



To: Tim Goering

From: Elaine Jacobs

RE: Recommendation regarding replacing Alluvial Well SCA-1

Date: June 21, 2011

This memo regards the replacement of alluvial well SCA-1 and the nearby drive point SCA-1-DP. After review of the installation notes and field summary data, shopping around for a special pre-pack well screen suitable for silt size particles, and a field visit to the site; I recommend semi-annual inspection and cleaning of the drive point screen rather than installation of a new alluvial well. Water levels should continue to be collected at SCA-1 since its location has been surveyed and the transducer can remain in place while sampling occurs at SCA-1-DP (Rich Koch, personal communication, June 20, 2011).

Several reports/data were consulted in making this recommendation. These include the well completion report for SCA-1 (Kleinfelder 2006, 095121), the sediment investigation section (reach S-2) of the Sandia Canyon Investigation Report (LANL 2009, 107453), field summary reports for groundwater sampling from 2006 to present, the Groundwater Level Status Report for 2010 (Koch and Schmeer 2010, 201566), and field parameter and water quality data posted in the water quality database (WQDB). In addition, I spoke with sales representatives at GeoInsight (Las Cruces, NM), QED Environmental, and Geotech regarding possible well screen solutions. I also spoke with Rich Koch, Steve Reneau, John Archuleta and Consuelo Montoya regarding the geomorphology and history of field activities at this site.

The location of this sample site within substrate characterized by 100% fines and vegetative debris in a wetland environment is generally contrary to basic well screen design which has been formulated for aquifer conditions in coarser grained sediment. Alluvial well SCA-1 was built using the best well technology available for the site conditions. In all likelihood, any screen placed in this environment would be expected to silt up over a 1-3 year period.

Table 1 includes a timeline and descriptions of the well/drive point installation and field sampling at SCA-1 and SCA-1-DP. SCA-1 was installed on August 25, 2006. According to the August 2007 Executive Summary report, sampling at this well was problematic soon after installation due to slow recharge and high turbidity. These problems worsened over time and 2.5 years later, on February 19, 2009, a drive point, SCA-1-DP, was installed to replace sampling at SCA-1. A transducer was left in SCA-1 to provide water level data. The drive point worked well for the next two sample events (8 months). However, in November 2009, problems with recharge and turbidity began to be encountered at SCA-1-DP. Accordingly the drive point was removed and cleaned a year later (November 9, 2010). John Archuleta participated in this cleaning and described the screen as coated with black silt. Deionized water was poured over the screen and the screen was scrubbed with a wire brush. However no water was poured down the inside of the drive point to flush out the silt in its base. A field sampling event a few days later was able to collect a full sample suite with the water starting out clear but quickly turning to black. On May 23, 2011, a full suite was successfully collected, but water from the drive point was described as murky and sulphurous. The field crews described pumping at a low rate (to keep turbidity down) and



making sure the sampling tube was positioned above the silt as keys to successful sampling (Andrew Stocker, personal communication, June 16, 2011).

On June 14, 2011, I visited the site with John Archuleta and Consuelo Montoya. We pulled the drive point out of the ground, photographed the screen, and cleaned the screen with deionized water both on the outside and by running water down through the pipe and out the screen (Consuelo's idea!). Figures 1-4 are photos of the drive point and screen prior to cleaning. The screen was in good condition and was much cleaner than it had been in November 2010 (John Archuleta, personal communication, 6/14/2011). After cleaning, it was possible to view sunlight all the way through the screen. It is anticipated that this thorough cleaning should allow sampling to proceed smoothly for the next several months. This is a simpler, more effective, and less expensive solution than installation of a replacement well. To keep turbidity at a minimum, field crews should continue to pump at a low rate and maintain the depth of the sample tubing at ~ 4.7 ft. BTOC or above any potential accumulation of silt in the bottom of the drive point.

\*\*Please note that the drive point needs a new cap. The current cap threads are rusted and will not screw onto the pipe.

#### Reports Cited:

Kleinfelder, December 2006. "Final Completion Report for Sandia Canyon Drilling Program 2006," report prepared for Los Alamos National Laboratory, Project No. 73885, Albuquerque, New Mexico. (Kleinfelder 2006, 095121)

Koch, R.J., and S. Schmeer, March 2011. "Groundwater Level Status Report for 2010, Los Alamos National Laboratory," Los Alamos National Laboratory report LA-14437-PR, Los Alamos, New Mexico. (Koch and Schmeer 2010, 201566)

LANL (Los Alamos National Laboratory), October 2009. "Investigation Report for Sandia Canyon," Los Alamos National Laboratory document LA-UR-09-6450, Los Alamos, New Mexico. (LANL 2009, 107453)

Schmeer, S., and T. Brillante, November 2010, "Field notes for Sandia Watershed Sampling, Q2, November 2011, 2010 Interim Plan". TPMC informal field notes

Stocker A. , and H. Wershow, May 2011, "Field notes for Sandia Watershed Sampling, Q4, May 2011, 2010 Interim Plan", TPMC informal field notes

TPMC, various dates. "Field Summary reports, Mortandad /Sandia Watersheds, 2007-2011", informal internal reports

Table 1. Timeline for well installation, sample events, and cleaning for locations SCA-1 and SCA-1-DP

