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Date: FEB 02 2015
Refer To: ADESH-15-008
LAUR: 15-20021
Locates Action No.: N/A

John Kieling, Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Subject: Submittal of the Drilling Work Plan for Groundwater Monitoring Well SIMR-2 (Formerly R-68)

Dear Mr. Kieling:

Enclosed please find two hard copies with electronic files of the Drilling Work Plan for Groundwater Monitoring Well SIMR-2 (San Ildefonso Mortandad Regional [SIMR], formerly R-68). The well is being installed as required by the New Mexico Environment Department's (NMED's) approval with modifications for the Phase II Investigation Report for Sandia Canyon, dated February 19, 2014. SIMR-2 will be located on the Pueblo de San Ildefonso at a location selected collaboratively by representatives of the Pueblo, NMED, and the Los Alamos National Laboratory.

If you have any questions, please contact Stephani Swickley at (505) 606-1628 (sfuller@lanl.gov) or Hai Shen at (505) 665-5046 (hai.shen@nnsa.doe.gov).

Sincerely,

Michael T. Brandt, DrPH, CIH, Associate Director
Environment, Safety, and Health
Los Alamos National Laboratory

Sincerely,

Peter Maggiore, Assistant Manager
Environmental Projects Office
Los Alamos Field Office

36891

MB/PM/DM/SS:sm

Enclosures: Two hard copies with electronic files – Drilling Work Plan for Groundwater Monitoring Well SIMR-2

Cy: (w/enc.)
Hai Shen, DOE-NA-LA, MS A316
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Public Reading Room (EPRR)
ADESH Records (electronic copy)

Cy: (Letter and CD and/or DVD)
Laurie King, EPA Region 6, Dallas, TX
Raymond Martinez, San Ildefonso Pueblo
Dino Chavarria, Santa Clara Pueblo
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Amy De Palma, PADOPS (date-stamped letter emailed)
Michael Lansing, PADOPS (date-stamped letter emailed)

Drilling Work Plan for Groundwater Monitoring Well SIMR-2

Primary Purpose	Los Alamos National Laboratory (LANL or the Laboratory) is installing regional aquifer groundwater monitoring well SIMR-2 (San Ildefonso Mortandad Regional [SIMR], formerly R-68), "a single-screen regional aquifer well south of R-50," as required by the New Mexico Environment Department's (NMED's) approval with modifications of the Phase II Investigation Report for Sandia Canyon, dated February 19, 2014 (NMED 2014, 524467). A location was selected collaboratively with NMED, the Pueblo de San Ildefonso, and the Laboratory and is shown in Figure 1. The approval with modifications states the objectives of the well are to "1) delineate the offsite nature and extent of the plume; 2) potentially be used for long-term contaminant detection and monitoring, and monitoring of any future remediation efforts; and 3) provide data and information as to whether production well Pajarito Mesa #4 (PM-4) is susceptible to contamination from the chromium plume." The target monitoring zone for the well is generally planned to be located near the water table. An initial design for the well is provided in Figure 2. The design of the well, including screen length and screen position, will be based on data obtained during drilling, including information from lithologic logs of cuttings, water-level measurements, video logs, geophysical logs, and field-team observations. Well-design recommendations will be submitted to NMED for its approval before construction.
Drilling Approach	Drilling will be conducted with methods selected to optimize the collection of representative groundwater samples as soon after completion as possible. A combination of open-hole and casing-advance methods with air-rotary fluid assist will be used. Each interval of open hole or casing advance will be optimized to meet well objectives. Casing will be used to advance the borehole when open-hole drilling is not possible and to secure the borehole through unstable zones or any perched groundwater horizons. A down-the-hole hammer, with or without casing advance, may be used to penetrate the Cerros del Rio basalts. Drilling foam may be used to condition the borehole, lift cuttings, and reduce the volume of compressed air needed to clean the borehole but will be terminated at least 100 ft above the regional aquifer.
Potential Drilling Fluids, Composition, and Use	Fluids and additives will be used to facilitate drilling and well development. Fluids and additives previously approved for use by NMED include • Potable water, municipal water supply, to aid in delivery of other drilling additives and cool the drill bit; • QUIK-FOAM, a blend of alcohol ethoxy sulfates, used as a foaming agent; and • AQF-2, an anionic surfactant, used as a foaming agent. Complete records will be maintained detailing the type, amount, and volume of fluid and additives used; depth where fluids or additives are added to the borehole; amount of residual material stored the borehole; and recovery volume of fluids and additives. No drilling fluids will be used within 100 ft of the regional aquifer, except potable municipal water and compressed air, unless otherwise discussed with, and approved by, NMED.
Groundwater Occurrence	It is not known whether perched water will be encountered at the planned location for SIMR-2. If perched water is encountered, attempts will be made to collect a sample(s). Drilling methods that may be used in potential perched zones may affect the representativeness of the data. Water-level data from wells in the area indicate regional saturation should be encountered at a depth of approximately 873 ft below ground surface within the Puye Formation.

