

03

R-62
Sandra Johnston
ENTERED
Canyon

Kulis, Jerzy, NMENV

From: Everett, Mark C [meverett@lanl.gov]
Sent: Wednesday, August 31, 2011 10:33 PM
To: Kulis, Jerzy, NMENV; Dale, Michael, NMENV; Cobrain, Dave, NMENV
Cc: Shen, Hai; 'Lance.Woodworth@nnsa.doe.gov'; Ball, Theodore T
Subject: Proposed R-62 well design
Attachments: R-62 Well Design-final.docx

Jerzy,

Here is our proposed design for R-62. Let's talk in the morning if you have any comments.

Thanks,
Mark Everett

From: MARK EVERETT <meverett_9@msn.com>
To: Everett, Mark C
Sent: Wed Aug 31 22:27:47 2011
Subject: FW: R-62 well design

From: meverett_9@msn.com
To: meverett@lanl.gov
Subject: RE: R-62 well design
Date: Wed, 31 Aug 2011 22:23:03 -0600

> From: meverett@lanl.gov
> To: meverett_9@msn.com
> Date: Wed, 31 Aug 2011 21:03:30 -0600
> Subject: Fw: R-62 well design

>
>
> Mark Everett

> ----- Original Message -----
> From: David T. Vaniman <dvaniman@lanl.gov>
> To: Everett, Mark C
> Cc: Woldegabriel, Giday
> Sent: Wed Aug 31 18:07:04 2011
> Subject: FW: R-62 well design

>
> Mark - here are some fixes from Broxton. I responded to him about the silty
> region and why we need to start with the well down there.

>
> DV

> -----Original Message-----
> From: David Broxton [<mailto:broxton@lanl.gov>]
> Sent: Wednesday, August 31, 2011 5:51 PM
> To: Vaniman David
> Subject: R-62 well design

34722



- >
- > Dave,
- >
- > Looks good - minor comments.
- >
- > Dave
- >
- >

R-62 Well: Proposed Well Design

Well Objectives

R-62 is a regional groundwater monitoring well located on a narrow ridge between Sandia and Mortandad Canyons at the east end of Sigma Mesa and on the same drill pad as potential perched-intermediate well SCI-4 (Figure 1). Well R-62 is being installed to reduce uncertainty about the upgradient extent of chromium contamination in the area west-northwest of wells R-42 and R-28. Data collected during R-62 drilling will be used to assess the presence or absence of perched groundwater, which will determine the need for perched-intermediate well SCI-4. The drilling work plan for R-62 proposed completion of a two-screen monitoring well in the regional aquifer; however, a single screen well is proposed for reasons described below.

The well design is based on subsurface information collected during drilling, which includes lithologic types, depth of groundwater, geophysical logs, and drilling information. Because of the well's downgradient proximity to chromium contamination, the well screen is set near the top of regional saturation to maximize the detection of potential contaminants after they enter the regional aquifer.

Recommended Well Design

It is recommended that R-62 be installed as a single 20-ft screen of rod-based, wire-wrapped 20-slot screen 20 ft below the top of the regional groundwater level. Initially a two-screen well design was considered, but the two-screen option became untenable after fine sands and gravels heaved to about 1220-1225 ft in the 12-in drill casing set at a depth of 1260 ft. A preliminary regional static ground water level was measured at about 1152 ft bgs when drill casing was at 1195 ft depth. This depth to water is 14 ft deeper than the anticipated depth to water of 1138 ft, which is based on tightly constrained data from surrounding wells. The primary filter pack will consist of 10/20 sand extending 5 ft above and 5 ft below the well screen. A 2-ft secondary filter pack will be placed above the primary filter pack as shown in Figure 2. The well design is based on the drilling work plan objectives and on subsurface information collected during drilling.

Well Design Considerations

Preliminary lithological contacts from visual examination of cuttings and from natural gamma logging identified the following geologic contacts in descending stratigraphic order: Bandelier Tuff (Qbt3 to Qbog) (0–603 ft), upper Puye Formation (Tpf) (603-655 ft), Cerros del Rio Volcanics (Tb4) (655-881 ft), lower Puye Formation (Tpf) (881-1100 ft), Miocene pumiceous sands and gravel (Tjfp) (1100-1230 ft), and Miocene riverine sands and gravels with flowing sands (Tcar) (1230-1260 ft). Regional groundwater is within the Miocene pumiceous sands and gravel that consists of pebbly to silty fractions of rounded white pumice with sparse biotite phenocrysts. The pumiceous sands and gravels of Tjfp are uniform in nature, with the exception of a significantly finer-grained silty interval from 1170-1190 ft.

