanied by information supporting that request.
- 6) The flow to the ASR wells at the wellhead shall be monitored and controlled at all times to ensure the maximum fluid velocity down the well during normal operation does not exceed the respective peak hourly flow rate indicated below:

Wa11	Peak Hourly Flow Rate				
vven	gpm	MGD			
ASR-4-SW	3,500	5.04			
ASR-5-SW	3,500	5.04			

7) For each ASR well, the wellhead casing shall be monitored and controlled at all times to ensure the maximum pressure at the wellhead does not exceed 66 percent (%) of the tested pressure on the final casing. Accordingly, the maximum wellhead pressure shall not exceed the respective pressure indicated below:

Well	Maximum Wellhead Pressure (psi)			
ASR-4-SW	67			
ASR-5-SW	67			

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- 8) ASR well system monitoring devices:
 - a) Pursuant to Rules 62-528.425(1)(b) and 62-528.605(2), F.A.C., the ASR well system shall be monitored by continuous indicating, recording and totalizing devices to monitor flow rate and volume, and continuous indicating and recording devices to monitor injection pressure and monitoring zone pressure (or water level, as appropriate; all zones). All indicating, recording and totalizing devices shall be maintained in good operating condition.
 - b) The surface equipment shall be such that manual backup capability to monitor pressure shall be provided for systems utilizing automatic and continuous recording equipment.
- 9) Any failure of ASR system monitoring and recording equipment for a period of more than 48 hours shall be reported to the Department within 24 hours. A written report describing the incident shall also be submitted to the Department within five days of the start of the event. The written report shall contain a complete description of the occurrence, a discussion of its cause(s), and the steps being taken to reduce, eliminate, and prevent recurrence of the event, and all other information deemed necessary by the Department.
- 10) The ASR well system shall be monitored in accordance with the parameters and frequency listed below. The data shall be collected and reported to the Department in Monthly Operating Reports (MORs). The permittee shall submit monthly to the Department the results of all ASR well and monitoring well data required by this major modification to permit (in the MORs) no later than the **last day of the month** immediately following the month of record. The results shall be sent to the Department of Environmental Protection, Southeast District Office, UIC Section, 400 N. Congress Avenue, Suite 200, West Palm Beach, FL 33401. A copy of this report shall also be sent to the Department of Environmental Program, MS 3530, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The report shall include the following data:

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SPECIFIC CONDITIONS:

- a) **DURING RECHARGE AND RECOVERY PHASES** Initial monitoring and sampling schedule for operational testing during recharge and recovery phases shall be in accordance with the parameters and frequencies listed on the following table:
 - The daily maximum and minimum flow rates at the ASR wells shall span a 15 minute minimum time interval. Similarly, the daily maximum and minimum pressures at the ASR well shall span a 15 minute minimum time interval.
 - For the ASR wells (ASR-4-SW & ASR-5-SW), the fluid monitored during recharge shall be sampled under flowing conditions while it is being injected, whereas the fluid monitored during recovery phases shall be recovered groundwater. The fluid being injected using the ASR wells shall be sampled one common sampling point, located at the sampling tap situated after the UV disinfection system (excluding the pre-treatment coliform samples to be collected prior to the UV disinfection system, entailed in S.C. 6.a.11) below). Sampling of Wells ASR-4-SW & ASR-5-SW during recovery shall commence at the very onset of recovery.

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SPECIFIC CONDITIONS:

INITIAL MONITORING SCHEDULE FOR RECHARGE & RECOVERY PHASES							
PARAMETER	UNIT	FREQUENCY (physical parameters)	ASR Wells (ASR-4-SW & ASR-5-W)	Upper Zone of Dual Zone Monitor Well MW-FA-1-SW (ASR MW-FA-1-SW - U)	Lower Zone of Dual Zone Monitor Well MW-FA-1-SW (ASR MW-FA-1-SW -L)	Biscayne Aquifer Monitor Well MW-BA-1-SW	
Physical:							
Flow Rate, max.	gpm	continuous	D/M				
Flow Rate, min.	gpm	continuous	D/M				
Flow Rate, avg.	gpm	continuous	D/M				
Total Volume Recharged	MG	daily	D/M				
Total Volume Recovered	MG	daily	D/M				
Net Storage – per well & total	MG		D/M				
Injection Pressure, max.	psi	continuous	D/M				
Injection Pressure, min.	psi	continuous	D/M				
Injection Pressure, avg.	psi	continuous	D/M				
Water Level, max.	ft (NAVD 88)	continuous		D/M	D/M		
Water Level, min.	ft (NAVD 88)	continuous		D/M	D/M		
Water Level, avg.	ft (NAVD 88)	continuous		D/M	D/M		

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INITIAL MONITORING SCHEDULE FOR RECHARGE & RECOVERY PHASES, CONTINUED							
PARAMETER	UNIT	FREQUENCY (physical parameters)	ASR Wells ¹ (ASR-4-SW & ASR-5-SW)	Upper Zone of Dual Zone Monitor Well MW-FA-1-SW (ASR MW-FA-1-SW - U)	Lower Zone of Dual Zone Monitor Well MW-FA-1-SW (ASR MW-FA-1-SW -L)	Biscayne Aquifer Monitor Well MW-BA-1-SW	
General:							
Specific Conductance	µmhos/cm		W +	W	М	М	
(Field) Temperature	°C		W +	W	М	М	
Total Dissolved Solids	mg/L		W	W	М	М	
Chloride	mg/L		W	W	М	М	
Total Suspended Solids	mg/L		W (recharge)				
Turbidity ++	NTU		W (recharge)				
pH ++	std. units		W	W	М	М	
Arsenic & related:							
Arsenic	µg/L		W	W	М	М	
Dissolved Oxygen ++	mg/L		W	W	М	М	
Oxidation-Reduction Potential	mV		W	W	М	М	
Total Organic Carbon, (TOC)	mg/L		W	W	М	М	
Total Nitrate	mg/L		W	W	М	М	
Sulfate	mg/L		W	W	М	М	
Sulfide	mg/L		W	W	М	М	
Total Manganese	mg/L		W	W	М	М	
Total Alkalinity	mg/L		W	W	М	М	
Total Iron	mg/L		W	W	М	М	
Radionuclides:	0.						
Gross Alpha	ρCi/L		М	М	М	М	
Radium ^{226/228}	ρCi/L		M*	M*	M*	M*	
Microbial indicators:							
Total Coliform	cts/100 ml		W	W	М	М	
Fecal Coliform	cts/100 ml		W	W	М	М	

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SPECIFIC CONDITIONS:

INITIAL MONITORING SCHEDULE FOR RECHARGE & RECOVERY PHASES, CONTINUED

PARAMETER	UNIT	FREQUENCY	ASR Wells 1	Upper Zone of	Lower Zone of	Biscayne
		(physical	(ASR-4-SW &	Dual Zone	Dual Zone	Aquifer
		parameters)	ASR-5-SW)	Monitor Well	Monitor Well	Monitor Well
				MW-FA-1-SW	MW-FA-1-SW	MW-BA-1-SW
				(ASR	(ASR	
				MW-FA-1-SW -	MW-FA-1-SW	
				U)	-L)	
Other:						
Calcium	mg/L		М	М	М	М
Bicarbonate	mg/L		М	М	М	М
Carbonate	mg/L		М	М	М	М
Ammonia (as N)	mg/L		М	М	М	М
Total Kjeldahl	mg/L		М	М	М	М
Nitrogen	<u> </u>					
Primary and			A+++			
Secondary Stds.						

Explanation:

- ¹ For the ASR wells, samples shall be collected from sampling tap after the UV disinfection system (for recharge), and from each of the ASR wells (Wells ASR-4-SW and ASR-5-SW) during recovery.
- + Weekly average to be reported from mounted probe signals
- ++ Field samples
- +++ Sampling during first quarter of year unless alternate approved by FDEP (recharge water); see **S.C. 6.a.14**)
- Analyzed only if Gross Alpha exceeds 15 pCi/L
- W weekly; D/M daily and monthly; M monthly; Q quarterly; A annually

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Mr. John Renfrow Director M-DWASD Page 24 of 32

SPECIFIC CONDITIONS:

- b) **<u>DURING STORAGE PHASES</u>** Initial monitoring and sampling schedule for operational testing during storage **shall be the same as entailed in the table above, with the following two exceptions**:
 - (1) ASR wells No sampling of the ASR wells during storage; and
 - (2) Upper Zone of Dual Zone Monitor Well MW-FA-1-SW During long storage periods (exceeding 30 days), monthly sampling of this zone is allowed, but only after 30 days into that storage period.

Samples shall be collected according to the frequency specified above during cycle testing until the Department authorizes a reduction in sampling frequency to a proposed alternative frequency. A request for reduction in sampling frequency or parameters shall be accompanied by cycle testing data accompanied by technical justification and interpretations. The request shall be submitted to the Department's Southeast District office in West Palm Beach/UIC Program and to the Tallahassee UIC Program office, for review and Department approval.

The MORs shall indicate monthly averages for all physical parameters recorded daily.

- c) The Department may require the monitoring of additional parameters if water quality monitoring of the Floridan aquifer indicates any of the following:
 - (1) results of the sampling indicate significant differences in water quality during consecutive sampling events; or
 - (2) a source of contamination to the ASR storage zone is discovered that was not addressed in the major modification to permit.
- d) All ASR well system data submissions, including Monthly Operating Reports (MORs), shall be clearly identified on each page with: facility name, I.D. Number, permit number, operator's name, license number, daytime phone number, date of sampling/recording, and type of data. The lead plant operator or higher official must sign and date each submittal.

Mr. John Renfrow Director M-DWASD Page 25 of 32 PERMIT NUMBER: 0131773-009-UC DATE OF ISSUANCE: July 18, 2011 EXPIRATION DATE: August 20, 2013

SPECIFIC CONDITIONS:

- 11) Supplementing the monitoring for total coliforms indicated in the table above, the permittee shall also collect weekly grab samples from the raw water sampling tap located prior to the UV disinfection system, to ensure that the disinfection system is performing its intended function. The results of the weekly test reports shall be included in the MORs submitted to the Department.
- 12) A record shall be included in each MOR that documents the exercising of valves. All valves integral to the wellhead shall be exercised at the time of each cycle change. (See **S.C. 7.b.**). For each valve, this record shall include the valve identification number (tag), type of valve, date and time when exercised, and the initials of operator(s) performing the work. The record shall be maintained at the facility and shall be available for review by FDEP personnel at all times.
- 13) A minimum of three well volumes of fluid shall be evacuated from the monitoring systems prior to sampling for the chemical parameters listed above. A State-certified laboratory shall analyze all samples. Sufficient purging shall have occurred when either of the following have occurred:
 - a) pH, specific conductivity <u>and</u> temperature when sampled, upon purging the third or subsequent well volume, each vary less than 5% from that sampled upon purging the previous well volume; or
 - b) upon purging the fifth well volume.

