

TRAD



**Kulis, Jerzy, NMENV**

**From:** Kulis, Jerzy, NMENV  
**Sent:** Tuesday, May 11, 2010 12:56 PM  
**To:** 'Everett, Mark C'; Cobrain, Dave, NMENV; Dale, Michael, NMENV  
**Cc:** Lynnes, Kathryn D; Whitacre, Thomas J; Mignardot, Edward R Jr; Ball, Theodore T; Shen, Hai; Katzman, Danny; Broxton, David E; vaniman@lanl.gov; Longmire, Patrick; Mike Klahn  
**Subject:** RE: R-3: request for alternative drilling methods

Mark,

NMED approves the use of a combination casing-advance and modified reverse circulation drilling method, with recirculation of the introduced potable and formation water, in drilling of well R-3 as described in your e-mail below. The use of a conventional mud rotary method is not approved at the moment.

Please let me know if you have any questions.

Thanks,

Jerzy Kulis  
Environmental Scientist  
Hazardous Waste Bureau  
New Mexico Environment Department  
2905 Rodeo Park Drive East, Bldg 1  
Santa Fe, NM 87505-6303  
Phone: 505-476-6039  
Fax: 505-476-6030

**From:** Everett, Mark C [mailto:meverett@lanl.gov]  
**Sent:** Tuesday, May 11, 2010 8:08 AM  
**To:** Cobrain, Dave, NMENV; Dale, Michael, NMENV; Kulis, Jerzy, NMENV  
**Cc:** Lynnes, Kathryn D; Whitacre, Thomas J; Mignardot, Edward R Jr; Ball, Theodore T; Shen, Hai; Katzman, Danny; Broxton, David E; vaniman@lanl.gov; Longmire, Patrick; Mike Klahn  
**Subject:** R-3: request for alternative drilling methods

We are currently drilling regional aquifer well R-3 and are encountering challenges that may require switching to alternative drilling methods. The purpose of this e-mail is to communicate the current conditions at the well, to discuss potential conditions we will encounter, and to propose solutions that we believe will increase the likelihood of meeting our objectives.

Well R-3 is located in Pueblo canyon near municipal supply well O-1. The purpose of the well is to examine contaminant pathways by installing a screen near the top of the regional aquifer and a screen at an elevation similar to the top of the screen louvers at O-1. We are currently at 600 ft, just above the regional aquifer which is anticipated to be at 647 ft. The borehole is 23-in diameter and we have 18-in casing to bottom. We are currently excavating a 4<sup>th</sup> and 5<sup>th</sup> cutting pits as the first three are near capacity with a total of nearly 100,000 gallons of water already in storage.

Based on other wells in the Pueblo canyon area we anticipate large water production as we penetrate the 450 feet into the aquifer to reach our target depth of 1100 ft. beyond the five containment pits it is likely we will need numerous frac tanks to manage the possible water produced to reach target depth. In addition to the large volumes of water, the drillers are concerned about the challenging borehole conditions encountered in the area. Specifically, the swelling clays that resulted in lost tools at R-4 and



the heaving sands that terminated R-5 short of the target depth. We have not had great success drilling deep into the aquifer in this part of the lab and our team is concerned.

To address both the potentially large volumes of produced water and the unfavorable drilling conditions, our team has proposed two alternative drilling methods that will increase the likelihood of reaching our target depth successfully. The first is conventional mud rotary which brings with it the known concerns about introduction of bentonite and polymers into the target aquifer. Their second recommendation is a combination casing-advance and modified reverse-circulation. In this approach the borehole would be advanced with the same casing-advance methods used successfully around the lab with formation-stabilizing pressure provided by maintaining a standing column of water in the borehole during drilling. Because of its location in Pueblo canyon a supply of fresh water to keep the borehole flooded is not readily available. To overcome this, we propose to recirculate the introduced potable and formation water produced during drilling. Solids will be removed before the water is reintroduced downhole but because of the potentially large volumes of water required to maintain the "flooded" condition re-use will be required.

Please call me at your earliest convenience so that we may discuss these options with you.

Thanks,

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