Los Alamos NATIONAL LABORATORY EST 1943

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GROUND WATER
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Symbol: EPC-DO-18-414
LA-UR: 18-29710
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Date: NOV 19 2018

Ms. Michelle Hunter, Chief
Ground Water Quality Bureau
New Mexico Environment Department
Harold Runnels Building, Room N2261
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502

Subject: DP-1132, Condition No. 33, Alluvial Monitoring Wells Workplan

Dear Ms. Hunter:

On August 29, 2018, the New Mexico Environment Department (NMED) issued Discharge Permit DP-1132 to the U.S. Department of Energy and Los Alamos National Security, LLC (subsequently transferred to Triad National Security, LLC) for discharges of treated effluent from the TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF). Pursuant to permit Condition No. 33, *Replacement of Two Existing Alluvial Ground Water Monitoring Wells*, the U.S. Department of Energy and Triad National Security, LLC (DOE/Triad) is required to submit a workplan for NMED approval by November 27, 2018. DOE/LANS proposed workplan is provided as Attachment 1.

Please contact Karen E. Armijo by telephone at (505) 665-7314 or by email at Karen.Armijo@nnsa.doe.gov, or Robert S. Beers by telephone at (505) 667-7969 or by email at bbeers@lanl.gov if you have questions regarding this proposed workplan for the replacement of two alluvial ground water monitoring wells.

Very truly yours,

Enrique "Kiki" Torres
Division Leader
Environmental Protection & Compliance
Triad National Security, LLC

Very truly yours,

Karen E. Armijo
Permitting and Compliance Program Manager
National Nuclear Security Administration
U.S. Department of Energy

ET/KEA/MTS/RSB:jdm

Attachment(s): Attachment 1 Drilling Workplan for Discharge Permit DP-1132 Alluvial Monitoring Wells

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ATTACHMENT 1

Drilling Workplan for Discharge Permit DP-1132
Alluvial Monitoring Wells

EPC-DO: 18-414

LA-UR-18-29710

Date: NOV 19 2018

Drilling Work Plan for Discharge Permit DP-1132 Alluvial Monitoring Wells

1.0 GENERAL BACKGROUND

Los Alamos National Laboratory (LANL) discharges treated effluent from the Technical Area (TA) -50 Radioactive Liquid Waste Treatment Facility (RLWTF) to NPDES Outfall 051 in Effluent Canyon. See Figure 1.0. On August 29, 2018 the New Mexico Environment Department (NMED) issued Discharge Permit DP-1132 to the U.S. Department of Energy and Los Alamos National Security, LLC. Subsequently, the permit was transferred to Triad National Security, LLC for said discharges. As presented below, Condition No. 33 of Discharge Permit DP-1132, requires the installation of two new alluvial groundwater monitoring wells in the canyon downgradient of the outfall.

DP-1132 CONDITION NO. 33. REPLACEMENT OF TWO EXISTING ALLUVIAL GROUND WATER MONITORING WELLS - *Within 90 days of the effective date of this Discharge Permit (by November 27, 2018), the permittees shall submit to NMED a work plan for the installation of two replacement monitoring wells in the alluvial aquifer at a location hydrologically downgradient of Outfall 051. The well installation work plan will include proposed well locations, drilling methods, well specifications, and proposed schedule for construction. Upon NMED approval, the Permittees shall construct the replacement wells in accordance with the Groundwater Quality Bureau, Monitoring Well Construction and Abandonment Guidelines, Revision 1.1, March 2011 and the approved work plan and schedule.*

DOE/Triad propose in this work plan to install two new alluvial groundwater monitoring wells, RLW-A-1 and RLW-A-2, hydrologically downgradient of Outfall 051 and in accordance with NMED Ground Water Quality Bureau Monitoring Well Construction and Abandonment Guidelines. The location of alluvial groundwater monitoring wells RLW-A-1 and RLW-A-2 are shown in **Figure 1.0.**

2.0 SITE PREPARATION

The drill sites will be prepared with as minimal an impact and disturbance to the area as practical. Road or drill pad construction will not be required for either location. Any ground disturbance will be kept to a minimum, but if a drill site area is disturbed, then Best Manage Practices (BMPs) will be installed to minimize erosion and any surface water run-on or run-off from the site. Borehole locations near stream channels will have a sediment barrier installed between drilling operations and the stream channel.

