

***PEACE RIVER MANASOTA REGIONAL WATER SUPPLY AUTHORITY
BOARD OF DIRECTORS MEETING
June 1, 2022***

**ROUTINE STATUS REPORTS
ITEM 8**

Partially Treated Water Aquifer Storage and Recovery Project

Project Status Report

Project: Partially Treated Water Aquifer Storage and Recovery

Date: June 1, 2022

Prepared by: James P. Guida, , P.G., Water Resources & Planning Director

Project Description

The Authority's Aquifer Storage and Recovery (ASR) System includes 21 ASR production wells with a design storage capacity of 6.3 BG. While this system is a critical storage component for the Peace River Facilities, it is operationally expensive. Water in ASR is fully treated twice to drinking water standards; first on injection in accordance with our existing operations permit for ASR; and again on recovery as water recovered from ASR is discharged to the raw water reservoir system because of naturally occurring arsenic picked up during storage in the limestone aquifer. Operationally this makes water from ASR twice as expensive as water from the raw water reservoir system. Converting to a "partially treated" (minimal filtration and disinfection prior to injection) ASR system has the potential to offer considerable cost savings, improve ASR recovery efficiency, and may also provide opportunities to obtain credit for over-recharging the Floridan Aquifer in the Southern Water Use Caution Area (SWUCA). This is a multi-step project including:

- Modification of the existing ASR permit to allow pilot testing the partially treated ASR concept on two existing ASR production wells.
- Conducting the pilot testing, evaluating results, and re-evaluating costs for the system.
- If results are favorable the ASR system would be re-permitted to enable use of partially treated water for recharging the system.
- New pumping, filtration and disinfection facilities would be constructed adjacent to Reservoir 1 to support ASR recharge.

Current status

A modification of the ASR permit to allow pilot testing of partially treated water (PTW) at Wellfield 2 was issued in December 2016. As required, an application to renew the ASR Operation permit was submitted in February 2018. Pilot testing of PTW ASR was completed and results were presented to the Board in July 2018. At the July 2018 meeting the Board authorized proceeding with permitting of PTW ASR. Authority staff met with FDEP and then submitted a written clarification of the application confirming the request to include PTW at ASR Wellfield 2 on August 23, 2018. The FDEP requested additional information to support the permit application on September 28, 2018. The Authority provided the requested information on October 12, 2018.

In a November 2018 phone discussion, FDEP staff indicated the application is complete and evaluation is continuing. Subsequent discussions with FDEP staff in January 2019 indicated agency action on the permit application would not take place until after FDEP receives U.S. Environmental Protection Agency (EPA) direction on ASR and aquifer recharge projects

proposing to store/recharge anything other than fully treated drinking water. EPA provided FDEP with a letter regarding ASR permitting on March 1, 2019. However, a June 2019 conversation with FDEP indicated they had only received direction from EPA regarding injection of fully treated drinking water. Until they receive such direction they stated will not know when they may take action on permit applications that request PTW ASR.

The Authority awaited a decision and action by the FDEP through July 2020, at which time the Authority decided to propose a plan for disinfection of PTW at ASR WF 2 in order to move the project forward. On July 30, 2020 the Authority provided the proposed plan for implementation of disinfection treatment of PTW, provided a review of secondary drinking water standards (DWS; i.e., aesthetic standards) that may require a Zone of Discharge (ZOD) or Water Quality Criteria Exemption (WQCE), and a proposed monitoring plan. Four secondary standards were identified including aluminum, color, iron, and odor. None of these secondary DWSs are regulated by the EPA.

The Authority currently has a WQCE for arsenic mobilization (issued February 12, 2013). A letter from EPA issued September 27, 2013, allows for arsenic mobilization at ASR facilities serving public water systems. The letter allows for re-permitting of Peace River's ASR facility using permit conditions which are protective of public water systems and other groundwater users. The Authority has operated the ASR system since the 1980's without endangering groundwater users. In 2020, FDEP staff indicated they now preferred a ZOD, rather than a WQCE, as the regulatory mechanism for authorizing arsenic mobilization below properties controlled by the Authority. As documented in the annual reports (the most recent being August 2021) arsenic mobilization is limited to a small number of wells under the Authority's control. Therefore, in July 2020 the Authority requested the permit include a ZOD for the foregoing secondary DWSs (i.e., aesthetic standards) and for arsenic mobilization. The requested ZOD encompasses the Suwannee Limestone below property owned or otherwise controlled by the Authority (a depth interval from 500-1,000 feet below land surface). The Authority also provided details of a proposed update to the Authority's already extensive monitoring plan.