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Mr. John Renfrow Director M-DWASD Page 26 of 32

- 14) Once cycle testing begins, a source water analysis representative of the injectate [grab sample(s) collected at the sampling tap situated after the UV disinfection system] shall be submitted annually (sampled in the first quarter of the calendar year and submitted on or before April 30). The permittee may submit a request to the Department to extend the sampling and reporting due dates for the source water analysis to alternate dates if the phase(s) of the cycle testing being implemented in the first quarter precludes compliance with the above specified due dates. VOC parameters and biological parameters shall be sampled either in-situ or grab. The source water analysis shall include:
 - a) Primary and secondary drinking water standards established in Chapter 62-550, Part III, F.A.C., (excluding asbestos, butachlor, acrylamide, epichlorohydrin, and dioxin), see **Attachment**;
 - b) Specific conductance and temperature (field measurements);
 - c) Ammonia, total Kjeldahl nitrogen (TKN) and total nitrogen (TN);
 - d) Total phosphorous (TP) and orthophosphate;
 - e) Fecal coliform and total coliform (cfu/100 mL);
 - f) Giardia lamblia and Cryptosporidium (count and viability testing, where applicable), Escherichia (E.) coli, and Enterococci;
 - g) Turbidity (NTU);
 - h) Total suspended solids, TSS (mg/L);
 - i) Dissolved oxygen (mg/L);
 - j) Oxidation-reduction potential (ORP; mV);
 - k) Total sulfide (mg/L);
 - 1) Total organic carbon (TOC; mg/L); an
 - m) Total alkalinity (mg/L as CaCO3);
 - n) Radium ^{226/228} (ρCi/L);
 - o) Calcium (mg/L);
 - p) Bicarbonate (mg/L);
 - q) Carbonate (mg/L);
 - r) All other parameters not listed above, but required of a permitted drinking water treatment facility, shall also be submitted.
- 15) If backflushing of the ASR wells is performed as a maintenance procedure, these events must be noted in the MORs.

Mr. John Renfrow Director M-DWASD Page 27 of 32

- 16) As the Southwest Wellfield ASR Facility is a remotely operated site, any records that must be kept under conditions of this permit shall be available at the Alexander Orr, Jr. WTP. This includes 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, UV disinfection system records 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.
- b. The Department's authorization to commence pilot cycle testing may specify specific conditions that supplement the conditions stated above, including an initial pilot cycle testing schedule and monitoring plan that are consistent with the latest developments and regulatory requirements regarding ASR technology.
- c. The permittee shall conduct operational testing of the ASR well system to demonstrate that the ASR wells can maintain water quality standards and assimilate the design daily flows prior to granting approval for full operation.
- d. No fluids shall be injected without prior written authorization from the Department.
- e. The only source of injectate (recharge water) shall be water meeting all Primary and Secondary drinking water quality standards (62-550, F.A.C.) and minimum criteria (62-520, F.A.C.) unless otherwise exempted. All parameters that are not exempted under a water quality criteria exemption, aquifer exemption, variance or waiver, as appropriate, shall meet the appropriate standard at all times.
- f. The following operational testing conditions apply specifically to the operation of the UV disinfection system:
 - 1) To prevent inadequate disinfection due to the Power systems in Florida being subject to frequent, short-term interruptions, the ASR pumps shall stop immediately after a loss of power and shall remain stopped until the UV disinfection system is activated;

Mr. John Renfrow Director M-DWASD Page 28 of 32 PERMIT NUMBER: 0131773-009-UC DATE OF ISSUANCE: July 18, 2011 EXPIRATION DATE: August 20, 2013

SPECIFIC CONDITIONS:

- 2) The UV disinfection system shall be activated when raw water from the drinking water wells is to be injected into the ASR wells. The UV disinfection system shall run continuously during recharge;
- 3) Individual lamp failure alarms shall be provided. Should there be a sufficient number of lamp failures to cause the output to fall below the threshold required to achieve disinfection, the recharge of the raw water into the ASR wells shall cease immediately. For each lamp failure that occurs, the MORs shall report the date the failure began and the date the failure was rectified.
- 4) The following shall be monitored and records available at the Alexander Orr, Jr. WTP (for the Southwest Wellfield ASR Facility, a remotely operated site) for review by the Department at the time compliance and/or other inspections:
 - a) Continuous Monitoring and recording of the following:
 - (1) The on/off status of each lamp;
 - (2) Ground fault interrupter (GFI) status of the UV disinfection system. A GFI condition shall result in stoppage of the raw water from being injected into the ASR wells;
 - (3) UV intensity in each reactor;
 - (4) Operational UV dosage shall be continuously calculated and recorded. The operational UV dose shall be a minimum of 40mJ/cm2 at all times the UV disinfection system is operation.
 - b) Cumulative UV disinfection system power consumption.
 - c) Each reactor power setting.
 - d) Individual lamp age (hours).
 - e) Raw water flow rate (gpm or MGD).

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Mr. John Renfrow Director M-DWASD Page 29 of 32 PERMIT NUMBER: 0131773-009-UC DATE OF ISSUANCE: July 18, 2011 EXPIRATION DATE: August 20, 2013

- 5) Verification and calibration of Monitoring Equipment shall be performed as stated below. The records for these activities shall be available at the Alexander Orr, Jr. WTP for the remotely operated Southwest Wellfield ASR Facility for review by the Department at the time compliance and/or other inspections.
 - a) UV intensity probe readings shall be verified at least monthly, using a reference UV intensity probe. The location of the on-line probe(s) and the reference probe must be identical to those in the UV reactor used for performance validation.
 - b) The calibration of the UV transmittance shall be in accordance with manufacturer's recommendations. In addition, laboratory measurements of the UV transmittance of grab samples shall be used to verify the accuracy of on-line transmittance monitoring equipment on a weekly basis.
- g. Should the Environmental Protection Agency (EPA) ever develop a Maximum Contamination Level (MCL) for other bacteria and/or viruses, the Underground Injection Control (UIC) regulations require the MCL to be met prior to recharge.
- 7. Surface Equipment
 - a. The integrity of the ASR sampling system shall be maintained at all times. Sampling line(s) shall be clearly and unambiguously identified at the point at which samples are drawn. All reasonable and prudent precautions shall be taken to ensure that samples are properly identified and that samples obtained are representative. Sampling lines and equipment shall be kept free of contamination with independent discharges and no interconnections with any other lines.
 - b. The surface equipment for the ASR well system shall maintain access for logging and testing, and reliability and flexibility in the event of damage to the well and piping. A regular program of exercising the valves integral to the wellhead shall be instituted. At a minimum, all valves integral to the wellhead shall be exercised at the time of each cycle change. A record shall be maintained at the facility that documents the exercising of the valves. [See **S.C. 6.a.12**).]
Mr. John Renfrow Director M-DWASD Page 30 of 32 PERMIT NUMBER: 0131773-009-UC DATE OF ISSUANCE: July 18, 2011 EXPIRATION DATE: August 20, 2013

SPECIFIC CONDITIONS:

- c. The surface equipment and piping for the ASR well system shall be kept free of corrosion at all times.
- d. Spillage onto the well pad during maintenance, testing or repairs to Wells ASR-4-SW & ASR-5-SW or the dual zone monitor well (MW-FA-1-SW) shall be contained by an impermeable wall around the edge of the respective pad and disposed of via approved and permitted methods.
- e. Any waters spilled during maintenance, testing or repairs to Wells ASR-4-SW and ASR-5-SW or the dual zone monitor well (MW-FA-1-SW) shall be contained on the respective pad.
- 8. Plugging and Abandonment and Alternate Use Plans
 - a. Permittees who are unable to operate the ASR wells 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 wells. 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.
- 9. Signatories
 - a. All reports and other submittals required to comply with this major modification to permit shall be signed by a person authorized under Rules 62-528.340(1) or (2), F.A.C.

Mr. John Renfrow Director M-DWASD Page 31 of 32

SPECIFIC CONDITIONS:

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."

- 10. 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.
 - b. If recharge is to continue beyond the expiration date of the construction and testing permit, the permittee shall apply for, and obtain an operation permit. If necessary to complete the operational testing period, the permittee shall apply for renewal of the construction and testing permit at least 60 days prior to the expiration date of the construction and testing permit.
 - c. Testing of Wells ASR-4-SW & ASR-5-SW shall cease upon expiration of the construction and testing permit, unless a new permit is issued by the Department, or a timely renewal application (Rules 62-4.090, F.A.C. and 62-528.307(2)(a), F.A.C.) for a construction and testing permit has been submitted to the Department.

Mr. John Renfrow Director M-DWASD Page 32 of 32 PERMIT NUMBER: 0131773-009-UC DATE OF ISSUANCE: July 18, 2011 EXPIRATION DATE: August 20, 2013

SPECIFIC CONDITIONS:

d. A written, detailed evaluation of the ASR system performance shall be included with the permit renewal or operation permit application.

Issued this <u>|8</u> day of July, 2011

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Liven

Jill S. Creech, P.E. Southeast District Director

JSC/LAB/JRM/mas

PRIMARY & SECONDARY DRINKING WATER STANDARDS Updated February 1, 2007

PRIMARY DRINKING WATER STANDARDS

PARAMETER

Alachlor (Polychlorinated Biphenyl or PCB) Aldicarb Aldicarb sulfoxide Aldicarb sulfone (Sulfone aldoxycarb) Alpha, Gross Antimony Arsenic Atrazine Barium Benzene Benzo(a)pyrene Beryllium Bis(2-ethylhexyl) adipate (Di(2-ethylhexyl) adipate) Bis(2-ethylhexyl) phthalate (Di(2-ethylhexyl) phthalate) Bromate Cadmium Carbofuran Carbon Tetrachloride (Tetrachloromethane) Chlordane Chlorine Chlorine Dioxide Chlorite Chlorobenzene (Monochlorobenzene) Chloroethylene (Vinyl Chloride) Chromium Coliforms, Total Cyanide 2,4-D (2,4-Dichlorophenoxyacetic acid) Dalapon (2,2-Dichloropropionic acid) Dibromochloropropane (DBCP) 1,2-Dibromoethane (EDB, Ethylene Dibromide) 1,2-Dichlorobenzene (o-Dichlorobenzene) 1,4-Dichlorobenzene (p-Dichlorobenzene or Para Dichlorobenzene) 1,2-Dichloroethane (Ethylene dichloride) 1,1-Dichloroethylene (Vinylidene chloride) 1,2-Dichlorethylene (cis-1,2-Dichloroethylene or trans-1,2-Dichloroethylene) cis-1,2-Dichloroethylene (1,2-Dichlorethylene) trans-1,2-Dichloroethylene (1,2-Dichlorethylene) Dichloromethane (Methylene chloride) 1,2-Dichloropropane Di(2-ethylhexyl) adipate (Bis(2-ethylhexyl) adipate) Di(2-ethylhexyl) phthalate (Bis(2-ethylhexyl) phthalate)

PRIMARY & SECONDARY DRINKING WATER STANDARDS Updated February 1, 2007

PRIMARY DRINKING WATER STANDARDS, CONT'D

PARAMETER

Dinoseb Diquat EDB (Ethylene dibromide, 1,2-Dibromoethane) Endothall Endrin Ethylbenzene Ethylene dichloride (1,2-Dichloroethane) Fluoride Glyphosate (Roundup) Gross Alpha Haloacetic Acids (HAA5) Heptachlor Heptachlor Epoxide Hexachlorobenzene (HCB) gamma-Hexachlorocyclohexane (Lindane) Hexachlorocyclopentadiene Lead Lindane (gamma-Hexachlorocyclohexane) Mercury Methoxychlor Methylene chloride (Dichloromethane) Monochlorobenzene (Chlorobenzene) Nickel Nitrate (as N) Nitrite (as N) Total Nitrate + Nitrite (as N) Oxamyl p-Dichlorobenzene or ParaDichlorobenzene (1,4-Dichlorobenzene) Pentachlorophenol Perchloroethylene (Tetrachloroethylene) Picloram Polychlorinated biphenyl (PCB or Aroclors) Radium Roundup (Glyphosate) Selenium Silver Silvex (2,4,5-TP) Simazine Sodium Strontium-90 Styrene (Vinyl benzene) Tetrachloroethylene (Perchloroethylene) Tetrachloromethane (Carbon Tetrachloride)

