



Well R-30 Drill Plan

Installation of Well R-30,
TA-49, Los Alamos National Laboratory

Task Order 4
In accordance with
Master Task Order Agreement 72006-000-09

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CONTENTS

ACRONYMS	V
1.0 INTRODUCTION.....	1
1.1 PROGRAM MANAGEMENT AND OPERATIONS	2
1.1.1 Project Staff.....	2
1.1.2 Health and Safety Training	3
1.1.3 Security	4
1.1.4 Schedule	4
1.1.5 Permits	4
1.1.6 New Mexico Environment Department Field Visits.....	5
2.0 FIELD ACTIVITIES	5
2.1 SITE PREPARATION AND DRILLING SITE MAINTENANCE	5
2.1.1 Radiological Screening	5
2.1.2 Field Office and Site Services.....	5
2.1.3 Lay-Down Area	6
2.2 WELL DRILLING.....	6
2.2.1 Drilling	6
2.3 CORING.....	8
2.4 GROUNDWATER DETECTION	8
2.5 SAMPLE COLLECTION PROCEDURES	8
2.5.1 Groundwater Sample Collection	8
2.5.2 Cuttings Sampling.....	10
2.6 DOWN-HOLE GEOPHYSICS.....	11
2.7 WELL INSTALLATION AND COMPLETION	12
2.7.1 Well Construction.....	12
2.7.2 Well Development.....	13
2.7.3 Aquifer Testing	14
2.7.4 Sampling System Installation.....	14
2.7.5 Surface Completion	15
2.8 INVESTIGATION-DERIVED WASTE	15
2.9 SITE RESTORATION	16
3.0 REFERENCES.....	16

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TABLES

Table 1.1-1 NWI Project Staff and Roles 18
 Table 1.1-2 LANL Project Staff and Roles 19
 Table 1.1-3 Drilling Schedule 20
 Table 2.5-1 Sampling and Analysis Plan for R-30 21
 Table 2.8-1 Waste Characterization for Wells R-30 23

FIGURES

Figure 1.0-1 - Location of Well R-30 at TA-49 25
 Figure 1.1-1 Project field organization chart 26
 Figure 2.1-1 Water Source Location for the R-30 Drill Site 27
 Figure 2.1-2 Route to the Pajarito lay-down yard from Well R-30 28
 Figure 2.2-1 Well R-30 site layout 29
 Figure 2.2-2 Well Pad and Laydown Area Dimensions 30
 Figure 2.7-1 Proposed well design schematic for well R-30 31
 Figure 2.7-2 Surface completion schematic 32

APPENDICES

Appendix A Drilling FormsA-1
 Appendix B Security Plan for TA-49, R-30 Monitor Well Installation.....B-1
 Appendix C Traffic Control Plan C-1
 Appendix D Excavation Permit D-1
 Appendix E Spark and Flame PermitE-1

ACRONYMS

ASTM	American Society for Testing and Materials
ags	above ground surface
bgs	below ground surface
CPR	cardiopulmonary resuscitation
DOE	Department of Energy
EES-14	Earth and Environmental Sciences Division, Hydrology, Geochemistry, and Geology Group
EP	Environmental Programs
FOM	Field Operations Manager
ft	feet
HAZWOPER	Hazardous Waste Operations and Emergency Response
HE	high explosives
ID	inside diameter
IDW	investigation-derived waste
in	inch
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security, LLC
Layne	Layne Christensen Company
LWI	LANL work instruction
LWSP	Laboratory Water Stewardship Program
MDA	Material Disposal Area
mL	milliliter
NGWA	National Ground Water Association
NMED	New Mexico Environment Department
NOI	notice of intent
NPDES	National Pollutant Discharge Elimination System
NTU	nephelometric turbidity unit
NWI	North Wind, Inc.
OD	outside diameter
PIC	person in charge
POC	point of contact

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ppm	parts per million
psi	pounds per square inch
PVC	polyvinyl chloride
RCT	Radiation Control Technician
SAP	Sampling and Analysis Plan
SAPP	sodium acid pyrophosphate
SMO	Sample Management Office
SOP	standard operating procedure
SSEHASP	Site-Specific Environmental Safety and Health Plan
SSO	Site Safety Officer
STR	Subcontract Technical Representative
SWPPP	Storm Water Pollution Prevention Plan
TA	technical area
TD	total depth
TOC	total organic carbon
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WCSF	waste characterization strategy form

1.0 INTRODUCTION

Los Alamos National Laboratory (LANL) Management and Operations contracted North Wind, Inc. (NWI) to manage the installation of regional aquifer monitoring well R-30. The well is being installed to provide hydrogeologic and water quality data required by the March 1, 2005, Compliance Order on Consent (Consent Order) agreed to by the New Mexico Environment Department (NMED) and the Department of Energy (DOE) for environmental remediation at LANL. NWI will complete this work for the Los Alamos National Security, LLC (LANS) Environmental Programs (EP) Directorate – American Reinvestment and Revitalization Act (ARRA) Project Office.

The proposed location for well R-30 is within Technical Area (TA) 49, near the eastern boundary of TA-49 and downgradient of MDA AB (Figure 1.0-1). Well R-30 is being installed to assist in the overall evaluation of the nature and extent of contamination from TA-49 as well other upgradient sites that could potentially contribute to contamination of perched or regional groundwater in the area.

This drilling plan provides technical guidance for activities associated with drilling, installation, sampling, and aquifer testing of regional monitoring well R-30. The well is projected to be advanced to a total depth (TD) of approximately 1275 feet (ft) below ground surface (bgs), in volcaniclastic sediments of the Puye Formation. Well R-30 is projected to be completed with a 20-ft screened interval, between 1135-1155 ft bgs. It is unclear whether this interval will be within lavas or sediments; however, cuttings recovered during the drilling of well R-30 will resolve this uncertainty. Drilling may be terminated at a shallower depth if a suitable zone of water production is found before reaching TD.

The primary hydrogeologic and geochemical objective for the installation of R-30 is to provide a regional aquifer monitoring well downgradient of TA-49, which will provide data that will be integral to descriptions of the nature and extent of contamination from TA-49, as well as from other upgradient sites, as applicable. Other hydrogeologic and geochemical objectives are to establish water levels in the regional aquifer in this area for use in further constraining regional groundwater flow direction and gradients, to determine whether other zones of perched-intermediate groundwater occur under MDA AB, and to resolve from cuttings and geophysical logs whether lavas are present at this location, a difference in volcanic stratigraphy that can impact flow models in this area.

Well R-30 will provide supplemental data that may resolve uncertainties about the hydrogeologic properties of the subsurface below MDA AB. Well R-27 was installed northeast of this area in Water Canyon with a screen set in the Puye Formation, and shows no evidence of contamination. During drilling of R-27, a thin perched zone was noted at the top of the Cerros del Rio basalt, and it is uncertain whether this perched zone extends south beneath TA-49. Observations made during drilling of R-30 will help determine the areal extent of the perched zone encountered during the installation of R-27.

There are conflicting interpretations for the hydrogeologic conceptual model at well R-30. Lithologic logs from older test wells (DT-5A, DT-9 and DT-10) suggest that the Tschicoma dacite lavas may be present in this area rather than Cerros del Rio basalts. Adding to the uncertainty, no lavas were detected in the recently drilled R-29 borehole located about 0.25 mi north. Since these formations slope in opposite directions, i.e., Tschicoma to the east and Cerros del Rio to the west, uncertainty exists about the flow direction of perched water, if present, above these lavas. Drill cuttings and geophysical logs obtained during the installation of R-30 will help determine whether any perched water flows east, west or vertically.

This drilling plan is in compliance with the scope of work set forth in Task Order 4 of the Master Task Order Agreement Contract between LANS and NWI. The following sections provide an overview of the program management and operations.

1.1 Program Management and Operations

1.1.1 Project Staff

Tables 1.1-1 and 1.1-2 indicate the project roles, staff, and responsibilities for NWI project personnel and LANL project personnel, respectively. The overall project organization of the field personnel is shown on Figure 1.1-1. Additional qualified and experienced staff, both existing and new, may be added after submitting this drill plan. With approval of the LANL Subcontract Technical Representative (STR), staff will be identified and roles will be assigned prior to commencement of field work.

Project management, administration, and quality assurance oversight will be conducted out of NWI's Los Alamos, New Mexico office. The Field Operations Manager (FOM) or designee will provide oversight and will review ongoing operations as they relate to this drilling plan and will assist the drilling team with any technical, operational, or other project related issues.

During each drilling shift, a minimum of one NWI personnel will be present at the drill site. The Field Geologist will have the following responsibilities:

- Maintain detailed field notes describing general drill site activities;
- Compile and submit daily reports and drilling forms (examples included in Appendix A);
- Record down-hole tool types and lengths;
- Conduct lithologic logging;
- Conduct daily safety meetings; and,
- Inspect equipment.

The FOM and/or Field Geologist will also be responsible for compliance with established health and safety documentation and will serve as the Site Safety Officer (SSO) in the absence of the project Health and Safety Officer.

A person in charge (PIC) will be designated at all times during field operations. The PIC is responsible for interaction with LANL personnel and other visitors to the site. Ordinarily, the PIC will be the FOM. In the event that the FOM is not present, the following person(s) will be designated to act as the PIC in this order, if the previous person is not present:

- Lead NWI Field Geologist,
- Associate NWI Geologist.

During an emergency situation, in the absence of on-site NWI personnel, the following person(s) will be designated to act as the PIC in this order:

- Drilling Supervisor (tool pusher);

- Driller.

1.1.2 Health and Safety Training

A Site-Specific Environmental Health and Safety Plan (SSEHASP) has been prepared for this site. Though not anticipated to be a hazardous waste site, all NWI personnel will be in compliance with Occupational Safety and Health Administration Hazardous Waste Operations and Emergency Response (HAZWOPER) training requirements. In addition, at least two site personnel will be trained in first aid/cardiopulmonary resuscitation (CPR).

Before mobilization into the field, all staff will be trained to the following:

- EP-Wide Health and Safety Master Plan;
- SSEHASP (North Wind 2009);
- NWI EP-wide Standard Operating Procedures (SOPs; North Wind 2009);
- Associated LANL Work Instructions (LWIs);
- NWI EP-Wide Quality Assurance Plan;
- Operational Security Plan;
- Site-Specific security requirements (Exhibit G of the Task Order 4); and
- General field lithologic logging techniques and field operating expectations.

The FOM will be responsible for monitoring adherence to the project plans and environmental safety and health requirements. Field personnel at the well site will be required to read, understand, and follow NWI-identified SOPs required to meet the scope of work.

Additionally, the following LANL training will be required for key field personnel and managers:

- LANL General Employee Training;
- TA-49 Site-Specific Orientation (required for everyone who will be on-site)
- TA-49 Security Plan (required for everyone who will be on-site);
- Emergency Management System Training (TP 7215);
- Annual Security Refresher;
- Integrated Work Management Overview (TP 6957);
- Substance Abuse Awareness (TP 458);
- Traffic Safety and Special Materials Convoys (TP 9311);
- EP-DIR-SOP-2011, R4, Personnel Training and Qualification;

- EP-DIR-SOP-4004, R1, Records Transmittal and Retrieval Process;
- EP-DIR-SOP-8001, R0, Inspection, Test, and Acceptance;
- EP-DIR-SOP-5006, R0, Control of Measuring and Testing Equipment; and
- Occupational Safety and Health Act 29 Code of Federal Regulations 1910.120 HAZWOPER 40-hour training. (This training is a best management practice for this project. It is not a specific health and safety requirement).

1.1.3 Security and Traffic Control

Well R-30 is located within TA-49 and all access control issues will be maintained from that point. It is not anticipated that contact with access control for TA-15, located across the canyon, will be necessary during site operations. Security control will be maintained as follows:

- R-30 drill site will be accessed using the ESH-247 key at TA-49 access control gate B.
- Access control gate B will remain locked except during site access. Locks will be daisy-chained together.
- Names and Z Numbers of all personnel on site will be maintained in the access control/equipment room of Building 0113 during site operations.
- Site personnel and visitors will be required to sign the on-site tailgate safety briefing log maintained by NWI.

The main road at TA-49 to the site will remain accessible. Traffic control will be maintained as follows:

- The speed limit at TA-49 will not exceed 25 miles per hour (mph).
- Near the R-30 drill site, signs will be posted to indicate that traffic will flow in a counterclockwise direction; traffic is one-way on this road.
- At the R-30 drill site, signs will be posted to indicate that the speed limit is 15 mph during drilling operations and when pedestrians are present (see Figure 1.0-1).

1.1.4 Schedule

Table 1.1-3 shows the tentative well R-30 drilling schedule. Drilling is planned in two 12-hour shifts per day, with the day shift typically occurring from 0700-1900 and the night shift from 1900-0700.

1.1.5 Permits

A National Pollutant Discharge Elimination System (NPDES) Storm Water Pollution Prevention Plan (SWPPP) permit has been implemented. The SWPPP notice of intent (NOI) has been submitted to the United States Environmental Protection Agency (USEPA). Other required permits have been obtained through the LANL Permits and Requirements Identification process, including the Excavation Permit and the Spark or Flame Producing Operation Permit, contained in Appendix D and Appendix E, respectively. Copies of permits, notifications, inspection reports,

and site access authorization will be maintained at the drilling site. The LANL-provided Spill Prevention Containment, Control and Countermeasures Plan is included in the SSEHASP. NWI will assume implementation of this plan because NWI plans to maintain bulk fuel storage at the drilling site.

1.1.6 New Mexico Environment Department Field Visits

If NMED personnel visit the site, the PIC will attempt to notify the STR or other appropriate LANL personnel (Table 1.1-2), until contact has been made. Thus, LANL personnel shall be promptly informed of NMED personnel visits to the site, and will maintain agency coordination.

2.0 FIELD ACTIVITIES

2.1 Site Preparation and Drilling Site Maintenance

Basic site preparation will be conducted by LANL personnel prior to drill rig and personnel mobilization. This task will include construction of access roads to provide adequate passage for transporting the drilling and support equipment to the site. Construction of the drilling pads, as well as the construction and lining of cuttings pits, will also be conducted by LANL. This task will also provide work areas for the drilling crew and the scientific/engineering personnel, and will provide adequate space for the drill rig, support equipment, and temporary storage of the investigation-derived waste (IDW).

NWI will place secondary containment basins beneath the drill rig and support vehicles and equipment prior to commencement of drilling activities at each location. Berms will be constructed to surround the work areas to prevent run-on and run-off of precipitation from the site, in accordance with the SWPPP. NWI will install high-visibility safety fencing around drill cuttings pits that will be a minimum of 6 ft away from these berms. Rope ladders and life rings will be accessible and placed near the pits.

During drilling activities, NWI will keep the drilling site and work areas safe, neat, and in orderly condition at all times. NWI will maintain temporary fencing and barricades and will be responsible for snow removal in the immediate vicinity of the drill site.

2.1.1 Radiological Screening

LANL will screen and clear the work zone and access roads prior to mobilization and site-preparation activities. Because the drilling equipment has been screened prior to mobilization to the site where it is currently located, screening of the drilling equipment will not be required prior to mobilization of equipment and tooling to R-30. A Radiation Control Technician (RCT) from the Radiation Protection 1, TA-18 RCT pool will screen the equipment and tooling prior to demobilization from TA-49 upon completion of work. If determined to be necessary, an RCT will be on site during drilling of the upper part of the borehole.

2.1.2 Field Office and Site Services

A trailer (or equivalent shelter) will be used as a field office. Potable water will be provided to the drill site with a water truck filled at LANL fire hydrant(s) #13-719 and/or #4A-718 or through use of the water drop located near the access control office for TA-49; and transported to the drill site. Figure 2.1-1 shows the water source location for Well R-30.

2.1.3 Lay-Down Area

A primary lay-down area for all drilling contractors is provided at the northwest corner of the intersection of NM State Highway 4 and Pajarito Road (referred to as either the White Rock Lay-down Yard or the Pajarito Lay-down Yard). Figure 2.1-2 shows the main lay-down area for R-30. In addition, an alternate lay-down yard located near TA-49 Access Control may be available to provide temporary work space as shown on Figure 2.2-1.

2.2 Well Drilling

Layne Christensen Company (Layne), under contract to and direct supervision of NWI, will drill the R-30 borehole. Necessary drilling equipment will be situated near the drill site in a safe and secure manner. The orientation and placement of this equipment will depend upon the physical constraints at the drilling site. Figures 2.2-1 and 2.2-2 show the site layout and dimensions.

2.2.1 Drilling

2.2.1.1 Drilling Methods

Drilling will be conducted with methods selected to optimize the potential of completing the well without the use of any drilling additives in or immediately above the target zone of saturation. Specifically, no drilling additives other than potable municipal water will be used within 100 ft of the projected top of the regional aquifer. A combination of casing advance and open-hole drilling methods may be employed. The determination of the preferred drilling method will be based on field assessments of subsurface conditions including but not limited to: lithologic conditions, borehole stability, occurrence of perched water, and/or loss of circulation. Each interval of open hole or casing-advance will be optimized to meet well objectives depending upon site conditions.

The R-30 borehole will be advanced using a Schramm Inc. T130XD Rotadrill dual rotary drilling rig with casing rotator. The dual rotary system will allow for advancement of the casing with the casing rotator while drilling with conventional air/mist/foam methods. Steel drive casing will be used to protect the open borehole intervals and to advance the borehole when open borehole drilling is not possible.