Date	SCA-1	SCA-1-DP	Reference
8/25/2006	Well completed to depth of 2.1 ft bgs; 0.6 ft long screen		Kleinfelder 2006, 095121
11/6/2006	referenced in August 2007 report		Executive summary report could not be located
2/13/2007	referenced in August 2007 report		Executive summary report could not be located
6/19/2007	referenced in August 2007 report		Executive summary report could not be located
8/30/2007	well surged and bailed on August 29th; allowed to rest overnight; sampled August 30th; Due to continued recharge problems, a limited analytical suite was collected. The turbidity reading was > 1000 NTU.		Executive Summary – Mortandad/Sandia Watersheds Sampling Event 8/13/07 - 9/3/07
11/12/2007	well surge blocked for 30 min 4 days prior to sampling event; on sample day well purged dry in 1 minute; purge water had high suspended solids and was black; suggest p&a and replacement of well; No sample collected.		Executive Summary - Mortandad/Sandia Watersheds Sampling Event 11/07/07-11/27/07
2/26/2008	water column frozen. No sample collected		Executive Summary - Mortandad/Sandia Watersheds Sampling Event 02/06/08 – 02/26/08
5/19/2008	1 cv purged on May 13th; abbreviated suite collected on May 19th, recharge very poor.		Executive Summary - Mortandad/Sandia Watersheds Sampling Event 05/12/08 – 05/29/08
11/4/2008	1 cv purged on Nov 3rd; abbreviated suite collected on Nov 4th; well would no longer effectively recharge		Executive Summary - Mortandad and Sandia Watersheds Quarterly Event 2, November 2008
2/18/2009	on Feb 17th well was purged dry after 0.25 gallons; left overnight to recharge; abbreviated suite collected on Feb 18th	SCA-1-DP installed by LANS on 02/19/09, ~10ft northwest of SCA-1. It is a single completion drive point well (installed via sledge hammer) consisting of a stainless steel casing with a slotted screen ( 2.66 ft bgs; 0.5 ft long screen). The well was developed on 02/19/09 using a Geopump and 4.5 casing volumes were purged. On 02/20/09, SCA-1-DP was sampled. The well was purged 3 cv's and a full suite collected.	Executive Summary - Mortandad and Sandia Watersheds Quarterly Event 3, February 2009
4/29/2009	well was purged dry after 0.30 gallons; abbreviated suite collected 3 hrs later; recommended that sampling be abandoned	full suite easily collected	Executive Summary - Mortandad and Sandia Watersheds Quarterly Event 4, May 2009

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Date	SCA-1	SCA-1-DP	Reference
8/3/2009	well purged dry on August 2; left overnight to recharge; abbreviated suite collected on 8/3/2009	full suite easily collected	Executive Summary - Mortandad and Sandia Watersheds Quarterly Event 1, August 2009
11/2/2009	water level only	Well went dry every few minutes during sampling, but a full suite was collected; poor recharge indicates that well is silting in and should be moved before next sample event. Black water	Executive Summary - Mortandad and Sandia Watersheds Quarterly Event 2, November 2009
1/25/2010	water level only	Well went dry every few minutes during sampling, but a full suite was collected; poor recharge indicates that well is silting in and should be moved before next sample event	Executive Summary - Mortandad and Sandia Watersheds Quarterly Event 3, January/February 2010
5/13/2010	water level only	full suite collected	Field Activities Summary report; 2009 Interim Groundwater Monitoring Plan, Mortandad/Sandia Watershed Q4 and other Field Activities between May 3rd and 31st, 2010
11/9/2010	water level only?	Drive point cleaned with Deionized water and wire brush - Screen was covered with black silt. Cleaning was done only by pouring water on outside of drive point (John Archuleta, personal communication, June 14, 2011)	Field Summary report; 2010 Interim Facility-Wide Groundwater Monitoring Plan, All field activities November 9- November 29, 2010 including Mortandad/Sandia Watersheds 2010, Q2
11/11/2010	water level only?	SCA-1-DP was purged dry and allowed to recharge on 11/11/10. Recharge was insufficient to collect a full suite; a prioritized suite was collected on the same day. Water was black.	Field Summary report; 2010 Interim Facility-Wide Groundwater Monitoring Plan, All field activities November 9- November 29, 2010 including Mortandad/Sandia Watersheds 2010, Q2
11/11/2010		when pump first turned on water was clear, in 4 minutes the well was pumped dry and the last water was black. The well was allowed to recharge for 9 minutes. Water was dark grey in color and turned black within 3 minutes. 0.7 gal purged. Full prioritized suite collected.	Field notes for sample event - S. Schmeer and T. Brillante

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Date	SCA-1	SCA-1-DP	Reference
2/14/2011		sampling cancelled - no samples required.	Field Summary report; 2010 Interim Facility-Wide Groundwater Monitoring Plan, Mortandad and Sandia Watersheds 2010, Q3 and Supplemental Field Activities February 8- March 1, 2011
5/23/2011	water level only?	Well kept purging dry. Had to turn pump on and off every few minutes and wait for well to recharge. 0.26 gal purged. Water described as murky, sulphurous. Sample crew described no problems with sampling as long as they didn't over pump and disturb sediment in bottom of screen. Also the crew was careful to keep the sampling tube (4.70 ft. BTOC) above silt at bottom of the screen (4.91 ft BTOC).	Field notes for sample event - A. Stocker and H. Wershow
6/14/2011		Drive point cleaned with 2 gal DI water. Water poured on outside of drive point and down pipe. Silty black water came out of screen when water was poured down the pipe. Screen showed no signs of incrustation and could be "seen through" when cleaning was complete. Photos were taken and are included with this report. The drive point needs a new cap, the current cap threads are rusted and will not screw onto the pipe.	Elaine Jacobs, John Archuleta, Consuelo Montoya



Figure 1. SCA-1-DP in wetland prior to cleaning, June 14, 2011



Figure 2. Removing SCA-1-DP for cleaning, June 14, 2011



Figure 3. Six inch long screen on SCA-1-DP prior to cleaning, June 14, 2011



Figure 4. Close-up view of screen SCA-1-DP showing no mineral build-up, June 14, 2011