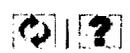




Document Discussion



Return To Library > Records 2 > ERID-108000 through ERID-108499 > ERID-108127 1) APPROVAL PERCHED INTERMEDIATE WELL R-47I WELL DESIGN EMAIL

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Document Date: 11/06/2009
To:(Addressees - Organization) LIZ ENGLISH
From:(Senders - Organization) MARK EVERETT
Other Document Number(s): PKG-1855, CT 09-164
TA: N/A

October 22nd, 2009

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33508

From: Mark Everett
To: "Liz English"
Cc: "Ted Ball"
Subject: FW: Perched Intermediate Well R-47i Well Design
Date: Monday, November 09, 2009 10:33:00 AM
Attachments: Perched Intermediate Well R-47i Well Design (232 KB).msg

Liz,

NMED approval of our R-47i well design is below and the design submittal is attached.

Mark Everett, PG
 Drilling Project Technical Lead
 EP-WSP
 LANL
 (505) 667-5931 (office)
 (505) 231-6002 (mobile)
 (505) 606-0503 (fax)

From: Dale, Michael, NMENV [mailto:Michael.Dale@state.nm.us]
Sent: Friday, November 06, 2009 8:54 AM
To: David Broxton
Cc: Cobrain, Dave, NMENV; Kulis, Jerzy, NMENV; meverett@lanl.gov; tedball@lanl.gov; HShen@doeal.gov; Thomas J. Whitacre; katzman@lanl.gov; andybaumer@lanl.gov; huberpr@lanl.gov
Subject: RE: Perched Intermediate Well R-47i Well Design

Dave,

This e-mail serves as NMED approval for installation of intermediate aquifer well R-47i as proposed in the document attached to the original e-mail received by NMED yesterday (November 5, 2009 at 4:47 PM). This approval is based on the information available to NMED at the time of the approval. NMED understands that LANL will provide the results of preliminary sampling, any modifications to the well design proposed in the above-mentioned e-mail, and any additional information related to the installation of well R-47i as soon as such information becomes available. NMED advises LANL to give notice of this installation to the New Mexico Office of the State Engineer as soon as possible. Thank you.

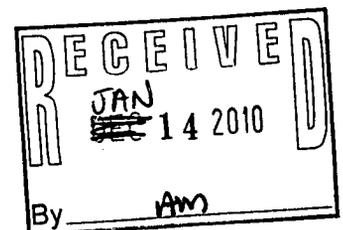
Michael Dale, NMED HWB

-----Original Message-----

From: David Broxton [mailto:broxton@lanl.gov]
Sent: Thu 11/5/2009 4:47 PM
To: Cobrain, Dave, NMENV; Kulis, Jerzy, NMENV; Dale, Michael, NMENV
Cc: meverett@lanl.gov; tedball@lanl.gov; HShen@doeal.gov; Thomas J. Whitacre; katzman@lanl.gov; andybaumer@lanl.gov; huberpr@lanl.gov
Subject: Perched Intermediate Well R-47i Well Design

Gentlemen,

Attached is LANL's proposed design for completing a single-screen perched intermediate well at the R-47 drill site. Please review the proposed well design and provide your comments and approval by e-mail. Please contact Mark Everett or me if you have any questions or concerns.



Thanks,

Dave

--

David E. Broxton
Earth and Environmental Sciences Division
Los Alamos National Laboratory
Mail Stop T003
Los Alamos, NM 87545

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Cell Phone: (505) 699-0950
Fax: (505) 665-8737
e-mail: broxton@lanl.gov

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From: [David Broxton](mailto:David.Broxton)
To: dave.cobrain@state.nm.us; jerzy.kulis@state.nm.us; Michael.Dale@state.nm.us
Cc: meyerett@lanl.gov; tedball@lanl.gov; HShen@doeal.gov; [Thomas J. Whitacre](mailto:Thomas.J.Whitacre); katzman@lanl.gov;
andybaumer@lanl.gov; huberpr@lanl.gov
Subject: Perched Intermediate Well R-47i Well Design
Date: Thursday, November 05, 2009 4:47:52 PM
Attachments: [R-47i Well Design2.doc](#)

Gentlemen,

Attached is LANL's proposed design for completing a single-screen perched intermediate well at the R-47 drill site. Please review the proposed well design and provide your comments and approval by e-mail. Please contact Mark Everett or me if you have any questions or concerns.