PRIMARY DRINKING WATER STANDARDS, CONT'D

PARAMETER

Thallium Toluene Toxaphene 2,4,5-TP (Silvex) 1,2,4-Trichlorobenzene 1,1,1-Trichloroethane 1,1,2-Trichloroethane Trichloroethylene (Trichloroethene, TCE) Trihalomethanes, Total Vinyl Chloride (Chloroethylene) Xylenes (total)

SECONDARY DRINKING WATER STANDARDS

PARAMETER

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

BEFORE THE STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Permittee:

AO # 11-0456

Miami-Dade Water and Sewer Department (M-DWASD) 3071 SW 38th Ave. Miami, FL 33146

Facility:

Southwest Wellfield ASR Facility In Proximity to the Intersection of SW 79th Street and SW 123rd Avenue Miami-Dade County DEP Permit No. 0131773-005-UC and Major Modification to Permit No. 0131773-009-UC

Responsible Authority: Mr. John Renfrow Director

Project:

M-DWASD Southwest Wellfield ASR Site Class V, Group 7 Aquifer Storage & Recovery (ASR) Well System

ADMINISTRATIVE ORDER

I. STATUTORY AUTHORITY

The Department of Environmental Protection (Department) issues this Administrative Order under the authority of Section 403.088(2)(f) of the Florida Statutes (F.S.). The Secretary of the Department has delegated this authority to the Director of District Management, who issues this Order and makes the following findings of fact.

II. FINDINGS OF FACT

1. The Miami-Dade Water and Sewer Department (M-DWASD) is a person under Section 403.031, F. S.

- 2. The facility is located on Miami-Dade Water and Sewer Department (M-DWASD) owned land, at the Miami-Dade Southwest Wellfield ASR facility, located near the intersection of SW 79th Street and SW 123rd Avenue, in unincorporated Miami-Dade County, Florida. The facility is north of Kendall Drive (SW 88th Street) and just east of Belen Saborido Avenue (also known as SW 127th Avenue). The facility will capture raw groundwater from production wells completed into the Biscayne aquifer during times of excess supply, treat the groundwater by ultraviolet disinfection, inject it into the receiving zone of the upper Floridan Aquifer System (FAS) for storage, and will recover this water when potable demand is high. This aquifer storage and recovery (ASR) operation is subject to the requirements contained in Chapters 62-4, 62-520, 62-528 and 62-550, Florida Administrative Code (F.A.C.), which includes underground injection control, permitting, and groundwater monitoring requirements.
- The Miami-Dade Water and Sewer Department applied for a major modification to permit on January 6, 2010, under Section 403.0876, F.S., to allow a request for Department authorization to activate the operational (cycle) testing of the aquifer storage and recovery (ASR) system at this facility. This Major Modification to Permit, issued under FDEP File No. 0131773-009-UC, allows operational (cycle) testing – with Department approval – for the approved ASR Facility.
- 4. The Facility has provided reasonable assurance that the water injected will meet all primary drinking water standards prior to recharge, unless otherwise exempted.
- 5. The Facility is being issued a major modification to permit to construct and test after March 26, 2008, the effective date of Program Guidance Memo WRM/GW-08-01. The permit being modified was also issued after this date.

III. ORDER

Based on the foregoing findings of fact, IT IS ORDERED,

6. The Facility shall comply with all conditions of Permit No. 0131773-005-UC as modified by the Major Modification to Permit (under FDEP File No. 0131773-009-UC), and applicable water quality standards, except as otherwise authorized under this Administrative Order.

- 7. If arsenic levels during operational (cycle) testing conducted under Permit No. 0131773-005-UC — as modified by the major modification to permit (under FDEP File No. 0131773-009-UC) — exceed 10 μg/L in the recovered water or any associated monitor well, the permittee shall submit a report addressing the operational (cycle) testing results of the collected groundwater monitoring data including a determination after every two cycles of whether arsenic levels are decreasing. The report shall be submitted to the Department no later than 90 days following the end of the recovery period for the second cycle. The report shall include a discussion of the changes in water quality for parameters exceeding maximum contaminant levels, including arsenic, during the recharge, storage, and recovery periods. The discussion of the arsenic results shall address the possibility that continued cycles may allow the facility to come into compliance without pretreatment and shall include a projected time until compliance will be achieved.
- 8. If the arsenic standard continues to be exceeded in recovered water or groundwater as a result of ASR operations, any future ASR permits for this facility can only be issued with an associated Consent Order.
- 9. In addition, the Department may require certain enhancements to the ASR facility, which may include, but not be limited to, additional monitoring parameters; a greater monitoring frequency; additional monitoring wells particularly if groundwater not meeting the arsenic standard may be migrating off-site; and a pretreatment program to reduce arsenic leaching in the storage zone.

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- 10. If monitoring indicates that arsenic exceeding $10 \mu g/L$ is occurring off-site because of the ASR activity, the Department shall require the following:
 - (a) An estimate of the vertical and lateral extent of arsenic concentration exceeding $10 \ \mu g/L$;
 - (b) A field-verified inventory of all water wells within the area determined by best professional judgment to include the area potentially affected by the discharge plus a safety factor of 50%, or a one-mile radius, whichever is larger (area of review);
 - (c) Provisions for alternate water supplies for water wells within the area of review;
 - (d) Measures that will be taken to remove off-site contamination or risk-based corrective actions the facility will conduct under Chapter 62-780, F.A.C., including Department-approved institutional controls in accordance with the Division of Waste Management's Institutional Controls Procedures Guidance, November 2004, to prevent the construction and use of new water wells within areas of off-site contamination. The Department also shall accept a local government's ordinance as an institutional control if that ordinance prohibits the construction or use of water wells within the areas of off-site contamination.
 - (e) The Facility may be required to sample off-site wells identified within the area of review that withdraw from the storage zone;
 - (f) The Department will notify all property owners of off-site wells likely to exceed the arsenic standard.
- 11. Reports or other information required by this Administrative Order shall be sent to the Department of Environmental Protection, Underground Injection Control Program, Southeast District office, 400 N. Congress Avenue, Suite 200, West Palm Beach, FL 33401, and to the Department of Environmental Protection, Underground Injection Control Program, 2600 Blair Stone Road, MS 3530, Tallahassee, Florida 32399-2400.
- 12. This Administrative Order does not operate as a permit under Section 403.088 of the Florida Statutes. This Administrative Order shall be incorporated by reference into the major modification to permit (under FDEP File No. 0131773-009-UC) and the permit it modifies, Permit No. 0131773-005-UC.
- 13. Failure to comply with the requirements of this Administrative Order shall constitute a violation of this Administrative Order, the major modification to permit (under FDEP File No. 0131773-009-UC) and the permit it modifies, Permit No. 0131773-005-UC, and may subject the Facility to penalties as provided in Section 403.161, F.S.

14. If any event, excluding administrative or judicial challenges by third parties unrelated to the Facility, occurs which causes delay or the reasonable likelihood of delay, in complying with the requirements of this Administrative Order, the Facility shall have the burden of demonstrating that the delay was or will be caused by circumstances beyond the reasonable control of the Facility and could not have been or cannot be overcome by the Facility's due diligence. Economic circumstances shall not be considered circumstances beyond the reasonable control of Facility, nor shall the failure of a contractor, subcontractor, materialman or other agent (collectively referred to as "contractor") to whom responsibility for performance is delegated to meet contractually imposed deadlines be a cause beyond the control of Facility, unless the cause of the contractor's late performance was also beyond the contractor's control. Upon occurrence of an event causing delay, or upon becoming aware of a potential for delay, the Facility shall notify the Southeast District of the Department orally at 561-681-6691 within 24 hours or by the next working day and shall, within seven calendar days of oral notification to the Department, notify the Department in writing at: Department of Environmental Protection, Underground Injection Control Program, Southeast District office, 400 N. Congress Avenue, Suite 200, West Palm Beach, FL 33401. The notification shall indicate the anticipated length and cause of the delay, the measures taken or to be taken to prevent or minimize the delay and the timetable by which Facility intends to implement these measures. If the parties can agree that the delay or anticipated delay has been or will be caused by circumstances beyond the reasonable control of the Facility, the time for performance hereunder shall be extended for a period equal to the agreed delay resulting from such circumstances.

If the parties can agree that the delay or anticipated delay has been or will be caused by circumstances beyond the reasonable control of the facility, the time for performance hereunder shall be extended for a period equal to the agreed delay resulting from such circumstances.

IV. NOTICE OF RIGHTS

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

Under Rule 62-110.106(4), Florida Administrative Code, a person may request enlargement of the time for filing a petition for an administrative hearing. The request must be filed (received by the clerk) in the Office of General Counsel before the end of the time period for filing a petition for an administrative hearing. Petitions by the applicant or any of the persons listed below must be filed within fourteen days of receipt of this written notice. Petitions filed by any persons other than those entitled to written notice under Section 120.60(3), Florida Statutes, must be filed within fourteen days of publication of the notice or within fourteen days of receipt of the written notice, whichever occurs first. Under Section 120.60(3), Florida Statutes, however, any person who has asked the Department for notice of agency action may file a petition within fourteen days of receipt of such notice, regardless of the date of publication.

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

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

(a) The name, address, and telephone number of each petitioner; the name, address, and telephone number of the petitioner's representative, if any; the Department permit identification number and the county in which the subject matter or activity is located;

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

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

(d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate;

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

(f) A concise statement of the ultimate facts alleged, as well as the rules and statutes which entitle the petitioner to relief and

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

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

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

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

Any party to the major modification to permit has the right to seek judicial review of the Order under Section 120.68, Florida Statutes, by the filing of a notice of appeal under Rules 9.110 and 9.190, Florida Rules of Appellate Procedure, with the clerk of the Department in the Office of General Counsel, Mail Station 35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000; and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The notice of appeal must be filed within 30 days from the date when this Order is filed with the clerk of the Department.

DONE AND ORDERED on this 1 day of July 2011 in West Palm Beach, Florida.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

at Stucch

Jill S. Creech, P.E. Southeast District Director

Date

JSC/LAB/JRM/mas



FLORIDA DEPARTMENT OF

Environmental Protection Southeast district office 400 North Congress avenue, 3rd floor West PALM BEACH, FL 33401 561-681-6600

RICK SCOTT GOVERNOR

HERSCHEL T. VINYARD JR. SECRETARY

ELECTRONIC CORRESPONDENCE

May 15, 2013

Mr. John Renfrow Director Miami-Dade Water and Sewer Dept. 3071 SW 38th Ave. Miami, Florida 33146 <u>RenfrJ@miamidade.gov</u> Miami-Dade County UIC – **M-DWASD W & SW Wellfields** FILES: W Wellfield: 0127837-008-UC & 0127837-015-UC; SW Wellfield: 0131773-005-UC & 0131773-009-UC.