The subcontractor intends to install two strings of steel casing to a depth between 60-100 ft bgs, before attempting to advance the borehole via open-hole methods. These casing strings will include a 24-in surface conductor casing, as well as an 18-in casing string. The borehole will be advanced via dual rotary methods from ground surface to the top of competent rock, in order to install the 24-in. surface conductor casing. The 18-in. casing will then be installed inside the 24-in. to the bottom of the 24-in casing, and the annular space between the 18-in and 24-in casing will be sealed with bentonite at the bottom, and a welded flange at ground surface. This will provide a decrease in the annular volume between the drill pipe and ID of the casing and, as a result, increase the up-hole velocity and aid cuttings returns. If possible, the borehole will then be advanced via open-hole methods using a 17-in diameter tricone bit with water and foam injection.

If additional casing strings are necessary to secure the borehole and/or allow for advancement, it is expected that the borehole will be underreamed in order to advance 12-in casing. If 12-in casing advance becomes too difficult or impossible, 10-in casing will be advanced to the projected TD of 1275 ft bgs in the Puye Formation, or to a shallower depth in the Cerros del Rio or Tschicomma lavas, if a suitable productive zone is encountered.

If required, casing may be utilized to secure the borehole through unstable zones or significant perched groundwater intervals, which may potentially occur within the R-30 borehole at depths of

approximately 881 ft bgs and 1087 ft bgs. It is intention of this subcontractor to initially attempt to stabilize these zones through the emplacement of neat cement grout, thus allowing open-hole drilling to continue without employing additional strings of casing. Alternatively, casing may be landed in bentonite in the bottom of the borehole in order to attempt to establish an impermeable seal before advancing. The emplacement of a neat cement grout seal in potential problem zones will expedite operations, preventing unnecessary delays to the rigorous well installation schedule.

The top of regional saturation is projected at approximately 1125 ft bgs in the Cerros del Rio/Tschicoma lavas. The borehole will be advanced to approximately 1025 ft bgs (near the top of the Cerros del Rio/Tschicoma lavas) via open-hole methods with water and foam injection. This depth correlates to approximately 100 ft above the projected top of the regional aquifer at 1125 ft bgs. At this depth, the use of drilling additives other than potable water will be discontinued, and the borehole will be advanced open-hole with only air and potable water injection, if possible.

2.2.1.2 Drilling Additives

Fluids and additives that may be used to facilitate drilling are consistent with those previously used in the drilling program at LANL and have been characterized geochemically. The fluids and additives previously authorized by NMED include:

1. Potable water from the municipal water supply, which may be used to aid in the delivery of other drilling additives and to cool the drill bit;
2. QUIK-FOAM™, a blend of alcohol ethoxy sulfates, which may be used as a foaming agent;
3. AQF-2™, an anionic surfactant, which may be used as a foaming agent;
4. Seadrill S-110™, a silicone emulsion, which may be used as a de-foaming agent;
5. Suppressor 3579™, a blend of white mineral oil and paraffin, which may be used as a de-foaming agent, and;
6. Devil Dog DF430™, a silicone emulsion, which may be used as a de-foaming agent.

Complete records will be maintained detailing the type, amount, and volume of drilling fluids used; the borehole depth where the drilling fluids are added; the estimated amount of drilling fluids in storage; and the estimated volume of drilling fluids recovered. No drilling fluids, except potable municipal water, will be used within 100 ft of the regional aquifer. If the regional aquifer cannot be reached without adding other drilling fluids, the situation will be discussed with LANL and NMED personnel. In addition, no other chemicals, except those listed above, will be added to the borehole without approval from LANL and NMED.

2.2.1.3 Drilling Contingencies

NWI will attempt to drill the borehole with the methods described above. However, drilling conditions may require converting to alternative drilling methods. NWI will consult with LANL before modifying the above referenced drilling methods (see Section 2.2.1.1).

Historically, borehole instability and/or the loss of drilling fluid circulation have been the most common and difficult drilling conditions encountered. If the borehole becomes unstable or if cuttings returns cannot be established, 12-in casing will be installed to the existing TD of the borehole, and advanced via dual rotary methods to the projected TD of 1275 ft bgs. In

preparation for these possibilities, additional tooling will be stored within the Los Alamos area to expedite the change in drilling procedures.

2.2.1.4 Dust Control

The drill rig may generate dust during dry drilling operations. Dust control will be implemented by applying potable water to the drill rig discharge line.

2.3 Core Sampling

Core sample collection is not planned for R-30.

2.4 Groundwater Detection

Methods for groundwater detection may include driller's observations, water-level measurements, borehole video, and borehole geophysics. If groundwater is encountered at any point, the depth to water will be checked using a water level meter through the drill string. The LANL STR will be notified within 4 hours of groundwater detection, if detection occurs during the day shift; and no later than 10:00 am the following morning, if detection occurs during the night shift. The presence of water will be verified as necessary by LANL personnel.

Depth to water measurements will be conducted in accordance with the following NWI SOPs:

- NWI ENVP-007, Water Level Measurements, Rev. 2; and,
- NWI ENVP-014, Sampling Equipment Decontamination, Rev. 1.

2.5 Sample Collection Procedures

Groundwater and cuttings sample collection and handling activities are described in the following subsections.

2.5.1 Groundwater Sample Collection

Sample collection and handling activities will be conducted in accordance with the following LANL and NWI requirements and/or SOPs.

- Filtering and Chemical Preservation of Water Samples, ENV-WQH-SOP-066;
- Field Water Quality Analyses, ENV-DO-203;
- Groundwater Sampling, SOP-5232;
- Field Decontamination of Equipment, EP-ERSS-SOP-5061;
- NWI ENVP-002, Sample Handling, Packaging and Shipping, Rev. 1;
- NWI ENVP-004, Collection of Quality Control Samples, Rev. 1;
- NWI ENVP-006, Groundwater Sampling, Rev. 3;
- NWI ENVP-014, Sampling Equipment Decontamination, Rev. 1;

- NWI ENVP-021, Chain of Custody Documentation, Rev. 4; and,
- NWI LWI-010, Filtering and Chemical Preservation of Water Samples, Rev. 0.

The Sampling and Analysis Plan (SAP) in Table 2.5-1 details the analyte suite, container types and volumes; and, preservative, if applicable, for all the groundwater samples that will be collected in the open borehole as well as in the completed well.

2.5.1.1 Perched Groundwater Sampling

Perched water is expected to be encountered at specified formational contacts. If perched zones are present, they will be sampled, if possible, and then sealed off with the emplacement of a neat cement grout plug, which will then be drilled out before continuing to the target depth.

Based on the installation of well R-27, there is the potential for perched groundwater at two depths in well R-30: at the base of the Guaje Pumice, and at the top of the Cerros del Rio basalt or Tschicomac dacite. However, neither the Cerros del Rio basalt or Tschicomac dacite were encountered during the drilling of R-29 just to the north of the R-30 location.

If significant perched water is encountered, every attempt will be made to collect a sample via bailer or air lifting methods. Perched groundwater samples will be analyzed for cations/metals (both dissolved and total); and, anions (dissolved) by Earth and Environmental Sciences Division's Geochemistry, and Geomaterials Research Laboratory (formerly known as EES-14). Additional samples will be analyzed for high explosives (HE), tritium, and volatile organic compounds (VOCs) at off-site laboratories. The groundwater samples will be placed in the appropriate containers as specified in Table 2.5-1 and delivered to the Sample Management Office (SMO).

2.5.1.2 Regional Groundwater Sampling

Regional groundwater is expected to be encountered at 1125 ft bgs in lavas or sediments.

Two samples will be collected within the regional aquifer. One sample will be collected when water is first encountered, estimated to be at 1125 ft bgs, and the other sample will be collected at TD, estimated to be at 1275 ft bgs. The groundwater at the top of the regional aquifer will not be collected until three consecutive water level measurements – recorded at 15 minute intervals – show no more than 0.5 ft variance, or as specified by an alternative method approved by LANL. A groundwater sample will then be collected, if practical, and processed. The sample at TD will not require three consecutive water level measurements.

The groundwater screening samples will be analyzed for cations/metals (dissolved and total) and anions by Earth and Environmental Sciences Division, Hydrology, Geochemistry, and Geology Group (EES-14). Additional analyses for HE, tritium, and VOCs will be completed by off-site laboratories.

A groundwater characterization sample will be collected by LANL after installation of the permanent sampling system. The sample is mandated to be collected between 10 and 60 days after well development and the completion of aquifer testing, in accordance with the Consent Order. These samples will be analyzed for the full suite of constituents, including radiochemistry, metals/cations, general inorganic chemicals, HE, VOCs, SVOCs, and stable isotopes.

Subsequent groundwater samples will be collected per the current *2009 Interim Facility-Wide Groundwater Monitoring Plan* (LANL 2009, EP2009-0143).

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2.5.1.3 Groundwater Sample Handling Procedures

Groundwater samples will be preserved in iced coolers, and delivered to the Sample Management Office (SMO) for processing. After processing, NWI personnel or available LANL personnel will transport the groundwater samples to EES-14 for analysis. EES-14 will provide rapid turn-around analyses for the screening analytes (see Table 2.5-1). The results of the analyses will be used to evaluate whether perched water zones should be isolated with casing before the regional aquifer is penetrated.

2.5.1.4 NMED Split Sampling

NMED personnel may perform a field visit to collect a split of the groundwater samples during drilling. The procedure for an NMED visit is as follows.

- The STR will notify NMED personnel when the drilling team encounters, or is expected to encounter water-bearing zones.
- Once on-site, NMED personnel will sign the visitor's log.
- Due to restrictions outlined in the SSEHASP, it is a requirement that NMED personnel collect a split of the groundwater sample outside of the exclusion zone.
- In the case of limited groundwater volume, the appropriate LANL analyte suite outlined in Table 2.5-1 will be given priority.

2.5.2 Cuttings Sampling

Samples of cuttings generated during drilling of R-30 will be collected from the drilling rig discharge line or cyclone. When cuttings returns are available, cuttings will be collected over the entire interval of the borehole, separated and homogenized in 5-ft intervals. The cuttings will be examined to determine lithologic characteristics and to prepare the borehole lithologic log. Sample collection of the borehole cuttings is outlined in Table 2.5-1. The sampling will be conducted in accordance with the following NWI SOPs:

- NWI LWI-001, Geologic Logging of Cuttings and Core, Rev. 0;
- NWI ENVP-014, Sampling Equipment Decontamination, Rev. 1; and,
- NWI LWI-011, Transportation and Admittance of Borehole Materials to the Field Support Facility, Rev. 0.

Portions of the cuttings will be sieved using >#10 and >#35 mesh sieves and placed in chip trays along with a sample of unsieved cuttings. Finer sieved sizes or bulk cuttings will be collected when >#10 mesh materials are absent. The remaining cuttings will be placed in Ziploc[®] bags (approximately 200 to 300 milliliters [mL]), labeled, and archived in core boxes. Cuttings will be screened by an RCT before being removed from the drilling site.

Zones where no cuttings are returned (e.g., zones of lost circulation) will be indicated by labeling the appropriate depths in the sample trays with "no returns." If foam or drilling mud is used during drilling, cuttings return lag time will be recorded. Up-borehole velocities will be calculated based on borehole diameter and fluid volumes used. Physical measurements of lag time may also be

made by clean circulating the borehole, drilling a 6-in. interval, and measuring the up-borehole travel time.

2.6 Down-Hole Geophysics

As conditions allow, LANL's borehole video camera, natural gamma, and induction tools will be used to view and test the open borehole prior to installing well casing in the borehole after drilling is completed. The natural gamma tool has the capability to be run in a cased borehole, and may be used to determine cased borehole characteristics, if conditions require.

If open borehole conditions exist at TD, the following geophysical logs may be conducted by LANL's subcontractor, Schlumberger, Inc., including:

- Accelerator Porosity Sonde (Neutron Porosity),
- Array Induction,
- Combined Magnetic Resonance,
- Natural and Spectral Gamma, and
- Formation Micro-Imager logs.

If borehole conditions are not stable, the following geophysical logs may be conducted by LANL's contractor, Schlumberger, Inc., in the cased-hole including:

- Accelerator Porosity Sonde (Neutron Porosity),
- Triple Lithodensity,
- Elemental Capture,
- Natural Gamma, and
- Spectral Gamma logs.

These geophysical logs will be used to characterize the hydraulic properties of saturated rocks in the regional aquifer, to select the well screen depth, number of screens, screen lengths, and other aspects of well construction. The suite and timing of geophysical logging will depend on borehole conditions. Alternatively, they may be used to define geologic and hydrogeologic properties of the borehole, and to determine zones of potential and observed perched water.

An NWI field staff member will be present during logging operations to oversee logging runs and calibration checks. NWI will notify the STR at the start and end of geophysical logging operations, and will provide to the STR three hard copies and one electronic copy of unprocessed geophysical logs. Oversight of geophysical logging will be performed in accordance with NWI LWI-004, Contract Geophysical Logging, Rev. 0.

2.7 Well Installation and Completion

Based on the potentiometric surface in LANL's 3-D regional geo-hydrologic model, the top of regional saturation at R-30 is approximately 1125 ft bgs. Well R-30 is tentatively designed with one 20-ft-long screen, from 1135 – 1155 ft bgs, within the regional zone of saturation, as shown on Figure 2.7-1. Actual screen lengths and intervals will be determined based on data acquired during drilling, video logging, and geophysical logging. It is anticipated that the screened interval will be near the top of the zone of saturation, with a fully submerged sand pack, to target a highly-productive zone and allow for placement of the sampling system.

Final well design will be based on discussions between NWI, LANL, DOE, and NMED personnel.

2.7.1 Well Construction

The well casing and screen will be provided by LANL. The casing and screen will be factory-cleaned before shipment and delivery to LANL. Additional decontamination of the stainless steel components will be performed on-site prior to well construction using high pressure heated water, if necessary. Water used during decontamination will be managed in accordance with the waste characterization strategy form (WCSF) in Table 2.8-1.

The well will be constructed of 5.0-in. inner diameter (ID)/5.563-in. outer diameter (OD) type A304 welded stainless steel casing fabricated to American Society for Testing and Materials (ASTM) standard A312, "Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes." A slag apron or "witch's hat" will be placed around the casing being welded to prevent slag and welding debris from entering the borehole or well casing. Stainless steel casing will be placed below the screen to provide a 20-ft sump (to be determined by LANL). Stainless steel centralizers will be placed immediately above and below the screen(s). The well casing string will be suspended in the borehole during backfill and will not be allowed to rest on the bottom of the borehole at any time.

One screened interval will be installed in R-30 unless otherwise directed by the STR, and will be placed and constructed based on site-specific information and as determined during discussions between NWI, LANL, and NMED personnel. The screened interval of R-30 is planned to consist of one 20-ft length of 5.563-in OD compatible, 0.020-in rod-based wire-wrapped well screen, giving the well screen an effective screen length of 20 ft.

Steel tremie pipe (2-in ID) will be used during well construction to place annular fill materials down-hole. The bottom of the borehole will be tagged prior to well installation and sand will be placed in the bottom of the borehole to the base of the sump. Bentonite chips will then be placed around the sump, to within 5 ft of the bottom of the screen. Potable water will be used to transport backfill materials down-hole.

The primary filter pack will consist of 10/20 grade sand and will be placed on top of the bentonite seal to approximately 5 ft above the top of the screen. The actual primary filter pack interval will be based on site-specific conditions. After placement, the screened interval will be swabbed to promote settling and compaction of the primary filter pack. A 2-ft-thick transition zone of 20/40 grade sand will be placed above the primary filter pack.

Bentonite chips will be placed on top of the fine sand collar to approximately 60 ft bgs. The bentonite seal will be allowed to hydrate for at least 4 hours prior to emplacement of the surface seal. Type I Portland cement, with a mixture ratio of 5.2 gallons potable water per bag, or other LANL-approved mix, will be used to fill the borehole annulus from the top of the bentonite seal to approximately 3 ft bgs. The depth to annular backfill materials will be tagged after each pour to

determine that the materials are settling properly. Down-hole video and natural gamma logs may be performed by LANL personnel to confirm well construction (see section 2.6).

2.7.2 Well Development

The primary objective of well development is to remove suspended sediment from the water until turbidity is <5 nephelometric turbidity units (NTU) for three consecutive samples. The well will be developed to ensure that drilling fluids have been recovered and that water quality parameters are within the specified limits and stable.

The well may be developed by both mechanical and chemical methods. Mechanical methods, the primary method of well development, include swabbing, bailing, air-lifting, jetting and pumping. Chemical methods will only be employed in cases where mechanical methods have proven ineffective in removing residual drilling fluids. Development by chemical means may include detergents (i.e., sodium acid pyrophosphate [SAPP] or AQUA-CLEAR PFD™) to remove natural and added clays; and/or, chlorine to kill any bacteria introduced during well completion. Chemical methods will only be used if approved, in writing, by the STR.

A suitable winch line rig, pulling unit, or work over rig will be used for well development. Development of the well will begin by bailing and swabbing the screened interval and sump to remove drilling fluids, formation sands and fines that have been introduced into the well during drilling and installation. Bailing will be conducted using a suitable stainless steel bailer. Bailing will continue until water clarity visibly improves. The screened interval(s) will be swabbed using a surge block to enhance filter pack development. The surge block will consist of an appropriately-sized rubber disk attached to a winch line or pipe. The swabbing tool will be lowered into the well and drawn repeatedly above, below, and within the screened interval(s) for approximately 1 hour. Water turbidity will not be measured during the bailing and swabbing process. Water produced during swabbing and bailing operations will be discharged to the cuttings pit.