Thanks,

Dave

--

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e-mail: broxton@lanl.gov

R-47i Well Objectives

The principal objective of Well R-47i is to monitor perched intermediate groundwater down gradient of high-explosive release sites at TA-16. Well R-47i is located on the north rim of Cañon de Valle, near a possible zone of infiltration for potential contaminants. A significant perched groundwater zone was encountered in the Puye Formation while the R-47 borehole was being drilled to a target depth in the regional aquifer. This perched intermediate zone was sealed off behind drill casing as the borehole was advanced to the regional aquifer.

The original drilling workplan for R-47 called for completion of a monitoring well in the regional aquifer. The R-47 borehole reached a total depth of 1348 ft and well construction was initiated using a NMED-approved well design. However, construction was halted when borehole video logs showed that annular bentonite fill had intruded the regional aquifer well screen. The R-47 stainless steel regional well components were extracted from the borehole to assess the degree of bentonite intrusion into the well screen target zone. In consultation with NMED, it was determined that collection of representative water quality data in the future would probably be compromised by the intrusion of bentonite into the well screen interval. As a result, the decision was made to plug and abandon the lower part of the R-47 borehole and to install perched intermediate well R-47i in the upper portion of the borehole. The borehole was backfilled with bentonite to the current depth of 890 ft to prepare for construction of the R-47i perched intermediate well.

Plans to fulfill the original goal of completing a R-47 regional well at or near this site are currently being developed. Once completed, these plans will be submitted to NMED for approval.

R-47i Recommended Well Design

It is recommended that R-47i be installed as a single-screen well with a 20-ft stainless-steel, 20 slot, wire-wrapped well screen extending from 840 ft to 860 ft bgs. The depth to top of perched saturation is about 832 feet (see discussion below). The primary filter pack will consist of 10/20 sand extending 5 ft above and 5 ft below the screen openings. A 2-ft secondary filter pack will be placed above the primary filter pack. The proposed well design is shown in Figure 1.

This well design is based on the objectives stated above and on the information summarized below.

R-47i Well Design Considerations

Preliminary lithologic logs indicate that the geologic units encountered while drilling the R-47 borehole are Tshirege Member of the Bandelier Tuff (0–360 ft), Cerro Toledo interval (360–580 ft), Otowi Member of the Bandelier Tuff and Guaje Pumice Bed (580–775 ft), and the Puye Formation (775–1348 ft TD). The perched intermediate water targeted by R-47i is within the Puye Formation (Figure 1).

Significant perched intermediate groundwater was encountered at a depth of about 832 ft while drilling R-47. The perched water was observed issuing from crudely stratified boulders, cobbles, and gravels of the Puye Formation in a borehole video. The perching horizon for this zone is not known with certainty, but may be in the rocks below 873 ft where larger clasts such as cobbles and boulders are supported in a matrix of silt or fine sand.

Well R-47i will be constructed with 5 in. ID stainless steel casing and a rod-based 20-slot stainless steel screen. During the drilling to depth for R-47, large amounts of bentonite were pressure grouted into the annulus of the 12-in casing landed at 1040 ft to seal off the perched groundwater before drilling to the regional aquifer. The geophysical logs in the completed borehole suggest that bentonite

fills the annulus outside the 12 in. casing from 900 to 1040 ft depth. Much of this bentonite could have become displaced upwards across the perched zone as the 12 in. casing was retracted during well construction of R-47. When problems with bentonite incursion into the R-47 well screen were recognized and the decision was made to remove the regional well, it was decided to cut off the 12 in. casing at 900 ft and leave the casing interval from 900 to 1040 ft in the borehole. This prevented the possibility of dragging bentonite up with the casing into the perched zone. After removing the remaining drill casing, the borehole was backfilled to a depth of 895 ft with bentonite and sand. Then, the 12.75-in borehole wall was jetted and reamed from 748 to 895 ft depth using a 14.75-in under reamer. The cuttings were air lifted from the borehole using foam and water. A borehole video performed after these operations showed that the borehole wall is free of bentonite. Water levels determined by tagging and borehole video range between 831 and 832 ft depth.