3.0 DRILLING AND WELL INSTALLATION METHODS

Both boreholes will be completed using a hollow stem auger (HSA) drilling techniques. See **Table 1.0** and **Figure 2.0**. Water or other fluids will not be used for any drilling method anticipated for this project. Split-spoon samples will be collected every 5-feet for borehole logging purposes. Borehole logs will be prepared in the field, as borings are drilled, by a qualified, experienced geologist or geotechnical engineer.

Drilling Work Plan for Discharge Permit DP-1132 Alluvial Monitoring Wells

A boring log will be prepared for each borehole. The drill log will contain at a minimum the following information: name of the project and site; hole number and dates drilled; location of the boring; type of drill rig; size and type of bit used; thickness of each stratum; identification of the material of which each stratum is composed; depth interval from which each formation sample was taken; depth at which groundwater was first encountered; depth to static water level and changes in static water level with hole depth; total depth of hole; loss of tools or equipment and any other problems encountered; reference elevation for all depth measurements; and name of driller and name and signature of the geologist preparing the log.

A 4-in inside diameter (ID) PVC well with a .010-in continuous wrap vee-wire screen will be installed in the borehole. Two stainless steel centralizers shall be installed, one immediately above the screen and the second above the bentonite seal to centralize the well in the borehole. A 20/40 silica sand filter pack will be placed extending 1-foot below the completed well to 2-feet above the top of the screened interval. A bentonite seal will then be placed immediately above the filter pack. The bentonite seal shall be 3 feet in thickness, consisting of chips or pellets (3/8-inch size) and hydrated with clean water. The annular space above the bentonite seal shall be sealed with cement grout or a bentonite-based sealing material acceptable to the NMOSE pursuant to 19.27.4 NMAC. The annular seal will extend from the top of the bentonite seal to within 2 feet of the ground surface. A locking protective surface casing will be cemented in place, filling the remaining annular space above the cement grout/bentonite-based annular seal.

Suitable construction (as-built) diagrams detailing construction practices of both wells will be maintained. The diagram should be prepared by the geologist/geotechnical engineer present during all construction operations. Information provided in the construction diagram should include, but not be limited to the following: reference elevation for all depth measurements; project and site name; well number; date(s) of installation; the location and thickness of each stratum; nominal hole diameter(s); the depth of the static water level during drilling, at completion, before and after development; total depth of the completed well; depth of any grouting or sealing materials; depth and type of well casing; description of well screen (to include length, location, diameter, slot size, material, and manufacturer); description of development procedures, including method, time spent developing, water quantity removed; sand content, pH, conductivity and temperature as appropriate; other construction details including grain size and source of well filter pack material, location of seals and casing joints, and generalized surface completion; name of driller and name and signature of the geologist preparing the diagram.

Table 1.0. Alluvial Monitoring Wells, Drilling Requirements

Well Name	Location	Approximate Alluvial Thickness/ Borehole Depth	Drilling Method	Well Material (diameter)	Estimated Screen Length	Well Screen Design
RLW-A-1	Mortandad Canyon Above Confluence with Ten Site Canyon	~20/25 ft	HSA[1] 6 ¼ ID[2] 10 ¼ OD[3]	PVC (4-in. ID) 2 stainless steel centralizers	~10 ft	.010-in. slot size, continuous wrap vee-wire screen with 20/40 filter pack sand
RLW-A-2	Mortandad Canyon Above Confluence with Ten Site Canyon	~40 ft	HSA 6 ¼ ID 10 ¼ OD	PVC (4-in.ID) 2 stainless steel centralizers	~20 ft	.010-in. slot size, continuous wrap vee-wire screen with 20/40 filter pack sand

Notes:
[1]HSA means hollow stem auger
[2]ID means inside diameter
[3]OD means outside diameter

All drilling and sampling equipment will be decontaminated before use at each borehole, and prior to demobilizing from LANL. The augers, samplers, and all sampling scoops and bowls will be cleaned between wells. Whenever possible, dry decontamination methods will be used to minimize waste products.