Upon completion of swabbing and bailing development methods, development of the well will continue by pumping the well at an appropriate rate, dependant on well and aquifer characteristics. A 4-in.-diameter Grundfos™ submersible pump (or equivalent) with an appropriately sized pump motor will be used for the final stage of well development. The pump intake will be set at multiple depths across the screened interval(s) and in the sump to remove as much suspended sediment as possible from the well, filter pack, and formation immediately surrounding the borehole. Water produced during pumping will be captured and stored in suitable tanks. Development water will be containerized and managed as described in section 2.8, Investigation-Derived Waste. Well development through pumping will continue until the specified water quality parameters are met (turbidity <5 NTU for three consecutive readings, all other parameters stable). If the turbidity standard is not attainable, an alternate standard of stabilization of pH, temperature, and specific conductivity readings combined with TOC levels less than 2.0 ppm must be achieved before the termination of development activities.

The water quality parameters that will be monitored during the pumping stage of well development include:

- pH,
- Specific conductance,
- Temperature,
- Turbidity, and,
- total organic carbon (TOC).

During pumping, water samples will be collected daily in 40-mL septum vials and 250-mL high-density polyethylene bottles and transferred to EES-14 for TOC and anion analyses. Samples will be submitted unfiltered and without acid preservatives. All parameters will be measured in a flow through cell, when possible.

2.7.3 Aquifer Testing

If the decision is made to test aquifer properties within installed screened interval(s), NWI shall collect and record aquifer test data consistent with requirements in the NWI-developed and LANL-approved procedures technically equivalent to Pumping Tests, EP-ERSS-SOP-5039. These tests will be conducted by LANL subcontractor David Schafer and Associates. A NWI field staff member will be present during aquifer testing to oversee and record field activity, and to assist David Schafer and Associates.

LANL will provide the stainless steel pipe for the pump install for the aquifer test. Prior to conducting the aquifer test of the screened zone, NWI will collect both water level and local barometric data over a period of 2 days. Barometric data from LANL meteorology towers will be used as the source of barometric measurements. An additional day will be allowed to optimize pumping rates, collect additional early test data, and to fill the discharge pipe. A suitable pump and discharge pipe will be installed in the well and the discharge pipe will have check valves installed. Inflatable packers will be used to isolate the screened zone and to reduce casing storage effects. Non-vented transducers will be used during aquifer testing. The pumping phase of the aquifer test will run for 24 hours, followed by 24 hours of collection of water level recovery data. Characterization samples, if required, will be collected by LANL staff at the end of each day. Water quality parameters will be measured in a flow-through cell, and TOC levels will be verified at the end of the aquifer test.

2.7.4 Sampling System Installation

Upon completion of well development and aquifer testing activities, a dedicated sampling system including pump, discharge pipe, additional plumbing, wiring, control panel, etc. will be installed in the well. The dedicated sampling system will meet the specifications mandated in MTOA Section 4.8, and a design schematic of the sampling system will be submitted to LANL for approval prior to ordering the system. The dedicated sampling system technical specifications and installation procedures are described below.

The pump system is planned as a single screen completion with a submersible pump. A stainless steel check valve will be installed to protect against backflow. Any materials that will contact groundwater samples will be constructed of stainless steel or Teflon, although brass check valves may be used in the discharge pipe above the static water level. A 1-in. ID,

passivated stainless steel pipe will be used as the discharge pipe and a weep valve will be installed approximately 20 ft bgs to prevent freezing of water within the discharge pipe. Two 1-in ID strings of polyvinyl chloride (PVC) pipe will be installed above the top of the pump, but below the anticipated minimum water level. One pipe will be used for the installation of a dedicated transducer, an In-Situ LevelTroll™, and the other will be used for checking the water level manually with a water level tape. The bottom 1.5 ft of the PVC pipe will be slotted and a closed end-cap will be installed. In addition, a weather-resistant pump control box will be installed adjacent to the wellhead.

2.7.5 Surface Completion

Surface completion shall be performed consistent with NWI-developed and LANL-approved procedures technically equivalent to SOP-5032 no later than 30 days after the completion of well development.

The monitoring well surface completion for R-30 will include a 16-in I.D. (16.75-in OD) steel casing to protect the stainless steel monitoring well and associated sampling equipment/cabling. The protective casing will be installed to a minimum depth of 3 ft bgs, and the top of the protective casing will be set at 3 ft ags. A 0.5-in diameter weep hole will be drilled in the base of the protective casing to prevent accumulation of water inside. The top of the protective casing will be fitted with a tamper-proof well cover plate and will be set in a 10-ft x 10-ft x 6-in-thick reinforced concrete pad (2,500 psi, minimum). The surface pad will be sloped so that meteorologic waters will drain away from the protective casing. Four bright yellow removable safety bollards will be set in the pad around the wellhead. The bollards will serve as traffic barriers but will allow access during well sampling or maintenance. A brass survey marker will then be placed in the northwest corner of the pad, approximately 1 ft from the edges of the pad. Figure 2.7-2 shows the projected well head and surface completion details.

A New Mexico licensed Professional Land Surveyor will survey the horizontal location and elevation of the permanent brass marker, the top of the well casing, the top of the protective outer casing, and the ground surface of the completed well. Data provided by the surveyor will be in North American Datum of 1983 State Plane Coordinate, and elevation in relation to mean sea level (National Geodetic Vertical Datum of 1929). The accuracy of the survey data will be 0.1 ft for horizontal position and to the nearest 0.01 ft for vertical elevations. Survey data will be on file with NWI and provided in the well fact sheet and the well completion report.

2.8 Investigation-Derived Waste

Ordering of sample paperwork from the SMO will be coordinated with the LANL waste generator. Investigation-derived waste (IDW) will be managed in accordance with SOP EP-SOP-5328, "Characterization and Management of Environmental Program Waste" (<http://www.lanl.gov/environment/all/qa/adeq.shtml>). This SOP incorporates the requirements of applicable USEPA and NMED regulations, DOE orders, and Laboratory requirements. The primary waste streams include drill cuttings, drilling water, development water, purge water, decontamination water, and contact waste.

Drill cuttings will be managed in accordance with the WCSF and the NMED-approved "NOI Decision Tree for Land Application of IDW Solids from Construction of Wells and Boreholes" (NMED 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" (NMED 2006). Initially, drill cuttings and drilling water will be stored in lined pits. The contents of the pits will be characterized with direct sampling following completion of drilling activities, and waste determinations will be made from validated data in accordance with the

WCSF included in Table 2.8-1. If validated analytical data show these wastes cannot be land-applied, they will be removed from the cuttings pit, containerized, and placed in accumulation areas appropriate to 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 days 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 and then properly disposed in accordance with the WCSF (see Table 2.8-1).

2.9 Site Restoration

Upon completion well construction activities and final demobilization, the contractor will perform the site restoration activities including grading and revegetation per the contractor's Engineering Design Standards on seeding and site stabilization and the site-specific approved SWPPP.

3.0 REFERENCES

29 CFR 1910.120, 2002, Title 29, "Labor," Part 1910, "Occupational Safety and Health Administration," Subpart H, "Hazardous Materials," Section 1910.120, "Hazardous Waste Operations and Emergency Response," *Code of Federal Regulations*, Office of the Federal Register.

LANL, 2007, *2007 Interim Facility-Wide Groundwater Monitoring Plan*, LA-UR-07-3271, EP2007-0277, Los Alamos National Laboratory, May 2007.

LANL, 2009. "Exhibit D, Scope of Work and Technical Specifications, Drilling and Installation of Well R-51, R-52, and R-29 at LANL," Task Order 3 # 72006-003-09 in accordance with the Master Task Order Agreement, Los Alamos National Laboratory, Los Alamos, New Mexico (release date 9/10/09).

LANL, 2009, Security Plan

NMED, 2006, "NOI Decision Tree for Drilling, Development, Rehabilitation, and Sampling Purge Water," New Mexico Environment Department, November 2006.

NMED, 2007, "NOI Decision Tree for Land Application of IDW Solids from Construction of Wells and Boreholes," New Mexico Environment Department, November 2007.

North Wind, 2009, "Environmental Programs-Wide Environmental Health and Safety Plan for Projects at Los Alamos National Laboratory, Revision 3," North Wind, Inc., January 2009.

North Wind, Inc., 2009. "Environmental Programs-Wide Standard Operating Procedures for Los Alamos National Laboratory, Revision 0," January, 2009.

North Wind, 2009, "Environmental Programs-Wide Quality Assurance Plan for Projects at Los Alamos National Laboratory, Revision 0," North Wind, Inc., January 2009.

North Wind, 2009, "Site-Specific Environmental Health and Safety Plan Drilling and Installation of Wells R-29, R-51, and R-52," NWI-10005-003, In support of Task Order 3 In accordance with Master Task Order Agreement # 72006-000-09, North Wind, Inc., November 2009.

NWI ENVP-002, Sample Handling, Packaging and Shipping, Rev. 1, North Wind, Inc.

NWI ENVP-004, Collection of Quality Control Samples, Rev. 1, North Wind, Inc.

NWI ENVP-005, Design, Installation, and Development of Monitoring Wells, Rev. 2, North Wind, Inc.

NWI ENVP-006, Groundwater Sampling, Rev. 3, North Wind, Inc.

NWI ENVP-007, Water Level Measurements, Rev. 2, North Wind, Inc.

NWI ENVP-014, Sampling Equipment Decontamination, Rev. 1, North Wind, Inc.

NWI ENVP-021, Chain of Custody Documentation, Rev. 4, North Wind, Inc.

NWI LWI-001, Geologic Logging of Cuttings and Core, Rev. 0, North Wind, Inc.

NWI LWI-004, Contract Geophysical Logging, Rev. 0, North Wind, Inc.

NWI LWI-010, Filtering and Chemical Preservation of Water Samples, Rev. 0, North Wind, Inc.

NWI LWI-011, Transportation and Admittance of Borehole Materials to the Field Support Facility, Rev. 0, North Wind, Inc.

SOP EP-SOP-5238, "Characterization and Management of Environmental Program Waste"
(<http://www.lanl.gov/environment/all/qa/adeq.shtml>).

**Table 1.1-1
NWI Project Staff and Roles**

Clear and unambiguous lines of authority and responsibility for safety matters are established and maintained at all organizational levels.

Role	Name	Description
Project Manager (PM)	Doug Jorgensen, PMP	Responsible for ensuring all project activities are performed safely and within applicable requirements.
Field Manager (FM)	Heather Smith, PG Brennon Orr Eric Whitmore	Primary communicator between the NWI integrated team and LANL STR. Responsible for the protection of employees, the public, and the environment. In addition, the FM shall be responsible for following: 1) oversee the day-to-day drilling and drilling-related operations; 2) manage the project field drilling operations, execute the work plan and schedule, enforce safety procedures and site controls, and document drilling field activities; and, 3) ensure that all personnel under their supervision clearly understand their authority, responsibility, and are accountable with Conduct of Operations requirements.
Lead Geologist (LG)	Dan Osbourne Greg Kinsman Tom Klepfer Diane Oshlo Mike Whitson Andrew Feltman Stephen Thomas	Provides oversight for drilling activities, monitoring well installation, and general site management/oversight services including monitoring field conditions. In addition, the LG will be responsible for geologic logging and sample collection, waste management, daily field progress reporting, and interacting with the LANL STR.
Environmental Health & Safety Representative (HSR)	Jason Barkell Or approved alternate	The HSR, as part of the field team, shall be dedicated on-site. Personnel shall work closely with CONTRACTOR management personnel to implement and administer SUBCONTRACTOR'S approved SSEHASP.
Health and Safety Director (HSD)	Bruce Miller	Corporate HSD responsible for NWI HSPs and SSHASP approvals
Environmental Professional	Melanie Lamb	The Environmental Professional will implement and administer SUBCONTRACTOR'S required environmental deliverables and CONTRACTOR'S environmental requirements.
Geologist/Sample Technician	Bill Larzelere Kyle Morgan Desiree Staires Randall Boyle Liz Mockabee Donny Jaramillo	The geologist/sample technician, as part of the field team, will perform general field activities including sampling, logging, documentation, drilling oversight, and waste management per the LG and the WMC.
Waste Management (WM) Coordinator	Kim Oman	The WM Coordinator shall: 1) be responsible for the segregation, characterization, packaging and management of all waste forms generated by the project; 2) provide real-time support to the field team; and, 3)

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Role	Name	Description
		prepare packages for shipment, as necessary.
Waste Management (WM) Technician	Angela Trujillo	Assists the LG and field team with supervision and implementation of waste management requirements and shall be directed in their work by the WM Coordinator.
Quality Assurance (QA) Specialist	Kitty Gandee Melanie Lamb	Assists the LG and field team with supervision and implementation of quality assurance requirements.

**Table 1.1-2
LANL Project Staff and Roles**

Role	Name	Description
Procurement Specialist	Terry Forrester	The Procurement Specialist is the authority that directs commercial or technical changes to any subcontract.
STR	Robin Reynolds (lead) Marvin Gard Dave Anderson Jim Thompson	The STR is the LANS employee with technical and performance oversight of the subcontractor's scope of work including, but not limited to, engineering, procurement, safety, quality, schedule, and coordinated execution of the work that is carried out by the subcontractor. The STR has no authority to direct commercial or technical changes to any subcontract.
Technical Lead	Mark Everett	Technical expert on-site
Environmental Health and Safety point of contact (POC)	Dave Dixon Oliver Wilton	LANS environmental safety oversight
Shift Operations Managers	Steve Pearson Greg Helland	Logistics oversight
Access Control Personnel (or F.O.D.) for TA-49	Brad Lounsbury	Badge Control access for the main gate or TA-49.
Waste Generator	Bennie Martinez	The waste generator is the LANS employee whose act or process produces hazardous waste or whose act first causes a hazardous waste to become subject to regulation.
Waste Management (WM) Coordinator	Dave Mikkelson	The LANS WM Coordinator shall provide support as follows: 1) responsible for the segregation, characterization, packaging and management of all waste forms generated by the project; 2) provide real-time support to the field team; and, 3) prepare packages for shipment, as necessary.

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**Table 1.1-3
 Drilling
 Schedule**

North Wind		Los Alamos National Laboratory - Drilling Services Task Order 4 - Regional Monitoring Well R-30														
Act ID	Description	Orig Dur	Rem Dur	Early Start	Early Finish	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1000	Contractor Preparation of Plans	7d	7d	22FEB10	02MAR10	Contractor Preparation of Plan										
1001	Review and Acceptance of Plans	3d	3d	03MAR10	05MAR10	Review and Acceptance of Plans										
1002	Long Lead Procurement	10d	10d	22FEB10	05MAR10	Long Lead Procurement										
1003	MOV Meeting	1d	1d	08MAR10	08MAR10	MOV Meeting										
1004	Equipment Inspections	1d	1d	08MAR10	08MAR10	Equipment Inspections										
1005	Notice to Deploy	1d	1d	09MAR10	09MAR10	Notice to Deploy										
2000	ARCA Rig move to R-30	1d	1d	09MAR10	09MAR10	ARCA Rig move to R-30										
2001	Setup at R-30	2d	2d	10MAR10	11MAR10	Setup at R-30										
3000	R-30 Casing Advance and Drilling	20d	20d	12MAR10	08APR10	R-30 Casing Advance and Drilling										
4000	R-30 Logging/Monitoring Well Installation	14d	14d	09APR10	26APR10	R-30 Logging/Monitoring Well Installation										
5000	Well Development (WO Rig)	8d	8d	29APR10	10MAY10	Well Development (WO Rig)										
6000	R-30 Aquifer Testing	8d	8d	11MAY10	20MAY10	R-30 Aquifer Testing										
7000	R-30 Surface Completion	8d	8d	21MAY10	01JUN10	R-30 Surface Completion										
8000	Installation of Sampling Systems	5d	5d	02JUN10	08JUN10	Installation of Sampling Systems										
9000	Waste Management Complete	0	0	27SEP10	24SEP10	Waste Management Complete										
9010	IDW Management	141d	141d	12MAR10	24SEP10	IDW Management										
9020	Site Maintenance	64d	64d	12MAR10	09JUN10	Site Maintenance										
9030	Develop and Submit R-30 Well Fact Sheet	20d	20d	29APR10	26MAY10	Develop and Submit R-30 Well Fact Sheet										
9040	Draft R-30 Well Completion Report	60d	60d	29APR10	21JUL10	Draft R-30 Well Completion Report										
9050	Submit Final Well Completion Report	30d	30d	22JUL10	01SEP10	Submit Final Well Completion Report										

Start date	22FEB10	<p align="center">NORTH WIND INC. DRILLING SCHEDULE</p>	Early bar
Finish date	24SEP10		Progress bar
Data date	22FEB10		Critical bar
Run date	27FEB10		Summary bar
Page number	1A		Start milestone point
© Primavera Systems, Inc.			Finish milestone point

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**Table 2.5-1
Sampling and Analysis Plan for R-30**

Sample Type	Analysis	Lab	Method	Container	Preservative	Interval
Drill cuttings	Lithologic	N/A	Grab	chip tray #10 & #35 sieve and whole rock 200 ml to 300 ml plastic bags where sufficient	N/A	Every 5 ft
Perched zone water	Metals/cations (dissolved & total)	EES-14	grab/airlift	1-liter poly	4°C	Any perched aquifer
	Anions (dissolved)	EES-14	grab/airlift	1-liter poly	4°C	Any perched aquifer
	High explosives	GEL	grab/airlift	3 1-liter amber	4°C	Any perched aquifer
	VOCs	GEL	grab/airlift	2 40ml VOAs	HCl/4°C	Any perched aquifer
	Tritium	U of M	grab/airlift	500 ml poly	N/A	Any perched aquifer
Regional aquifer zone water	Metals/cations (dissolved & total)	EES-14	grab/airlift	1-liter poly	4°C	First water and total depth
	Anions (dissolved)	EES-14	grab/airlift	1-liter poly	4°C	First water and total depth
	High explosives	GEL	grab/airlift	3 1-liter amber	4°C	First water and total depth
	VOCs	GEL	grab/airlift	2 40ml VOAs	HCl/4°C	First water and total depth
	Tritium	U of M	grab/airlift	500 ml poly	4°C	First water and total depth

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**Table 2.5-1
(continued)**

Sample Type	Analysis	Lab	Method	Container	Preservative	Interval
Well development screening water (confirmation sample everyday)	pH	Field	Grab	N/A	N/A*	At the screen interval
	Specific conductance	Field	Grab	N/A	N/A	At the screen interval
	Temperature	Field	Grab	N/A	N/A	At the screen interval
	Turbidity	Field	Grab	N/A	N/A	At the screen interval
	TOC	EES-14	Grab	2 40ml VOAs	N/A	At the screen interval
Final well development water	Metals/anions	EES-14	Grab	1 liter poly	4°C	At the screen interval
	TOC	EES-14	Grab	2 40ml VOAs	HCl/4°C	At the screen interval
Final aquifer test	Metals/anions	EES-14	Grab	1 liter poly	4°C	At the screen interval
	TOC	GEL	Grab	2 40ml VOAs	HCl/4°C	At the screen interval
EES-14 = Earth and Environmental Sciences Division's Geochemistry, and Geomaterials Research Laboratory (formerly known as EES-14) GEL = General Engineering Laboratory U of M = University of Miami TOC = total organic carbon VOA = volatile organic analysis VOC = volatile organic compound SVOC = semivolatile organic compound						

Notes: RAD swipes will be collected on all equipment downhole and parked on-site. Equipment will also be screened upon entering and exiting the site.