Core Sampling	No core collection or sampling is planned. Drill cuttings will be collected at 10-ft intervals and used for lithologic description.
Geophysical Testing	A full suite of Schlumberger geophysical logs may be collected when the borehole has been drilled to total depth. In open-hole sections of the borehole, this logging will include accelerator porosity sonde (neutron porosity), array induction, combined magnetic resonance, natural and spectral gamma, and formation microimager logs. In cased portions of the borehole, neutron porosity, triple lithodensity, elemental capture, natural gamma, and spectral gamma logs will be collected. These logs will be used to refine estimates of the top of regional saturation and to characterize the hydraulic properties of saturated strata beneath the water table. The suites run and the timing of geophysical logging will depend on borehole conditions.
Well Completion Design	An initial design for the well is provided in Figure 2. Final design of the well, including screen length and screen position, will be based on data obtained during drilling, including information from lithologic logs of cuttings, water-level measurements, video logs, geophysical logs, and field-team observations. A proposed well design will be submitted to NMED for approval before construction begins.
Well Development	Development will proceed in a graded manner and may include both mechanical and chemical means. Mechanical means include swabbing, bailing, jetting, and pumping. Chemical means include the use of additives to remove clays and/or chlorination to kill bacteria introduced during well completion. After initial swabbing and bailing, a submersible pump will be used to complete the development process. The pump intake will be set at multiple depths within the screen to distribute flow energy throughout. Water-quality parameters will be measured in a flow-through cell. The parameters to be monitored are pH, specific conductance, dissolved oxygen, temperature, turbidity, oxidation-reduction potential, and total organic carbon (TOC). If the Laboratory is unable to bring the water-quality parameters to within the limits specified below, jetting will be employed. Jetting may require the introduction of potable water to prevent pumping level drawdown into the screen. If jetting and subsequent pumping cannot bring the water-quality parameters to within the limits specified below, chemical well development may be discussed with NMED. No chemicals will be added without NMED's approval. Chemical means that may be used include sodium acid pyrophosphate and AQUACLEAR PFD to remove clays and/or chlorination. Well development will be considered complete when target water-quality parameters are met and a volume of water equivalent to twice what was introduced into the aquifer during drilling, construction, and development is removed. The target water-quality parameters are turbidity <5 nephelometric turbidity units, TOC <2 ppm, and other parameters stable.
Hydraulic Testing	Hydraulic testing will be conducted following well completion and development. The most likely test will be a 24-h constant-rate pump test.

Investigation-Derived Waste Management	Investigation-derived waste (IDW) will be managed in accordance with standard operating procedure (SOP) EP-DIR-SOP-10021, Characterization and Management of Environmental Program Waste (available at http://www.lanl.gov/community-environment/environmental-stewardship/plans-procedures.php). This SOP incorporates the requirements of applicable U.S. Environmental Protection Agency and NMED regulations, U.S. Department of Energy orders, and Laboratory requirements. The primary waste streams will include drill cuttings, drilling water, drilling fluids and additives, development water, purge water generated during hydraulic testing, decontamination water, and contact waste. Drill cuttings with residual additives will be managed in accordance with the NMED-approved Notice of Intent (NOI) Decision Tree for Land Application of IDW Solids from Construction of Wells and Boreholes (November 2007). Drilling, purge, and development waters will be managed in accordance with the NMED-approved NOI Decision Tree for Drilling, Development, Rehabilitation, and Sampling Purge Water (November 2006). Initially, drill cuttings and drilling water will be stored in lined pits. The cuttings may or may not contain residue of drilling/well completion additives (e.g., drilling foam and bentonite clay). The contents of the pits will be characterized with direct sampling following completion of drilling activities and/or via use of a composite of subsamples collected during drilling, and waste determinations will be made from validated data. If validated analytical data show these wastes cannot be land-applied, they will be removed from the pit, containerized, and placed in accumulation areas appropriate for the type of waste. Cuttings, drilling water, development water, and purge water that cannot be land-applied and are designated as hazardous waste will be sent to an authorized treatment, storage, or disposal facility within 90 d of containerization. Development water, purge water, and decontamination water will be containerized separately at their point of generation, placed in an accumulation area appropriate to the type of waste, and directly sampled. Contact waste will be containerized at the point of generation, placed in an appropriate accumulation area, and characterized using acceptable knowledge of the media with which it came in contact.
Schedule	Well SIMR-2 is proposed to be installed by September 30, 2015. However, the completion date may be affected by ongoing negotiations with the Pueblo de San Ildefonso.

