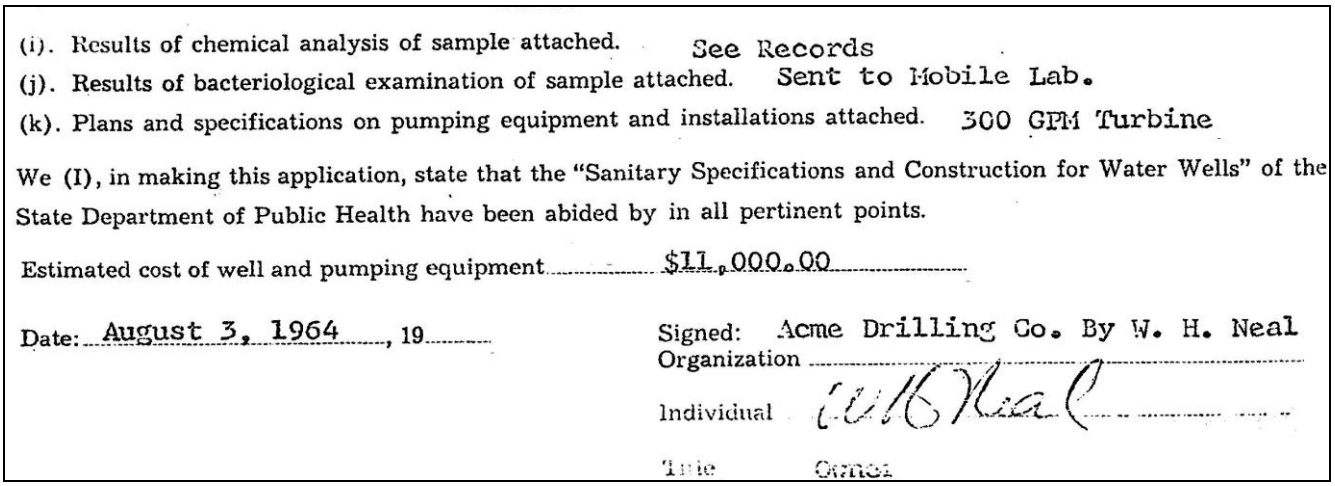
Who ya gonna call?

By Dan O'Donnell, PG
O'Donnell & Associates, Inc.

The saying "When there's something strange in the neighborhood, who ya gonna call…Ghostbusters!" makes sense if you find yourself dealing with ghosts. If, however, you are responsible for a water system and you need a new well, forget calling the Ghostbusters, you need to call a hydrogeologist.

The cost of developing a new groundwater source has changed considerably over the past 46 years. The days of completing a new 300-gallon per minute well, see Inset 1, for as little as $11,000 dollars has gone the way of the nickel candy bar. Today the cost of a new well project can easily exceed half a million dollars.



(i). Results of chemical analysis of sample attached. See Records
(j). Results of bacteriological examination of sample attached. Sent to Mobile Lab.
(k). Plans and specifications on pumping equipment and installations attached. 300 GPM Turbine

We (I), in making this application, state that the "Sanitary Specifications and Construction for Water Wells" of the State Department of Public Health have been abided by in all pertinent points.

Estimated cost of well and pumping equipment $11,000.00

Date: August 3, 1964, 19

Signed: Acme Drilling Co. By W. H. Neal
Organization
Individual
Title Owner

Inset 1: Cost of a 300 GPM Public Supply Well in 1964

A hydrogeologist can improve the odds of successfully and efficiently completing a new well by conducting a hydrogeologic assessment of the water system's service area. The assessment compiles information of the system's existing resources and the hydrogeology of the service area. This information is used to identify area aquifers, target area wells for sampling to determine aquifer water quality and to recommend well sites that offer the best potential to be developed by single wells or through multiple wells at a single location (i.e. wellfields). Using this approach, costly test bores and test wells may be eliminated or be targeted for the most promising aquifers. Presented here are two case studies of how hydrogeologic assessments completed by O'Donnell & Associates, Inc. (OAI) made the difference for a public supply system and an industrial client.

