

Irvine Ranch Water District. Deep Aquifer Treatment System.

IRWD. WELL GROUNDED IN WATER RELIABILITY.



Project Purpose:

Providing reliable, high-quality, cost-effective drinking water, the Irvine Ranch Water District Deep Aquifer Treatment System taps into the deepest groundwater aquifer in Orange County, located 2,000 feet below the surface. This water, low in salt content, is the color of weak iced tea. The color is the result of the remnants of ancient redwood trees that covered this area millions of years ago.

Project Background:

In operation since 2002, the DATS facility uses membrane filtration to separate the color molecules from the water. For every 100 gallons of colored water that enters the plant, 98 gallons of clean, clear drinking water are produced. A total of eight million gallons per day is pumped from two deep groundwater wells. DATS also protects the upper aquifers from color, so those aquifers can be pumped without treatment.

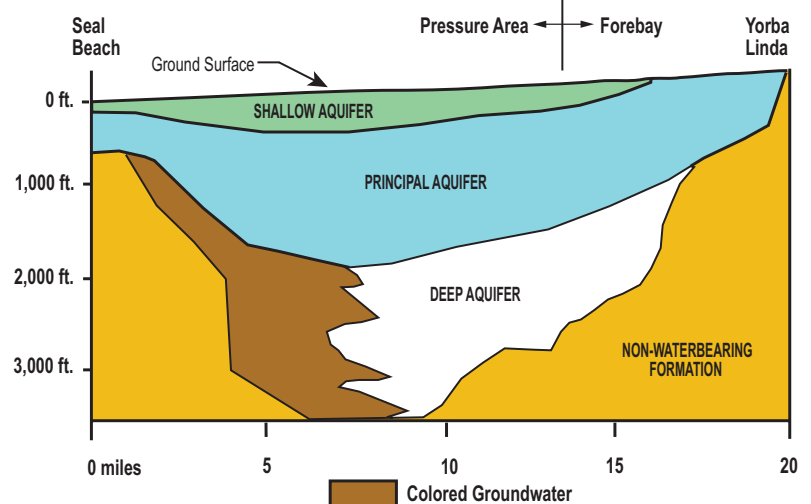


DEEP AQUIFER SYSTEM (DATS) WATER

Untreated colored water (above, left) is treated to produce clear drinking water (above, center) as the final product. The concentrated colored by-product (right) is disposed in the sewer system. At left, water samples are regularly collected at the DATS facility and used to monitor the treatment process.



AQUIFER LAYERS FOUND IN THE ORANGE COUNTY GROUNDWATER BASIN



Project Process:

Wells: Two wells, C-8 (on site) and C-9 (in Carl Thornton Park), draw water from the Deep Aquifer. The wells are approximately 2000 feet deep and are equipped with 300 horsepower submersible well pumps.

Pretreatment: Groundwater from wells C-8 and C-9 is pumped to the DATS Plant. To prevent scaling of the membranes, an antiscalant is added to the water which is then passed through 10 micron cartridge filters. These pretreatment steps help to protect the nanofiltration membranes.

Nanofiltration (NF) Feed Pumps:

Three 150-horsepower pumps are used to provide the pressure required to operate the nanofiltration system. Variable frequency drives are used on each pump to provide the exact pressure required for the system, approximately 100 pounds per square inch.

Nanofiltration Trains - The Heart of the System:

The nanofiltration (NF) is a selective membrane process used to separate the color constituents from the incoming feed water. The high quality permeate continues to the next step of the process while the colored concentrate is sent to the CATS system. Each of the three NF trains produce 1700 gallons per minute (2.44 mgd) at a recovery rate of 92 percent.

Concentrate Treatment System

(CATS): The CATS portion of the system provides an additional treatment train to further treat the concentrate from the three DATS NF trains. A 60-horsepower pump moves the DATS concentrate through the CATS NF train at a pressure of approximately 70 pounds per square inch. The CATS NF train produces approximately 300 gallons per minute (0.43 mgd) of high quality water which increases total plant recovery to 98 percent.

Degasification: The groundwater in the Deep Aquifer contains low levels of methane gas which is not removed

during the membrane treatment process. Therefore the permeate water from the membranes is further treated using three forced-air degasifiers.

The level of methane released into the atmosphere is not harmful and is below all air quality standards.

Product Pumps: Final product water is stored in an underground concrete clearwell. Three 300-horsepower pumps (two primary and one standby) are used to pump the product water to the distribution pipeline. Product water receives disinfection off-site prior to entering the IRWD drinking water system.

Clean-In-Place System: An on-site clean-in-place system is used for periodic cleaning of the NF membranes. The NF trains are taken off-line and a cleaning solution is circulated through the membranes to remove contaminants. After flushing and testing, the NF trains are placed back in service.



Cartridge Filters



Nanofiltration Trains



Degasifiers (at left) & Final Product Pumps



Testing DATS water



For more Information:

Please visit: www.irwd.com

Call us: (949) 453-5500