To determine the efficacy and details of of an effective disinfection system, the Authority engaged Hazen & Sawyer to conduct a study to confirm the ideal methodology for providing disinfection of PTW. A study entitled "Disinfection Study of Partially Treated Surface Water for Aquifer Storage and Recovery" was published on September 14, 2021. The study determined that disinfection standards can be met in the PTW source water without exceeding DWSs for DBPs. On September 28, 2021, the Authority submitted the study to FDEP along with other pertinent information. Based on this information, the Authority requested the FDEP move forward with re-permitting the Authority's ASR operations as provided in the permit application.

Continued communications with FDEP since submittal of the September 2021 submittal. FDEP has informed the Authority that it would now prefer to use a Petition for WQCE (Petition) as the mechanism for authorizing exceedance of the four secondary DWSs. FDEP's preferred regulatory mechanism for re-authorizing arsenic mobilization below Authority-controlled properties remains under discussion. A conference call was conducted with FDEP on April 28, 2022, to discuss the approach and content of the Petition and the FDEP's intent with respect to the Petition and reissuance of the Operation permit. The draft Petition is in development and is anticipated to be

submitted to the FDEP within approximately the next month. Thereafter, the Petition will be advertised and acted upon by FDEP. Assuming FDEP approval of the Petition, it is anticipated they will thereafter develop a draft of the proposed Operation permit.

Project History Briefing

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The following information summarizes the historical milestones and key events of the Partially Treated Water (PTW) ASR Project.

- October 2015 Executed Work Order 15-02 with CH2M for Partially Treated ASR Desk-Top Study October 9, 2015.
- March 2016 Desk-top study completed March 24, 2016. Recommends pilot testing partially treated concept. If pilot testing is successful, study indicates potential savings of \$334K to \$394K per year for partially treated system compared with current system. Requires new \$7.5M pumping facilities near Reservoir 1 for recharging ASR.
- April 2016 Presentation of partially treated ASR concept to Authority Board April 6, 2016. Recommended scheduling meeting with FDEP in Tallahassee to discuss concept, permit modification and pilot testing. Met with FDEP staff in Tallahassee April 29, 2016 to discuss partially treated water ASR at the Peace River Facility. Recommendation from meeting is to apply for ASR permit modification enabling pilot testing.
- May - July 2016 Began preparing application to modify ASR permit to allow pilot testing of partially treated ASR concept on two wells in Wellfield No. 2.
- August 2016 August 3, 2016 - Submitted request to FDEP for major modification of the Authority's ASR permit and associated Water Quality Criteria Exemption to enable pilot testing of partially treated ASR concept on two wells in Wellfield No. 2.
- September 2016 September 1, 2016 - Received Request for Additional Information (RAI) from FDEP to support the Authority's ASR permit modification request. September 8, 2016 - CH2M prepared and submitted responses to the FDEP's RAI. CH2M preparing Work Order for pilot testing of partially treated ASR concept on two wells in Wellfield No. 2. September 30, 2016 - Authority received Draft

Class V, Group 7 permit from FDEP including the requested changes to enable pilot testing at ASR Wells S-4 and S-20