RE: Authorization to Commence the Operational Testing of Aquifer Storage and Recovery (ASR) Wells ASR-1-W, ASR-2-W and ASR-3-W located at the Miami-Dade Water and Sewer Department (M-DWASD) West Wellfield, and ASR Wells ASR-4-SW and ASR-5-SW located at the M-DWASD Southwest Wellfield, Utilizing UV Disinfection Treatment Prior to Aquifer Recharge

Dear Mr. Renfrow:

The Florida Department of Environmental Protection (Department or FDEP) herein authorizes the recommencement of operational testing of the three ASR wells located at M-DWASD's West Wellfield, and the initiation of operational testing of the two ASR wells located at M-DWASD's Southwest Wellfield. At both facilities, UV disinfection shall be utilized to treat the recharge water (raw groundwater withdrawn from Biscayne aquifer production wells) prior to its injection into the upper Floridan aquifer storage zone. The authorization is based upon information provided by M-DWASD, including M-DWASD's request to commence operational testing received February 26, 2013 and the findings of a pre-operational testing site inspection conducted on February 27, 2013.

With this authorization, the operational testing of M-DWASD's five ASR wells may commence under the FDEP permits referenced in the following table, subject to all permit conditions stated in the major modifications to permit and the administrative orders (that accompanied the major modifications to permit) also referenced in this table:

> "More Protection, Less Process" www.dep.state.fl.us

Mr. John Renfrow M-DWASD Authorization to Commence Operational Testing of ASR Wells Page 2 of 3

Wellfield	Wells	Major Modification	Permit Modified by Major Modification	Administrative Order
		to I climit	Wajor Wiodification	
West	ASR-1-W,	0127837-015-UC	0127837-008-UC	AO # 11-0455
	ASR-2-W &			
	ASR-3-W			
Southwest	ASR-4-SW &	0131773-009-UC	0131773-005-UC	AO # 11-0456
	ASR-5-SW			

The operational testing of all five ASR wells is subject to the following conditions:

- 1. Receipt of test results (in the MORs) that demonstrate compliance with all applicable rules pertaining to underground injection (Chapter 62-528, F.A.C.).
- 2. Compliance with all specific conditions and specifications of the two major modifications to permit referenced in the table above.
- 3. Pertaining to ASR system(s) start-up, the following specific conditions of the major modifications to permit for the West and the Southwest Wellfields are applicable:
 - a. Specific Condition (S.C.) 6.a.1) For each ASR well, a qualified representative of the Engineer of Record must be present for start-up operations (operational testing commencement) and the Department must be notified in writing of the date that the operational testing begins.
 - b. S.C. 5.b.2) This specific condition requires the collection of source water samples (Biscayne aquifer groundwater) from the sampling tap located after the UV disinfection system. An October 1, 2012 email from Virginia Walsh of M-DWASD to the Department indicated that samples for the following three remaining parameters would be collected upon ASR system(s) start-up, to fulfill requirements stated in S.C. 5.b.2) of both major modifications to permit:
 - Dibromochloropropane (DBCP);
 - 1,2-Dibromoethane (EDB, Ethylene Dibromide); and
 - Sulfide.

Laboratory analytical results for these parameters shall be submitted to the Department within 30 days of samples collection.

Mr. John Renfrow M-DWASD Authorization to Commence Operational Testing of ASR Wells Page 3 of 3

Please be advised that the permittee is subject to all requirements of the major modifications to permit and the administrative orders entailed above, as well as the requirements and regulations of Miami-Dade County, including the Miami-Dade County Health Department, and the South Florida Water Management District (SFWMD) regarding the operation of these ASR well systems.

This authorization to commence ASR operational testing must be made a part of and attached to the permits and major modifications to permit, which are all referenced in the table contained in this authorization letter. This authorization should be available at each facility at all times (along with the permits and major modifications to permit) for ready reference by all operators.

Should you have any questions, please contact Mr. Mark Silverman, P.G., of this office at (561) 681-6778. When referring to this authorization, please reference the date of this authorization letter and the file numbers for the major modifications to permit.

Sincerely,

Linda A. Brien, P.G. Water Facilities Program Administrator Southeast District

LAB:mas

Copies furnished to: Virginia Walsh, M-DWASD Rafael Terrero, M-DWASD Richard O'Rourke, M-DWASD Jack Epaves, M-DWASD Sonia Villamil, M-DWASD Maria Macfarlane, M-DWASD Joe Haberfeld, FDEP/TLH Cathy McCarty, FDEP/TLH Joseph May, FDEP/WPB Samir Elmir, M-D Health Dept Emily Richardson, SFWMD/WPB

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APPENDIX C

ASR CYCLE TESTING WATER QUALITY SAMPLING REQUIREMENTS

Southwest Wellfield ASR System Water Quality Monitoring

The following physical parameters will be continuously recorded by the SCADA system:

PARAMETER	UNIT	FREQUENCY (physical parameters)	ASR-4-W ASR-5-W	Upper MW-FA1-SW	Lower MW- FA1-SW
Physical:					
Flow Rate, max	gpm	continuous	D/M*		
Flow Rate, min.	gpm	continuous	D/M		
Flow Rate, avg.	gpm	continuous	D/M		
Total Volume Recharged	MG	Daily	D/M		
Total Volume Recovered	MG	Daily	D/M		
Net Storage-per well & total	MG		D/M		
Injection Pressure, max.	Psi	continuous	D/M		
Injection Pressure, min.	Psi	continuous	D/M		
Injection Pressure,	Psi	continuous	D/M		
avg.					
Water Level, max.	Ft (NAVD 88)	continuous		D/M	D/M
Water Level, min.	Ft (NAVD 88)	continuous		D/M	D/M
Water Level, avg.	Ft (NAVD 88)	continuous		D/M	D/M

*D/M : daily - to be averaged for monthly MOR reporting

Flow rates and pressures will be collected at a minimum of 15 minute time span intervals. The MORs will include the monthly averages for all physical parameters collected daily. The following tables indicate WQ sample collections by AOWTP staff and the sampling locations.

Southwest Wellfield Water Quality Sampling Requirements for <u>RECHARGE PHASE</u>

MONTHLY:

PARAMETER	UNIT	UV Disinfection system tap effluent	Upper MW-FA1-SW	Lower MW-FA1-SW	Biscayne Aquifer MW-BA-1-SW
Specific Conductance	µmhos/c m	x	x	X	x
(Field) Temperature	°C	x	x	x	x
Total Dissolved Solids	mg/L	x	x	x	x
Chloride	mg/L	X	X	Х	X
Total Suspended Solids	mg/L	X			
Turbidity	NTU	Х			
рН	std. units	X	x	X	х
Arsenic	µg/L	X	X	X	X
Dissolved Oxygen ++	mg/L	X	х	X	х
Oxidation- Reduction Potential	mV	x	x	x	x
Total Organic Carbon, (TOC)	mg/L	X	х	X	Х
Total Nitrate	mg/L	Х	X	Х	X
Sulfate	mg/L	X	Х	X	X
Sulfide	mg/L	X	X	X	X
Total Manganese	mg/L	X	X	X	X
Total Alkalinity	mg/L	X	X	X	X
Total Coliform	cts/100 ml	X	x	X	x
Total Iron	mg/L	X	X	X	X
Gross Alpha	ρCi/L	Х	Х	X	X
Radium* 226/228	ρCi/L	Х	X	X	X
Calcium	mg/L	Х	X	X	X
Bicarbonate	mg/L	X	X	X	X
Carbonate	mg/L	X	X	X	X
Ammonia (as N)	mg/L	X	X	X	X
Total Kjeldahl Nitrogen	mg/L	X	X	X	x

*Analyzed only if Gross Alpha exceeds 15 pCi/L

Southwest Wellfield Water Quality Sampling Requirements for <u>RECHARGE PHASE</u>

WEEKLY:

PARAMETER	UNIT	Raw water Pre- UV Disinfection system tap	UV Disinfection system tap	Upper MW-FA1-SW
Specific Conductance	µmhos/cm		Х	Х
(Field) Temperature	°C		Х	Х
Total Dissolved Solids	mg/L		Х	Х
Chloride	mg/L		Х	Х
Total Suspended Solids	mg/L		Х	
Turbidity	NTU		Х	
рН	std. units		Х	Х
Arsenic	µg/L		Х	Х
Dissolved Oxygen	mg/L		Х	Х
Oxidation-Reduction Potential	mV		Х	Х
Total Organic Carbon, (TOC)	mg/L		х	Х
Total Nitrate	mg/L		Х	Х
Sulfate	mg/L		Х	Х
Sulfide	mg/L		Х	Х
Total Manganese	mg/L		Х	Х
Total Alkalinity	mg/L		Х	Х
Total Iron	mg/L		Х	Х
Total Coliform	cts/100 ml	Х	Х	Х

Southwest Wellfield Water Quality Sampling Requirements for <u>STORAGE PHASE</u>

MONTHLY:

PARAMETER	UNIT	Upper [*] MW-FA1-SW	Lower MW-FA1-SW	Biscayne Aquifer MW-BA-1-SW
Specific Conductance	µmhos/cm	Х	Х	Х
(Field) Temperature	°C	Х	Х	Х
Total Dissolved Solids	mg/L	Х	Х	Х
Chloride	mg/L	Х	Х	Х
Total Suspended Solids	mg/L			
Turbidity	NTU			
рН	std. units	Х	Х	Х
Arsenic	µg/L	Х	Х	Х
Dissolved Oxygen ++	mg/L	Х	Х	Х
Oxidation-Reduction Potential	mV	Х	Х	Х
Total Organic Carbon, (TOC)	mg/L	Х	Х	х
Total Nitrate	mg/L	Х	Х	Х
Sulfate	mg/L	Х	Х	Х
Sulfide	mg/L	Х	Х	Х
Total Manganese	mg/L	Х	Х	Х
Total Alkalinity	mg/L	Х	Х	Х
Total Coliform	cts/100 ml	Х	Х	Х
Total Iron	mg/L	Х	Х	Х
Gross Alpha	ρCi/L	Х	Х	Х
Radium*** 226/228	ρCi/L	Х	Х	Х
Calcium	mg/L	Х	Х	Х
Bicarbonate	mg/L	Х	Х	Х
Carbonate	mg/L	Х	Х	Х
Ammonia (as N)	mg/L	Х	Х	Х
Total Kjeldahl Nitrogen	mg/L	Х	Х	Х

*Monthly only if storage period is longer than 30 days. If storage period is less than 30 days, then weekly sampling of Upper MW-FA1-SW shall be conducted. Weekly sampling of Upper FA1-SW shall be conducted during the first month of a storage phase.

