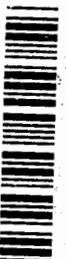


Meeting Record

Purpose: DQO Meeting to Recommend Characterization Activities for Well R-11, Sandia Canyon	Meeting Date: 1/9/03
Background Information: <p>The Hydrogeologic Workplan rationale for R-11 was as a sentry well for water supply well PM-3. PM-3 is located down gradient of potential sources in TA-21 and TA-53.</p> <p>Geology – The geology in this area is fairly well constrained by data from PM-3 (Sandia Canyon), R-8 (to the northeast in Los Alamos Canyon), O-4 (to the north in Los Alamos Canyon), R-7 (to the northwest in Los Alamos Canyon), R-15 (to the south in Mortandad Canyon) and R-12 (east in Sandia Canyon). R-11 could help to resolve one outstanding geologic question regarding the nature of the transition from the Cerros del Rio basalts encountered in R-9, R-12, R-13, and R-14 to the dacitic lavas encountered in R-15.</p> <p>It is anticipated that R-11 would penetrate the base of the Tshirege member of the Bandelier Tuff and may encounter a thin sequence of Cerro Toledo above the Otowi Member. Puye Formation may be encountered at about 250 ft and Cerros del Rio basalts (or equivalent lavas) may be between 350 and 540 feet, underlain by Puye Formation. Totavi (river gravels) may be encountered at about 800 ft. Miocene basalt of unknown thickness may be present at greater than 1200 feet, dipping steeply to the west. Santa Fe Group sediments may also be encountered at these depths.</p> <p>Hydrology – <i>Vadose zone:</i> R-11 would be located just below the break in slope in Sandia Canyon. This break in slope is an area of surface water loss. Flow of effluent from the sewage plant upcanyon is sustained until the break in slope, where the water quickly infiltrates. The sewage effluent is volumetrically one of the larger water sources on the plateau. There are wetlands sustained by the effluent in the headwaters of Sandia Canyon. There are highly fractured units below the break in slope that may facilitate infiltration. It is anticipated that R-11, below the break in slope, would encounter perched water zone(s) created by the infiltration of surface water, possibly in the Cerro Toledo, Guaje, or Cerros del Rio basalt.</p> <p><i>Regional aquifer:</i> In this area, the gradient in the regional aquifer is expected to be fairly horizontal and detailed knowledge of vertical gradients in the regional aquifer is not necessary at this location. The regional aquifer is likely to be encountered at 950 to 1000 feet, within the Puye Formation.</p> <p>Geochemistry- Contaminants of concern include nitrate, tritium, PCBs, plutonium, and perchlorate. Nitrate (about 5 ppm) was detected in perched water from the R-12 borehole (prior to well construction), but nitrate was not detected after the well was completed, perhaps due to the use of drilling fluids, which reduce nitrate. Zonal sampling was conducted in PM-3 and anomalously high nitrate was detected in certain regional aquifer zones. Tritium has been measured at about 100-200 pCi/L in perched water and about 60-80 pCi/L in the regional aquifer in R-12. PCBs have been released from sources above the wetlands in</p>	



upper Sandia Canyon and have been measured in sediments in the wetlands. Plutonium has been detected sporadically in PM-3, although re-sampling the well has shown the results to be non-repeatable and non-reproducible. Perchlorate is a contaminant of concern because the primary source of water in Sandia Canyon has been effluent and the proximity to industrial areas of TA-3, which may have contained perchlorate.

Recommendations:

Based on discussions at the R-11 DQO meeting, a recommendation is made that R-11 be sited in Sandia Canyon below the break in slope in order to characterize groundwater in the intermediate-depth perched groundwater (if present) and regional groundwater down gradient of releases in Sandia Canyon. This goal is a refinement of the original criteria for siting this well in the Hydrogeologic Workplan, because the investigation of pathways from surface infiltration to intermediate perched to regional aquifer are judged to be of greater importance than placing the well as a sentry closer to PM-3.

The R-11 Sandia Canyon site is designed to address the following data needs:

- To determine subsurface distribution of contaminants in an area down gradient of releases in Sandia Canyon. These data are needed to understand the contributions to groundwater from treatment plant discharges.
- To evaluate groundwater pathways and interconnections between the surface and deep groundwater recharge in Sandia Canyon.
- To identify geologic and hydrologic controls on groundwater pathways; these data are part of the general characterization of groundwater conditions beneath the Laboratory and support ongoing efforts to improve the hydrogeologic conceptual model.
- To provide water-level, aquifer characteristics, and chemistry data for improving the regional flow and transport model.

It is recommended that R-11 be drilled as an open borehole, using air with minimal fluids. The open hole will facilitate the use of borehole geophysics, which can be used to characterize moisture distribution and identify perched groundwater in the vadose zone. Open-hole geophysics will also provide data to characterize the hydraulic properties of saturated rocks in the regional aquifer as well as provide key information for the selection of well screen depth.

The desire for open-hole characterization data will be balanced against the potential for creating a groundwater pathway to the regional aquifer. If perched groundwater is encountered during drilling, borehole water samples shall be collected and submitted for rapid turn-around analyses for non-sorbing potential contaminants (e.g. ClO_4 , NO_3); these screening analyses will be used to evaluate whether contaminants in perched water zones should be isolated with drill casing before the regional aquifer is penetrated. Subsequent intermediate depth wells will be installed to monitor the intermediate-depth saturated zones.

Hydraulic testing is planned to determine the conductivity at the well screen. The R-11 well should be completed with a single 10-ft long screen located about 15-20 feet below

the regional aquifer water table to optimize conditions for hydrologic testing. Testing will consist of injection tests or aquifer pumping tests.

The upper portion of the boring (until auger refusal or a maximum of 250 feet) will be cored in order to determine contaminant distribution, moisture, and anion/³H /isotope profiles in the vadose zone. Cuttings will be collected every 5 feet by the subcontractor to identify geologic contacts, describe rock characteristics, and provide samples for additional geologic characterization. These data will be used to prepare a lithologic log of the borehole.

Water samples from the completed borehole will be analyzed for the full suite of analytes, after the formation has re-equilibrated and the water is representative of the formation. Sampling for colloids will be conducted to evaluate colloidal transport as a possible mechanism for sporadic plutonium detections in PM-3.

A summary of the data needs and data collection is shown in the following table:

Data Needed	Data Collection
Stratigraphy	Core, cuttings, and geophysical logs
Perched zone identification	Driller observations, borehole video, drill with minimal fluids
Perched zone water chemistry	Borehole screening sample, if perched water is encountered
Contaminant distribution in vadose zone	Core in upper portion (maximum 250 ft); cuttings for sorbing species
Regional aquifer water level	Measure water level in borehole and well
Regional aquifer water chemistry	Collect water samples from well, sampling for colloidal materials
Regional aquifer hydraulic characteristics	Hydrologic testing

<p>Action Items:</p> <ol style="list-style-type: none"> 1. Update cost estimates based on approved R-11 work scope. 2. Brief NMED/OB on work scope and location for R-11 3. Finalize R-11 well site location 4. Prepare FIP for R-11 	<p>Action Assigned To:</p> <p>McCann</p> <p>Nylander McCann/Pearson/ Broxton/Gallaher Broxton/WGII</p>
<p>Participants:</p> <p>David Rogers Elizabeth Keating Bruce Gallaher Charlie Nylander David Vaniman Tom Whitacre Bob Enz John McCann Kelly Bitner</p>	
<p>Meeting Record Prepared By</p> <p>Kelly Bitner</p>	<p>Date:</p> <p>1/21/03</p>