Rinsate samples will be collected on tanks not certified as clean.

* N/A = Not applicable.

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Table 2.8-1 Waste Characterization for Well R-30

Waste Description	Waste # 1 Contact Waste	Waste #2 Drill cuttings	Waste #3 Drilling Fluids	Waste #4 Development Water	Waste #5- Decontamination Fluids
Volume	30 cy	80 cy/well	50,000 gal/well	40,000 - 60,000 gal/well	500 gal/well
Packaging	Drums or roll-off bins	Lined pit or approved containers	Lined pit or approved containers	Approved Containers	Approved Containers
Regulatory Classification					
Radioactive (rad)	X	X	X	X	X
Solid	X	X	X	X	X
Hazardous	X	X	X	X	X
Mixed (hazardous and rad)	X	X	X	X	X
Toxic Substances Control Act	—	—	—	—	—
New Mexico Special Waste	—	—	—	—	—
Industrial	X	X	X	X	—
Sanitary Wastewater	—	—	—	—	X
Characterization Method					
Acceptable knowledge (AK): Existing Data/Documentation	X	—	—	—	X
AK: Site Characterization	—	—	—	—	—
Direct Sampling of Containerized Waste	—	X	X	—	X
Analytical Testing					
Volatile Organic Compounds (EPA 8260-B)	—	X	X	X	X
Semi volatile Organic Compounds (EPA 8270-C)	—	X	X	X	X
Organic Pesticides (EPA 8081-A)	—	X	X	X	X
Organic Herbicides (EPA 8151-A)	—	X	X	X	X
PCBs (EPA 8082)	—	X	X	X	—
Total Metals (EPA 6010-B/7471-A)	—	X	X1	X1	X
Total Cyanide (EPA 9012-A)	—	X	X2	X2	X
General (NO3+NO2, F, Cl, SO4, TDS, pH, microtox/COD/TSS)	—	X (nitrates if land applied)	X	X	X3
Perchlorates	—	X	X	X	X
High Explosives Constituents (EPA 8330/8321-A)	—	—	X	X	—
Asbestos	—	—	—	—	—
BTEX (EPA-8021b)	—	—	—	—	—
Tot. pet. hydrocarbon (TPH)-GRO (EPA 8015-M) TPH-DRO (EPA-8015-M)	—	—	—	—	—
Toxicity characteristic leaching procedure (TCLP) Metals (EPA 1311/6010-B)	—	X	—	—	—
TCLP Organics (EPA 1311/8260-B & 1311/8270-C)	—	—	—	—	—
TCLP Pest. & Herb. (EPA 1311/8081-A/1311/8151-A)	—	—	—	—	—
Radium 226 & 228 (EPA 9320)	—	X	X	X	—
Gross Alpha (alpha counting) (EPA 900)	—	X	X	X	X
Gross Beta (beta counting) (EPA 900)	—	X	X	X	X
Tritium (liquid scintillation) (EPA 906.0)	—	X	X	X	X
Gamma spectroscopy (EPA 901.1)	—	—	X	X	X
Isotopic plutonium (chem. separation/alpha spec.) (HASL-300)	—	X	X	X	X
Isotopic uranium (chem. separation/alpha spec.) (HASL-300)	—	X	X	X	X
Total uranium (6020 inductively coupled plasma mass spectroscopy [ICPMS])	—	—	—	—	—
Strontium-90 (EPA 905)	—	X	X	X	—
Americium-241 (Separation/alpha spec.) (HASL-300)	—	X	X	X	—

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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TABLE 2.8-1 (CONTINUED)

Waste Description	Waste #6 Municipal Solid Waste	Waste #7 PCS	Waste #8 Concrete Chips and Concrete Slurry
Volume	2 cy/well	<1 cy/well	60 cy
Packaging	Approved Containers	Approved containers	Approved Containers
Regulatory classification			
Radioactive	—	X	X
Solid	X	—	X
Hazardous	—	—	X
Mixed (hazardous and radioactive)	—	—	—
Toxic Substances Control Act (TSCA)	—	—	—
New Mexico Special Waste	—	X	—
Industrial	—	X	X
Characterization Method			
Acceptable knowledge (AK): Existing Data/Documentation	—	X	X
AK: Site Characterization	X	X (rad only)	X
Direct Sampling of Containerized Waste	—	X	X (as needed)
Analytical Testing			
Volatile Organic Compounds (EPA 8260-B)	—	X	—
Semivolatile Organic Compounds (EPA 8270-C)	—	X	—
Organic Pesticides (EPA 8081-A)	—	—	—
Organic Herbicides (EPA 8151-A)	—	—	—
PCBs (EPA 8082)	—	X	—
Total Metals (EPA 6010-B/7471-A)	—	—	X (if required by ENV-RCRA)
Total Cyanide (EPA 9012-A)	—	X	—
General (NO ₃ +NO ₂ , F, Cl, SO ₄ , TDS, pH, microtox/COD/TSS)	—	—	—
Perchlorates	—	—	—
High Explosives Constituents (EPA 8330/8321-A)	—	—	—
Asbestos	—	—	—
BTEX (EPA-8021b)	—	—	—
Total petroleum hydrocarbon (TPH)-GRO (EPA 8015-M) TPH-DRO (EPA 8015-M)	—	X	—
TCLP Metals (EPA 1311/6010-B)	—	X	—
TCLP Organics (EPA 1311/8260-B & 1311/8270-C)	—	X	—
TCLP Pest. & Herb. (EPA 1311/8081-A/1311/8151-A)	—	X	—
Radium 226 & 228 (EPA 9320)	—	—	—
Gross Alpha (alpha counting) (EPA 900)	—	X	—
Gross Beta (beta counting) (EPA 900)	—	X	—
Tritium (liquid scintillation) (EPA 906.0)	—	X	—
Gamma spectroscopy (EPA 901.1)	—	X	—
Isotopic plutonium (hem.. Separation/alpha spec.) (HASL-300)	—	X	—
Isotopic uranium (hem.. Separation/alpha spec.) (HASL-300)	—	X	—
Total uranium (6020 inductively coupled plasma mass spectroscopy [ICPMS])	—	—	—
Strontium-90 (EPA 905)	—	X	—
Americium-241 (hem.. Separation/alpha spec.) (HASL-300)	—	X	—

1-FILTERED METALS REQUIRED FOR LAND APPLICATION (EXCEPT HG)

2-FILTERED CYANIDE FOR LAND APPLICATION

3-ANALYZE FOR MICROTOX//COD/TSS/TDS/Oil and Grease and pH for SWWWS Plant; include TOC , Total Nitrogen, and Total Nitrates for RLWTF.

NOTE: Multiple sampling may be required to ensure WAC requirements are met.

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

<https://intranet.nwindenv.com/>

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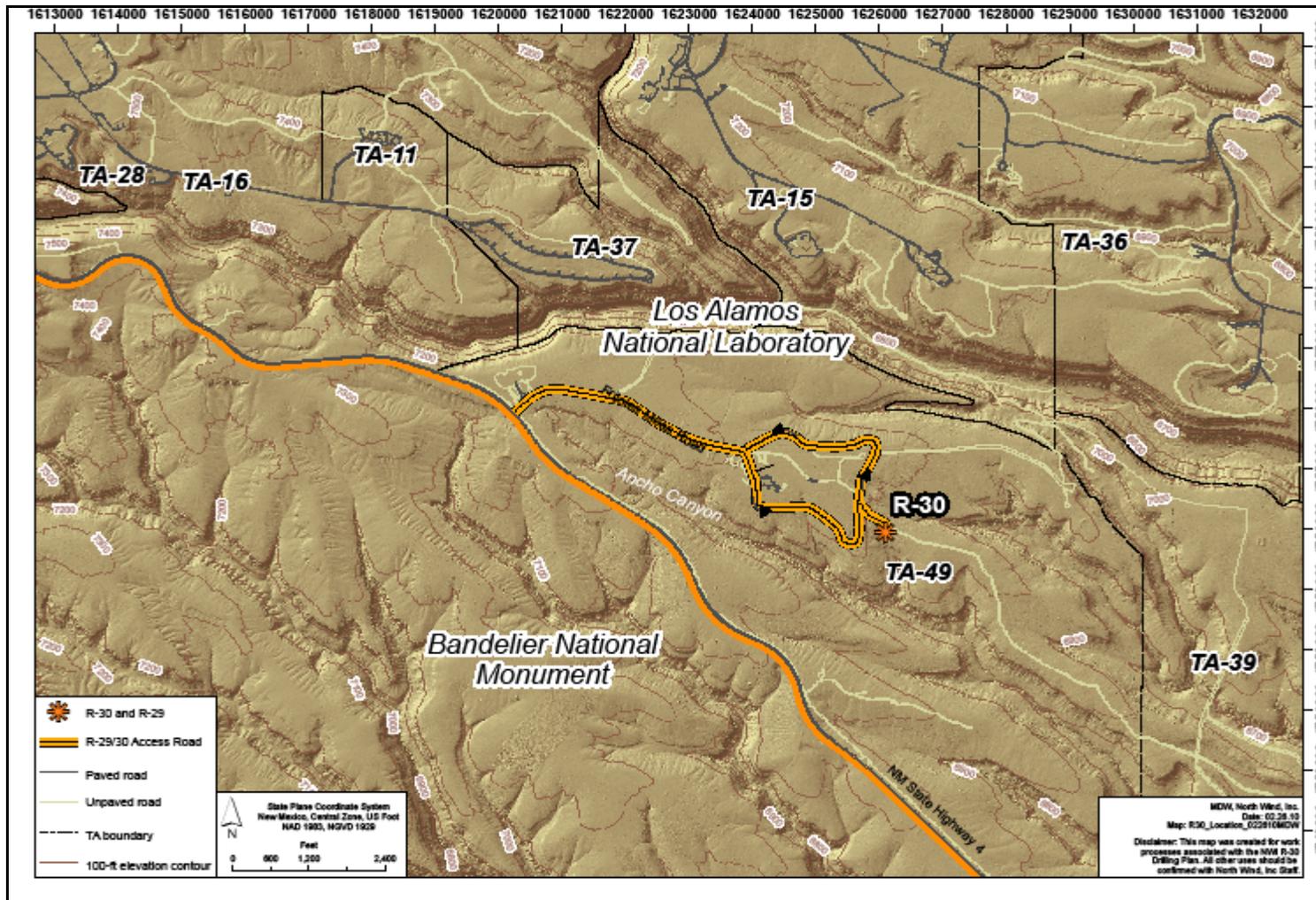


Figure 1.0-1 - Location of Well R-30 at TA-49

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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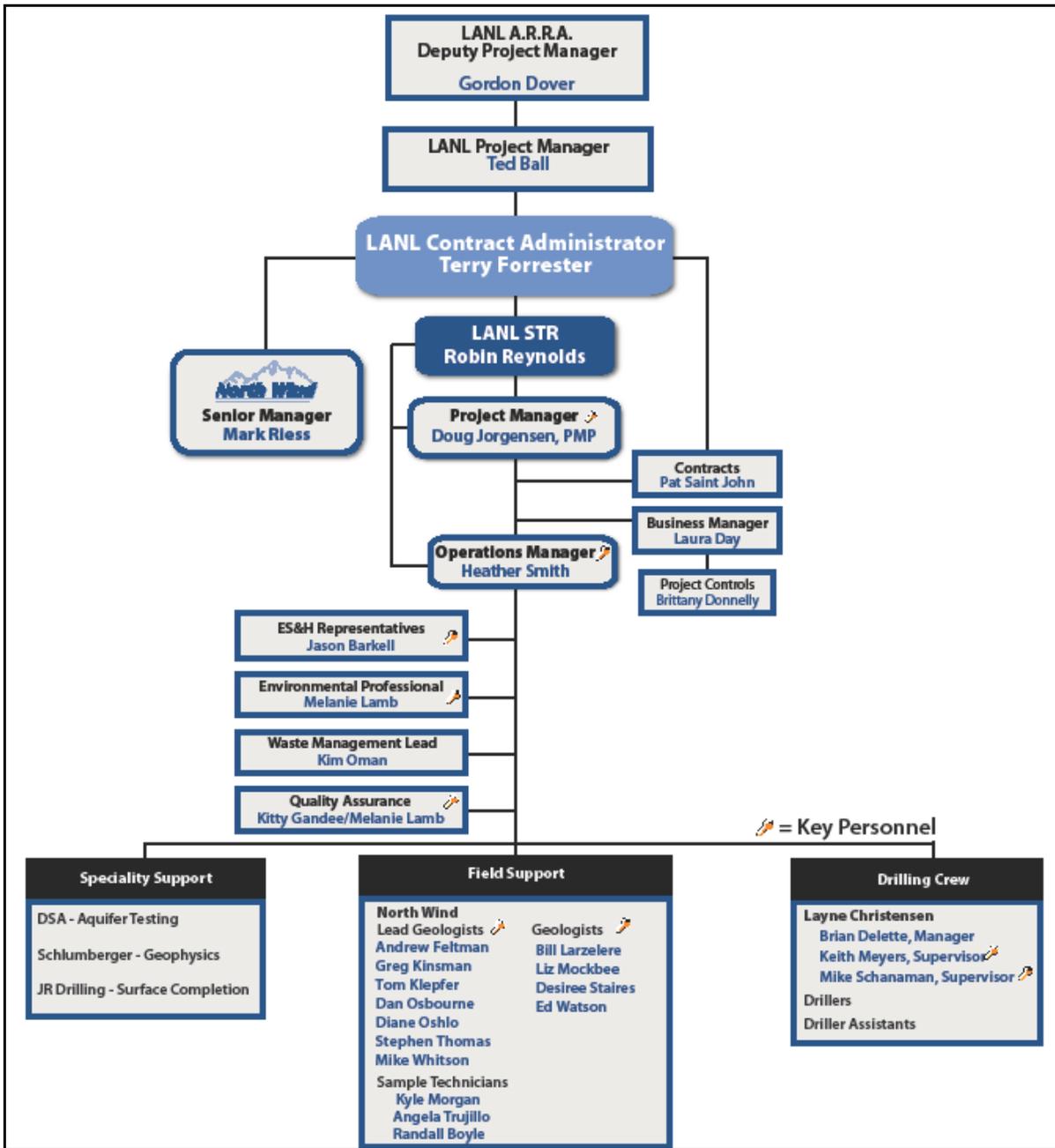