- October 2016 Board approved WO 17-01 to CH2M for Pilot Testing at ASR Wellfield 2 (October 5, 2016).
- November 2016 Conducted Public Meeting November 17, 2016 at Peace River Facility for public comment on recently issued draft permit modification for Authority Class V Group 7 ASR system. Site visit by SWFWMD staff November 21, 2016 for review and discuss co-funding application the partially treated ASR Project.
- December 2016 Received notice of permit on December 14, 2016 authorizing pilot testing. Authorized CH2M to begin work on test set-up. Attended meeting with SWFWMD staff in Tampa on December 22nd to discuss project co-funding. Low probability for out-of-cycle funding for FY 2016 and 2017 work on this project.
- January 2017 Conducted project safety & coordination meeting with consultant and Authority staff on January 11th in preparation for beginning the test. Authority staff collecting background samples from production and monitor wells and reservoir 1. Installation of piping to ASR wells S-4 and S-20 and recharge pump is ongoing.
- February 2017 Installation of piping and pumping equipment was completed and background water quality monitoring was completed the week of February 6th and testing (recharge cycle) was initiated on February 9, 2017. An intensive data collection effort in nearby monitor and ASR production wells is ongoing. Recharge rates are averaging approximately 0.7 MGD, and 1.3 MGD into ASR wells S-4 and S-20 respectively.
- March 2017 The recharge portion of this cycle in the testing was completed on March 9, 2017. Total volume of water pumped from Reservoir 1 into S-4 and S-20 was about 60 MG. Storage and recovery portions of the testing are ongoing, as are associated data collection efforts.
- April 2017 Recovery portion of the pilot test was ceased on April 10, 2017 after recovering approximately 26 MG from Test wells S-4 & S-20 (total) in order to enable full scale recovery operations in ASR Wellfield 2. Data collection efforts supporting the pilot testing operations continued.

- May 2017

Data collection efforts associated with the test continued, and analysis of test data is underway to aid in refining the test procedure for Cycle 2 (probable timeframe mid-summer 2017). Authority and CH2M staff met on May 25th to discuss test results and plan Cycle 2 testing.
- June 2017

Authority requested test revision from FDEP on June 22, 2017 to conduct extended cycle 2 in lieu of two separate shorter cycles to complete the pilot testing program. FDEP approval received on June 27, 2017 for the extended cycle. Data analysis from Cycle 1 is ongoing. Preparing for initiation of Cycle 2 (extended) in early July. Authority staff are working with SWFWMD staff on development of the co-funding agreement for the project.
- July 2017

Initiated Cycle 2 recharge on July 6, 2017 at initial rate of 2.6 MGD. Recharge of the entire ASR system is ongoing at this time – although the other 19 ASR wells are being recharged with fully treated drinking water. Data collection is ongoing. The test pump malfunctioned a number of times in July and was ultimately moved off-site by Xylem for re-build.
- August 2017

Re-initiated Cycle 2 recharge on August 2, 2017 at rate of 2.6 MGD. Treated water recharge of the remaining 19 ASR wells is still ongoing at this time. Met with project consultant August 29, 2017 to discuss data collection and ASR Permit Renewal. Pilot Test data collection is ongoing.
- September 2017

Recharge Cycle 2 was suspended between September 6th and September 18th due to Hurricane Irma. Recharge is ongoing and projected to continue into October. Attended Sarasota delegation Meeting September 20, 2017 to discuss funding request for the PTW ASR Project. Data collection is ongoing.
- October 2017

Recharge Cycle 2 is ongoing at a rate of about 2.0 MGD. Data collection for the pilot test is ongoing.
- November 2017

Recharge Cycle 2 was terminated on November 1, 2017 and a planned 30-day storage cycle was initiated. As part of the storage cycle all recharge to ASR wellfield 2 has been suspended. ASR Wellfield 1 recharge is continuing. The recovery cycle from test wells S-4 & S-20 is scheduled to commence in early December 2017. Data collection for the pilot test is ongoing. Test pump supplier - Xylem removed their equipment from the ASR pilot test site on November 8th & 9th.

