

Preliminary information regarding well construction at Devils Postpile National Monument

Information from the Forest Service

The US Forest Service operates 5 campgrounds in the San Joaquin River Valley in close proximity to Devils Postpile National Monument. The Forest Service has constructed several test wells in the area in an attempt to provide drinking water for their campgrounds. Mr. Allan Tobey (engineer, USFS 760-873-2487) provided information regarding test wells and water supply wells constructed by the Forest Service.

The Forest Service drilled two wells at Reds Meadow Campground; one in the meadow and one in the pasture, both wells produced hot, geothermal water and were abandoned. At the Rainbow Falls Trailhead they drilled 250 feet and had a dry hole.

The Forest Service then drilled horizontal wells into a seep area, on the hillside northeast of Reds Meadow Campground. The horizontal wells were approximately 30 feet long. The wells produced water, but it always had high bacteriological counts and they were abandoned. The Forest Service then constructed a pipeline to connect the Reds Meadow Campground with the well at Pumice Campground.

Reds Meadow Resort (just south of the USFS campground) has a well with good water. I have no other information regarding this privately-owned well.

Four of the campgrounds (Pumice, Minaret, Reds Meadow, Upper Soda Springs) are supplied by a single well located at Pumice Campground. The well is 85 feet deep and the depth to water is about 20 feet below ground surface. Mr. Tobey recalls that the well was drilled through alluvium to a depth of about 40 feet and then was in bedrock to 85 feet. The well produces good quality groundwater. Mr. Tobey believes the well was constructed with a 20-foot surface seal. Current regulations call for a 50-foot surface seal and the county doesn't grant any variances (per Mr. Tobey). The Pumice Campground well is about 1 mile northeast of Devils Postpile.

The well at Agnew Campground is 70 feet deep and has good water. Agnew Campground is about 3½ miles north of Devils Postpile.

Mr. Tobey thought it unlikely that we could complete a well in alluvium along the San Joaquin River at Devils Postpile. The alluvium is generally less than 50 feet thick.

Information from the USGS

The USGS constructed a monitoring well a short distance east of Devils Postpile. This well provides water level data in support of research regarding earthquakes and volcanic activity. An excerpt from a report by Evelyn Roeloffs describing the hydrogeology at this location follows;

Figure 1 illustrates the setting of the Devil's Postpile dilatometer at Long Valley caldera, California. The geology consists of basalt flows with permeable tops, overlying older, lower porosity granite bedrock. During drilling of the strainmeter borehole, a productive aquifer was encountered at a depth of 43 m; the strainmeter is installed well below this aquifer in the granite. The observation well was added later to monitor fluid pressure in the aquifer.

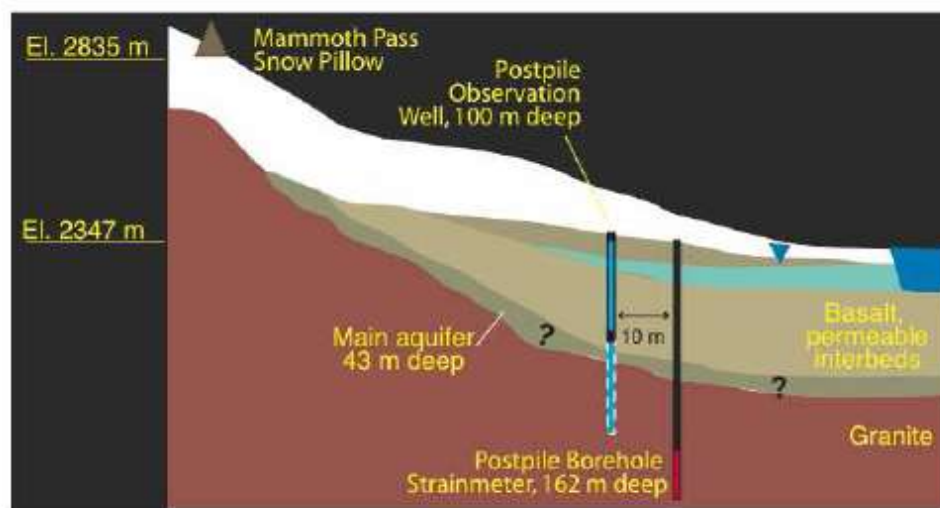


Figure 1. Cartoon showing setting of the Devils Postpile dilatometer, Long Valley, California.

Source: Coupling of Hydrologic Effects to Borehole Strain Data,
by Evelyn Roeloffs, USGS, 2005, accessed at:

http://www.unavco.org:8080/cws/straindata/Notes%20from%202005%20class/hydro_coupling.pdf

The USGS monitoring well is located at a gravel pit about 500 feet east of the turnoff to Devils Postpile (see following map). The elevation of the monitoring well is 2333 meters msl (the topo map has a 20 meter contour interval).

There are two important items to note about the description of the hydrogeology. First, the description of the geology implies that there are multiple basalt flows with permeable zones between the distinct flows. The presence of permeable rubble zones coinciding with the top and bottom of flows is very common in basalt hydrogeology. The second item to note is that the main aquifer occurred at a depth of 43 meters. If that elevation carries through to the area underlying the monument, the main aquifer would occur at a depth of about 10-15 meters below land surface at the campground, and there would be insufficient depth for a 50-foot surface seal for a new well. However, a well constructed on the hill near the existing water storage tank would be nearly the same elevation as the USGS monitoring well and should

Recommendation

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