Figure 1.1-1 Project field organization chart

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

<https://intranet.nwindenv.com/>

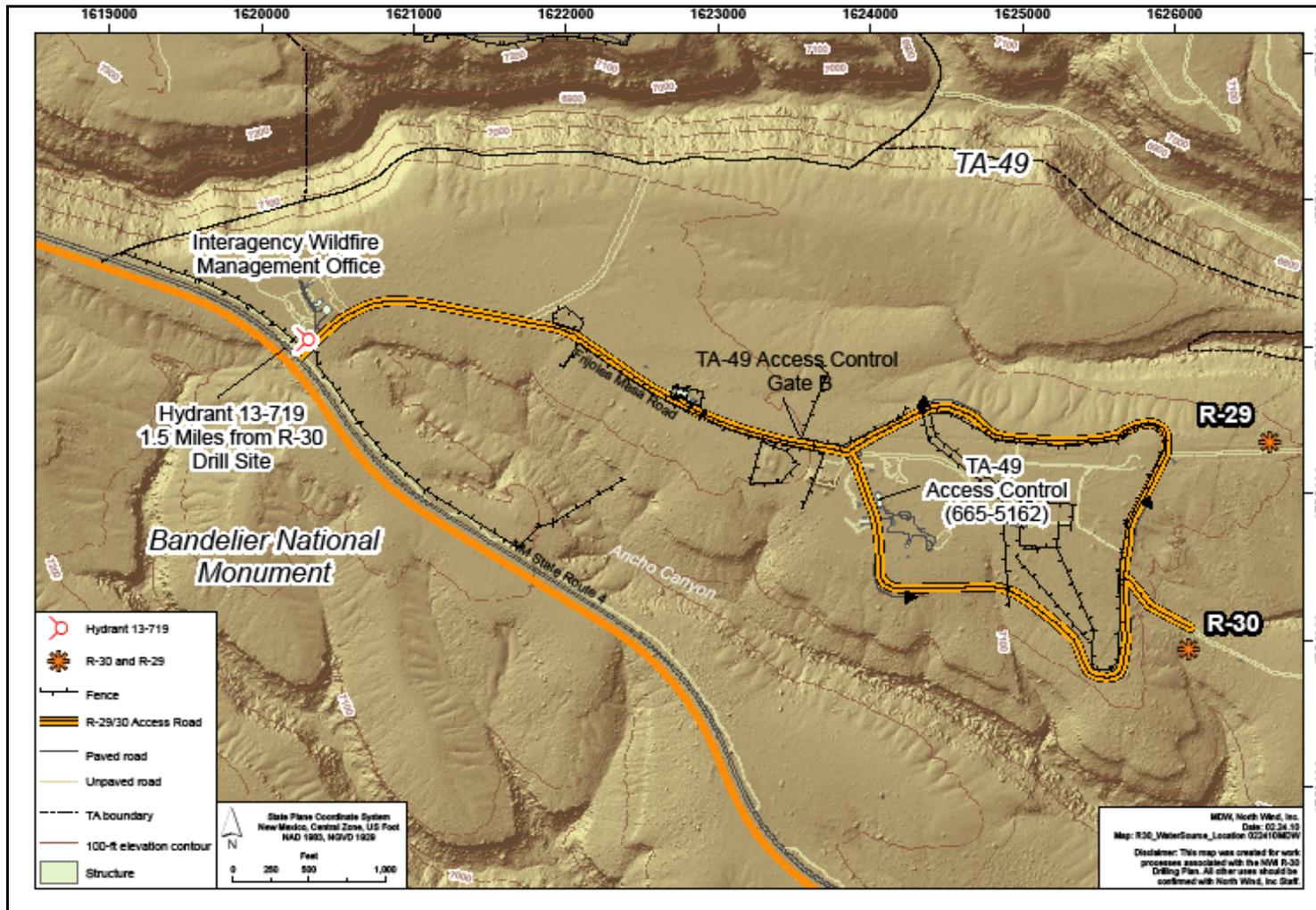


Figure 2.1-1 Water Source Location for the R-30 Drill Site

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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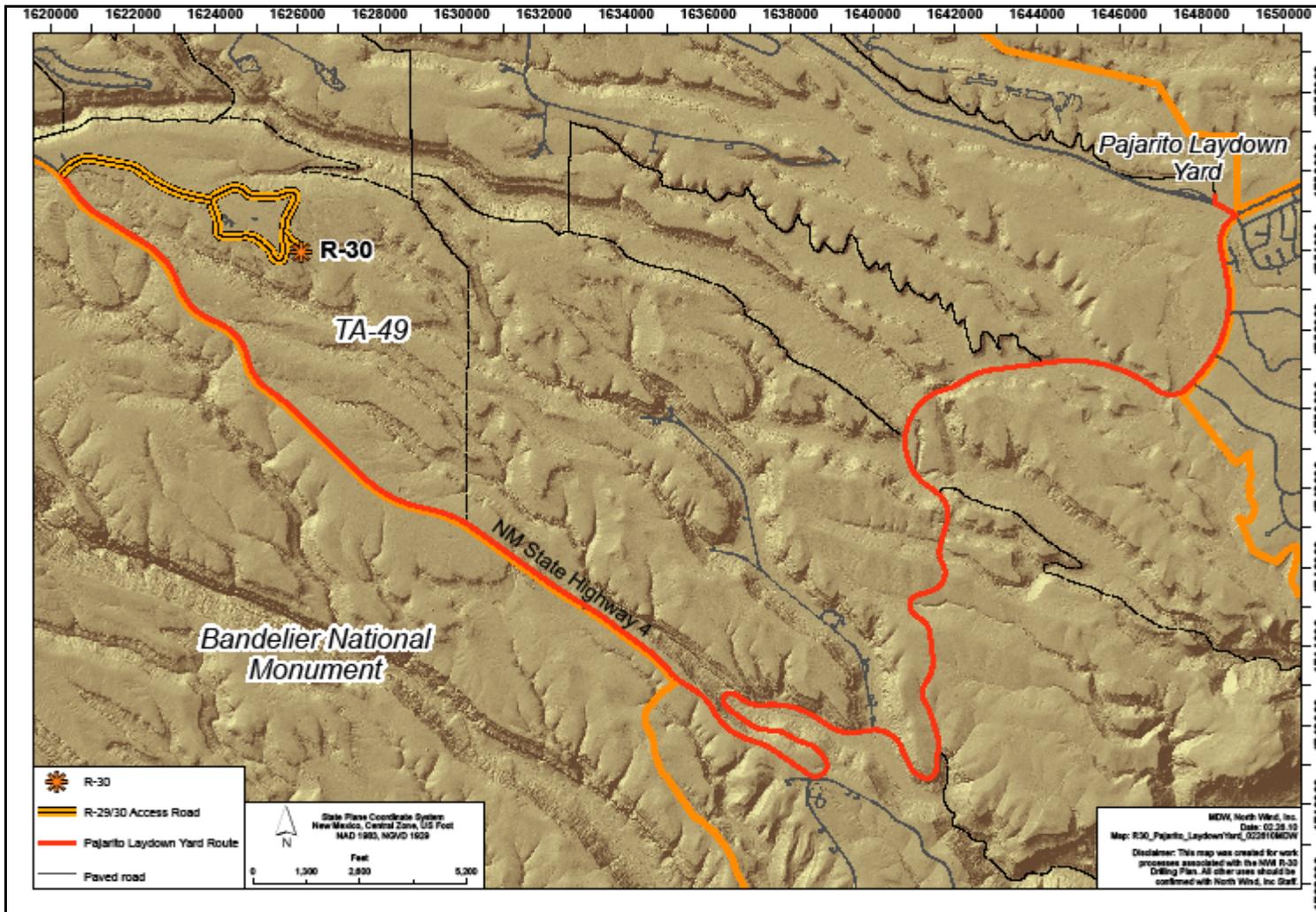


Figure 2.1-2 Route to the Pajarito lay-down yard from Well R-30

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

<https://intranet.nwindenv.com/>

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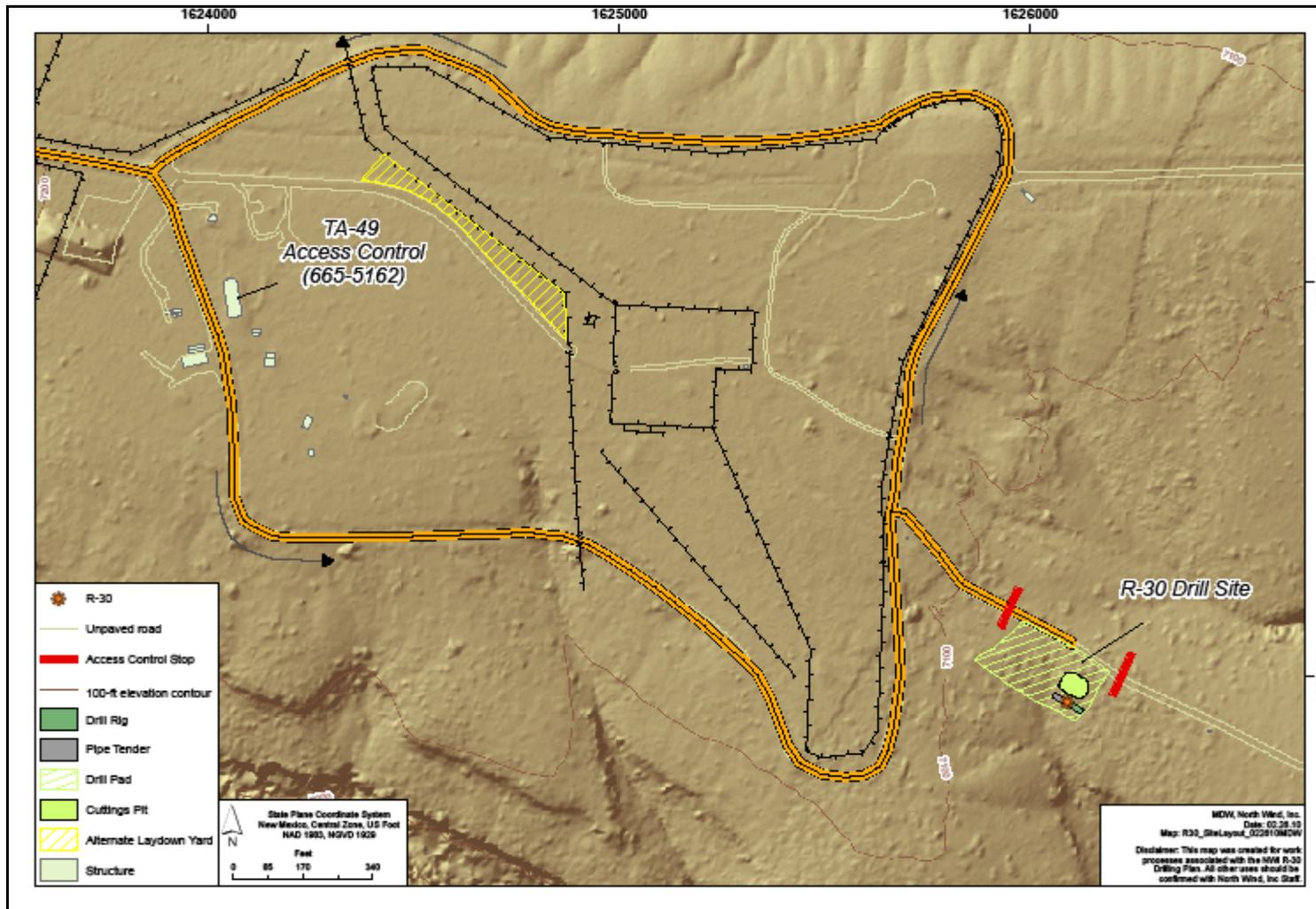


Figure 2.2-1 Well R-30 site layout

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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Figure 2.2-2 Well Pad and Laydown Area Dimensions

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

<https://intranet.nwindenv.com/>

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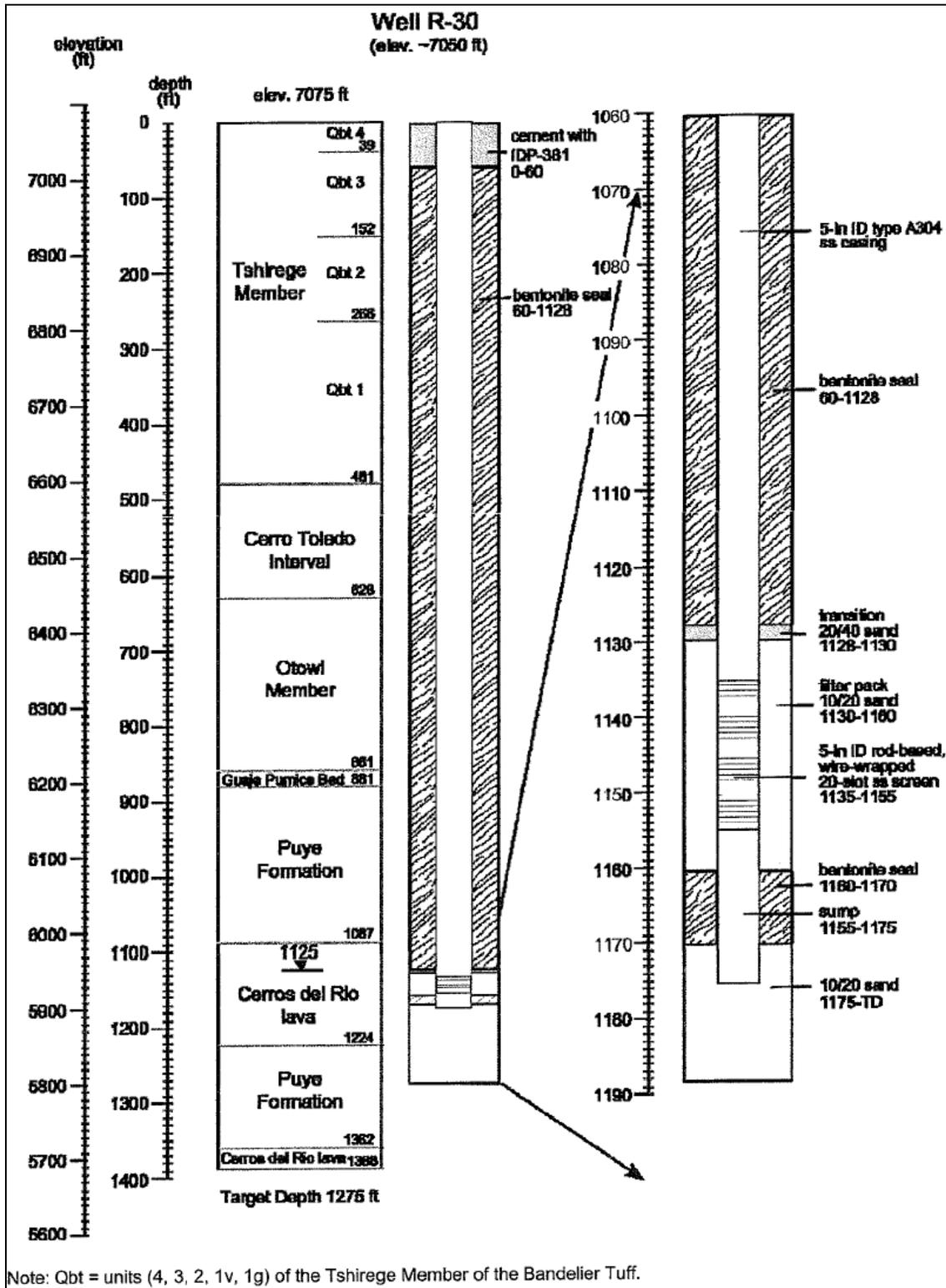


Figure 2.7-1 Proposed well design schematic for well R-30

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

<https://intranet.nwindenv.com/>

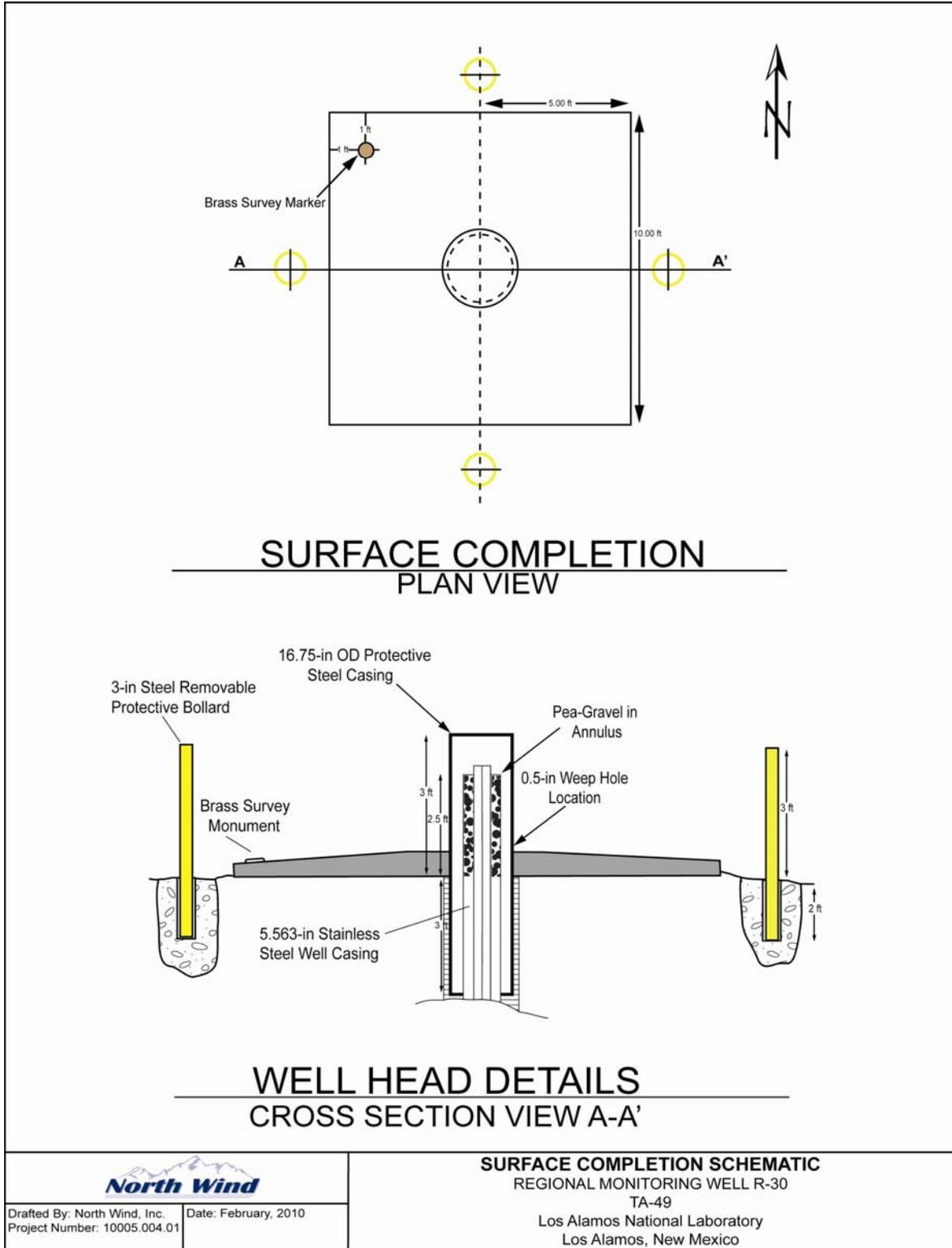


Figure 2.7-2 Surface completion schematic

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

<https://intranet.nwindenv.com/>

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APPENDIX A

Drilling Forms for MTOA #72006-000-09

Task Order 4

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

<https://intranet.nwindenv.com/>

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ANNUAL/BOREHOLE FILL

Provide all depth measurements with respect to ground surface

Site Name: _____ Project No.: _____
 Location: _____ Document Originator: _____
 Lead Company: _____ Document Reviewer: _____
 Supporting Company: _____ Review Complete: _____

Start Date/Time: _____ End Date/Time: _____

ANNULAR BOREHOLE FILL

Each column represents a different backfill lift. A backfill lift is defined by a change in backfill material or borehole diameter.