REFERENCE

The following list includes all documents cited in this plan. Parenthetical information following each reference provides the author(s), publication date, and ER ID or ESH ID. This information is also included in text citations. ER IDs were assigned by the Environmental Programs Directorate's Records Processing Facility (IDs through 599999), and ESH IDs are assigned by the Environment, Safety, and Health (ESH) Directorate (IDs 600000 and above). IDs are used to locate documents in the Laboratory's Electronic Document Management System and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the ESH Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

NMED (New Mexico Environment Department), February 19, 2014. "Approval with Modifications, Phase II Investigation Report for Sandia Canyon," New Mexico Environment Department letter to P. Maggiore (DOE-LASO) and J.D. Mousseau (LANL) from J.E. Kieling (NMED-HWB), Santa Fe, New Mexico. (NMED 2014, 524467)

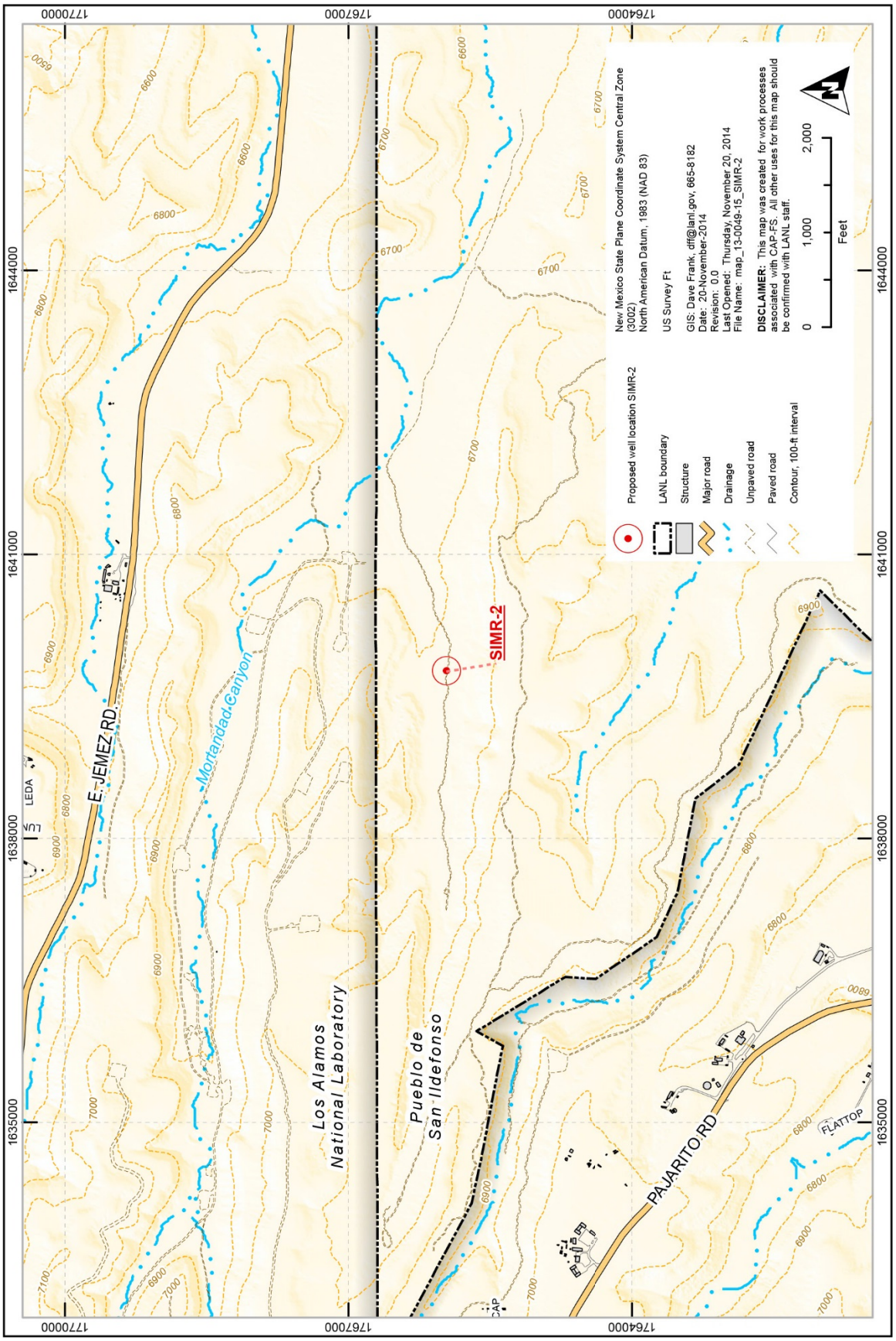

Figure 1 Proposed location of groundwater monitoring well SIMR-2

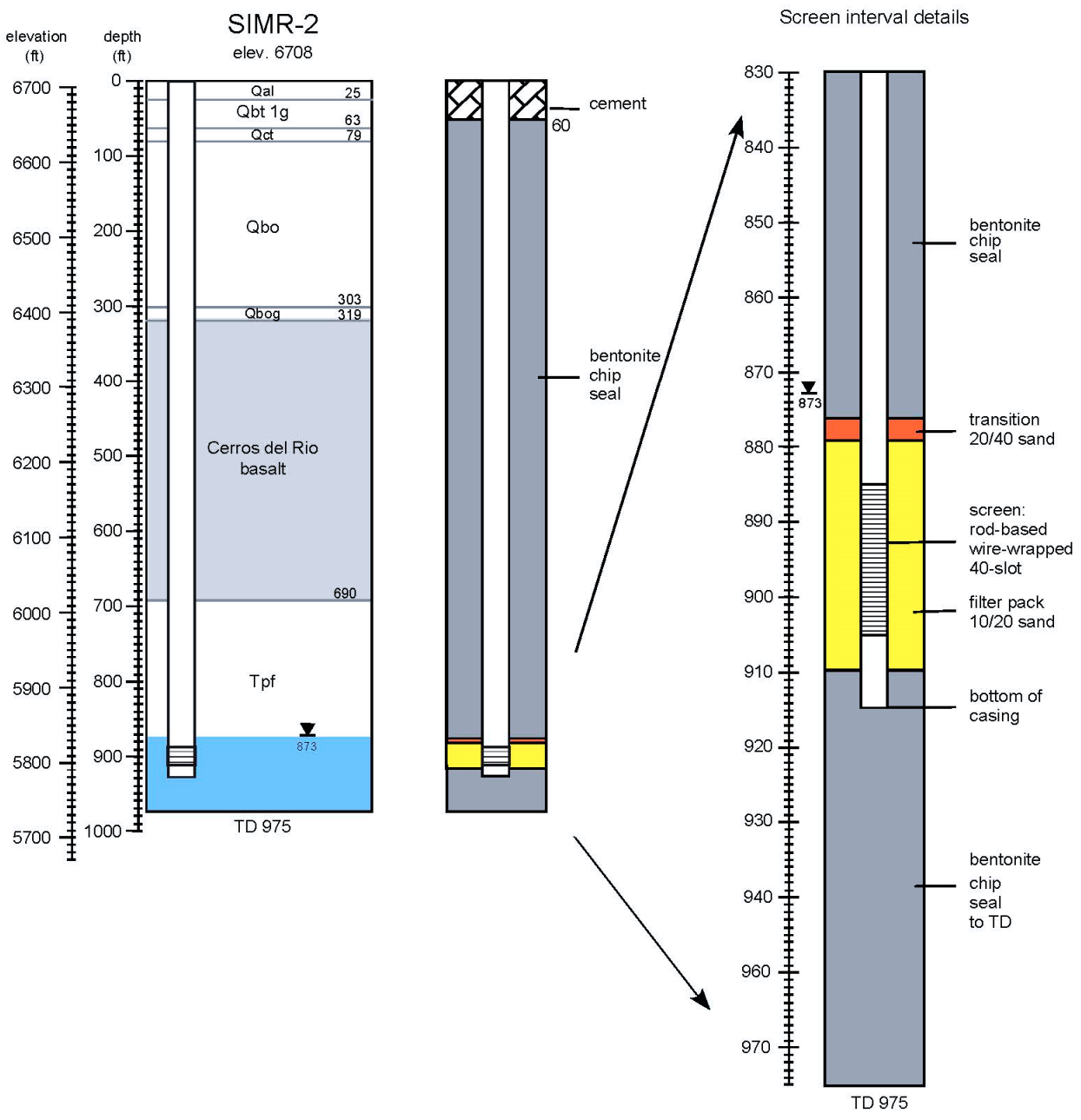

Figure 2 Predicted geology and conceptual well design for well SIMR-2