The Droplet

Florida Water Environment Association
Integrated Water Resources Committee

September 2013 Volume 5 Issue 3

Destin Water Users Reclaimed Water ASR System Success?

Destin Water Users, Inc. (DWU) reclaimed water aquifer storage and recovery (ASR) system is the first ASR system in Northwest Florida and the first operational system in Florida to successfully use a shallow sand aquifer (Sand-and-Gravel Aquifer) as a storage zone. The DWU ASR system is one of a handful of operational reclaimed water ASR systems in Florida and is the only one that uses an aquifer considered to be an Underground Source of Drinking Water (USDW) as a storage zone. The storage zone of the DWU ASR system contains freshwater, but does not meet potable standards. The DWU ASR system also pioneered the use of institutional controls to address public health concerns and avoid the possibility of indirect potable reuse, namely an existing local prohibition against the use of the storage aquifer for potable supply purposes. The current source of drinking water is the Upper Floridan.

The DWU reclaimed water is mainly reused for landscape irrigation. DWU's initial need for the ASR system was for additional wet weather disposal capacity for their water reclamation facility. At the same time ASR would be a huge benefit in balancing reclaimed water supply and demand.

The DWU ASR system consists of seven (7) ASR (injection and recovery) wells and six (6) associated monitoring wells, and has a design injection and recovery capacity of 2.125 million gallons per day (MGD). Reclaimed water is stored in the main-producing zone of the Sand-and-Gravel Aquifer of the Surficial Aquifer System (Figure 1). The ASR system was constructed in two phases. Phase I included the construction and testing of a pilot ASR system, which consists of a single ASR well (ASR-1) and three associated monitoring wells. Two of the monitoring wells are existing wells that were converted to storage-zone monitoring wells (SZMW-1 and SZMW-2) and a newly constructed shallow monitoring well (SMW-1). Phase II of the ASR project consists of the construction of six additional ASR wells (ASR-2 through ASR-7), two additional storage zone monitoring wells (SZMW-3 and SZMW-4), and an additional shallow monitoring well (SMW-2) as shown in Figures 2 & 3.

The ASR wells are constructed with a 16-inch diameter injection casing set to 106 to 110 feet below land surface (ft bls). The wells are completed with 50 feet of 8-inch diameter, either 0.035-inch slot (ASR-1) or 0.050-inch slot (ASR-2 through ASR-7) wire-wrapped 316 stainless steel screen with 5 feet of tail pipe. The annulus is filled with 8/16 grade sand filter pack. The wells are designed so that the screen and inner casing could be removed to rehabilitate the well, if necessary. Total construction costs were approximately $2 million for all 7 wells, which provide 2.125MGD of storage or 6.375MG of wet weather storage to meet WWTP permit requirements.