An earlier video log collected several weeks ago when the borehole was 1034 ft deep and the water level was 896 ft provided excellent imaging of the perched interval. The video log showed a wet borehole wall at 834-835 ft, with water dripping along one quadrant of the wall. Strong flow of water on the borehole wall was observed at 842 ft, and by 857 ft the flow was continuous around the full diameter of the borehole. Observations from the borehole video log and cuttings suggest a possible increase in fine matrix and clay content below ~873 ft; induction logging (Figure 2) indicates discrete conductive layers of several feet thickness below 873 ft that may represent perching horizons containing nearly saturated matrix fines.

The 20-ft well screen proposed for R-47i (Figure 1) captures much of the perched zone above horizons of potentially nontransmissive matrix fines. The filter pack extends 5 ft above and below the screen interval allowing inflow from zones of flow along the borehole wall observed in the borehole video logs.

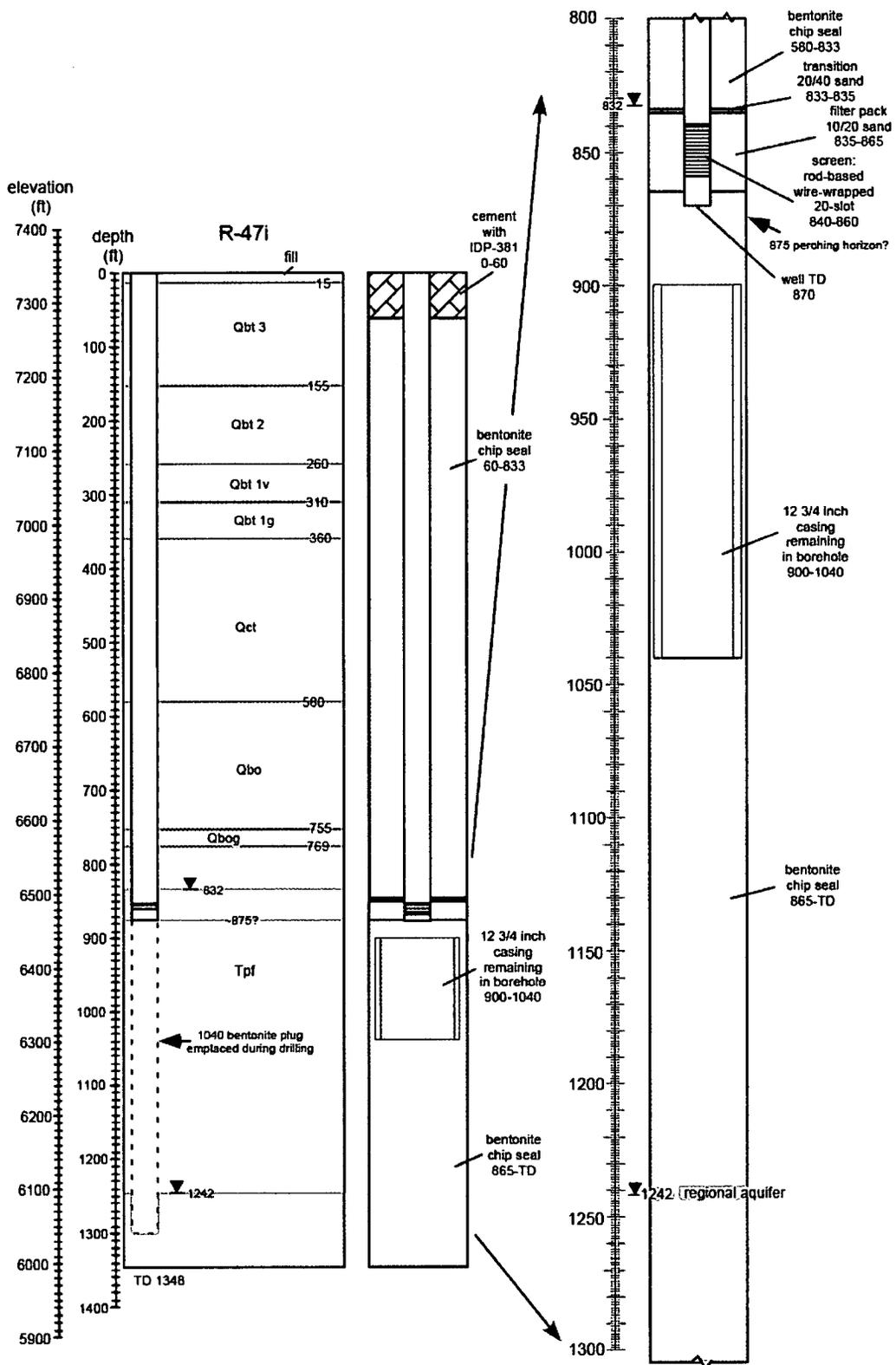


Figure 1. Proposed well design, R-47i.