Two perched groundwater zones were encountered when the R-62 borehole was drilled. The upper perched groundwater was encountered in the upper Puye Formation above the Cerros del Rio lavas. Initially, perched water was measured at 641.7 ft depth but additional measurement indicated the water level at 633 ft. A lower perched zone was encountered in the lower part of the Cerros del Rio basalt and top of the underlying Puye Formation. Low chromium content (2-4

ppb) was measured in water samples collected from the lower perched zone. Although there are no reliable water levels measured for this lower zone, borehole video logs show water entering the borehole at depths of 844 ft, 855-864 ft, and 882-892 ft.

As noted above, regional groundwater depth was predicted at approximately 1138 ft based on the water table map for the area. The drillers noted the first indication of water near the predicted level. However, an electronic sounder obtained a stable groundwater level of 1152 ft bgs after the cased borehole reached a depth of 1195 ft. Based on these measurements, an 1152-ft water level was used to determine the initial well-screen placement in the proposed well design (see the detailed column labeled “initial well placement” in Figure 2).

The 20-ft screen interval will first be placed at 1172 to 1192 ft allowing 20 ft of submergence beneath the depth to water of 1152 ft that was encountered during drilling. The current plan is to pull the drill casing to 1220 under a static water load and monitor the depth to water as the water load equilibrates. The well will be emplaced to the screen level of 1172-1192 ft depth and additional water levels will be obtained. If the water level rises toward the predicted level of 1138 ft, the 20-ft screen will be raised accordingly to maintain 20-ft submergence up to placing the top of the screen at 1158 ft (see column labeled “maximum potential rise in screen” in Figure 2).

Other Design Considerations

Placement of a second short well screen at a depth of 1238.5 to 1243.5 ft within Miocene riverine sands and gravels with flowing sands (Tcar) was initially planned; however this option was eliminated after the formation sands heaved and the depth of the borehole was reduced from 1260 ft to between 1220 to 1225 ft, above the contact between Tjfp and Tcar.