Southwest Wellfield Water Quality Sampling Requirements for <u>STORAGE PHASE</u>

WEEKLY:

PARAMETER	UNIT	Upper [*] MW-FA1-SW
Specific Conductance	µmhos/cm	Х
(Field) Temperature	°C	Х
Total Dissolved Solids	mg/L	Х
Chloride	mg/L	Х
Total Suspended Solids	mg/L	
Turbidity	NTU	
рН	std. units	Х
Arsenic	µg/L	Х
Dissolved Oxygen ++	mg/L	Х
Oxidation-Reduction Potential	mV	Х
Total Organic Carbon, (TOC)	mg/L	Х
Total Nitrate	mg/L	Х
Sulfate	mg/L	Х
Sulfide	mg/L	Х
Total Manganese	mg/L	Х
Total Alkalinity	mg/L	Х
Total Coliform	cts/100 ml	Х
Total Iron	mg/L	Х
Gross Alpha	ρCi/L	Х
Radium*** 226/228	ρCi/L	Х
Calcium	mg/L	Х
Bicarbonate	mg/L	Х
Carbonate	mg/L	Х
Ammonia (as N)	mg/L	Х
Total Kjeldahl Nitrogen	mg/L	Х

*Monthly only if storage period is longer than 30 days. If storage period is less than 30 days, then weekly sampling of Upper MW-FA1-SW shall be conducted. Weekly sampling of Upper FA1-SW shall be conducted during the first month of a storage phase

Southwest Wellfield Water Quality Sampling Requirements for <u>RECOVERY PHASE</u>

MONTHLY:

PARAMETER	UNIT	ASR-4-SW ASR-5-SW **	Upper MW-FA1-SW	Lower MW-FA1-SW	Biscayne Aquifer MW-BA-1-SW
Specific Conductance	µmhos/c	Х	X	X	Х
(Field) Temperature	°C	x	x	x	x
Total Dissolved Solids	mg/L	х	x	x	x
Chloride	mg/L	Х	Х	Х	Х
Total Suspended Solids	mg/L				
Turbidity	NTU				
рН	std. units	x	x	x	x
Arsenic	µg/L	Х	X	Х	X
Dissolved Oxygen ++	mg/L	x	x	x	x
Oxidation- Reduction Potential	mV	x	x	x	x
Total Organic Carbon, (TOC)	mg/L	Х	x	x	x
Total Nitrate	mg/L	Х	X	Х	X
Sulfate	mg/L	Х	X	Х	X
Sulfide	mg/L	Х	X	Х	X
Total Manganese	mg/L	Х	X	X	X
Total Alkalinity	mg/L	Х	X	X	X
Total Coliform	cts/100 ml	x	x	x	x
Total Iron	mg/L	Х	Х	Х	Х
Gross Alpha	ρĊi/L	Х	Х	Х	Х
Radium* 226/228	ρCi/L	Х	X	Х	X
Calcium	mg/L	Х	X	Х	X
Bicarbonate	mg/L	X	X	X	X
Carbonate	mg/L	X	X	X	X
Ammonia (as N)	mg/L	X	X	X	X
Total Kjeldahl Nitrogen	mg/L	x	x	x	x

*Analyzed only if Gross Alpha exceeds 15 pCi/L

** sample collected from sampling taps located on each ASR well

Sampling of ASR-4-SW and ASR-5-SW for the recovery phase should <u>immediately commence</u> when system is turned on to Recovery mode.

Southwest Wellfield Water Quality Sampling Requirements for <u>RECOVERY PHASE</u>

WEEKLY:

PARAMETER	UNIT	ASR-4-SW** ASR-5-SW	Upper MW-FA1-SW
Specific Conductance	µmhos/cm	Х	Х
(Field) Temperature	°C	Х	Х
Total Dissolved Solids	mg/L	Х	Х
Chloride	mg/L	Х	Х
Total Suspended Solids	mg/L		
Turbidity	NTU		
рН	std. units	Х	Х
Arsenic	µg/L	Х	Х
Dissolved Oxygen	mg/L	Х	Х
Oxidation-Reduction Potential	mV	Х	Х
Total Organic Carbon, (TOC)	mg/L	Х	Х
Total Nitrate	mg/L	Х	Х
Sulfate	mg/L	Х	Х
Sulfide	mg/L	Х	Х
Total Manganese	mg/L	Х	Х
Total Alkalinity	mg/L	X	Х
Total Iron	mg/L	X	Х
Total Coliform**	cts/100 ml	X	X

* sample collected from sampling taps located on each ASR well

Sampling of ASR-4-SW and ASR-5-SW for the recovery phase should <u>immediately commence</u> when system is turned on to Recovery mode.

Southwest Wellfield Source Water Analysis

ANNUALLY:

PARAMETER	UNIT	ASR-4-SW ASR-5-SW **	UV Disinfection Tap***
Primary and Secondary Stds*		x	х
Specific Conductance	µmhos/cm		Х
(Field) Temperature	°C		X
Ammonia	mg/L		X
TKN	mg/L		X
Total Nitrogen	mg/L		X
Total Phosphorus	mg/L		X
Orthophosphate	mg/L		X
Total Coliform	cts/100 ml		X
Giardia lamblia			X
Cryptosporidium			X
Escherichia (E.) coli			X
Enterococci			X
Turbidity	NTU		X
Total Suspended Solids	mg/L		X
Dissolved Oxygen	mg/L		X
Oxidation-Reduction Potential	mV		X
Total sulfide	mg/L		X
Total Organic Carbon, (TOC)	mg/L		Х
Total Alkalinity	mg/L		Х
Radium 226/228	ρCi/L		Х
Calcium	mg/L		Х
Bicarbonate	mg/L		Х
Carbonate	mg/L		X
All other parameters required for a permitted drinking water treatment plant			X

*As listed in the permit ** collected at sampling tap on each ASR well *** collected at sampling tap situated after the UV disinfection system

Annual sampling will be conducted during the first quarter of the calendar year.

APPENDIX D

ASR CYCLE TESTING DAILY OPERATIONAL DATA

Miami-Dade Water and Sewer Department SWWF ASR Cycle Testing Operational Data FDEP UIC 0131773-010-011-UC/5Q ; File #0131773-009-UC

CYCLE 1

	TOTAL RE	CHARGE	<u>50.74</u>				
		SWWF	ASR MOR		Date Start Repo	orting:	
PHASE:	RECHARGE		ASR4		Date End Repo	orting:	
	FLOW_MIN	FLOW_MAX	FLOW_AVG	PRESS_MIN	PRESS_MAX	PRESS_AVG	TOT_VOL
07/29/2013	0.00	5.16	2.07	0.00	52.23	29.82	2.08
07/30/2013	3.81	4.07	3.91	52.24	53.72	52.61	3.91
07/31/2013	3.72	3.98	2.89	52.20	53.70	39.78	3.87
08/01/2013	0.81	3.98	3.68	19.43	54.36	51.47	3.67
08/02/2013	0.08	0.83	0.54	12.36	14.27	13.07	0.55
08/03/2013	0.00	0.73	0.50	0.00	13.09	11.69	0.55
08/04/2013	0.06	0.73	0.45	12.64	12.79	12.72	0.45
08/05/2013	0.01	2.57	0.29	10.08	113.16	13.14	0.29
TOTAL							15.37
		SWWF	ASR MOR		Date Start Repo	orting:	
PHASE:	RECHARGE		ASR5		Date End Repo	orting:	
	FLOW_MIN	FLOW_MAX	FLOW_AVG	PRESS_MIN	PRESS_MAX	PRESS_AVG	TOT_VOL
07/29/2013	0.00	6.11	2.55	0.00	50.18	31.03	1.93
07/30/2013	4.61	4.90	4.73	50.17	51.46	50.55	4.73
07/31/2013	4.71	4.99	3.64	51.40	52.88	39.02	4.82
08/01/2013	4.67	5.13	4.86	51.65	53.20	52.29	4.86
08/02/2013	5.00	5.52	5.30	50.02	51.83	50.79	5.30
08/03/2013	0.00	5.42	4.88	0.00	50.88	46.35	5.32
08/04/2013	5.28	5.50	5.36	50.07	50.69	50.46	5.36
08/05/2013	0.07	5.50	3.07	14.67	106.14	35.85	3.07
TOTAL							35.38

Miami-Dade Water and Sewer Department SWWF ASR Cycle Testing Operational Data FDEP UIC 0131773-010-011-UC/5Q ; File #0131773-009-UC

SWWF

CYCLE 1

Out of service (OOS)

	TOTAL RE	<u>COVERY</u>	<u>57.97</u>				
		SWWF	ASR MOR		Date Start Repo	orting:	
PHASE:	RECOVERY		ASR4		Date End Repo	orting:	
	FLOW_MIN	FLOW_MAX	FLOW_AVG	PRESS_MIN	PRESS_MAX	PRESS_AVG	TOT_VOL
08/06/201	3 0.00	5.03	2.05	10.15	100.12	13.07	2.05
08/07/201	3 4.21	4.92	4.46	11.00	12.17	11.15	4.64
08/08/201	3 4.05	4.53	4.10	10.97	12.88	11.01	4.27
08/09/201	3 4.16	4.48	4.36	11.25	11.36	11.30	4.36
08/10/201	3 4.05	4.49	4.31	11.28	11.38	11.32	4.31
08/11/201	3 4.06	4.51	4.35	11.27	11.37	11.32	4.35
08/12/201	3 2.82	4.60	4.14	1.22	12.54	11.32	4.14
08/13/201	3 0.00	5.19	2.28	0.00	55.34	8.00	0.00
08/14/201	3 0.00	0.00	0.00	7.86	9.68	7.62	0.00
08/15/201	3 0.00	0.00	0.00	9.71	10.18	10.00	0.00
08/16/201	3 0.00	0.02	0.00	8.97	19.40	12.55	0.00
TOTAL							28.12

Date Start Reporting: Date End Reporting: PHASE: RECOVERY ASR5 FLOW_MIN FLOW_MAX FLOW_AVG PRESS_MIN PRESS_MAX PRESS_AVG TOT_VOL 08/06/2013 0.00 4.99 2.01 3.11 12.88 6.29 2.01 08/07/2013 4.66 4.78 4.51 4.49 9.34 6.10 4.70 08/08/2013 4.55 4.70 4.46 4.48 8.25 5.85 4.65 08/09/2013 4.67 4.64 4.61 8.42 6.23 4.64 4.61 08/10/2013 4.58 4.65 4.62 4.73 8.28 6.32 4.62 6.22 08/11/2013 4.64 4.61 4.69 7.92 4.61 4.58 08/12/2013 4.50 6.61 4.61 0.00 9.81 6.30 4.61 08/13/2013 5.62 2.60 0.00 17.57 5.97 0.00 0.00 08/14/2013 0.00 0.00 0.00 4.63 9.42 5.48 0.00 08/15/2013 0.00 0.15 0.00 2.94 9.40 6.27 0.00 08/16/2013 0.00 0.00 0.00 5.81 43.21 20.55 0.00 TOTAL 29.85

ASR MOR

Miami-Dade Water and Sewer Department SWWF ASR Cycle Testing Operational Data FDEP UIC 0131773-010-011-UC/5Q ; File #0131773-009-UC

CYCLE 2

TOTAL RECHARGE 383.89

Out of service (OOS)

