

How We Build a Well

According to historical accounts, even before the first of the '49er wagon trains limped out of Death Valley on their way from points east to California gold and silver strikes, there was a well located on what is now Highway 14 just north of Inyokern. Although no one knows who put it there, contemporary verbal tales and written diaries mention that the clean, cool water was considered a God-send to those first intrepid Eastern Sierra non-native explorers and saved literally hundreds of lives.

The construction of water wells has come a long way since then – or even since the Fox brothers began digging at their first site with a couple of shovels many decades ago. In days gone by, not a lot was known about the mysteries of the water source here so settling on a well location was largely based on observation, guesswork and a good deal of luck. There were no worries about endangered species or concerns about the effects on the surrounding water table. Well pumping mechanics and building procedures were straightforward and the entire process, while not always successful and sometimes expensive, was still relatively simple.

Times have certainly changed.

Choosing a well site, for example, has evolved into much more of a science. Using a variety of information gathered over the years, combined with new technologies, hydrologists identify sites that they estimate will result in the most productive well with minimal affects on the surrounding aquifer. The flora and fauna on the property must be thoroughly investigated by state approved biologists and botanists to evaluate the possible consequences construction activity could have on species classified as endangered or threatened. These factors and many more are addressed in an environmental assessment prepared under the requirements of the California Environmental Quality Act (CEQA), with review of these documents by the public and various regulatory and permitting agencies, like the California Department of Fish and Game.

A variety of disciplines are used in actual well construction with specific steps dependant upon its geologic conditions and intended use. But well construction and implementation almost always consist of the following stages. (Note: It is important to remember that all well construction contracts are awarded using the District's formal competitive bidding process.)

After a pilot bore is created by drilling, we interpret cuttings and well electric logs to determine the appropriate location and design of perforations in the casing, which is then custom fabricated. While the casing is being fabricated, the pilot hole is reamed to a larger diameter borehole that is sized to accommodate the casing and a gravel filter pack that is placed between the casing and the native soil formation. The filter pack is used to prevent the migration of fine, unwanted particles of sand and other sediments from entering the well and ultimately our distribution system. The old- fashioned equipment and methods of well construction did not allow for gravel filter pack installation, while

current equipment and methods do. Next, the upper space between the casing and borehole is filled with concrete at the borehole's uppermost 50 feet. Sometimes referred to as "grouting," this step prevents the seepage of possible contaminants from the surface and is performed in accordance with requirements set forth by the California Department of Health Services.

The next sequence of actions is referred to as "development." The main issues addressed during this phase have to do with amending the "permeability and porosity" of the aquifer near the borehole so that water can flow freely.

This activity, demanding a sophisticated combination of high capacity pumping and sometimes jetting, occurs in the areas where water enters the structure. Using a variable speed pump, it will maximize the amount of water that can be delivered to the surface.

When development is complete, extensive sampling and testing of the well's water begins. And finally, a permanent pump is installed followed by more sampling to determine that the water meets stringent potable water standards established by the Environmental Protection Agency (EPA) and California Department of Health Services (CDHS). As you may imagine, these procedures are much more highly regulated for any public utility water well than those installed for private use only.

To summarize the "expected" timetable:

- 1) biological surveys and environmental documents– four months
- 2) biological permitting – 12-18 months
- 3) requests for bids, award, and execution of contracts – two months
- 4) well and pumping plant construction – about a year
- 5) CDHS licensing – three months

As you can see, the process of drilling a new well and getting it into production may take as long as three years and requires a great attention to detail. If you would like to learn more about this process or if you have other questions about your water in the Indian Wells Valley, contact Water District offices at 375-5086. We are here to serve you.