4.0 COMPLETION, DEVELOPMENT, AND SURVEY OF GROUNDWATER MONITORING WELLS

Well Completion/Protection: Wellhead completion will include a protective outer casing and concrete pad. Pad dimensions will be a 3 ft square of 6-in.-thick concrete set into the ground surface. A brass monument will be placed in the northwest corner of the concrete pad as a survey marker point. Temporary wellhead protection measures will be maintained during all drilling and development activities so unauthorized individuals shall not have access to the open borehole/well.

Well Development: Forty-eight (48) hours after and within the first week of well completion, the well will be developed to remove cuttings, mobile particulates, and entrapped gases from within and adjacent to the well. Installed wells will be pumped or bailed, or combination of both, until the following criteria are met:

1. Well water is clear and measured turbidity is 5 nephelometric turbidity units (NTUs) or less and measured pH, specific conductivity, and temperature have stabilized.

2. A minimum of "five times the standing water volume" is removed[1]

The LANL Project Manager will be contacted if any of the following circumstances occur:

1. Well recharge is so slow that the required volume of water cannot be removed during 10 consecutive hours of development
2. Groundwater samples show persistent water discoloration after well development
3. Sediment remains after well development.

On-site potable and contaminant-free water required for proper well installation, grouting and equipment washing will be provided by drilling contractor.

Survey: A geodetic survey will be conducted by LANL after both wells are installed and surface completions finished. Survey results will be entered into the LANL database system. Survey results (northing, easting, and elevation) will be given in New Mexico state plane coordinate system, North American Datum (NAD) 1983. Elevation will be expressed in feet above mean sea level (amsl) using the National Geodetic Vertical Datum of 1929. Survey points include the top of brass marker in the concrete pad, top of PVC well casing and top of protective casing. Brass monuments will be stamped with well ID and elevation.

5.0 FORMATION WATER LEVEL MONITORING

An In-Situ LevelTroll® 500 series vented pressure transducer will be installed in each monitoring well for long-term water-level monitoring. Upon installation, the subcontractor shall program the transducers for 1-hour data collection intervals.

6.0 WASTE MANAGEMENT AND DISPOSAL

Investigation-derived waste (IDW) refers to all solid waste generated during the drilling operations. The anticipated IDW may include, but is not limited to, (1) drill cuttings; (2) personal protective equipment (PPE); (3) other wastes that may potentially come in contact with contaminants such as plastic, glass, disposable sampling supplies and solid decontamination wastes; (4) spent field screening supplies, (5) well purge water, (6) petroleum contaminated soil; and (7) petroleum contaminated absorbent materials.

[1] The "five times (5X) the standing water volume" is calculated to include the well screen and casing plus saturated annulus and assumes 30 percent annular porosity and that no water was used in the drilling or installation stages of the well.

It is anticipated that the IDW generated during implementation of the drilling operations will be characterized as non-hazardous waste but as a conservative practice all waste will be stored inside either a Satellite Accumulation Area (SAA) or a Central Accumulation Area (CAA) until a final hazardous waste determination is made. Waste characterization and determination will be completed using one or more of the following methods: (1) Acceptable Knowledge (e.g. review of existing data and/or documentation), (2) site characterization, or (3) direct sampling of waste.

Regardless, all wastes generated during each investigation will be characterized, stored in a proper waste accumulation area, managed, and disposed per the processes defined in the approved site-specific Waste Characterization Strategy Forms (WCSFs) as well as in accordance with all applicable SOPs.

Waste containers will be selected based on appropriate DOT requirements, waste types, and the estimated volumes generated. Immediately following containerization, each waste container will be individually labeled with a unique identification number and with information regarding waste classification, item(s), and date generated. Waste will be stored in clearly marked and appropriately constructed and managed waste accumulation areas. Waste accumulation area postings, regulated storage duration, and inspection requirements will be based on the type of IDW and its classification.

It is anticipated that all waste will be disposed of at one of the following locations, as appropriate: (1) an authorized non-hazardous solid waste disposal facility, (2) an authorized treatment, storage, and disposal facility, (3) a NM Special Waste landfill (or an out-of-state equivalent), or (4) land application via the NMED-approved decision trees for the land application of groundwater and drill cuttings. No waste will be generated during any of these investigations that do not have an identified disposal path.

