



Treatment Technology: Ensuring a High Quality and Affordable Water Supply

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As part of the SJRA's Groundwater Reduction Plan (GRP) program, a 30 million gallon per day (MGD) water treatment plant is being constructed at the east end of the Lake Conroe dam. As of January 1, 2016, the treatment plant will provide surface water to Montgomery County in order to comply with the Lone Star Groundwater Conservation District's (LSGCD) mandate for reducing groundwater withdrawals. SJRA's GRP will allow Montgomery County to reduce its dependence on groundwater by utilizing a reliable, long-term alternative water supply.

The source water for this treatment plant is Lake Conroe, which until now has not been used for potable water supply. As a result, much time and research went into the early planning stages of the plant before its design and construction began. From August 2010 to February 2011, a pilot plant was constructed to test the treatability of Lake Conroe's water. In addition, it was also used as a tool to select which treatment technology and process configuration would achieve State and Federal regulatory requirements and internally-set treatment goals.

The selected treatment process be-

gins with a number of "pre-treatment" steps. During pre-treatment, chemicals will be used to adjust the raw water alkalinity and pH. The lake water will also be treated to oxidize iron and manganese. This will cause both elements to precipitate out of the water and removal will occur during the sedimentation and filtration steps. The substances introduced during pre-treatment will also improve taste and remove odor compounds. Additives will also be used to cause smaller particles in the water to "stick together" and make bigger particles that will settle by gravity during the sedimentation step. The sedimentation step evens out and slows down the water to allow gravity to settle the bigger particles to the bottom of the sedimentation basin.

The heart of the treatment process is a membrane system supplied by Pall Corporation. After the sedimentation step, the water will be pumped through the membrane filters. Membranes are hollow tubes through which

water passes but particles and bacteria are left behind since they are too large to pass through the very small pores. The pore size through the membrane fiber is 0.1 micron (small enough to filter out the smallest of bacteria).

After the membrane filtration step, granular activated carbon (GAC) contactors will be used to remove taste, odor, and organic compounds present in the water. GAC is the same material used in home faucet filters to remove chlorine, taste, and odor compounds. Approximately 200,000 pounds of GAC will be collected in each contactor. SJRA's surface water treatment plant will initially have eight contactors.

Clean water will be used throughout

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the water treatment process for back-washing of strainers, GAC contactors, and the membranes. This water will be recycled back into the plant to receive full treatment, creating a very water efficient process. Process efficiency, for the treatment plant, is estimated to be in the 95-98 percent range with minimal water loss throughout the process.

After GAC, the water will be disinfected with chlorine to ensure that it is safe for consumption by the end user (i.e. you and me). It will be stored on-site in two 5-million gallon storage tanks. The massive storage tanks are baffled to keep the water circulating and make sure it doesn't sit still in the tank for any length of time. In addition, the storage tanks themselves contain a final treatment process involving oxygenating the water to remove any

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disinfection by-products.

After the treatment process is complete, the finished water will be pumped out of the storage tanks and into SJRA's transmission system by way of a pump station and two discharge headers located at the plant site. One header will head south to serve customers along Fish Creek Thoroughfare and down to The Woodlands and Rayford Road area. The other header will deliver water northeast towards Conroe. SJRA's water transmission system is comprised of approximately 55 miles of pipeline ranging from 12 inches to 60 inches in size. The water will be delivered to 16 different receiving facilities, which are existing water storage tanks owned by various utilities participating in the SJRA GRP. At the water receiving facilities, SJRA's treated surface water will be blended with each utility's existing groundwater supply.

SJRA has gone to extraordinary lengths to ensure that it delivers superior quality water at an affordable price.

For more information on the treatment process or to see numerous photos of the construction, please visit www.sjra.net/GRP. ♦

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