ESHID-600287

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RECEIVED
MAR 11 2015
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Hazardous Waste Bureau

National Nuclear Security Administration
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Date: MAR 11 2015
Refer To: ENV-DO-15-0069
LAUR: 15-21410
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 Replacement Regional Aquifer Well R-54r

Dear Mr. Kieling:

Enclosed please find two hard copies with electronic files of the Drilling Work Plan for Replacement Regional Aquifer Well R-54r.

If you have any questions, please contact Steve Paris at (505) 606-0915 (smparis@lanl.gov) or Cheryl Rodriguez at (505) 665-5330 (cheryl.rodriguez@nnsa.doe.gov).

Sincerely,

Alison M. Dorries, Division Leader
Environmental Protection Division
Los Alamos National Laboratory

Sincerely,

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

AMD/PM/DJM/SMP:sm

Enclosures: Two hard copies with electronic files – Drilling Work Plan for Replacement Regional Aquifer Well R-54r (EP2015-0039)

Cy: (w/enc.)
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Drilling Work Plan for Replacement Regional Aquifer Well R-54r

Primary Purpose	Replacement regional aquifer well R-54r is being installed by Los Alamos National Laboratory (LANL or the Laboratory) to meet the New Mexico Environment Department's (NMED's) requirement to install a single-screen well to replace existing well R-54, screen 1, in its letter dated May 28, 2013 (NMED 2013, 522648). The proposed location for replacement well R-54r is estimated to be approximately 50 ft upgradient of R-54 and on the same drill pad as R-54 (Figure 1). Based on observations made during drilling of R-54, the R-54r borehole is expected to penetrate the top of regional saturation at a depth of approximately 819 ft below ground surface (bgs) within basaltic sediments underlying the Cerros del Rio basalt. The target borehole total depth is approximately 875 ft bgs (Figure 2). The well will be completed with one 10-ft screen placed near the existing 10-ft screen 1 interval of 830–840 ft bgs. A final well design will be based on hydrogeological conditions encountered during drilling and will be submitted to NMED for its approval before the well is constructed.
Drilling Approach	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 (DTH) hammer, with or without casing advance, may be used to penetrate the Cerros del Rio basalts. If a DTH hammer is utilized, hammer oil will be used as a lubricant down to a depth of 719 ft (100 ft above the regional aquifer). Below 719 ft, use of the DTH hammer without lubricating oil may be attempted. If this method is not successful, a tricone bit air-rotary method will be employed. Drilling foam may be used to condition the borehole, lift cuttings, and reduce the use of compressed air needed but will be terminated at least 100 ft above the regional aquifer.
Potential Drilling Fluids, Composition, and Use	Fluids and additives that may be used to facilitate drilling are consistent with those previously used in the drilling program at the Laboratory. Fluids and additives previously approved for use by NMED include • potable water from municipal water supply to aid in delivering other drilling additives and cooling 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 drilling additive used; depth of drilling fluid added to the borehole and recovery volume of drilling fluid. No drilling fluids will be used within 100 ft of the regional aquifer, except potable municipal water. If the regional aquifer cannot be reached without adding drilling fluids, the situation will be discussed with NMED before the borehole is advanced.
Potential Groundwater Occurrence and Detection	• *Perched*: No perched water was observed during the drilling of R-54. • *Regional*: 819 ft bgs. Based on observations made during the drilling of R-54, regional groundwater is expected to occur in basaltic sediments underlying the Cerros del Rio lavas. • Methods for groundwater detection may include driller's observations, water-level measurements, borehole video, and borehole geophysics.

Groundwater Characterization Sampling	• Groundwater samples will be collected from the completed well between 10 d and 60 d after well development, in accordance with the Compliance Order on Consent. These samples will be analyzed for the full suite of constituents, including radiochemistry, metals, general inorganic chemicals, and volatile organic compounds. • Subsequent groundwater samples will be collected under the annual Interim Facility-Wide Groundwater Monitoring Plan.
Geophysical Logging	The Laboratory's borehole video camera and natural gamma and induction tools will be used in the open borehole if conditions allow.
Well Completion Design	Figure 2 shows the conceptual design for well R-54r. The final well design will be based on water-level measurements, drillers' observations, geophysical logs, and lithologic information from drill cuttings.
Well Development	The well may be developed by both mechanical and chemical means. Mechanical means include swabbing, bailing, and pumping. Chemical means include the use of additives to remove clay minerals introduced as annular fill 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. • 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 within measurement limits specified below, the use of chemicals to facilitate well development will be discussed with NMED. No chemicals will be added without NMED's approval. • Chemicals that may be used include the addition of sodium acid pyrophosphate and AQUACLEAR PFD to remove clay minerals and/or chlorination to kill bacteria introduced during well completion. Well development will be considered complete when target water-quality parameters are met. The target water-quality parameters are turbidity <5 nephelometric turbidity units, TOC <2 ppm, and other parameters listed above are stable.
Hydraulic Testing	Hydraulic testing will be conducted following 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 (procedures are listed at http://www.lanl.gov/community-environment/environmental-stewardship/plans-procedures.php and are available at eprr.lanl.gov). 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 R-54r will be completed by September 30, 2016.