7.0 SITE DEMOBILIZATION AND RESTORATION

Upon completion of investigation activities, all investigation-related equipment and materials will be promptly removed from the site. Staging areas no longer in use will be dismantled. Due to pending waste characterization results, site demobilization will be completed in two phases: (1) following completion of drilling, sampling, and well installation activities and (2) following the demobilization of waste containers, after receipt of waste characterization results.

8.0 SCHEDULE

Upon NMED approval or approval with conditions of this work plan, DOE/Triad will begin construction of the two alluvial monitoring wells in Mortandad Canyon within 180 days. Completion of the two alluvial monitoring wells will occur 60 days following the start of construction.

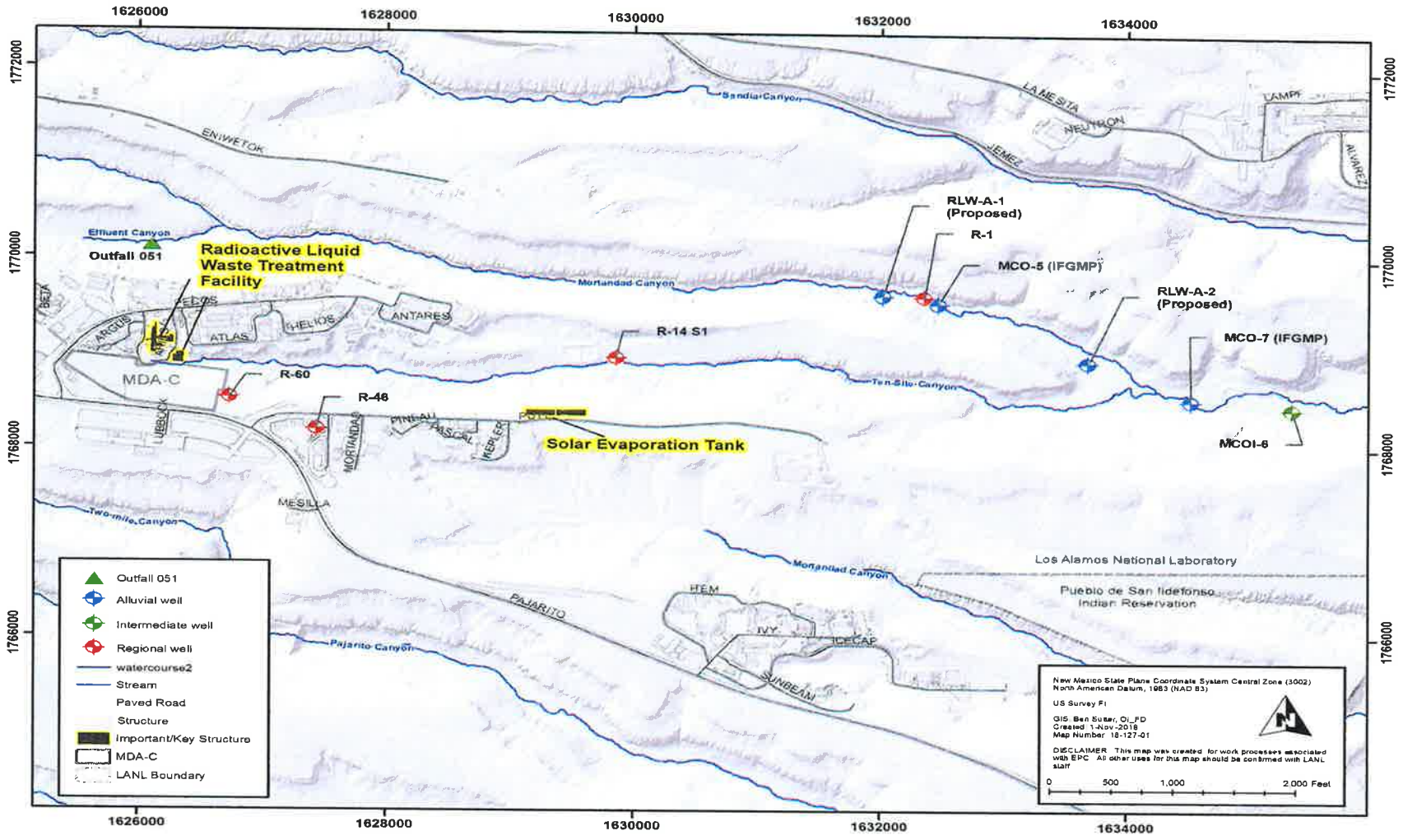

Figure 1.0. Location of Proposed Alluvial Monitoring Wells Downgradient of Outfall 051.

