

Development of a Suburban Wellfield

O'Donnell & Associates, Inc. (OAI) was retained to provide hydrogeologic services associated with the development of a new public water supply well for a southwest Alabama water system. Working with the system's engineer, OAI provided hydrogeologic planning, wellsite services and source water assessment services for this new well project which started out as a single well offset to one of the system's existing wells.

The existing well was completed in 1996 as a 600-gallon per minute well. The new wellsite is located a half mile to the north in what would become a new subdivision. The target of the new well was the Lower Theodore Aquifer; a prolific Miocene sand unit that supports eight public supply wells in Mobile County.

OAI's wellsite service, required of all new public supply wells in Alabama, included geologically logging the cuttings of the original borehole for the well. While the regulation allows this service to be completed off site after the bore is completed, OAI completes this service in real time as the boring is advanced. During the drilling operation, OAI logged a sand unit not previously under consideration but one which had characteristics favorable for development in addition to the target aquifer. A recommendation by OAI led to the testing and development of this second aquifer.

The second aquifer, a Miocene sand aquifer designated as the Black Chert Aquifer, is shallower than the target aquifer and separated from it vertically by 159 feet of clay. Testing on the Black Chert Aquifer proved favorable for development both water quality wise and production wise with no hydraulic interference between the two aquifers. The treatment plant/clearwell design, Photo A, was finalized based on the projected production from both the Lower Theodore and Black Chert Aquifers.



A: West side of plant showing clearwell and wells

The site's Shallow Well was completed in the Black Chert Aquifer with a tested production capacity of 900 gpm and it was permitted for 600 gpm. The site's Deep Well was completed in the Lower Theodore Aquifer with a tested production capacity of 1,276 gpm and it was permitted for

850 gpm. The two wells are located 41 feet apart horizontally, Photo B, on a single residential lot with the treatment plant designed to look like just another house in the subdivision, Photo C. The facility's privacy fencing obscures the wells and emergency power supply from the street view, Photo D.



B: Facility's backyard with two wells 41 feet apart



C: Street view of Treatment Plant



D: East side of plant showing emergency power unit

By involving OAI in this project, from its initial planning stage through the drilling and completion of the wells, this water system was able to maximize site production while reducing piping, treatment and land purchase costs over that generally associated with the development of two individual well locations. **Savings for the water system for this project were estimated at approximately \$600,000.**