



water supplies

United States Department of the Interior

GEOLOGICAL SURVEY

WATER RESOURCES DIVISION
8002 Federal Building
Salt Lake City, Utah 84138

March 26, 1979

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MINING AND
EXPLORATION

Mr. Jerry Vaninetti
Director of Exploration
Utah Power and Light Co.
P.O. Box 899
Salt Lake City, Utah 84110

Subject: Defining and monitoring the ground-water system on East Mountain, Trail Mountain, North Horn Mountain, and adjacent areas.

Dear Jerry:

Since UP & L, in their exploratory drilling program, will be investigating several areas of interest to the USGS, we are anxious to get involved in the gathering of ground-water data pertinent to these areas. In response to your suggestion given at our meeting on March 13, I am formally verifying our interest.

Accurately determining depths of water entry into the drill hole, of course, is the first information that should be collected, and these data determine the sequence of events to be followed in collecting additional ground-water data. For this reason a concentrated effort should be utilized to obtain depths of water zones. I believe the following procedures will provide these data.

Prior to drilling, two holes should be dug to receive cuttings and effluent from the drill hole. The first hole (detention pond) is necessary so that the foam used in the drilling operation can dissipate and its overflow can be continuously monitored, and cuttings can settle out. The second hole (retention pond) will receive effluent from the detention pond. Assuming an ejection rate of 15 gpm, it appears that a plastic-lined hole 12 x 5 x 4 feet would be of sufficient size for the first pond, providing a detention period of at least 15 minutes. This period should be adequate to permit most of the cuttings to settle out before flow measurement. Flow through a 4-inch pipe placed 6-8 inches below the rim of the depression will prevent foam from being discharged and allow measurement of the fluid leaving the borehole. The detention (first) pond should be filled to the pipe outlet prior to drilling (about 1,500 gal). The retention pond of your design should be placed at a lower elevation to permit gravity drainage. A meter measuring the amount of water injected into the drill hole should be installed on the drilling equipment, or some method used to determine the amount of fluid added to the hole. With data on water injected and ejected from the hole, the volume of formation water entering the hole could be estimated.

In order to more accurately determine zones of water entry, it also is suggested that in addition to the logs you normally run, neutron and caliper logs also should be run on the complete hole. Temperature logs also are advisable.

After each drill hole is completed, we should evaluate the data and decide whether the hole should be completed as an observation well to monitor water levels. The water zone that will be monitored should be isolated from other parts of the hole (which may include other water zones) so that water-level data represent only conditions in the zone of interest. The hole normally will be filled with cement from the bottom up to the water zone. If, during drilling, the hole lost circulation below the water zone, there is a small probability that it would be necessary to install a bridge plug below the water zone. Polyvinyl-chloride pipe (perforated at the bottom) then will be installed in the hole from the water zone to the land surface and gravel and sand placed around the perforated section. Rapid-curing cement could be placed above the perforated section for a short distance and the rest of the hole filled with cement, as it would be for normal test-hole plugging.

Once the PVC pipe is installed and cemented, the pipe should be blown out and a water sample secured. Obviously, only one water zone can be monitored using this procedure. Considering the probable problems that will be encountered, installation of more than one plastic pipe is probably asking too much at the onset of this project. Perhaps multiple observation pipes could be tried at a later date. This means, however, that in order to define the ground-water system several installations will be required.

Pipe, gravel, and bridge plugs (if used) will be furnished by the USGS. An observer to monitor water flows and assist in the operation will also be supplied.

So that material can be ordered at an early date, I suggest that you contact me stating your approval of this proposal at your earliest convenience. I will be available to answer any questions that may arise concerning our co-operation in this venture.

Sincerely,

Terence W. Danielson

Terence W. Danielson By JMW
Hydrologist
For the District Chief

cc: Carley Burton, UP & L
Greg Lines, USGS, WRD
Mike Graham, USGS, WRD