	TOTAL NE	SHANOL	303.03				
ASR4 PHASE:	RECHARGE				Date Start Repo Date End Repo	orting: orting:	
	FLOW_MIN	FLOW_MAX	FLOW_AVG	PRESS_MIN	PRESS_MAX	PRESS_AVG	TOT_VOL
08/16/2013	3 0.00	6.21	0.02	9.26	22.26	10.47	0.02
08/17/2013	3 0.00	0.10	0.01	10.17	11.30	10.30	0.01
08/18/2013	3 0.00	0.20	0.01	9.82	10.70	9.94	0.01
08/19/2013	3 0.00	4.69	2.11	9.39	51.43	31.20	2.11
08/20/2013	3 3.91	4.07	3.98	51.38	52.49	51.64	3.98
08/21/2013	3 3.71	4.04	3.75	50.78	52.28	49.57	3.92
08/22/2013	3 3.70	3.96	3.87	50.81	51.91	51.58	3.87
08/23/2013	3 3.79	3.90	3.84	51.44	51.60	51.52	3.84
08/24/2013	3 3.78	4.47	4.18	51.52	57.63	55.25	4.18
08/25/2013	3 4.29	4.41	4.35	57.37	57.58	57.47	4.35
08/26/2013	3 4.30	4.51	4.37	57.47	58.63	57.80	4.37
08/27/2013	3 0.00	5.28	3.24	18.29	60.13	46.77	3.24
08/28/2013	3 4.64	4.86	4.71	60.08	61.43	60.63	4.71
08/29/2013	3 4.62	4.75	4.68	60.24	60.82	60.48	4.68
08/30/2013	3 4.11	5.03	4.72	55.95	61.23	60.06	4.72
08/31/2013	3 0.00	5.19	1.61	16.68	59.22	30.70	1.60
09/01/2013	3 0.03	0.13	0.06	13.05	18.12	15.78	0.06
09/02/2013	3 0.02	0.74	0.06	15.39	15.57	15.54	0.06
09/03/2013	3 0.04	5.88	3.14	15.72	57.84	42.55	0.06
09/04/2013	3 4.68	4.68	4.68	57.18	57.18	57.18	0.06
09/05/2013	3 4.68	4.68	4.68	57.18	57.18	57.18	0.06
09/06/2013	3 4.68	4.68	4.68	57.18	57.18	57.18	0.06
09/07/2013	3 4.68	4.68	4.68	57.18	57.18	57.18	0.06
09/08/2013	3 4.68	4.68	4.68	57.18	57.18	57.18	0.06
09/09/2013	3 4.68	4.68	4.68	57.18	57.18	57.18	0.06
09/10/2013	3 4.68	4.68	4.68	57.18	57.18	57.18	0.06
09/11/2013	3 0.00	4.68	0.59	0.00	57.18	7.15	0.00
09/12/2013	3 0.00	5.46	2.55	0.00	56.86	31.68	2.55
09/13/2013	3 4.52	4.81	4.65	56.85	58.54	57.23	4.65
09/14/2013	3 4.50	4.80	4.67	57.40	57.62	57.53	4.67
09/15/2013	3 0.09	5.08	2.51	14.77	57.69	36.33	2.51
09/16/2013	3 0.00	0.48	0.35	0.00	33.53	12.91	0.35
09/17/2013	3 0.24	5.73	2.84	7.54	53.01	33.90	2.84
09/18/2013	3 4.17	4.84	4.54	52.66	53.94	53.35	4.54
09/19/2013	3 4.31	4.67	4.47	53.52	53.78	53.65	4.47
09/20/2013	3 4.23	4.55	4.43	52.76	54.09	53.81	4.43
09/21/2013	3 4.22	4.60	4.42	53.80	54.00	53.90	4.42
09/22/2013	3 4.28	4.55	4.44	53.79	54.04	53.93	4.44
09/23/2013	o 0.44	5.14	4.24	7.23	54.05	51.53	4.24

PHASE: RECHARGE

	FLOW_MIN	FLOW_MAX	FLOW_AVG	PRESS_MIN	PRESS_MAX	PRESS_AVG	TOT_VOL
09/24/2013	3.97	4.84	4.47	52.77	54.85	53.91	4.47
09/25/2013	0.00	4.87	3.20	0.00	54.19	40.12	3.20
09/26/2013	0.32	5.58	3.14	7.81	53.73	36.25	3.14
09/27/2013	4.19	4.78	4.53	53.70	54.10	53.92	4.53
09/28/2013	4.33	4.68	4.50	53.91	54.22	54.11	4.50
09/29/2013	4.18	4.77	4.48	53.37	54.32	54.21	4.48
09/30/2013	4.13	4.80	4.46	52.94	54.51	53.81	4.46
10/01/2013	3.19	4.66	4.37	51.24	54.34	52.99	4.37
10/02/2013	4.15	4.53	4.35	51.95	53.14	52.80	4.35
10/03/2013	3.60	4.49	4.32	51.63	53.41	52.67	4.32
10/04/2013	4.19	4.43	4.32	52.26	52.99	52.69	4.32
10/05/2013	4.13	4.66	4.35	52.30	53.13	52.72	4.35
10/06/2013	4.14	4.52	4.33	52.29	52.89	52.75	4.33
10/07/2013	0.25	5.01	2.30	5.80	52.89	29.57	2.29
10/08/2013	0.12	1.03	0.50	6.29	9.57	6.64	0.50
10/09/2013	0.24	0.75	0.41	4.65	8.71	5.35	0.49
10/10/2013	0.18	7.90	0.52	4.77	6.48	6.34	0.52
10/11/2013	0.22	0.72	0.40	4.56	6.60	6.38	0.40
10/12/2013	0.25	0.69	0.22	5.46	8.06	4.06	0.35
10/13/2013	0.12	0.59	0.33	4.69	8.26	6.50	0.33
10/14/2013	0.19	0.49	0.32	5.56	7.45	6.53	0.32
10/15/2013	0.00	1.39	0.28	0.00	9.04	5.56	0.29
10/16/2013	0.00	0.88	0.32	6.63	27.52	10.48	0.32
10/17/2013	0.00	0.29	0.01	12.02	12.77	12.40	0.01
10/18/2013	0.00	0.05	0.01	12.23	12.58	12.40	0.01
10/19/2013	0.00	0.02	0.01	12.48	13.53	12.81	0.01
10/20/2013	0.00	0.43	0.01	11.10	15.24	13.05	0.01
10/21/2013	0.00	0.07	0.00	12.51	15.19	13.19	0.00
10/22/2013	0.00	0.10	0.01	11.99	15.81	13.11	0.01
10/23/2013	0.00	0.04	0.01	11.00	15.99	13.14	0.01
10/24/2013	0.00	0.30	0.00	12.20	14.12	12.91	0.00
10/25/2013	0.00	5.36	0.03	6.19	47.85	10.33	0.03
10/26/2013	0.00	0.09	0.00	6.76	11.04	8.60	0.00
10/27/2013	0.00	0.04	0.00	7.28	8.60	7.93	0.00
10/28/2013	0.00	4.89	0.00	4.52	42.61	8.24	0.00
10/29/2013	0.00	0.14	0.00	8.91	12.35	10.61	0.00
10/30/2013	0.00	5.44	0.06	8.27	49.58	10.23	0.06
10/31/2013	0.00	0.00	0.00	8.39	12.44	9.35	0.00
11/01/2013	0.00	0.01	0.00	8.67	13.08	9.60	0.00
11/02/2013	0.00	0.00	0.00	8.84	9.09	8.98	0.00
11/03/2013	0.00	0.00	0.00	9.07	9.27	9.17	0.00
11/04/2013	0.00	0.00	0.00	9.13	9.59	9.32	0.00
TOTAL							155.05
ASR4							
PHASE:	RECHARGE		ASR5				
	FLOW MIN	FLOW MAX	FLOW AVG	PRESS MIN	PRESS MAX	PRESS AVG	TOT VOI
	_	_					

PHASE: RECHARGE

	FLOW_MIN	FLOW_MAX	FLOW_AVG	PRESS_MIN	PRESS_MAX	PRESS_AVG	TOT_VOL
08/16/2013	0.06	6.45	2.71	10.77	46.94	28.32	2.71
08/17/2013	5.19	5.35	5.27	46.93	47.80	47.18	5.27
08/18/2013	5.14	5.33	5.21	47.05	47.70	47.30	5.21
08/19/2013	4.70	5.49	4.99	46.55	48.78	47.86	4.99
08/20/2013	4.67	4.83	4.74	48.76	49.78	49.00	4.74
08/21/2013	4.27	4.81	4.49	48.50	49.62	47.00	4.69
08/22/2013	4.40	4.71	4.63	48.30	49.23	48.88	4.63
08/23/2013	4.55	4.67	4.60	48.53	48.96	48.81	4.60
08/24/2013	4.55	5.38	5.02	48.88	54.18	52.10	5.02
08/25/2013	5.16	5.31	5.22	53.93	54.35	54.18	5.22
08/26/2013	5.18	5.46	5.24	54.23	55.04	54.55	5.24
08/27/2013	5.15	5.65	5.35	48.41	55.63	54.10	5.35
08/28/2013	5.19	5.41	5.27	54.48	55.59	54.92	5.27
08/29/2013	5.08	5.34	5.21	54.32	55.15	54.76	5.21
08/30/2013	0.11	5.23	3.96	22.84	54.87	47.50	3.95
08/31/2013	0.09	0.18	0.11	15.62	22.63	18.45	0.11
09/01/2013	0.08	0.20	0.13	14.43	15.56	14.86	0.13
09/02/2013	0.10	0.24	0.14	13.85	14.46	14.26	0.14
09/03/2013	0.11	6.74	3.34	14.07	51.71	37.09	0.14
09/04/2013	5.05	5.05	5.05	51.65	51.65	51.65	0.14
09/05/2013	5.05	5.05	5.05	51.65	51.65	51.65	0.14
09/06/2013	5.05	5.05	5.05	51.65	51.65	51.65	0.14
09/07/2013	5.05	5.05	5.05	51.65	51.65	51.65	0.14
09/08/2013	5.05	5.05	5.05	51.65	51.65	51.65	0.14
09/09/2013	5.05	5.05	5.05	51.65	51.65	51.65	0.14
09/10/2013	5.05	5.05	5.05	51.65	51.65	51.65	0.14
09/11/2013	0.00	5.05	0.63	0.00	51.65	6.46	0.00
09/12/2013	0.00	6.00	2.71	0.00	51.59	28.98	2.71
09/13/2013	4.79	5.06	4.87	51.46	52.67	51.83	4.86
09/14/2013	4.76	4.92	4.82	51.79	52.24	52.07	4.83
09/15/2013	0.10	5.32	2.53	16.92	52.31	35.40	2.53
09/16/2013	0.00	0.29	0.15	0.00	16.78	15.73	0.15
09/17/2013	0.08	6.07	2.79	14.90	48.00	33.62	2.80
09/18/2013	0.50	4.71	4.53	47.68	48.86	48.30	4.53
09/19/2013	4.43	4.58	4.49	48.21	48.75	48.55	4.49
09/20/2013	4.29	4.58	4.48	48.01	49.03	48.70	4.48
09/21/2013	4.39	4.53	4.44	48.39	48.95	48.77	4.44
09/22/2013	4.37	4.49	4.42	48.42	49.00	48.77	4.43
09/23/2013	0.07	5.50	4.19	21.04	48.97	47.07	4.19
09/24/2013	4.16	4.63	4.42	47.89	49.34	48.76	4.42
09/25/2013	0.00	4.47	3.00	0.00	49.09	39.30	2.99
09/26/2013	0.05	5.74	2.92	16.13	48.51	36.07	2.93
09/27/2013	4.40	4.53	4.46	48.32	48.86	48.63	4.46
09/28/2013	4.37	4.48	4.42	48.56	49.08	48.88	4.42
09/29/2013	4.24	4.47	4.41	48.51	49.15	48.99	4.41
09/30/2013	4.22	4.45	4.34	47.64	49.22	48.61	4.34
10/01/2013	3.34	4.52	4,25	46.78	48.88	47.89	4.25