- December 2017 Recovery Cycle 2 was initiated on December 1, 2017 and will include an approximate 30-day period of recovering water from Test Wells S-4 and S-20. Data collection effort is continuing.
- January 2018 Recovery Cycle 2 was terminated on January 2, 2018. All test equipment (pumping, piping and electrical) has been removed. Data collection and evaluation is ongoing.
- February 2018 Project Consultant is evaluating data collected during the test. On February 7th a conference call was held with the FDEP staff in Tallahassee regarding pilot test results and the renewal application for the ASR system. The renewal application must be received by the FDEP by February 23, 2018 to be considered timely. Permit expires on April 23, 2018. Renewal Application was submitted on February 21, 2018.
- March 2018 Work is ongoing regarding the data analysis from the pilot test. Authority and Consultant staff held a project meeting on March 7th to discuss ongoing data analysis and project timeframe. Completion of the Final Report for the test program is projected in April 2018.
- April 2018 Held kick-off meeting (phone conference) with SWFWMD staff & project team for co-funding. Work is ongoing but geochemical analysis is behind schedule. Draft report delayed until late May with final report projected in June.
- May 2018 Work is ongoing regarding the data analysis from the pilot test. Consultant projects draft report available May 25, 2018. Projected schedule for Board consideration of the project is July 25, 2018.
- June 2018 Continuing work to finalize pilot test report. Projected schedule for Board consideration of the project is July 25, 2018.
- July 2018 Presented results from pilot testing partially treated water ASR to the Board on 7/25. Received Board authorization to proceed with permitting of PTW ASR for WF 2.
- August 2018 Pilot study completed. Project staff met with FDEP Tallahassee regulatory staff on 8/16 to discuss test results and inclusion of PTW for ASR in WF 2 in the permit. Based on those discussions, Authority issued written clarification of the request to use PTW on 8/23. FDEP staff continuing evaluation of the application.
- September 2018 Working with SWFWMD staff to revise individual task budgets in funding agreement (without changing Agreement total budget) to reflect actual expenditures and receipt of State grant funding. Received request for additional information on ASR operation Permit application 09/28/2018. Preparing RAI response.

- October 2018 Submitted RAI response 10/12/2018. Awaiting FDEP action. Continuing work on revision of SWFWMD co-funding agreement.
- November 2018 Awaiting FDEP action. Held discussions with SWFWMD staff about pulling the FY 2020 co-funding application for this project because it appears to be fully funded using currently approved dollars from SWFWMD and the State of Florida through 2020.
- December 2018 Awaiting FDEP action. Continued discussions with SWFWMD staff about pulling the FY 2020 co-funding application for this project because it appears to be fully funded using currently approved dollars from SWFWMD and the State of Florida through 2020.
- January 2019 Awaiting FDEP action. Prepared board item recommending pulling the FY 2020 co-funding application for this project for reasons atated previously. Phone discussion with FDEP staff 1/22/2019 about application status. FDEP staff reports they need to meet with the U.S. EPA to discuss ASR issues and until that is completed no action is expected to be taken on the application. U.S. EPA discussions are expected “soon”.
- February/March 2019 Received copy of March 1, 2019 letter from U.S. EPA to FDEP regarding ASR System Permitting. Awaiting FDEP interpretation of the letter and action on permit for the Authority project.
- April/ May 2019 Awaiting FDEP interpretation of the letter and action on permit for the Authority project.
- June/ July 2019 Held phone discussion with FDEP staff in June. FDEP staff indicate that the Department has not received direction from the USEPA on anything other than fully treated drinking water ASR projects and as such – until they receive such direction they do not know when they will take action on permit applications that request ASR or recharge with partially treated or raw water.
- Aug./ Sept. 2019 August 15, 2019 - received Amendment 1 to SWFWMD co-funding Agreement extending project agreement until December 31, 2021, and reducing SWFWMD funding from \$120,500 to \$20,500. Time extension required due to FDEP inactivity on ASR permit modification. Co-Funding amount reduced due to receipt of \$1M from State of Florida for the project which will carry work through most of the final design stage.
- Oct./ Nov. 2019 October 2, 2019 Board approved Amendment 1 to SWFWMD co-funding Agreement extending project agreement until December

31, 2021, and reducing SWFWMD funding from \$120,500 to \$20,500.

- Dec. 2019–June 2020 Awaiting FDEP action.

- July 2020 Pursuant to a July 14 conference call regarding the ASR permit application, on July 30 the Authority provided a proposed plan for using partially treated water (PTW) including disinfection treatment as a source water for PRF ASR Wellfield No. 2 (ASR WF 2). Per FDEP’s request, the Authority submitted:
 - 1) a proposed plan for the implementation of disinfection treatment of the PTW source water
 - 2) a review of the secondary drinking water standards (i.e., aesthetic standards) of the source water that may require a zone of discharge (ZOD) or water quality criteria exemption (WQCE); and
 - 3) a proposed monitoring plan

Additional infrastructure is required to implement PTW at WF 2, including a new pump station, additional piping, and filtration. The Authority also proposed disinfection treatment of the PTW (most likely chloramine; same method currently used at the PRF) to meet the total coliform groundwater discharge standard while maintaining compliance with primary drinking water standards (DWS) for disinfection byproducts (DBPs). The chloramine concentration and total contact time required for effective disinfection of PTW are to be determined through a study that will provide design criteria for related infrastructure.