	LIFT 1	LIFT 2	LIFT 3	LIFT 4	LIFT 5	LIFT 6
Tagged bottom Depth (ft)						
Tagged Top Depth (ft)						
Annular Material						
Annular material Function						
Hole Diameter						
Begin Date						
End Date						
Calc Volume (ft ³)						
Actual Volume (ft ³)						

ANNULAR BOREHOLE FILL (continued)

Each column represents a different backfill lift. A backfill lift is defined by a change in backfill material or borehole diameter. Please refer to ALB-WI-1.5 for annular material and annular material function options.

	LIFT 7	LIFT 8	LIFT 9	LIFT 10	LIFT 11	LIFT 12
Tagged bottom Depth (ft)						
Tagged Top Depth (ft)						
Annular Material						
Annular Material Function						
Hole Diameter						
Begin Date						
End Date						
Calc Volume (ft ³)						
Actual Volume (ft ³)						

Comments:

BACKFILL TALLY SHEET (Cover Page)

Provide all depth measurements with respect to ground surface

Site Name: _____ Project No.: _____
 Location: _____ Document Originator: _____
 Lead Company: _____ Document Reviewer: _____
 Supporting Company: _____ Review Complete: _____

Lift No.: _____ Lift Function: _____ Type of Backfill: _____
 Start Date: _____ End Date: _____ Backfill delivered via: Tremie Freefall

TARGET LIFT VALUES

Borehole Diameter _____ in. Well/Piezometer OD: _____ in. Annular Area Calc: _____ ft²/ft
 Target Lift Interval _____ to _____ ft bgs. Target Volume Calc: _____ ft²/ft
 Calc material to be added (bags, etc.): _____

ACTUAL LIFT VALUES

Actual Lift Interval _____ to _____ ft bgs. Actual Material Added (bags, etc.) _____

Calculated Volume (Based on actual lift interval): _____ ft³ (input this date point on Annular Borehole)
 Actual Volume of Final Interval: _____ ft³ (input this date point on Annular Borehole)

Use Reference Sheet for Calculations

Pour #	Targeted Interval (ft bgs)	Volume Calculation (cu ft)/Material Calculation (bags, pail, super sacks, etc.)	Actual Material Added (United defined by FTL)	Water Used (gals.)	Tremie Depth (ft bgs)	Actual Tag (ft bgs)

BOREHOLE STATUS FORM

To be filled out by drilling engineer or site geologist

Site Name: _____ Project No.: _____
 Location: _____ Document Originator: _____
 Lead Company: _____ Document Reviewer: _____
 Supporting Company: _____ Review Complete: _____

Logging Date: _____

Well Status: Open Hole Completed Other: _____

Number of Concentric Casing(s): _____ Current Borehole Depth: _____ ft. bgs

Borehole Summary Table

Casing Top Depth (ft)						
Casing Bottom Depth (ft)						
Casing Inside Diameter (in.)						
Casing Wall Thickness (in.)						
Casing Type/Material						
Bit Size (in.)						
From (ft)						
To (ft)						
Cement Plugs						
From (ft)						
To (ft)						

Type of Fluid in Hole: Groundwater QUIK-FOAM EZ-MUD No Fluid

Fluid Level: _____ ft. bgs

Fluid Level Determined: Estimated Measured Measured With: _____

Other Materials in Hole:

	From		To		ft.
	From		To		ft.
	From		To		ft.

Reason for Running Log:

Comment:



CONSTRUCTION TALLY SHEET (Cover Sheet)
 Provide all depth measurements with respect to ground surface

Site Name: _____ Project No.: _____
 Location: _____ Document Originator: _____
 Lead Company: _____ Document Reviewer: _____
 Supporting Company: _____ Review Complete: _____

Begin Date: _____ Item to be installed Well Piezometer Pump
 End Date: _____ Anchor of Screen(s) Top/Bottom: _____ ft.
 ITEM TO BE CONSTRUCTED

					Estimated Depth at Top of Component	Cent
Sump	End Cap/ Bullnose	Mid Body (ft)	Coupler (ft)	Joint Length (MB+C)	Total Length	Total Depth

STACK	Joint No.	Mid Body (ft)	Coupler (ft)	Joint Length (MB+C)			Cent

Stack Verified By: _____

STACK	Joint No.	Mid Body (ft)	Coupler (ft)	Joint Length (MB+C)			Cent

Stack Verified By: _____

STACK	Joint No.	Mid Body (ft)	Coupler (ft)	Joint Length (MB+C)			Cent

Stack Verified By: _____

Page Totals		
-------------	--	--



CONSTRUCTION TALLY SHEET (Continued)

Provide all depth measurements with respect to ground surface

Site Name: _____

Project No.: _____

Location: _____

Review Complete: _____

Date: _____

Totals from previous page

STACK	Joint No.	Mid Body (ft)	Coupler (ft)	Joint Length (MB+C)			Cent

Stack Verified By: _____

STACK	Joint No.	Mid Body (ft)	Coupler (ft)	Joint Length (MB+C)			Cent

Stack Verified By: _____

STACK	Joint No.	Mid Body (ft)	Coupler (ft)	Joint Length (MB+C)			Cent

Stack Verified By: _____

Page Totals



DAILY DRILL RIG INSPECTION CHECKLIST

Technical Area:

SSHASP No.

Date ____ / ____ / ____

	√ - Denotes Good Condition	D -- Denotes Deficiency	<u>COMMENTS</u>
<u>CAB</u>			
___	Fire Extinguisher (SABC minimum)		_____
___	F/E Inspected and Charged		_____
___	Lights		_____
___	Mirrors		_____
___	Gauges all functional		_____
___	Seat & belts in working order		_____
___	Cab kept neat & clean		_____
___	Window glass free of cracks		_____
<u>ENGINE</u>			
___	Engine operation		_____
___	Lubrication done regularly		_____
___	No fluids leaking from rig		_____
<u>DRIVE TRAIN</u>			
___	Tires in good condition – No loose lug nuts		_____
___	Brakes in working order		_____
___	Back-up alarm functional		_____
<u>CONTROLS</u>			
___	All Emergency switches working		_____
___	Pressure gauges functioning		_____
___	Safety relief working		_____
___	Weight indicator working		_____
___	All hoses in good condition		_____
___	All drill controls working		_____
<u>DRILLING EQUIPMENT</u>			
___	Hoses in good condition		_____
___	Tools in working order		_____
___	Jacks in working order		_____
___	Solid footing for rig and jacks		_____
___	All equipment guards in place		_____
___	Guards on sheaves to prevent line displacement		_____
___	Ropes in good condition (no cuts, worn sports, burns, etc.)		_____
___	Cables in good condition		_____
___	Hooks, slings, shackles free of cracks, corrosion, deformation, and signs of overloading or excessive wear		_____
___	Hooks all have safety latches (except auger lifting hook)		_____
___	Augers/rods in good condition		_____
___	Auger/rod pins and bolts in good condition		_____
___	Crown block and sheaves secured to mast		_____
___	Crown block and sheaves free of cracks, corrosion, deformation, missing components, and signs of overloading or excessive wear		_____
___	Sheave bearings properly lubricated		_____
___	Locking device on mast pivot points		_____
___	Bolts and nuts tight		_____
___	Cat head smooth & free of grooves		_____
___	Anti-fouling devices installed on all manual cat heads		_____
___	Guy lines in place		_____

Inspection Performed By: _____

Date: _____

DAILY FIELD REPORT

Project No.: _____ Date: _____
 Project/Well: _____ Weather: _____
 Lead Company: _____ Supporting Company: _____
 Location: _____
 Document Originator: _____ Document Reviewer: _____

Time On-Site: _____

Time Off-Site: _____

Personnel On-Site		Equipment On-Site	
Name	Company	Name	Description

Description of Daily Activities and Events

Total Water Volume Used:		Total Water Volume Injected Down Borehole:	
Total Fuel Delivered:	Gallons Diesel:	Gallons Gasoline:	
Comments:			

DAILY FIELD REPORT

Project No.:	_____	Date:	_____
Project/Well:	_____		_____
Lead Company:	_____	Supporting Company:	_____
Location:	_____		_____
Document Originator:	_____	Document Reviewer:	_____

Deviations from Planned Activities (Include reason for deviation)

Empty space for reporting deviations from planned activities.

LANL Support Needed for Next Shift

Empty space for reporting LANL support needed for the next shift.



FORKLIFT INSPECTION RECORD

MACHINE #:	MODEL:
MAKE:	DATE:
HOUR METER READING:	ENGINE OIL ADDED (QTS.):
INSPECTOR/OPERATOR:	

NO.	ITEM TO BE CHECKED	OK	REPAIR REQUIRED?	DATE OF REPAIR	REPAIRED BY
1.	Check oil and coolant levels for leaks				
2.	Check belts and radiator hoses for condition				
3.	Check hydraulic hose and fitting condition				
4.	Check exhaust system for leaks				
5.	Check tire condition and pressure				
6.	Check battery connections and mounting				
7.	Check electrical system				
8.	Check condition of forks-presence of cracks				
9.	Check steering system operation				
10.	Check for loose/missing bolts, guards, etc.				
11.	Check fire extinguisher				
12.	Clean windshield				
13.	Check for proper operation of all instruments and gauges				
14.	Check for operation of back-up alarm				
15.	Check boom angle and length indicator				
16.	Service and parking brake for proper operation				
17.	Ensure proper lubrication				
18.	Check for load capacity chart				
19.	Ensure warning and operation decals are readable				
20.	Ensure control panel markings are readable				
21.	Check that operator manual is with machine				
22.	Ensure that forks stay level with machine				
23.	Check attachments				
24.	Check condition and operation of all controls				
25.	Check condition of seat belts and cab				
26.	Check boom sections for cracks and damage				
27.	Check all boom pins and pin retainers				
28.	Check hydraulic cylinders for leaks and damage				
29.	Check boom mounting				
30.	Check boom wear pads, guides, and rollers				
31.	Check condition and operation of outriggers				
List needed supplies on back of sheet			Make any comments on back of sheet		

North Wind

LOG HEADER FORM

Fill out one form for each logging run

Site Name: _____ Project No.: _____
Location: _____ Document Originator: _____
Lead Company: _____ Document Reviewer: _____
Supporting Company: _____ Review Complete: _____

LOGGING EVENT INFORMATION

Logging Date: _____ Operator: _____ Run Number: _____
 KA or COLOG Equipment LANL Logging Trailer SLB Logging Vehicle No.: _____
Logging Unit/Serial Number: _____
Electronic File Name: _____ Format: _____
Start Time: _____ End Time: _____
Measuring Point Description: GL (Ground Level) *Default to Ground Level when suitable*
 Other _____
Measuring Point to GL: _____ ft
Top Log Depth: _____ ft Bottom Log Depth: _____ ft
Log Run Through: Casing Annular Space Tremie Open Hole

GEOPHYSICAL LOG INFORMATION

Log Type: Triple Litho Density Compensated Neutron Caliper-Gamma Ray
 Platform Express Array Induction Spontaneous Potential
 Natural-Gamma Ray Magnetic Resonance Elemental Capture
 Fullbore Micro Other (See Logger Remarks)
Calibration Matrix (neutron only) Dolomite Limestone Sandstone Not Applicable
Null Value (if applicable)
Uniform Log Speed? Yes No Logging Depth Increment: _____ ft/min

Calibration Note/FTL Logger Remarks/Quality of Log:

VIDEO LOG INFORMATION

No Water Observed Water Observed
Water Observed Entering At: _____ ft bgs _____ ft bgs _____ ft bgs
Quality of Log: Good Fair Poor
Quality Comment (Required for Fair or Poor):

FTL/Logger Remarks (Note any fluid encountered):

PUMP INSTALLATION

Provide all depth measurements with respect to ground surface

Site Name: _____ Project No.: _____
 Location: _____ Document Originator: _____
 Lead Company: _____ Document Reviewer: _____
 Supporting Company: _____ Review Complete: _____

INSTALLATION

Installation Company: _____
 Installation Start Date: _____ Installation Time: _____
 Installation End Date: _____ Installation End Time: _____
 Intake Depth (ft bgs): _____

PUMP

Manufacturer: _____
 Model: _____
 Type: _____ Serial No.: _____
 Stages: _____ Riser Diameter (in): _____
 Pump Capacity (gal/min): _____ Pump Outer Diameter (in): _____

PUMP MOTOR

Manufacturer: _____
 Model: _____ Serial No.: _____
 Horsepower: _____

TRANSDUCER

Transducer Tube Depth (ft): _____ Slot Interval (ft): _____
 Internal Diameter (in): _____

VALVES

Valve Type:						
Valve Depth (ft bgs):						

Valve Type:						
Valve Depth (ft bgs):						

Comments:



RECORD OF PHOTOGRAPHS

Project Number: _____

Film Type: _____	Roll No. _____
ASA Number: _____	

Photo No.	Date	Time	Photographer	Weather Conditions	Location	Description of Photograph
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						

Photographer Name

North Wind

SURFACE COMPLETION

Provide all depth measurements with respect to ground surface

Site Name: _____ Project No.: _____
Location: _____ Document Originator: _____
Lead Company: _____ Document Reviewer: _____
Supporting Company: _____ Review Complete: _____

SURFACE PAD COMPLETION

Start Date: _____ End Date: _____
Pad Thickness: _____ Pad Width (ft): _____
Pad Length (ft): _____ Concrete psi: _____
Brass Marker Location: _____ Well Completion Depth (ft): _____
Placement Date: _____

MONUMENT COMPLETION

Outside Diameter (ft): _____ Inside Diameter (ft): _____
Monument Install Date: _____ Lock Install Date: _____
Well Name Stamped on Brass Market Date: _____

BOLLARD COMPLETION

Number Installed: _____ Installation Date: _____
Color Painted: _____ Painted Date: _____

North Wind

WELL/PIEZOMETER CONSTRUCTION

Provide all depth measurements with respect to ground surface

Site Name: _____ Project No.: _____
 Location: _____ Document Originator: _____
 Lead Company: _____ Document Reviewer: _____
 Supporting Company: _____ Review Complete: _____

ITEM TO BE CONSTRUCTED Well Piezometer

PRODUCTION CASING

Each Column represents difference casing. Production casing is defined by a change in casing type, inner diameter, outer diameter, casing material and joint type. Please refer to ALB-WI-1.4 for casing type, casing material, and joint type options.

Begin Install Date						
End Install Date						
Casing Type						
Casing Length (ft)						
Bottom Depth (ft)						
Inner Diameter (in)						
Outer Diameter (in)						
Casing Material						
Joint Type						

CENTRALIZER

Each column represents centralizer information.

Provide all depths (ft)						
Material (S or SS)						

SCREENED INTERVAL

Each column represents a different screened interval. Please refer to ALB-WI-1.4 for screen type, screen material, and joint type options.

Screen Designation:						
Install Date						
Screen Type						
Screen Material						
Open Type Depth (ft)						
Open Bottom Depth (ft)						
Inner Diameter (in)						
Outer Diameter (in)						
Slot Size (in)						
% Open Area Per ft						
Joint Type						



APPENDIX B

Security Plan for TA-49, R-30 Monitor Well Installation

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

<https://intranet.nwindenv.com/>

Printed 3/4/2010

Security Plan for TA-49, R-30 Monitor Well Installation

Well R-30 is located within TA-49 and all access control issues will be maintained from that point. It is not anticipated that contact with access control for TA-15, located across the canyon, will be necessary during site operations. Security control will be maintained as follows:

- R-30 drill site will be accessed using the ESH-247 key at TA-49 access control gate B.
- Access control gate B will remain locked except during site access. Locks will be daisy chained together.
- Names and Z Numbers of all personnel on site will be maintained in the access control/equipment room of Building 0113 during site operations.
- Site personnel and visitors will be required to sign the on-site tailgate safety briefing log maintained by NWI.

APPENDIX C
Traffic Control Plan

Traffic Control Plan

There will be a minimal need for traffic control on this project based upon the outdoor remote locations of the well sites. Access to and from the sites will be performed on existing roadways. No traffic will be allowed on the well drilling site without approval of the Drilling Supervisor or the HSR. Parking areas will be established for essential site personnel and controlled by the HSR.

The main road at TA-49 to the site will remain accessible. Traffic control will be maintained as follows:

- The speed limit at TA-49 will not exceed 25 miles per hour (mph).
- Near the R-30 drill site, signs will be posted to indicate that traffic will flow in a counterclockwise direction; traffic is one-way on this road.

At the R-30 drill site, signs will be posted to indicate that the speed limit is 15 mph during drilling operations and when pedestrians are present.

