

# Ground Water Supply Evaluation Gilroy, California



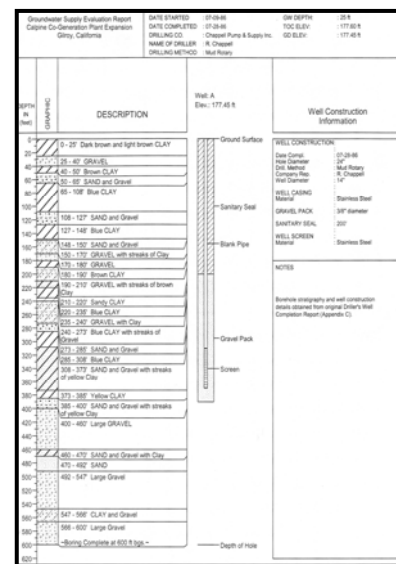
The Gilroy Energy Center is located south of San Francisco Bay, in the central western section of California. In the 2001, expansion plans for the Gilroy Energy Center called for the installation of six combustion turbines as part of a Peaker Project designed to meet the increasing energy needs in California.

At the Gilroy Center, two on-site ground water production wells were already providing the required operational water supply. However, prior to approving the expansion effort, the California Energy Commission and the Santa Clara Valley Water District required the client prove that increased ground water extraction would be sustainable and not cause detrimental long-term effects to the aquifer system.



To determine that a total ground water extraction of up to 2 million gallons per day was feasible; a ground water supply evaluation was designed to assess the impact of increased ground water extraction on the following issues:

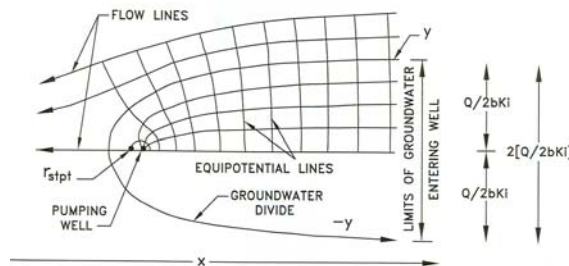
- Long-term aquifer water supply potential
- Well interference effects
- Impact on neighboring wells and surface water bodies
- Water quality impacts (i.e., increased vertical and lateral migration of saltwater and nitrates into the aquifer system)
- Ground subsidence



## Aquifer Test Program

A major concern of the regulators was that little site-specific information existed on which to base realistic predictions as to the impact of increased pumping. Consequently, a test program was designed, using both on-site production wells and several off-site agricultural wells. The aquifer test program consisted of three main components:

1. Determination of ambient (pre-test) conditions
2. Observation well drilling and construction (total depth of 400 ft)
3. Production well aquifer testing (8-hour step test and 24-hour aquifer test)



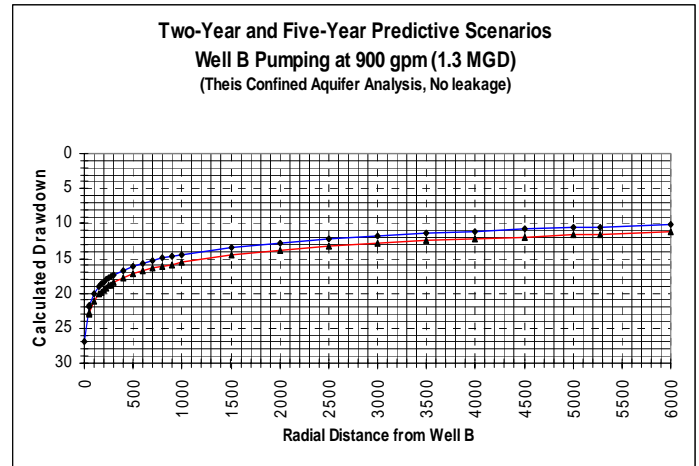
A major constraint associated with the aquifer test was the management of the 2 million gallons of well discharge water which was going to be generated during the 24-hour aquifer test. This discharge water could not, for the purposes of the test, re-enter the local ground water system without biasing the test results. With careful planning, this issue was identified early in the project and through systematic negotiation with the Regional Water Quality Control Board, neighboring farmers and the City of Santa Clara, it was agreed that water would be discharged to a nearby food processing facility for their operational use.

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### Water Supply Potential and Predictive Analyses

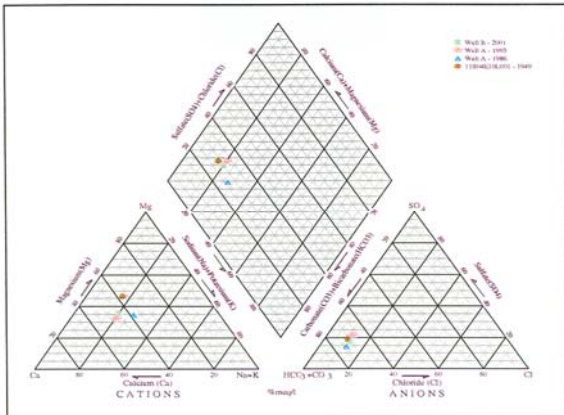
To evaluate the impact of increased groundwater extraction on the yield and water levels in wells within a 1-mile radius of the site, predictive analyses were performed using the aquifer hydraulic parameters measured during the 24-hour aquifer test.

Predictive analyses were completed using a Theis analysis (nonequilibrium flow for confined aquifers). Predictive radial drawdown calculations were completed for both a 2-year and a 5-year constant pumping scenario. With these analyses, it was possible to clearly demonstrate that nearby wells and water bodies would not be adversely affected by increased ground water extraction at the Gilroy Energy Center.



### Ground Subsidence

The magnitude of the predicted radial draw downs at a 1-mile radius from the site for the 2-year and 5-year Gilroy Energy Center configurations were such that it was possible to show that predicted changes in pressure would not be able to induce land subsidence.



### Ground Water Quality Analyses

Piper plots can be used to examine mixing of waters with different origins. For this project, a Piper plot was used to compare historic groundwater quality data (1949, 1986, 1993, and 2001) for the aquifer. The objective was to determine if observable changes in inorganic groundwater chemistry had occurred over the past 52 years as a result of steadily increasing groundwater extraction in the region. Using the piper plots, it was possible to show that no discernible change in inorganic chemistry in the ground water had been observed with increased ground water extraction.

### PROJECT HIGHLIGHTS:

- ✓ Project completed on schedule and within budget.
- ✓ Multi-agency and stakeholder involvement ensured timely and cooperative project completion.
- ✓ Complex data evaluation included 1) well interference effects analysis, 2) integration of regional ground water quality database for over 200 wells and 3) capture zone analysis.
- ✓ Received approval for increased groundwater extraction from the California Energy Commission and Santa Clara Valley Water District without report revision or comment.