Case Study No. 1:
Due in part to drought conditions in 2007 that brought declining water levels in their existing wells, this water system implemented system wide water restriction. The water restriction program slowed declining water levels but the reduce water sales resulted in a decline in revenue. After four months of water restriction measures and loss of revenue, the system decided to move forward with the development of a new well in an aquifer thought to be present at a depth of 1,200 feet. OAI was retained to complete an assessment of the area's hydrogeology to determine if the target aquifer was actually present at the proposed drilling location.

OAI compiled hydrogeologic data from a 240 square mile area around the system. The hydrogeologic data provided in-sight to the nature and settings of area aquifers, the production potential of each aquifer, the water quality of the aquifers and historic water level data for wells completed in the aquifers.

The results of OAI's hydrogeologic assessment provided the water system with information on the target aquifer including:

- that the target aquifer was confirmed as being present from a depth of 1,200 to 1,320 feet at the proposed location by means of a test bore was drilled and geophysically logged by the system in 1967 at the proposed location but this exploration effort was unknown by the current staff
- that a test well was completed in the target aquifer in 1967 at the proposed location
- that groundwater samples obtained from the 1967 test well indicated the aquifer's water was suitable for use as a source of public water supply
- that pumping tests on the 1967 test well indicated the aquifer had favorable hydraulics that would support a high volume production well

Based on the findings of OAI's hydrogeologic assessment, the planned (and budgeted) test bore and test well could be eliminated from their exploration program allowing them to proceed directly to the production well phase of their groundwater development project. The total cost reduction to the system by the elimination of the testing portion of the project (test bore, test well, geophysical logging and preliminary water sampling) was approximately $122,300.

Case Study No 2:
In 2004, OAI was contracted to assess the potential of developing groundwater as a source of industrial supply for a chemical manufacturing facility. Since its inception, the facility purchased water from an area utility because they were told groundwater was not an option in the vicinity of their plant. A local engineer that was aware of OAI's capabilities referred the facility's engineer to OAI.

The project involved researching published and un-published reports and records on groundwater in the 12 square mile area around the plant and, if conditions were favorable, making recommendations on an aquifer to target for development. The hydrogeologic assessment paid off with the identification of five independent aquifers underlying the area. Research also located reports that contained water quality and production data on five abandoned industrial supply wells in the area that tapped three key aquifers.

Using information obtained through the assessment, OAI recommended a drilling depth to develop the most favorable aquifer and provided documentation of the aquifer's expected production potential and water quality. In the area were ***groundwater was not an option***, a 700 gallon per minute well was completed to meet the plant's water needs eliminating their need to purchase industrial supply water.

At the rate of $1.30[1] per 1,000 gallons for purchased water cost, the development of their own groundwater supply well producing at the rate of 700 gpm well results in a potential savings up to $1,310 per day for the plant in purchased water cost. Assuming the well is only operational 80 percent of the time, the savings to the plant over the five years since the well was completed amounts to $1,913,184[2].

Excluding the industrial well mentioned above, OAI has been involved with the research, exploration and/or development of 10 other industrial supply wells with a combined production rate of 6,070 gallons per minute.

[1] Estimated purchased water cost; actual cost may differ.
[2] Estimated five year savings = 5 x 365 x (1,440 x 700)/1,000 x .8) x $1.30 = $1,913,184

Biographical Sketch
Daniel J. O'Donnell is a professional geologist employed by O'Donnell & Associates, Inc. (OAI), a hydrogeologic consulting firm located at 600 Bel Air Blvd., Suite 130, Mobile, Alabama 36606 (Ph: 251-478-9939, Fax: 251-478-9938, Cell 251-510-9355). Dan's responsibility at OAI includes the research, exploration, development and management of groundwater resources for industrial, public and irrigation supply purposes. Dan has completed over 70 hydrogeologic assessments.