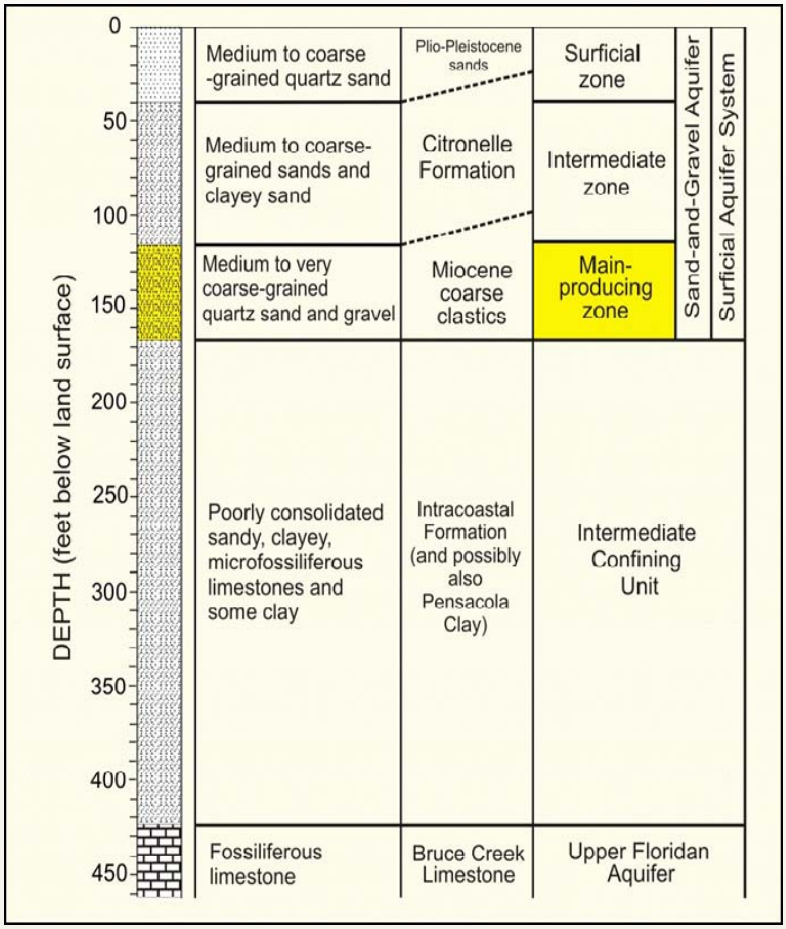

Figure 1: Hydrogeology of the DWU ASR System Site.

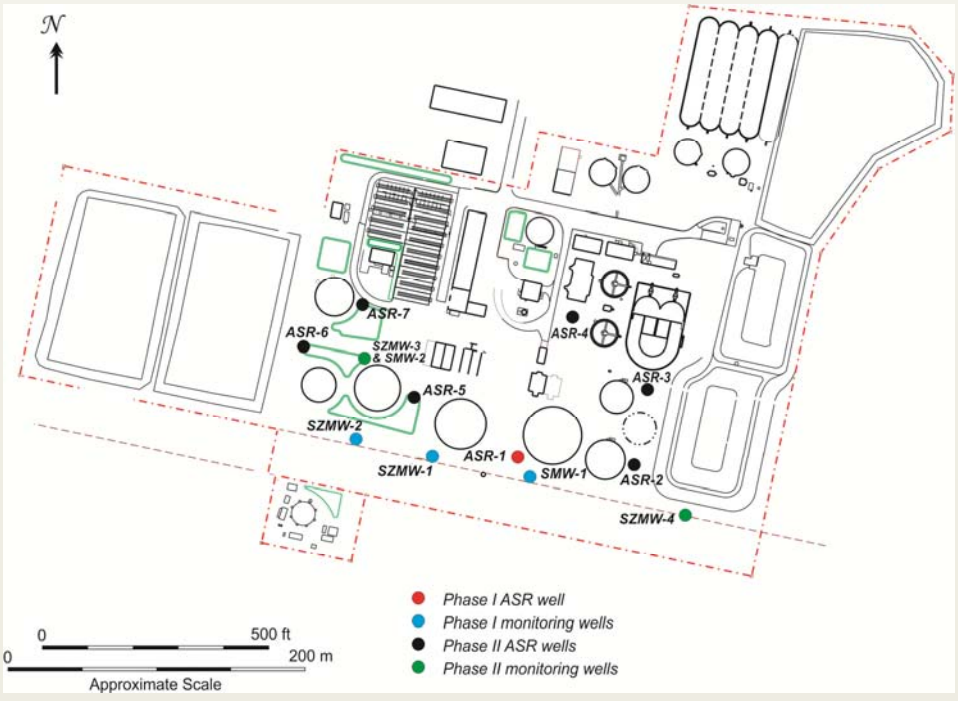

Figure 2. Site Plan of the George F. French Water Reclamation Facility showing locations of ASR system wells

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Figure 3. Well ASR-4 located at the George F. French Water Reclamation Facility.

REGULATORY ISSUES

The DWU ASR system is unique in Florida in that reclaimed water is being stored in a freshwater aquifer, with a native TDS <100 mg/l. A key issue for making the system economically feasible was obtaining a variance from some of the requirements of the FDEP Reuse Rules (FAC Chapter 62-610). ASR systems that use aquifers containing less than 1,000 mg/l of total dissolved solids (or in some cases less than 3,000 mg/L), are required to meet the full treatment and disinfection requirements, based under the assumption that indirect potable reuse will occur.

Both the surficial zone and main-producing zone of the Sand-and-Gravel aquifer are used in Destin only for irrigation water supply. Destin City Code specifically states that shallow wells which draw water from the Sand-and-Gravel aquifer shall be used for irrigation purposes only. The prohibition against potable use of the Sand-and-Gravel was instrumental in allowing DWU to obtain a variance from many of the full treatment and disinfection requirements, because it provided reasonable assurance that indirect potable reuse will not occur.

The permitting issues overcome in the DWU ASR project illustrate some the shortcomings of the federal and state underground injection control (UIC) rules. Groundwaters with a total dissolved solids concentration of less than 10,000 mg/L are uniformly treated as underground sources of drinking water, when in many instances there is no likelihood that potable use will ever occur. Institutional controls, such as local prohibitions against the potable use of an aquifer and setbacks from potable supply wells can be effective in meeting the ultimate goal of the UIC program of protection of potable water supplies.