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), May 28, 2013. "Evaluation to Determine the Cause of Reducing Conditions Observed in Regional Aquifer Monitoring Wells R-54 and R-61," 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 2013, 522648)

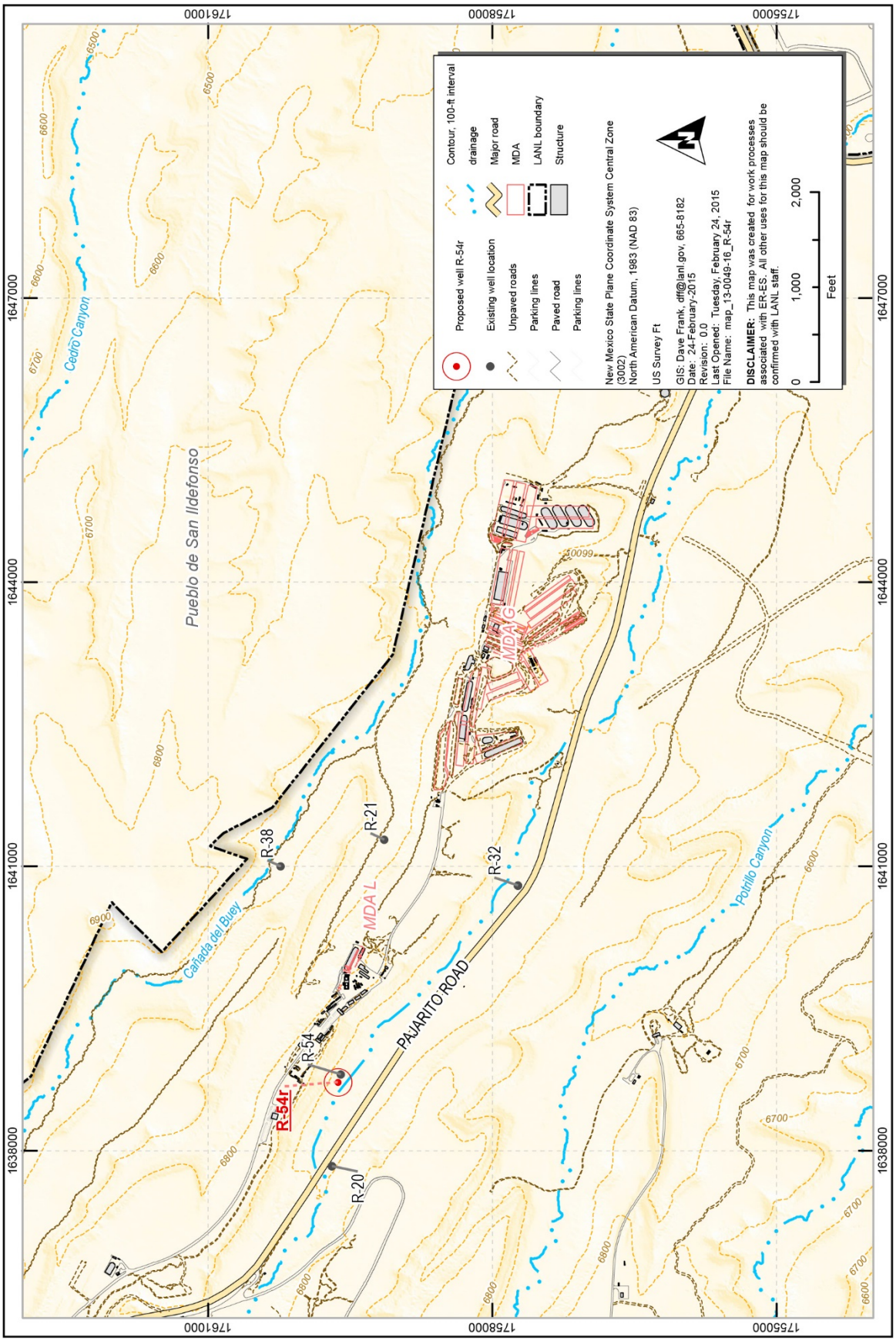

Figure 1 Proposed R-54r site

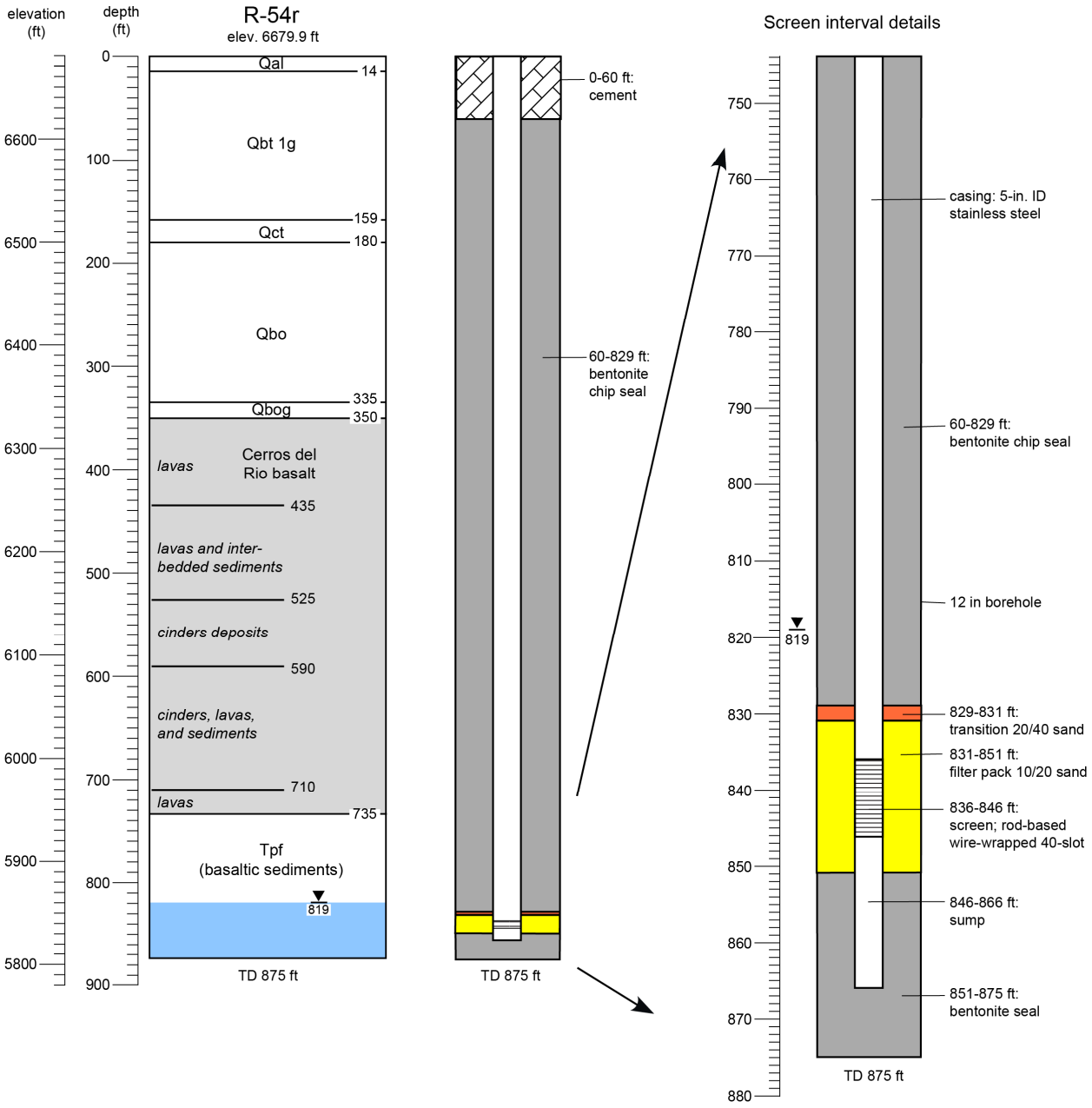

Figure 2 Predicted geology and well schematic for well R-54r