

DATS Features

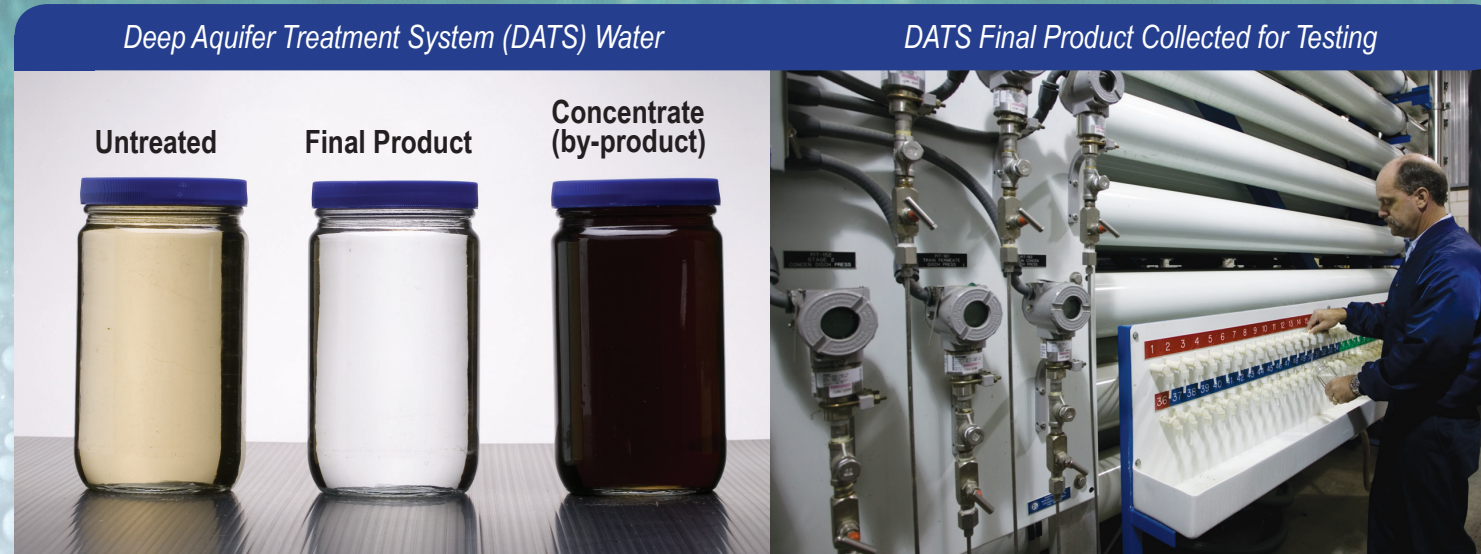
- Low Colored Water**
 Reduces color from ~285 color units (ice tea appearance) to <5 color units (clear)
- Better Quality**
 Total dissolved solids (TDS) 300 mg/L.
 This water contains fewer minerals than water imported from Metropolitan Water District.
- 8000 Acre-Foot Per Year (AFY)**
 of water provided by DATS with CATS
- Cheaper than Most Imported Water**
 DATS water cost **\$441** per AF versus imported water at **\$761** per AF (2010 prices)
- Regulated by**
 California Department of Public Health
- In Cooperation with**
 City of Santa Ana
 Orange County Water District
 Orange County Sanitation District
 County of Orange

For More Information Contact:

Irvine Ranch Water District
 15600 Sand Canyon Avenue
 Irvine, California 92618
 (949) 453-5300
 www.irwd.com