PHASE: RECHARGE

	FLOW_MIN	FLOW_MAX	FLOW_AVG	PRESS_MIN	PRESS_MAX	PRESS_AVG	TOT_VOL
10/02/2013	4.14	4.35	4.22	47.19	48.07	47.81	4.22
10/03/2013	3.59	4.36	4.20	46.89	48.25	47.72	4.20
10/04/2013	4.12	4.26	4.20	47.38	47.91	47.67	4.19
10/05/2013	4.09	4.24	4.20	47.35	48.06	47.67	4.19
10/06/2013	4.11	4.25	4.19	47.33	47.91	47.68	4.19
10/07/2013	0.07	5.34	3.83	19.11	47.88	43.48	3.83
10/08/2013	4.67	5.06	4.73	46.06	47.63	46.40	4.73
10/09/2013	4.54	4.92	3.95	45.48	47.43	38.46	4.76
10/10/2013	4.62	4.94	4.75	0.00	46.24	44.92	4.75
10/11/2013	4.59	6.90	4.76	45.18	46.17	45.96	4.76
10/12/2013	4.63	4.90	2.97	45.59	46.47	28.77	4.76
10/13/2013	4.51	4.97	4.76	45.44	46.57	46.03	4.76
10/14/2013	4.56	4.88	4.77	45.72	46.48	46.02	4.77
10/15/2013	0.00	5.03	3.93	45.66	47.07	38.47	4.72
10/16/2013	0.00	6.28	2.13	15.32	46.61	29.74	2.13
10/17/2013	0.00	0.31	0.02	14.24	15.26	14.68	0.02
10/18/2013	0.00	0.09	0.01	13.85	14.43	14.19	0.01
10/19/2013	0.00	0.06	0.00	13.64	14.11	13.96	0.00
10/20/2013	0.00	2.07	0.01	13.53	13.94	13.84	0.01
10/21/2013	0.00	0.07	0.01	13.43	13.83	13.71	0.01
10/22/2013	0.00	0.10	0.01	13.36	13.72	13.64	0.01
10/23/2013	0.00	0.07	0.01	13.22	13.68	13.55	0.01
10/24/2013	0.00	0.77	0.00	13.38	13.58	13.51	0.00
10/25/2013	0.00	5.87	2.37	13.37	45.28	28.27	2.37
10/26/2013	0.00	4.93	4.50	17.83	45.80	43.56	4.50
10/27/2013	0.00	0.02	0.00	13.94	16.64	14.60	0.00
10/28/2013	0.00	5.91	2.29	13.61	45.32	27.98	2.29
10/29/2013	0.00	5.38	4.37	16.56	47.69	42.93	4.36
10/30/2013	0.00	6.16	0.01	13.96	38.37	14.64	0.01
10/31/2013	0.00	0.00	0.00	13.43	13.94	13.70	0.00
11/01/2013	0.00	0.02	0.00	13.18	13.61	13.49	0.00
11/02/2013	0.00	0.00	0.00	13.08	13.55	13.39	0.00
11/03/2013	0.00	0.00	0.00	13.22	13.48	13.36	0.00
11/04/2013	0.00	0.00	0.00	13.14	13.37	13.29	0.00
TOTAL							228.84

ASR 5

APPENDIX E ASR CYCLE TESTING WATER QUALITY RESULTS

Southwest Wellfield Cycle Testing Water Quality Results

Date	Phase	ID	Specific Conductance	(Field) Temperature	TDS	Chloride	TSS	Turbidity	pН	Arsenic	Dissolved Oxygen ++	Oxidation-Reduction Potential	
	_	1.1.1	µmhos/cm	°C	mg/L	mg/L	mg/L	NTU	std. units	µg/L	mg/L	mV	
8/6/2013	RECOVERY	ASR-4-SW	1655	5 25.	2 860	740			7.16	0.026	0.2	5 78.1	8
8/6/2013	RECOVERY	ASR-5-SW	562	2 25.	3 148	3 100			7.12	0.0014	0.4:		1

Southwest 1

1	Date	Phase	ID	TOC	Total Nitrate NO3	Sulfate	Sulfide	Total Manganese	Total Alkalinity	Total Coliform	Total Iron	Gross Alpha	Radium* 226/228	Calcium
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	cts/100 ml	mg/L	pCi/L	pCi/L	mg/L
	8/6/2013	RECOVERY	ASR-4-SW	2.48V	0.01	6 10	3 1.0U	0.0074	1 19	2 P	6.95	5 18.	7 7.28/1.50	83.2
	8/6/2013	RECOVERY	ASR-5-SW	2.53V	0.12	6 2	9 1.0U	0.01	5 19	2 A	1.65	5 3.7	7 1.17U/0.950	75.2

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Date	Phase	ID	Bicarbonate	Carbonate	Ammonia (as N)	Total Kjeldahl Nitrogen	UV254	Color
		1 Sec. 11	mg/L	mg/L	mg/L	mg/L	%Trans	PCU
8/6/2013	RECOVERY	ASR-4-SW	192	C	0.5	51 0.28	3	2.1
8/6/2013	RECOVERY	ASR-5-SW	192	C	0.040U	0.15		4.2
Southwest Wellfield Cycle Testing Water Quality Results

			Field Measurement			Not specified if Field or Lab					for not specified if Field or Lab		
Date	Phase	ID	Conductivity	(Field) Temperature	(Lab) Temperature	(Field) TDS - Conductimetric	(Lab) TDS - Gravimetric	Chloride	TSS	Turbidity	(Field) pH	(Lab)) pH
			µmhos/cm	°C	°C	mg/L	mg/L	mg/L	mg/L	NTU	std. units	std. I	units
8/1/2013	B RECHARGE	Upper MW-FA1-SW	5484	22.8	3 22.2	3658	2867	1330		5 15.1	7	.9	7.71
8/5/2013	3 STORAGE	Upper MW-FA1-SW	5398	23.2	2	5398	2970	1300			1	6	
8/6/2013	B RECOVERY	Upper MW-FA1-SW	5433	24.7	1	2937		2620			8.	47	
8/16/2013	B RECHARGE	Upper MW-FA1-SW	5082	26.6	5 19.6	3390	2940	1320	-	31	٤	6	8.58
8/23/2013	B RECHARGE	Upper MW-FA1-SW	5366	22.9)	3056		1280		22.3	7.	36	
8/29/2013	B RECHARGE	Upper MW-FA1-SW	5294	23.3	3	2904		1300			8.	59	
9/6/2013	B RECHARGE	Upper MW-FA1-SW	5516	24.1		3128		1380		20.8	7.	36	
9/12/2013	B RECHARGE	Upper MW-FA1-SW	5439	22.7	21.5	3628	3043	1310		20.6	7.	73	8
9/19/2013	RECHARGE	Upper MW-FA1-SW	5371	22.8	5	3582		1290		24.4	7.	19	
9/26/2013	RECHARGE	Upper MW-FA1-SW	5320	22.8	8	3024		1290		27.7	7.	15	
10/3/2013	RECHARGE	Upper MW-FA1-SW	5423	22.7	()	3073		1300		23.5	7.	75	
10/10/2013	RECHARGE	Upper MW-FA1-SW	5412	22.7	() · · · · · · · · · · · · · · · · · ·	3104		1300		23.7	7.	76	
10/17/2013	B RECHARGE	Upper MW-FA1-SW	5354	22.8	21.9	3571	3107	1290		23,6	7	.7	7.96
10/24/2013	RECHARGE	Upper MW-FA1-SW	5379	22.6	5	2547		1260		22.6	7	.7	
10/31/2013	RECHARGE	Upper MW-FA1-SW	3598	22.9		3090		1280		25.4	7.	18	
11/7/2013	RECHARGE	Upper MW-FA1-SW	5503	22.7	20.5	3671	3037	1270		23.9	7.	12	7.97



Compound was analyzed for but not detected Sample held beyond the accepted holding time

Analyte was detected in both sample and the associated method blank J(M1)Q

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Southwest Wellfield Cycle T

Date	Phase	ID	Arsenic	Dissolved Oxygen ++	Oxidation-Reduction Potential	TOC	Total Nitrate NO3	Sulfate	Sulfide	Total Manganese	Total Alkalinity	Total Coliform	Total Iron	Gross Alph
			µg/L	mg/L	mV	mg/L		mg/L	mg/L	mg/L	mg/L	cts/100 ml	mg/L	pCi/L
8/1/2013	RECHARGE	Upper MW-FA1-SW	0.00047	0.1	-223,3	1.86	0	498	3.4	0.022	278	Absent	0.86	4.57
8/5/2013	STORAGE	Upper MW-FA1-SW	0.00047	0.14	-144.3	1.67	0.004	444	2.9	0.041	246	A	4.04	5,18
8/6/2013	RECOVERY	Upper MW-FA1-SW	0.00047	0.1	. 247.4	1.65	0.092	472	1.9	0.048	274	A	1.1	2.97
8/16/2013	RECHARGE	Upper MW-FA1-SW	0,00047	0.09	-88,2	1.44	0.5	378	1	0.004	244	N	2.14	2.54
8/23/2013	RECHARGE	Upper MW-FA1-SW	0.00047	0.3	202.9	1.97		492	1	0.023	290	Absent	1.75	
8/29/2013	RECHARGE	Upper MW-FA1-SW	0.00088	0.08	-308	1.93	0,5	434	5.9	PENDING	294	Absent	9.99	
9/6/2013	RECHARGE	Upper MW-FA1-SW	0.00047	0.88	201.7	1,73	0.5	507	5.5	0.021	290	Absent	1.67	3.01
9/12/2013	RECHARGE	Upper MW-FA1-SW	0.00047	0.19	-252.1	1.72	0.5	518	7.5	0.02	292	Absent	0.813	4.41
9/19/2013	RECHARGE	Upper MW-FA1-SW	0.021	0.09	-262	1.86	0.025	493	7.5	0.022	290	Absent	1.78	
9/26/2013	RECHARGE	Upper MW-FA1-SW	0.005	0.12	-275.5	2.3	0.86	488	4.2	0,0236	298	Absent	PENDING	
10/3/2013	RECHARGE	Upper MW-FA1-SW	0.005	0.08	-266	2.4	0.86	465	3.6	0.0202	296	Absent	2.43	
10/10/2013	RECHARGE	Upper MW-FA1-SW	0.0005	0.011	-275	2.2	0.86	481	7.5	0.0197	296	Absent	1.88	
10/17/2013	RECHARGE	Upper MW-FA1-SW	0.005	0.09	-264	2.3	0.86	497	6.5	0.0188	310	Absent	1.63	5.29
10/24/2013	RECHARGE	Upper MW-FA1-SW	PENDING	0.08	-260.1	1,86	0.86	501	5.9	0.021	312	Absent	0.93	
10/31/2013	RECHARGE	Upper MW-FA1-SW	0.005	0.12	-258	1.87	0.004	492	3.4	0.0203	316	Absent	1.49	
11/7/2013	RECHARGE	Upper MW-FA1-SW	0.0005	0.11	-276	2.03	0.86	481	4.5	0.0208	310	Absent	1.61	5.83



Compound was analyzed for but not detected Sample held beyond the accepted holding time Analyte was detected in both sample and the assoc J(M1)Q