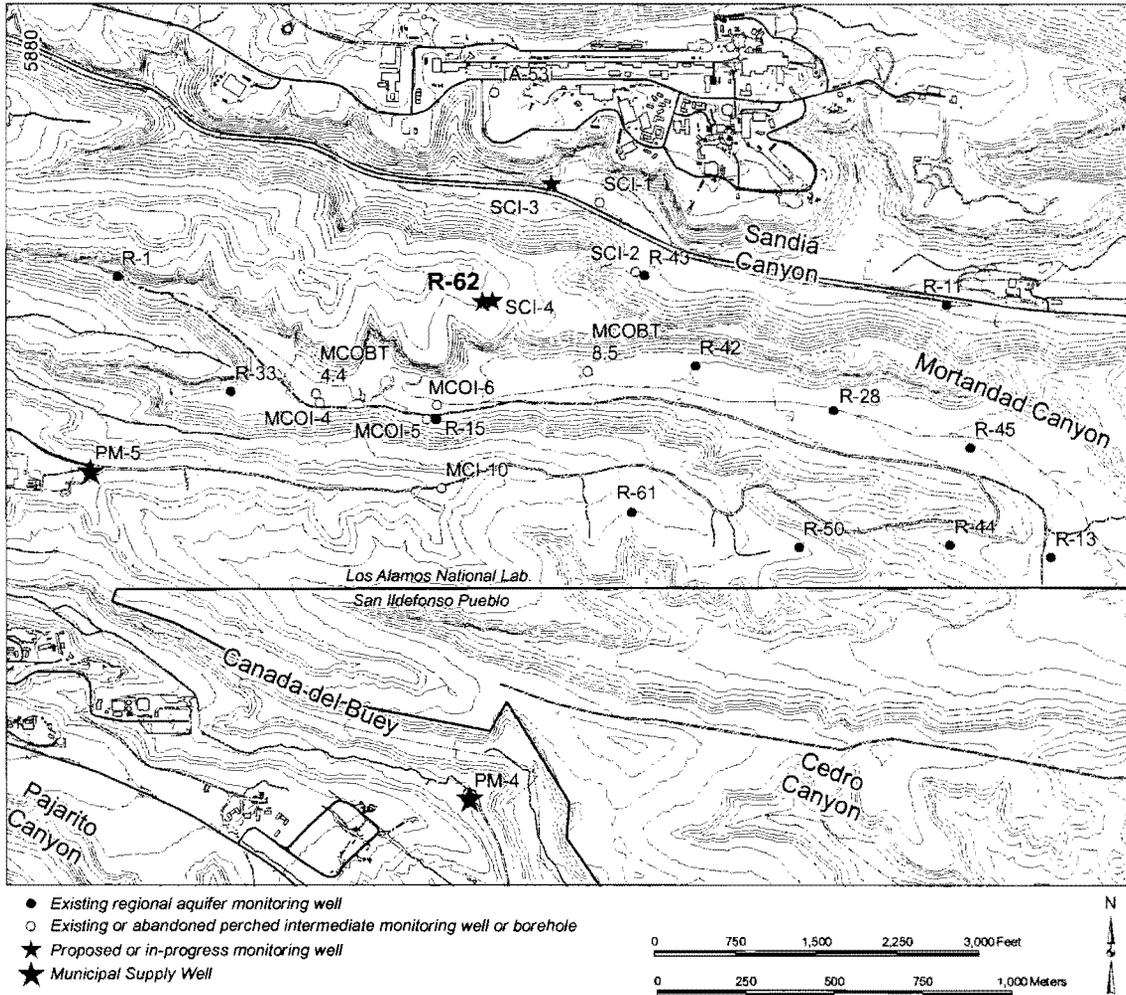


Figure 1. The map shows the location of the R-62 well at the eastern end of Sigma Mesa.

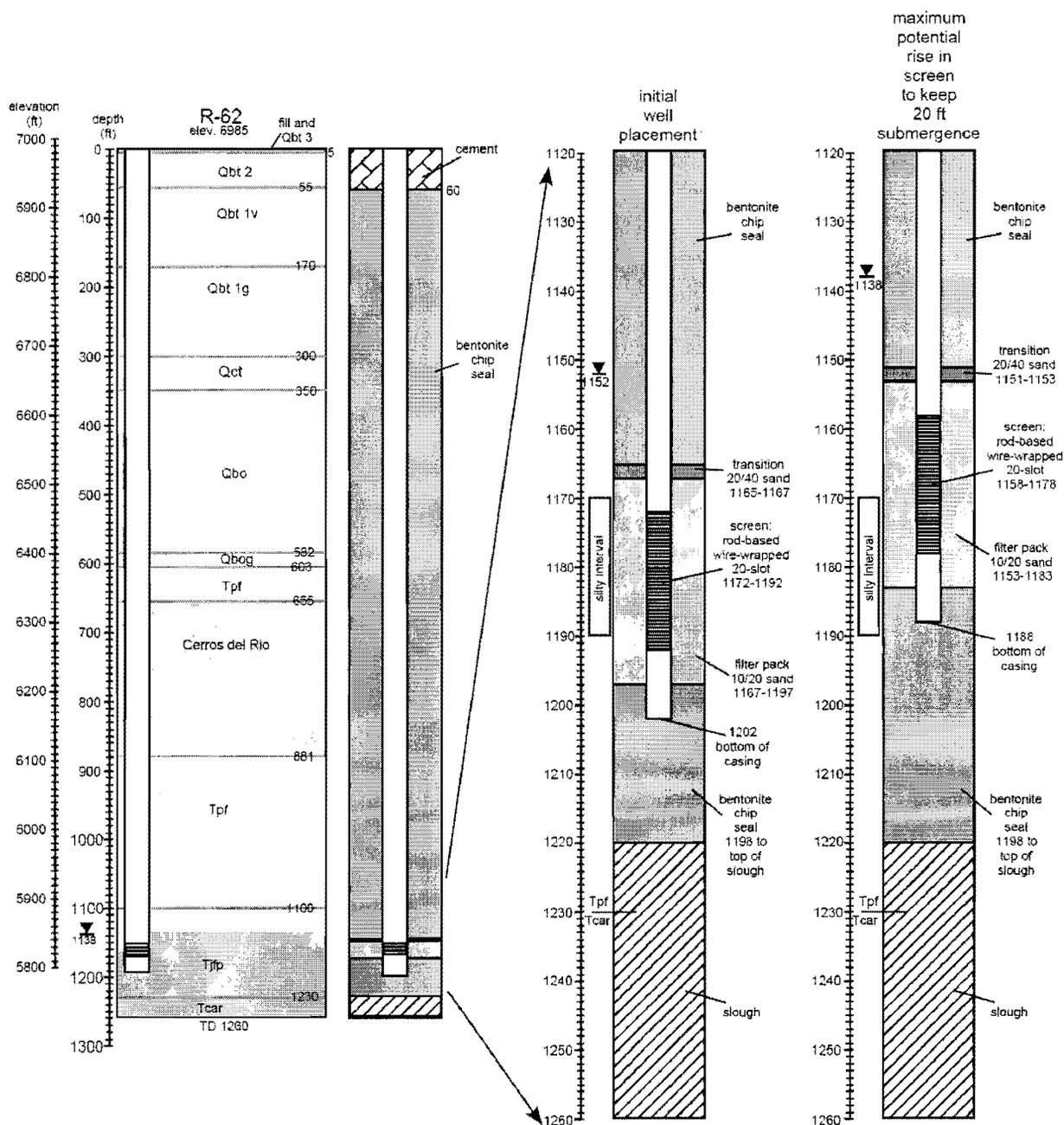


Figure 2. The stratigraphic sequence, lithologic types, and contacts are shown for the R-62 well. Two possible configurations of the 20-ft well screen design are shown to the right of the stratigraphic section.