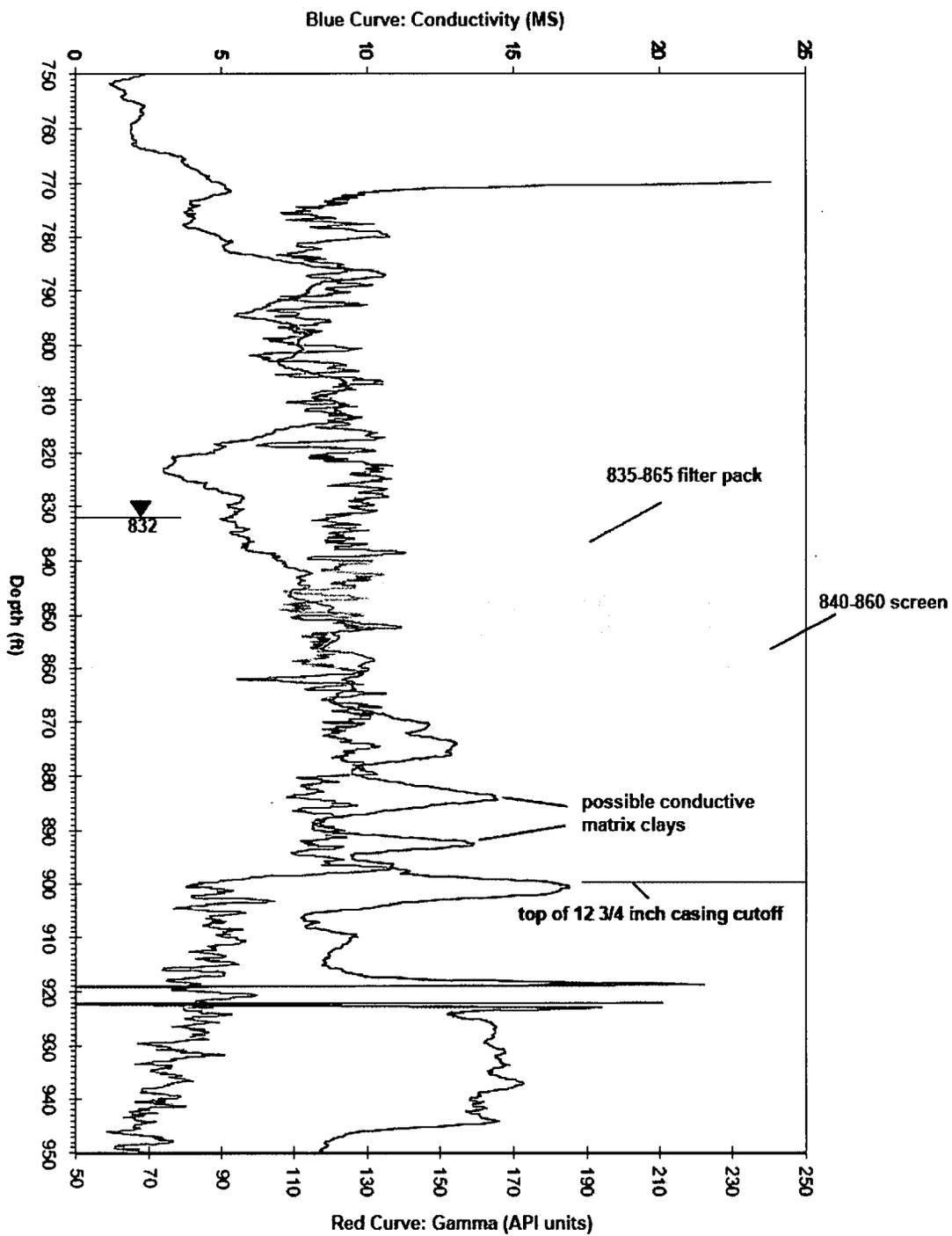


Figure 2. Gamma and induction logs across the proposed screen and filter-pack intervals, R-47i.