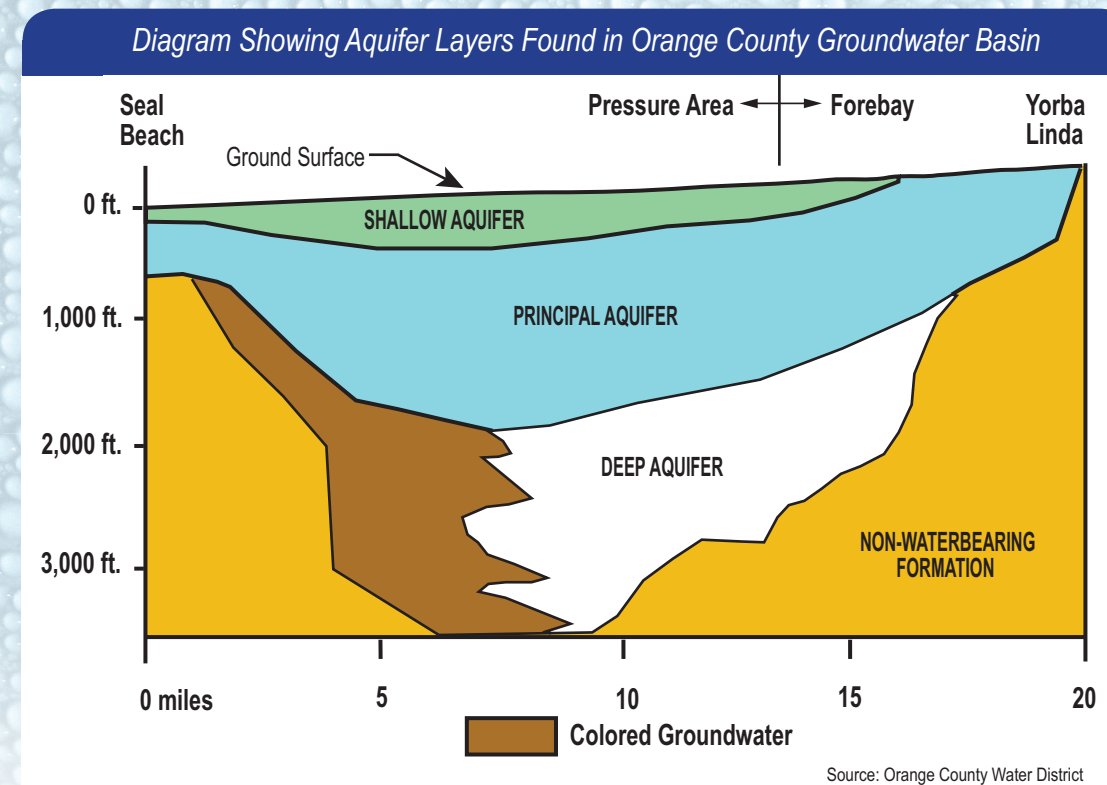


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Deep Aquifer Treatment System

*Providing a Reliable
 High Quality
 Cost Effective
 Water Supply*



Overview

In the late 1970s and early 1980s, Irvine Ranch Water District (IRWD) initiated the development of the Dyer Road Well Field (DRWF) located in the Orange County Groundwater Basin. During the development of the initial DRWF, two distinct aquifers were identified: the Principal Aquifer and a Deep (colored water) Aquifer.

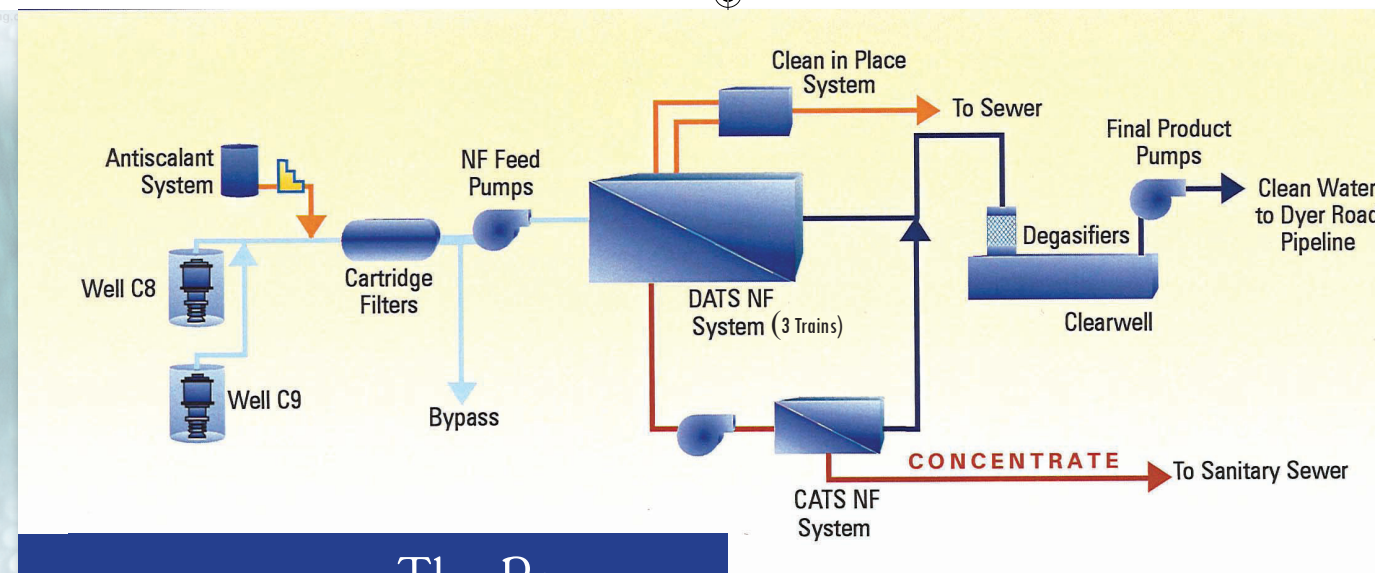
The Deep Aquifer Treatment System (DATS) purifies drinking water from the Deep Aquifer. Although the water from this aquifer is very high quality, it was previously unusable because it has a brownish tint imparted from redwoods and other ancient vegetation that once populated the area. Using new purification technology—nanofiltration—it is now possible and cost effective to remove the color from this water.

Currently, a total of eight million gallons of water per day (mgd) is pumped from two deep groundwater wells. DATS and CATS state-of-the-art nanofiltration systems remove color and organics to produce 7.8 mgd of drinking water, which is pumped into the Dyer Road Well Field pipeline.

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The 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.