APPENDIX D

**Excavation Permit
(copy)**

EXCAVATION / SOIL DISTURBANCE PERMIT **LOT 1**

Authorion No **09X-0679-49**

Title: **TA-49, R029 AND R30 WELL PADS, WELLS AND ACCESS ROADS**

WorkOrder/Charge Information:

TA **49**

Bldg/Area: **OUTSIDE**

Priority: **Routine**

Requestor Name: **JOHNNY SALAZAR**

Phone: **7-1997**

UMAP Secondary Research Date: **9/30/09**

UTILITIES LOCATED		LOCATING ORGANIZATIONS			
Utility Type	# Lines	Locating Organizations	Notify Date	Contact Person	Locates Required/Performed? initial, Z Number, and Date Located
Water	11A	Utilities and Infrastructure UMAP	10/9/2009	Pam Hornsby 665-1051	<input checked="" type="radio"/> Yes No G.V. 107099 10/13/09
Gas		Verizon FNS	10/9/2009	665-3232 667- 8375	<input checked="" type="radio"/> Yes No M.S. 217911 10/13/09
Sewer		EWMCO-RLW	10/9/2009	667-6904	Yes <input type="radio"/> No G.V.
Steam		New Mexico One Call			
Condensate		Agencies Notified:		800-321-2537	Yes <input type="radio"/> No G.V.
Primary Electric		PNM USWest Comcast		ID #: 2009	
Secondary Electric		Los Alamos County NMI Gas			
Cooling Water					
Storm Drains					
Unknown					
TRAD Liquid Waste		NM One Call Stake Date.		Markings Good Until.	
		NM One Call Confirmation #			
Telephone/Comm.	NA	Dimensions: 200 x 100		Maximum Depth: 10.00'	

REMARKS: **SEE MAP FOR LIMITS OF LOCATES**

IMPORTANT NOTES

REVALIDATION OF UTILITY MARKINGS AND/OR SKETCH IS REQUIRED FOR EACH OF THE FOLLOWING

- Person in Charge (PIC) has changed
- Utility field markings have changed or have been removed
- 30 days have elapsed from the date the utility locate markings were made (excludes NMI One Call)
- 10 working days have elapsed from the date of NM One Call Locates (allow 48 hours for locates)
- An unexpected underground utility or structure is found that was not previously marked

A copy of this permit, the IHS-OS Excavation/Fill/Soil Disturbance Request Form, all SMU Review Comments, and Utility locate sketch must be maintained on-site in a readily accessible protective container or within the work package throughout the excavation/fill/soil activity.

NOTE: The utility review for this excavation/fill/soil disturbance permit has been conducted using all available utility data to ensure that all known primary and secondary utility lines have been identified and located. Appropriate utility-specific PPE must be worn for each utility requiring hand-excavation. If there is an indication that an unidentified utility line is within the area of excavation, the Project Coordinator/Person-in-Charge must **immediately STOP WORK** and contact the IHS-OS helpline at 5-7645 and UMAP at 5-1051 for further investigation. When all available means to verify the existence and location of the suspected utility line have been utilized, the Project Coordinator/Person-in-Charge is responsible for ensuring the use of appropriate PPE for the safety of the workers. Excavations around building perimeter may involve grounding cables within 2-5 ft from bldg. edge

Permit expiration date is six (6) months from Review Completion date, found on Permit Request Form

SIGNATURES

Issued to PIC: Johnny Salazar Z-Number: 099260 Date: 10/13/09 Phone #: 667-1197

SIGNATURE IMPLIES AGREEMENT TO COMPLY WITH ALL UTILITY LOCATES AND SME REVIEW COMMENTS PROVIDED FOR THIS PERMIT

Release from UMAP for Signature: Pam Hornsby Z-Number: 291251 Date: 10/13/09

FOD Provided Facility Drawings: Yes No FOD UNIT

Activity Concurrence FOD/Designee: Cherie Barnard Z-Number: 102863 Date: 10-13-09

IHS-OS Permit Issuance: Travis Rodriguez Z-Number: 106739 Date: 10-13-09

EX-ID: **09X-0679-49**

PAVILION EXCAVATION / SOIL DISTURBANCE PERMIT

Authorisation No. 09X-0679-49

Title: TA-49, R029 AND R30 WELL PADS, WELLS AND ACCESS ROADS

WorkOrder/Charge Information:

TA: 49

Bldg/Area: OUTSIDE

Priority: Routine

Requestor Name: JOHNNY SALAZAR

Phone: 7-1997

UMAP Secondary Research Date: 9/20/09

UTILITIES LOCATED		LOCATING ORGANIZATIONS				
Utility Type	# Lines	Locating Organizations	Notify Date	Contact Person	Locates Required/Performed? Initial, Z Number, and Date Located	
Water	<u>NA</u>	Utilities and Infrastructure UMAP	10/9/2009	Pam Hornsby 665-1051	<input checked="" type="checkbox"/> No <u>G.V. 107099 10/13/09</u>	
Gas	}	Verizon FNS	10/9/2009	665-3232 667-8375	<input checked="" type="checkbox"/> No <u>M.S. 217911 10/13/09</u>	
Sewer		EWMO-RLW	10/9/2009	667-6904	Yes/No <u>G.V.</u>	
Steam		New Mexico One Call				
Condensate		Agencies Notified:		800-321-2537	Yes/No <u>G.V.</u>	
Primary Electric		PNM US/West Comcast Los Alamos County NM Gas		ID # 2009		
Secondary Electric		NM One Call Stake Date:		Markings Good Until:		
Cooling Water		NM One Call Confirmation #:				
Storm Drains		Dimensions: <u>200 X 150</u>		Maximum Depth: <u>15.00'</u>		
Unknown						
RAD Liquid Waste						
Telephones/Comm.	<u>NA</u>					

REMARKS: SEE MAP FOR LIMITS OF LOCATES

IMPORTANT NOTES

REVALIDATION OF UTILITY MARKINGS AND/OR SKETCH IS REQUIRED FOR EACH OF THE FOLLOWING

- Person in Charge (PIC) has changed
- Utility field markings have changed or have been removed
- 30 days have elapsed from the date the utility locate markings were made (excludes NM One Call)
- 10 working days have elapsed from the date of NM One Call Locates (allow 48 hours for locates)
- An unexpected underground utility or structure is found that was not previously marked

A copy of this permit, the IHS-OS Excavation/Fill/Soil Disturbance Request Form, all SMU Review Comments, and Utility locate sketch must be maintained on-site in a readily accessible protective container or within the work package throughout the excavation/fill/soil activity.

NOTE: The utility review for this excavation/fill/soil disturbance permit has been conducted using all available utility data to ensure that all known primary and secondary utility lines have been identified and located. Appropriate utility-specific PPE must be worn for each utility requiring hand excavation. If there is an indication that an unidentified utility line is within the area of excavation, the Project Coordinator/Person-in-Charge must immediately STOP WORK and contact the IHS-OS helpline at 5-7645 and UMAP at 5-1051 for further investigation. When all available means to verify the existence and location of the suspected utility line have been utilized, the Project Coordinator/Person-in-Charge is responsible for ensuring the use of appropriate PPE for the safety of the workers. Excavations around building perimeter may involve grounding cables within 2-5 ft from bldg. edge.

Permit expiration date is six (6) months from Review Completion date, found on Permit Request Form

SIGNATURES

Issued to PIC: Johnny Salazar Z-Number: 099960 Date: 10/13/09 Phone #: 667-1997

SIGNATURE IMPLIES AGREEMENT TO COMPLY WITH ALL UTILITY LOCATES AND SITE REVIEW COMMENTS PROVIDED FOR THIS PERMIT

Release from UMAP for Signature: Pam Hornsby Z-Number: 665-1051 Date: 10/13/09

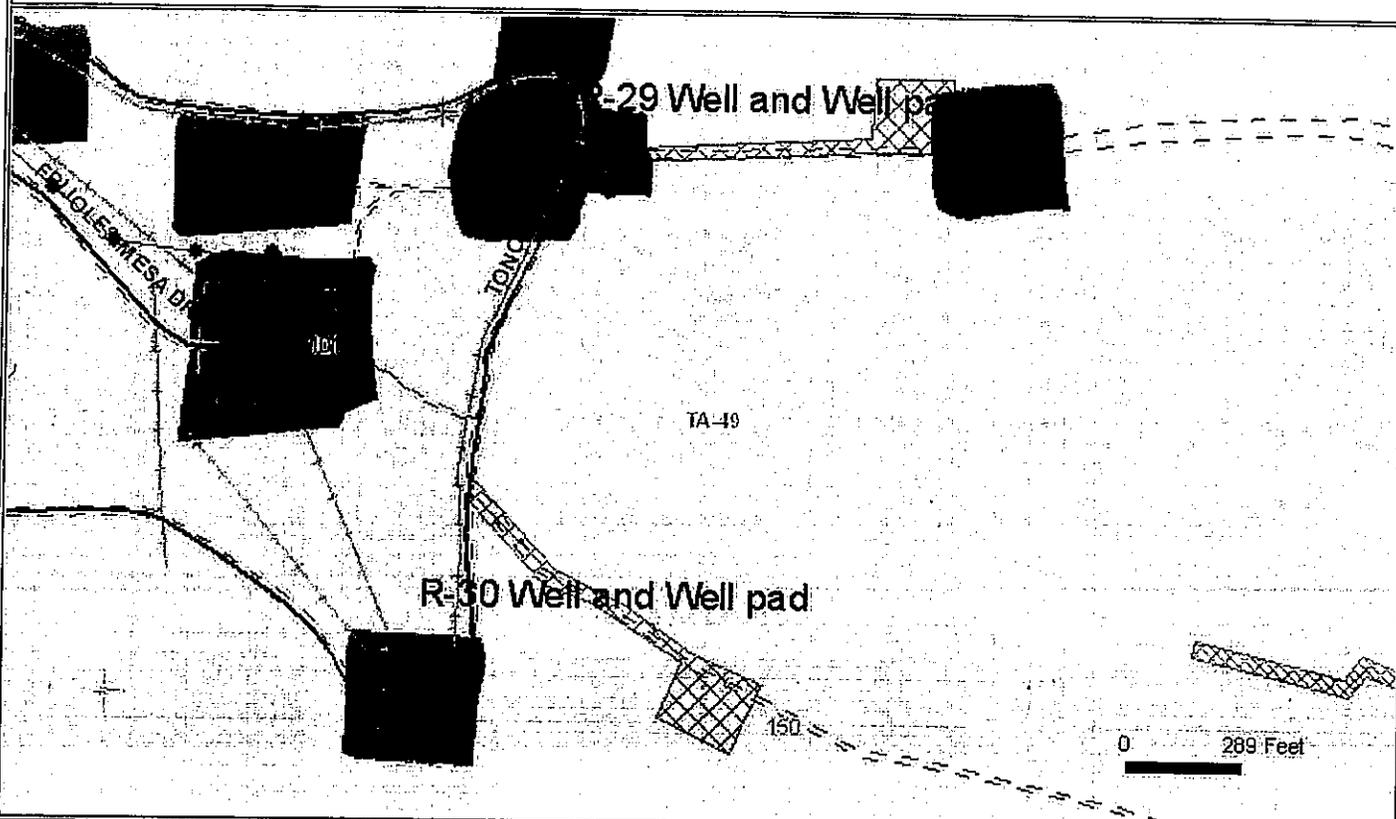
**FOD Provided Facility Drawings: Yes No FOD UNIT

Activity Concurrence FOD/Designee: Blaine Barnes Z-Number: 102863 Date: 10-13-09

IHS-OS Permit Issuance: Maria Collogos Z-Number: 106737 Date: 10-13-09

EX-ID: 09X-0679-49

IHS-OS Excavation Permit Review Mapping, Permit ID: 09X-0679



<p>Utilities</p> <ul style="list-style-type: none"> ● Electric Points — Primary Electric Lines ⊙ Gas Points — Primary Gas Lines ● Sewer Points — Sanitary Sewer Lines ⊙ Steam Points — Primary Steam Lines ● Water Points — Primary Water Lines 	<p>Roads</p> <ul style="list-style-type: none"> - - Dirt Roads — Lab Road — State Hwy — Other <p>Fences</p> <ul style="list-style-type: none"> - - Industrial Fence/Gate + Security Fence/Gate + Other <p>Contours</p> <ul style="list-style-type: none"> --- LANL Contours 100 ft. --- LANL Contours 20 ft. 	<p>Environmental Constraints</p> <ul style="list-style-type: none"> ▣ Areas Requiring a Cultural Survey ▣ Developed Core Habitat of Mexican Spotted Owl ▣ Undeveloped Core Habitat of Mexican Spotted Owl ▣ Developed Core Habitat of Southwestern Willow Flycatcher ▣ Undeveloped Core Habitat of Southwestern Willow Flycatcher ▣ Developed Core Habitat of Bald Eagle ▣ Undeveloped Core Habitat of Bald Eagle ▣ Floodplains ▣ Area of Concern ▣ Buildings ▣ Historical Buildings ▣ TA Boundary
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9/29/2009 10:57:10 AM

HELP: 665-5715

Disclaimer:

The legend above is a static legend of most of the possible environmental and physical layers. However, this map shows only those layers that the user has selected to display. **Not all relevant layers or environmental constraints may be represented on this map.** Likewise, an environmental layer may be displayed on this map but not represented in the legend.

The GIS application accessed through this web page provides a visual display of data and report generation for the sole purpose of evaluating environmental constraints. This application should not be used for other purposes, such as locating utilities for excavations; such use could expose workers to unexpected safety hazards.

Infrastructure data (buildings, roads, utilities, etc.) included in this application are provided to facilitate placing the proposed project location(s) on the map accurately. The application uses the most recent information available to us, but the data may not always reflect current conditions.

Excavation/Fill/Soil Permit Review Request

Los Alamos National Laboratory
 Operation & Facility (IH&S) Support

[INDEX](#) | [REQUEST A REVIEW](#) | [FRAMES](#) | [09X-0679](#) | [VIEW MAP](#) | [REVIEWER TICKLER](#) | [COMMENTS](#) | [COMMENT FORM](#) | [REVIEWER LIST](#)

Date of Request: 9/28/2009
 Date Posted: 9/28/2009
 Date Review Due: 10/12/2009
 Date Expires: 4/9/2010
 Status: Review Complete

[View Map](#)

09X-0679, TA-49, R-29 and R-30 well pads, wells and access roads

Contact: Arlene A. Suazo	Org: Operation & Facility (IH&S) Support	TA-Bldg: 59-36	Phone: 7-5719	Fax: 7-3805	E-mail: excavation@lanl.gov
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Priority
Priority: Routine

Title & Requester Information				
Title: TA-49, R-29 and R-30 well pads, wells and access roads				
Requester: JOHNNY SALAZAR	Org: EES-14	TA: 51	Bldg: 0027	MS: J495
	Phone: 667-1997	Fax:	Pager:	E-mail: salazar_johnny@lanl.gov
Person in Charge/Subcontract Technical Representative: JOHNNY SALAZAR	Org: EES-14	TA: 51	Bldg: 0027	MS: J495
	Phone: 667-1997	Fax:	Pager:	E-mail: salazar_johnny@lanl.gov
Alternate PIC: GREGORY HELLAND	Org: WES-FFS	TA: 64	Bldg: 0064	MS: K497
	Phone: 665-3368	Fax:	Pager:	E-mail: gdh45@lanl.gov

Applicable Identification Numbers
Work Order #: 0
Cost Center #: 6C000A
Program Code #: AREW
Cost Account #: 0130
Work Package #: DM00

Funding Organization

Funding Division: ENVIRONMENTAL PROGRAMS

Funding Group: ADEP

Project Location(s)

FOD Unit: UI Andrew Erickson erickson@lanl.gov	TA: 49	Sub-Area: Out side	Building #: N/A	Anticipated Start Date: 10/8/2009
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Description of the location of the excavation relative to the nearest building(s) or landmarks:
The proposed site for R-29 is located on side of the road approx 1000 ft east of the northeast corner of MDA AB at TA-49. The proposed site for R-30 is located off of the side of fire access rd 124 approx 1000 ft east of Tonapah loop perimeter road of MDA AB.

Scope of Project

Drill Pad will be approximately 150 ft x 200 ft, the well drilled will go down approx. 1200 ft to 1500 ft deep. We will have cuttings pit of 40 ft X 60 ft X 10 ft deep and a runoff pit of 8 ft X 10 ft x 6 ft deep. We will add base course to access roads. After project as been completed we will be covering up all the pits by land applying the drill cuttings on the pad and adding base course over cuttings. We will follow Lanl BMP requirements.

Purpose of Project

- Environmental Restoration
Specify: Regional well for monitoring contaminant movement.

Work Requirements

The project will involve or require the following:

- Equipment:
Loader, Backhoe, drill rig, forklift, generator, compressor.

- Disturbed Area(s): maximum dimensions

AREA #1: TA-49	Description: <u>R-29 Well and Well pad</u> Side #1: <u>182 ft</u> Side #2: <u>204 ft</u> Side #3: <u>369 ft</u> Side #4: <u>339 ft</u> Side #5: <u>15 ft</u> Side #6: <u>53 ft</u> Side #7: <u>23 ft</u> Side #8: <u>683 ft</u> Side #9: <u>151 ft</u> Side #10: <u>196 ft</u> Depth: <u>1500 ft</u> Total Area: <u>1.38</u> acres
	Description: <u>R-30 Well and Well pad</u> Side #1: <u>152 ft</u> Side #2: <u>205 ft</u>

AREA #2: TA-49	Side #3: <u>155</u> ft
	Side #4: <u>267</u> ft
	Side #5: <u>126</u> ft
	Side #6: <u>283</u> ft
	Side #7: <u>50</u> ft
	Side #8: <u>306</u> ft
	Side #9: <u>180</u> ft
	Side #10: <u>221</u> ft
	Side #11: <u>186</u> ft
	Side #12: <u>43</u> ft
	Depth: <u>1500</u> ft
	Total Area: <u>1.51</u> acres

Will project involve modification, replacement, and/or installation of a guardrail or sign?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will the excavated material be placed back in the original place of origin?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Will the work take place inside of a building?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Utility System Impacts

Will project involve modification, replacement, and/or installation of one or more utility lines?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<input type="checkbox"/> Primary Utilities - natural gas, sanitary sewer, water, steam, condensate and/or primary electric (electrical lines 600 volts and above)	
<input type="checkbox"/> Secondary Utilities - Any utility systems which are not classified as "primary" including compressed air, communication, industrial water, fire alarm, secondary electric (less than 600 volts), cooling water, storm drain, security lighting, street lighting, control wiring, fuel oil, security lines, etc.	
For information on the requirements for expediting utility locates please contact UTA at 5-1051.	