LESSONS FROM THE DWU ASR SYSTEM

The DWU ASR system is a pioneer in Florida in several ways and could serve as a prototype for similar systems. Shallow aquifers are present on many barrier islands and onshore in coastal areas that are not suitable for potable water supply, often because the freshwater resources are limited and may have been impacted by saline-water intrusion. The optimal use of these aquifers may be as storage zones for reclaimed water or perhaps storm water ASR systems for later irrigation use. The DWU ASR system demonstrated that reclaimed water ASR using shallow sand and gravel aquifers is feasible. There is a clear need for underground injection rules and policies to be modified so that permitting and monitoring requirements are based on actual public health risks rather than unrealistically assumed potable use. For example, there is no rational reason why the drinking

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water arsenic and total trihalomethane maximum contaminant levels should be applied to DWU and similar ASR systems.

Some of the things the DWU ASR system had to face:

- As operational testing of the ASR is well underway, additional challenges of managing two permits (WWTP reuse disposal site & Underground Injection Control) became apparent. Each permit had a different set of parameters required and at different frequencies.
- In addition, the WWTP Discharge Monitoring Report increase from about 40 pages pre ASR to about 100 pages with the ASR system included.
- One additional difference was that wastewater sampling parameters were single sample max versus drinking water regulations of average annual values.
- During initial cycle testing, the management of reclaimed water needed for testing was trying and pretty unwieldy. We had to balance the supply to our customers with the need to inject, store and recover water to meet cycle testing requirements.
- Biofilm screen fouling presented an early problem. Achieving the balance in chlorination rates to eliminate coliform and minimizing DBP production was difficult.

DWU and FDEP have worked together to resolve many of these issues and to help create a more efficient ASR permitting process.

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Committee News & Information

FWEA IWRC 2014 Bi-Annual Seminar: "Sustainable Solutions Utilities are Implementing for Integrated Water Resources"

IWRC announces our 1-day bi-annual seminar in January 2014 on "Sustainable Solutions Utilities are Implementing for Integrated Water Resources," where experts in the field will discuss the application of state-of-the-art sustainable practices. Speakers and other details will be announced in an upcoming edition of this newsletter. CEU's & PDH's will be available.

For more information contact: Leslie Gowdish (Leslie.Gowdish@atkinsglobal.com) or Beth Whikehart (bwhikehart@gmail.com)

IWRC Membership

If you would like further information about the IWRC or are interested in becoming a member, feel free to email any of our officers (see contact information in left margin) or visit our website at http://www.fwea.org/integrated_water_resources_com.php.

IWRC Calendar of Events

Date	Description
October 1, 2013	IWRC Monthly Teleconference
October 5-9, 2013	Inaugural Stormwater Congress at WEFTEC 2013 – Chicago, IL (see below for details)
October 26, 2013	Florida Water Festival, Crane's Roost Park, Altamonte Springs, FL
January, 2014	Integrated Water Resources Conference (details TBA)

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EVENT DETAILS

Inaugural Stormwater Congress at WEFTEC 2013 – Chicago, IL

From October 5-9, 2013, "Conference-within-a-Conference" to feature extensive technical programming, world-class speakers and dedicated exhibit space on stormwater-related issues

Featuring 17 technical sessions and more than 70 world-class speakers, the event's technical programming will include cutting-edge issues such as changing regulations and policies, climate change impacts, stream restoration, flow-based TMDLs, stormwater financing strategies, and more.

For more info, visit: http://www.wef.org/about/page.aspx?id=12884903452

Florida Water Festival – Crane's Roost Park, Altamonte Springs, FL

October 26, 2013 - 9:00AM-3:00PM

The Florida Water Festival is a unique learning opportunity for children and adults. The free to attend event is designed to educate the public at large of the importance of protecting Florida's precious water resources.

For more info, visit: http://mms.fwea.org/Calendar/moreinfo.php?eventid=23506

IWRC Goals and Focus

The goals of the IWRC are:

- To further the dialogue between water professionals throughout Florida to meet our growing needs in all areas of water resources.
- To provide timely, high-quality information and education on water as a valuable resource that can be used to meet current and future water resources and water supply challenges throughout Florida.
- To provide rewarding leadership opportunities to water professionals at all levels of experience.

The focus of the IWRC encompasses the following areas of water resources practice:

- water quality
- watershed and stormwater management
- water supply
- water conservation and reuse
- ecological and hydrologic restoration
- groundwater recharge
- hydrologic and hydraulic modeling
- funding and grant opportunities
- regulations and policies

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