Note: IFGMP means the well is sampled routinely pursuant to LANL's Interim Facility-Wide Groundwater Monitoring Plan.

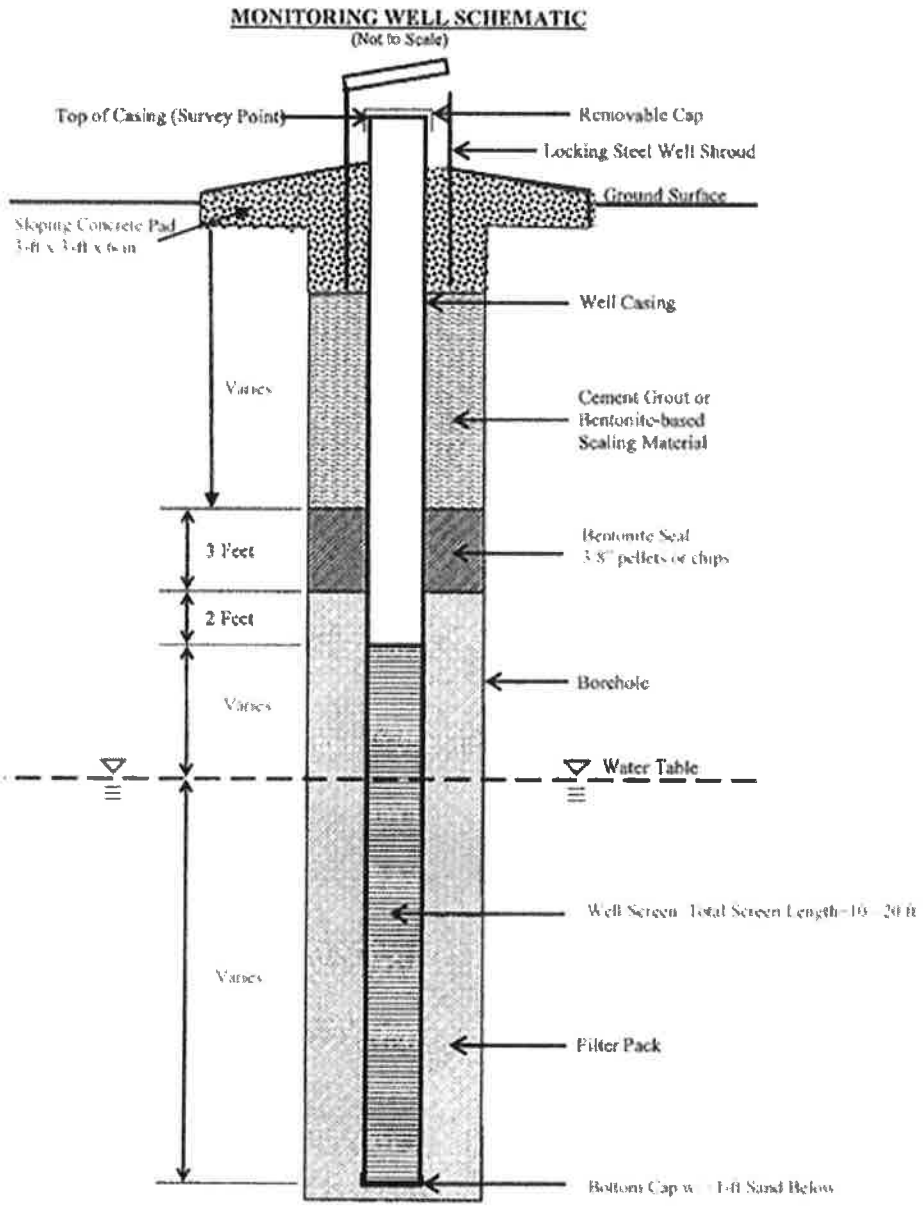

Figure 2.0. Conceptual Design, Alluvial Monitoring Well