A review of available data confirmed that aluminum, color, iron, and odor are the only secondary DWSs requiring a ZOD, and that there are no primary DWS of concern in the PTW other than total coliform (which is proposed to be treated through disinfection). None of these secondary DWSs are regulated by Environmental Protection Agency (EPA). The Authority currently has a WQCE for arsenic mobilization and it has been indicated by the FDEP that a ZOD for arsenic is preferred over a WQCE. The Authority requested that the permit include a ZOD for the foregoing secondary DWSs (i.e., aesthetic standards) and for arsenic mobilization that encompasses the Suwannee Limestone on property owned or otherwise controlled by the Authority (a depth interval from 500-1,000 feet below land surface). The Authority also provided details of a proposed update to the Authority’s already extensive monitoring plan.

- Aug. 2020 – Sept. 2021 The Authority engaged Hazen & Sawyer to conduct a study to confirm the ideal methodology for providing disinfection of PTW. A study entitled “Disinfection Study of Partially Treated Surface Water for Aquifer Storage and Recovery’ was published on September 14, 2021. The study determined that disinfection standards can be met in the PTW source water without exceeding DWSs for DBPs. On September 28, 2021, the Authority submitted the study to FDEP along with other pertinent information regarding the history of the Authority’s ASR operations since the 1980s, the Department’s previous authorization to conduct the PTW pilot test, results of the pilot test, and the history of the Authority’s pending permit application which has been in-house since 2018. Based on this information, the Authority requested the Department move forward with re-permitting the Authority’s ASR operations as provided in the permit application.

The Authority currently has a WQCE for arsenic mobilization that was issued February 12, 2013. A letter from EPA issued September 27, 2013, allows for arsenic mobilization at ASR facilities serving public water systems. The letter allows for re-permitting of Peace River's ASR facility using permit conditions which are protective of public water systems and other groundwater users.

The Authority has operated the ASR system since the 1980's without endangering groundwater users. As documented in the annual reports (the most recent being August 2021) arsenic mobilization is limited to a small number of wells under the Authority’s control. The report's Executive Summary lists the following points to demonstrate public health has not been endangered through operation of the ASR system.

- Water recovered from the ASR system is pumped to the reservoirs where it mixes with surface water and is then retreated at the water treatment plant (WTP), which significantly reduces the arsenic concentration. Finished water from the WTP meets all state and federal drinking water standards.
- As demonstrated in this report, the Authority has an extensive monitoring well network with a very robust dataset. This network has demonstrated that the areal extent of arsenic exceedances is limited to land owned or controlled by the Authority.
- There is strong evidence that arsenic is unstable in groundwater when influenced by ASR operations and reabsorbs to the host rock matrix relatively near the ASR boreholes.
- No competing users of the storage zone are located near either of the ASR wellfields.

- The Authority owns or controls a large area of land surrounding the ASR wellfields (institutional control) and data have demonstrated arsenic mobilization remains onsite.
- Arsenic concentrations have decreased with continued use of the ASR system, with most of the ASR wells now operating within the DWS.

The Authority requested the permit include a specific condition referencing the 2013 EPA letter, and requested the Department move forward with drafting a renewed Operation permit for storage and recovery of both potable water and PTSW from the onsite reservoirs in ASR WF 2 and only potable water in ASR WF 1. Only potable water will be recharged for the first few years under the permit renewal while the infrastructure is added to recharge PTSW which meets primary drinking water standards.

- Oct. 2021 – May 2022

Continued communications with the Department and development of the technical and legal aspects of the draft Petition for Water Quality Criteria Exemption (Petition). The petition would cover secondary drinking water standards including aluminum, iron, odor and color. A conference call was conducted with the Department on April 28, 2022, to discuss the approach and content of the Petition and the Department's intent with respect to the Petition and reissuance of the Operation permit. The draft Petition is in development and is anticipated to be submitted to the Department within the next month. Thereafter, the Petition will be advertised and acted upon by the Department. Assuming Department approval of the Petition, it is anticipated the Department will develop a draft of the proposed Operation permit.