Southwest Wellfield Cycle Te

Date	Phase	ID	Radium* 226 pCi/L	Radium pCi/L	* 228	Calcium mg/L	Bicarbonate mg/L	Carbonate mg/L	Ammonia (as N) mg/L	Total Kjeldahl Nitrogen mg/L	UV254 %Trans	Color PCU	
8/1/2013	RECHARGE	Upper MW-FA1-SW	4	09	1.12	48	278		0 0.56	0.74			8
8/5/2013	STORAGE	Upper MW-FA1-SW	2	19	0.665	41.6	216	6	0 0.56	0.64	C	5.00	3.7
8/6/2013	RECOVERY	Upper MW-FA1-SW	1	89	1	43.2	244	6	0 0.54	0.1			4.7
8/16/2013	RECHARGE	Upper MW-FA1-SW	1	65	1.06	33.6	244	6 B	0 0.51	0.68			4.8
8/23/2013	RECHARGE	Upper MW-FA1-SW										1 3	6.2
8/29/2013	RECHARGE	Upper MW-FA1-SW											4.1
9/6/2013	RECHARGE	Upper MW-FA1-SW	4	07	0,924	1							4.1
9/12/2013	RECHARGE	Upper MW-FA1-SW	4	11	0.634	52,8	292	8	0 0.63	0.68			4.8
9/19/2013	RECHARGE	Upper MW-FA1-SW											4
9/26/2013	RECHARGE	Upper MW-FA1-SW									10		4.8
10/3/2013	RECHARGE	Upper MW-FA1-SW											4.6
10/10/2013	RECHARGE	Upper MW-FA1-SW										1 13	4.7
10/17/2013	RECHARGE	Upper MW-FA1-SW	2	95	1.56	56	310	N (2	0 0.54	0.78		1.1.1.5	5.4
10/24/2013	RECHARGE	Upper MW-FA1-SW										1.1.1.5	4.3
10/31/2013	RECHARGE	Upper MW-FA1-SW									1	1.1.1	5.4
11/7/2013	RECHARGE	Upper MW-FA1-SW	2	35	0.892	54.4	310	6	0 0.63	0.84			4.5

U Q V Compound was analyzed for but not detected Sample held beyond the accepted holding time Analyte was detected in both sample and the assoc J(M1)Q

Southwest Wellfield Cycle Testing Water Quality Results

			Field Measurement			Not specified if Field or Lab					
Date	Phase	ID	Conductivity	(Field) Temperature	(Lab) Temperature	(Field) TDS - Conductimetric	(Lab) TDS - Gravimetric	Chloride	TSS	Turbic	dity
			µmhos/cm	°C	°C	mg/L	mg/L	mg/L	mg/L	NTU	
8/1/2013	RECHARGE	Lower MW-FA1-SW	6037	23.6	22.3	4026	3384	1580		8.1	12
8/5/2013	STORAGE	Lower MW-FA1-SW	6016	24		6016	3304	1540			
8/6/2013	B RECOVERY	Lower MW-FA1-SW	5996	25		3388		3060			
8/16/2013	RECHARGE	Lower MW-FA1-SW	5941	24.8	19.6	3963	3430	1540			4.42
9/12/2013	RECHARGE	Lower MW-FA1-SW	6052	23.3	23	4037	3416	1580			12.7
10/17/2013	RECHARGE	Lower MW-FA1-SW	5884	23.5	22	3925	3524	1570			5.75
11/7/2013	RECHARGE	Lower MW-FA1-SW	6136	23.3	18.7	4093	3532	1560		4	10.8



Compound was analyzed for but not detected Analyte was detected in both sample and the associated method blank

Southwest Wellfield Cycle T

Date	Phase	ID	*Not speci	fied if Field	or Lab	Dissolved	(Ovidation-	TOC	Total Nitra	Sulfate	Sulfida	Total Man	Total Alk	ali Total Colife 1	fotal Iron	Gross Alph
Duit	Thuse		std. units	std. units	µg/L	mg/L	mV	mg/L	Total Mitra	mg/L	mg/L	mg/L	mg/L	cts/100 ml n	ng/L	pCi/L
8/1/2013	RECHARGE	Lower MW-FA1-SW	7.67	7.68	0.00047	0.08	-162.5	1.09	9 0	536	1.7	0.0068	16	0 Absent	2.32	32.7
8/5/2013	STORAGE	Lower MW-FA1-SW	7.99		0.0012	0.2	-190	0.94	4 0.004	546	1	0.036	5 15	8 A	3.65	46.4
8/6/2013	RECOVERY	Lower MW-FA1-SW	7.93		0.0011	0.11	222.8	0.79	9 0.172	562	2	0.035	15	B A	5.35	28.2
8/16/2013	RECHARGE	Lower MW-FA1-SW	7.49	7.9	0.0027	0.13	-166.5	0.67	7 0.5	503	1	0.0045	15	2 N	5.52	23.3
9/12/2013	RECHARGE	Lower MW-FA1-SW	7.55	7.76	0.00047	0.29	-232.1	0.7	7 0.5	517	3.7	0.0062	16	2 Absent	0.234	24.8
10/17/2013	RECHARGE	Lower MW-FA1-SW	7.55	7.65	0.005	0.09	-252	1.	1 0.86	505	4	0.0025	16	8 Absent	0.308	25.5
11/7/2013	RECHARGE	Lower MW-FA1-SW	7.57	7.69	0.0005	0.11	-265	1.02	2 0.86	542	2.6	0.0077	16	5 Absent	0.426	26



Compound was analyzed for but not detected Analyte was detected in both sample and the asso-

Southwest Wellfield Cycle T

Date	Phase	ID	Radium* 226	Radium* 228		Calcium	Bicarbonat Carb	onate Amm	onia (Total Kjeld UV254	Color
			pCi/L	pCi/L		mg/L	mg/L mg/	L mg/L		mg/L %Trans	PCU
8/1/2013	RECHARGE	Lower MW-FA1-SW	24.	4	0,947	105.6	160	0	0.28	0.37	1
8/5/2013	STORAGE	Lower MW-FA1-SW	2	2	0.916	116.8	158	0	0.27	0.35	1.5
8/6/2013	RECOVERY	Lower MW-FA1-SW	2	2	0.936	110.4	158	0	0.26	0.35	2.4
8/16/2013	RECHARGE	Lower MW-FA1-SW	14.	8	0.758	107.2	152	0	0.24	0.35	2.4
9/12/2013	RECHARGE	Lower MW-FA1-SW	20.	7	0.669	120	162	0	0.31	0.29	2.1
10/17/2013	RECHARGE	Lower MW-FA1-SW	20.	5	1.05	144	168	0	0.25	0.4	8.7
11/7/2013	RECHARGE	Lower MW-FA1-SW	1	6	0.566	129.6	166	0	0.31	0.5	4.8

U Compound was analyzed for but not detected V Analyte was detected in both sample and the asso

Southwest Wellfield Cycle Testing Water Quality Results

			Field Measurement	() () () () () () () () () ()		Not specified if Field or Lab					*Not speci	fied if Field (
Date	Phase	ID	(Field) Conductivity	(Field) Temperature	(Lab) Temperature	(Field) TDS - Conductimetric	(Lab) T	S - Chloride	TDS	Turbidity	(Field) pH	(Lab) pH
			µmhos/cm	°C	°C	mg/L	mg/L	mg/L	mg/L	NTU	std. units	std. units
7/29/2013	RECHARGE	Biscayne Aquifer MW-BA-1-SW	601	26.5	23.5	39	1 2	27	10 :	144 30.3	3 7.61	7.85
8/16/2013	RECHARGE	Biscayne Aquifer MW-BA-1-SW	599	27.3	20.9	40	0		39	4.4	L 7.59	7.68
8/6/2013	STORAGE	Biscayne Aquifer MW-BA-1-SW	595	26.3		59	5 2	23	38		7.64	
8/6/2013	RECOVERY	Biscayne Aquifer MW-BA-1-SW	598	25.9		27	3		38		7.72	
9/12/2013	RECHARGE	Biscayne Aquifer MW-BA-1-SW	533	22.7	23.6	35	5 3	17	10	5.4	7.73	7.74
10/17/2013	RECHARGE	Biscayne Aquifer MW-BA-1-SW	598	26.3	20.8	39	9 3	104	10	3.6	7.55	7.74
11/7/2013	RECHARGE	Biscayne Aquifer MW-BA-1-SW	606	26.1	22.8	40	4 3	32	38	2.10	5 7.54	7.69

Compound was analyzed for but not detected

Analyte was detected in both sample and the associated method blank Value is between the laboratory method detection and the laboratory practical quantitation limit

Southwest Wellfield Cycle Testing Water Q

Date	Phase	ID	or Lab Arsenic	Dissolve	ed (Oxid	ation-l	тос	Total Nitra	Sulfate	Su	fide	Total Man	E Total Alkal	i Total Colifc T	otal Iron	Gross Alph	Radium* 226	Radium* 2
	-	a construction of the second	µg/L	mg/L	mV	1	mg/L		mg/L	mg	5/L	mg/L	mg/L	cts/100 ml n	ng/L	pCI/L	pCi/L	pCi/L
7/29/201	3 RECHARGE	Biscayne Aquifer MW-BA-1-SW	0.0011	. 0	.22	-178	1.23	0		9	1	0.01	234	Absent	0.76	13.7	2.3	4 0.89
8/16/201	3 RECHARGE	Biscayne Aquifer MW-BA-1-SW	0.00047	0	.31	127.4	0,86	0.025	1	.0	1	0.0027	238	N	0.17	6.08	0.89	5 0.936
8/6/201	3 STORAGE	Biscayne Aquifer MW-BA-1-SW	0.0014	0	.29	-138.2	1.26	0.004		8	1.4	0.008	238	A	0.75	4.71	1.8	7 0.944
8/6/201	3 RECOVERY	Biscayne Aquifer MW-BA-1-SW	0.00047	0	.37	142.9	0.91	0.004	1	1	1.4	0.0037	238	A	0.26	2.93	0.83	2 0.629
9/12/201	3 RECHARGE	Biscayne Aquifer MW-BA-1-SW	0.0011	. 0	.25	183.4	1.23	0.025	1	1	1.5	0.0017	234	Absent	0.063	6.83	3.6	2 0.778
10/17/201	3 RECHARGE	Biscayne Aquifer MW-BA-1-SW	0.005	0	.43	-177	0.83	0.043	10.	4	1.7	0.0025	240	Absent	0.146	6.77	1.2	2 0.943
11/7/201	3 RECHARGE	Biscayne Aquifer MW-BA-1-SW	0.0005	0	.43	-208	0.94	0.043	1	1	1.5	0.0016	234	Absent	0.0629	4.49	1.5	7 0,5

Compound was analyzed for but not detected Analyte was detected in both sample and the associ Value is between the laboratory method detection a

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Southwest Wellfield Cycle Testing Water Q

Date	Phase	ID	Calcium	Bicarbonat	Carbonate	Ammonia (Total Kjeldahl Nitrogen	UV254	Color
		and the back of the back of	mg/L	mg/L	mg/L	mg/L	mg/L	%irans	PCU
7/29/2013	RECHARGE	Biscayne Aquifer MW-BA-1-SW	29.6	234	0	0.02	0.18	90.37	2
8/16/2013	RECHARGE	Biscayne Aquifer MW-BA-1-SW	30.4	238	0	0.02	0.1		1,9
8/6/2013	STORAGE	Biscayne Aquifer MW-BA-1-SW	30.4	238	0	0.02	0.086		1.3
8/6/2013	RECOVERY	Biscayne Aquifer MW-BA-1-SW	31.2	238	0	0.02	0.086		4.3
9/12/2013	RECHARGE	Biscayne Aquifer MW-BA-1-SW	32	234	0	0.024	0.086		3.1
10/17/2013	RECHARGE	Biscayne Aquifer MW-BA-1-SW	46.4	240	0	0.02	0.11		4.3
11/7/2013	RECHARGE	Biscayne Aquifer MW-BA-1-SW	29.6	234	0	0.02	0.086		4.7

Compound was analyzed for but not detected Analyte was detected in both sample and the associ Value is between the laboratory method detection a

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