Water Quality System Impacts

Will this project implement Best Management Practices (BMPs) for Storm Water Pollution Prevention (SWPP) and/or soil erosion control?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Will the total area for this project, including staging areas, construction areas, and storage areas, exceed 1 acre?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Will the excavation be conducted in or near an arroyo or drainage area?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown
Will the excavation be conducted in or near a wetland?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will the excavation be conducted in or near a watercourse? If Yes, specify which areas: <u>Area #1</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Will the excavation be conducted in a floodplain?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will excavation be conducted in or near a storm drain?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Is it anticipated that other than potable or industrial water, other sources will be used or discharged during soil disturbing activities?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will this project impact a potable or industrial water supply system?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will this project impact the sanitary sewer system or a lift station?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will this project require any building drain modifications?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Solid Waste Impacts

What type of material will be removed from site during this project? Check all that apply. If OTHER, specify:	<input type="checkbox"/> Soil <input type="checkbox"/> Asphalt <input type="checkbox"/> Concrete <input type="checkbox"/> Other <input checked="" type="checkbox"/> None
If SOIL, ASPHALT, or CONCRETE will be removed, answer the remainder of the questions in this section. Otherwise, skip to <u>Ecological Impacts</u> .	
Will the concrete, asphalt or soil be taken from within or near a treatment, storage, or disposal (TSD) facility?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Has the area where the material originated ever been designated a Radiological Control Area (RCA), Radiological Material Management Area (RMMA), underground radioactive material area, or radiological soil contamination area?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If YES, will material from an RCA, RMMA, underground radioactive material area, or radiological soil contamination area be released in accordance with LIR 404-00-05, Managing Radioactive Waste, LIR 402-700-01, Occupational Radiation Protection Requirements, and/or DOE Order 435.1?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Have interviews with ES&H specialist, facility staff, workers or others (that may have historical knowledge of the site) been conducted to determine if any contamination or residue could be associated with the materials and whether operational releases have occurred in the material removal area? If YES, provide the information you obtained in the interview(s):	<input type="checkbox"/> Yes <input type="checkbox"/> No
Has the project or activity that is removing the concrete, asphalt or soil undergone a PR-ID review? If YES, specify the PR-ID number:	<input type="checkbox"/> Yes <input type="checkbox"/> No
I am willing to certify, under penalty of law that I am familiar with the operation that generated the asphalt, concrete or soil through personal knowledge as well as information provided to me by other relevant employees, and that to the best of my knowledge and belief, the information provided is accurate and complete and the material contains no constituents that would cause it to be considered a waste or pollutant. If NO, the asphalt, concrete, or soil CANNOT be removed from the project area until approval is obtained by ENV-SWRC.	<input type="checkbox"/> Yes <input type="checkbox"/> No

Ecological Impacts

Applicable NEPA Document: LAN-_____ or SWEIS Document # _____ Operations Level _____	
Has this project been reviewed by an authorized NCB (NEPA, Biological and Cultural Resources LIR 404-30-02.0) reviewer? If YES, specify name of reviewer:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Potential Release Site (PRS) Impacts

Has this excavation activity been reviewed by RRES-RS/ECR prior to this request?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will the excavation activity be conducted within or near any known PRSs?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown

Cultural Resource Impacts

Will this project be conducted in an unsurveyed Cultural Area?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will this project be conducted in a Cultural Site?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Will this project be conducted in a Cultural Site buffer?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Will this project be conducted in a Historical Building Site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Will this project be conducted in a Historical Building Site buffer?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
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Biological Resource Impacts

Will this project be conducted in a Spotted Owl buffer?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Will this project be conducted in an Undeveloped Spotted Owl core?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will this project be conducted in a Developed Spotted Owl core?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will this project be conducted in a Flycatcher buffer?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will this project be conducted in an Undeveloped Flycatcher core?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will this project be conducted in a Developed Flycatcher core?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will this project be conducted in a Bald Eagle buffer?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will this project be conducted in an Undeveloped Bald Eagle core?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will this project be conducted in a Developed Bald Eagle core?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Other

The project will involve:	
<input checked="" type="checkbox"/> Responsible LANL Group - LWSP	
<input checked="" type="checkbox"/> Responsible LANL Sub-Contractor - MSS Roads Ground	
<input checked="" type="checkbox"/> Sub-Contractor - North Wind	

Comments

No comments	
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[INDEX](#) | [REQUEST_A_REVIEW](#) | [FRAMES](#) | [09X-0679](#) | [VIEW MAP](#) | [REVIEWER TICKLER](#) | [COMMENTS](#) | [COMMENT FORM](#) | [REVIEWER LIST](#)

These pages are maintained by the Operation & Facility (IH&S) Support System Software Development Team.
 Please contact the [Excavation Team](#) with questions regarding the web review process.

Approved with Conditions.

During proposed construction activities, all laborers and personnel will abide by the following guidelines for working in a construction area in accordance with Construction safety guidelines for 29 CFR 1926:

- Always wear hard hats
- Always wear safety glasses
- Always wear safety shoes.

Assure the Positive identification of the location of buried utilities in the work area (location of where dirt is to be removed).

If overhead power lines exist and/ or heavy equipment will be used, then maintain at least a 10-foot distance of clearance of personnel and equipment from them and increase the protective boundary as recommended in the OSHA standard.

For the common laborer, stay clear of motor operated equipment, remain out of the operator`s blind spots, and don highly visible vests.

For the incidental visitor, assure the work area is properly barricaded to keep/prevent unauthorized personnel out of harms way by control their access to the work area.

Cultural Review, EES-C

(10/9/2009) by GERALD MARTINEZ
Approved with Conditions.

CULTURAL RESOURCES:

ISSUES: The Project Leader, Johnny Salazar, EES-14, has been working with LANL Cultural Resources Team (CRT) archaeologist Steve Hoagland to locate the TA-49, R-29 and R-30 access road and drill pad without any impacts to cultural resources. The current agreed upon alignment and pad location avoids impacts to cultural sites. However, there are archaeological sites, (R-29, south side from existing dirt road, and R-30, south and north side from existing dirt road) that must be avoided by project activities. Some of these archaeological sites have been marked, (white twine with pink flagging tape or t-post fence) for protection and avoidance from other LANL activities in this area`s.
It is not anticipated that project activities will affect any archaeological sites.

ECOLOGY & AIR QUALITY GROUP CULTURAL RESOURCES ACTIONS: None. If it is determined that project activities need to be conducted further out from the current defined area, then the ENV-EAQ CRT, must review the specific location involved.

YOUR ACTIONS: Avoid impacts (stay within scope of project, proposed R-29 and R-30 drill pad and access road) to the archaeological sites.

For questions or concerns, please contact Gerald Martinez, 665-8386 or Steve Hoagland, 667-9141.

NEPA Review, EES-CRO

(9/30/2009) by DANIEL PAVA
Approved with No Concerns.

National Environmental Policy Act (NEPA):

Issues/Comments: The proposed project is covered under the 2008 SWEIS, Non-key Document, 2.2.10 Environmental Research - Water and Soil Monitoring, and 1.1 Routine Maintenance (for the road work).

SME Group Actions: None.

Project Leader Actions: Comply with biological and cultural resource requirements.

Resource Protection Review, R-3

(9/30/2009) by VIRGINIA REY
Not Approved/Action Required.

Contact ER, RP-1 team leader Marty Peifer for radiological controls prior to working on the R-29 and R-30 well pads, wells and access roads at TA-49. Marty may be reached at ph 665-4342 or pg 664-6649. Also, if project work involves the use of sealed sources in geophysical logging activities, consult RP-3 Accountable Radioactive Sealed Sources/Radiation Generating Devices supervisor John Elliott. Please refer to article 1626 of ISD 121-1, Radiation Protection, for the requirements to use subcontractor owned RSS at LANL. Article 1626.5 states that the subcontractor must comply with the RSS receipt checklist which may be found below. The subcontractor must notify RP-3 prior to using accountable RSS on LANL. Therefore, contact RP-3 supervisor John Elliott at ph 665-7461/ pg 996-0178 or RCT Gilbert Estrada at ph 665-5298. Copy of EX-ID request and map sent to Marty Peifer.

REQUIREMENTS FOR ON-SITE SOIL COMPACT TESTING, WELL LOGGING, AND SEALED SOURCE RADIOGRAPHY BY OFF-SITE CONTRACTORS

- A LANL representative will be on-site at the work location at all times when the Nuclear Density Gauge, Camera or a Well Logging Tool is present.
- Nuclear Density Gauges, and Cameras, and Well Logging Tools will be operated in accordance with the conditions specified in the Contractor's New Mexico Environmental Department (NMED) License (and/or NMED letter of reciprocity and NRC License, if appropriate).
- Contractor employees shall have appropriate training and certifications as required by the contractor's NMED License (and/or NMED letter of reciprocity and NRC License, if appropriate).
- The Contractor employees will comply with any and all LANL Radiation Work Permits required by LANL Groups RP-3 and RP-1.
- The Contractor will follow their operating procedures.
- The Contractor shall wear appropriate whole body dosimeters and must possess a operational, calibrated health physics handheld instrument to perform radiation surveys as required by the Contractor's operating procedure.
- The Contractor shall provide the following information for LANL's review and approval to the responsible Project Manager prior to transporting a Nuclear Density Gauge or Sealed Source Camera onto LANL property:

1. A current copy of the Contractor's New Mexico Environmental Department (NMED) License (and/or NMED letter of reciprocity and NRC License, if appropriate).
2. Appropriate DOT Shipping Papers (e.g., Bill of Lading) for the specific Nuclear Density Gauge being transported.
3. A current copy of the source manufacturer's Special Form Certificate
4. A current copy of the package manufacturer's Competent Authority for Package.
5. A current leak test document for the Nuclear Density Gauge or Sealed Sources, which includes the Radionuclide and leak test results.
6. Current training documentation for all employees transporting and using the equipment in question.
7. A current copy of the Contractor's operating procedure.

SECURITY Review, IHS-OS

(9/29/2009) by ADRIAN TRUJILLO
Approved with No Concerns.

SECURITY Review, IHS-OS

(10/6/2009) by ARLENE SUAZO
Approved with Conditions.

Based on the work proposed for EX-ID 09X-0679 at TA-49 to install well pads and roads, and based on the review of PRS maps, PRSs 49-008(d) and 49-005(a) are located in the work area of R-29 road and pad. Requester shall work to the requirements for working in a PRS. Any changes in the planned location or scope of work will require a modification to this EX-ID and another review by WES PRS coordination representatives.

For questions or additional information, please contact Linda Nonno at 505-665-0725, lnonno@lanl.gov, or Sue Terp (sdterp@lanl.gov). The subject EP Project Leader, John McCann; jmccann@lanl.gov, is being copied on these EX-ID comments to document PRS impact (if any).

General Requirements for Working in a PRS are listed within ISD P101-17.0, Subsections 3.2 - 3.4.

<http://policy.lanl.gov/pods/policies.nsf/MainFrameset?ReadForm&DocNum=P101-17&FileName=P101-17.pdf>. The requirement applicability shall be determined by the requester's authorized IHS and RP representatives and by requirements determined in IWD form 2101 part 2 per Integrated Work Management P300.

Specific requirements that apply to excavations and soil disturbances performed in PRSs include the following:

- Compliance with OSHA 1910.120 Hazardous Waste Operations and Emergency Response regulations
- Detailed documentation of the Excavation/Fill/Soil Disturbance activity that indicates the length, width, depth, location,

and amount of soil excavated/disturbed and copies of waste characterization and disposal records for any of the soil removed from the PRS

- Excavated soil/material must be managed within the boundary of the PRS and returned to the excavation upon completion of the project
- Soil removed from a PRS that is not returned to the excavation must be managed, characterized, and disposed of in accordance with all applicable LANL waste management procedures.
- Vacuum truck potholing is not permitted and may not be used within the boundary of a PRS.

EP WES Requirements for Working in a PRS:

Any LANS employee or subcontractor conducting work within the boundary of a PRS must be made aware of the potential contaminants present in soils and other materials (concrete, asphalt, tuff, drain lines, etc.) at the site and the potential hazards associated with those contaminants. LANL subcontractors should refer to Appendix A (A-1) of the EP-WES Program Health and Safety Requirements Manual to determine applicable worker training requirements, equipment decontamination requirements etc. The manual can be found at the following URL: <http://int.lanl.gov/orgs/wes/docs/safety/HSRM-0001-R2.pdf>

All soil/fill excavated from a PRS must be managed within the boundary of the PRS and returned to the precise point and depth of excavation upon completion of the project. Soil/fill and other material excavated and disturbed within a PRS must be managed to ensure that it remains within the PRS boundary. This includes implementing measures to ensure the soil or other material is not dispersed off the site by wind, storm water runoff, vehicle or pedestrian traffic, etc. Any soil or other material including concrete and asphalt removed from a PRS boundary must be managed, characterized, and disposed of in accordance with all applicable LANL waste management LIRs and IMPs including approved waste profile forms, waste accumulation areas, etc

Wastewater of any type (including potable water) cannot be discharged to the environment without an EPA- and NMED-approved Notice of Intent (NOI) to discharge. To prevent the release or transport of a pollutant or contaminant from a PRS, wastewater discharges of any type are not permitted within a PRS. Questions regarding NOIs should be directed to Mark Haagenstad at 665-2014. Storm water discharges to or from a PRS are not permitted. In addition, storm water retention ponds cannot be located within the boundary of a PRS nor can a retention pond be constructed of fill material from a PRS.

To prevent the release or transport of a pollutant or contaminant from a PRS, storm water discharges to or from a PRS are not permitted. In addition, storm water retention ponds cannot be located within the boundary of a PRS nor can a retention pond be constructed of fill material from a PRS. Best Management Practices (BMPs) for Storm Water Pollution Prevention (SWPP) and/or soil erosion control must be in place for all projects prior to the start of any soil disturbing activities within a PRS to minimize potential contaminant migration. Please refer to BMP requirements and guidance listed in the LANL Civil Engineering Standards Manual ISD 341-2, Chapter 3, Section G10, Subsection 6-E, please follow the instructions; http://engstandards.lanl.gov/esm/civil/Ch3_G10-R2.pdf.

Complete PRS Unit Descriptions can be located at <http://erinternal.lanl.gov/PRS/PRSMAN.asp>. The requester's authorized IHS and RP representatives shall use the PRS database data summary tables to prepare IWD form 2101 part 2, per Integrated Work Management P300. To locate data, access the PRS database, type in the PRS number and click "Go". Select "PRS Number" to open PRS description. Scroll through PRS information. If a data table is not shown, there is no data for the PRS collected after 2005 or it is a consolidated unit. If the latter, scroll down to "Related PRSs" and select the individual PRS number. If there is data, it will show in a sampling summary table. If data was collected before 2005, select "CST Offsite Data" link. Clicking on the number in the column "No. of Analytes Detected" or "No. of Analytes Exceeding Background/Fallout Levels" will link to analyte values and depth of sample collected.

PRS Description Summary

PRS 49-008(d) [Radiological Site (less than Nuclear Hazard Category 3)] consists of an inactive underground test chamber, an inactive cable testing facility, and the potentially contaminated soil surrounding these two structures. These structures are located at TA-49 in Area 12. In 1997, contaminated soils were excavated to a depth of 6 in. or less, though some soil was removed to a depth of 9 in. to 12 in. The total area of soil removal is estimated to be 70 square ft. After soil removal, confirmation samples were collected from the two locations with the highest post-cleanup radioactivity, based on surveys with hand-held instruments. Inorganics above background values are cadmium, copper, lead, sodium, uranium and zinc. Radionuclides above background/fallout values are americium-241, plutonium-238/-239/-240 and uranium-234/-235/-238. Organics detected are BHC[alpha-], chlordane[alpha-] and chlordane[gamma-].

PRS 49-005(a) is an inactive landfill located east of Area 10 and north of the road that runs east from Area 10 at TA-49. The landfill, described as a small pit, is approximately 50 ft to 100 ft northeast of the Area 10 experimental chamber and shafts (AOC 49-002). The landfill was constructed in 1984 as a disposal area for nonradiologically contaminated debris that resulted from the 1984 general surface cleanup of TA-49. The wastes consisted primarily of wood and small pieces of metal.

Approved with Conditions.

SWPPP COVERAGE REQUIRED:

R-29 and R-30 will require coverage under a NPDES (National Pollutant Discharge Elimination System) General Permit for Storm Water Discharge from Construction Activities and an associated SWPPP (Storm Water Pollution Prevention Plan). Per my conversations with project staff the SWPPP is currently being developed.

Contact Terrill Lemke, (Office: 665-2397, or Cell: 699-0725, or email: tlemke@lanl.gov) with questions regarding SWPPP development, scheduling of soil disturbing activities, and associated regulatory requirements.

LIQUID DISCHARGES TO THE ENVIRONMENT:

Water may not be discharged to the environment for any reason (i.e., equipment wash down). All liquid waste streams must be contained onsite. Discharge of water (even unused potable water) to the environment requires approval from ENV- WQ & RCRA. Contact Mark Haagenstad (Office: 665-2014, Cell: 699-1733, Email: mph@lanl.gov) for evaluation, and approval of discharges to the environment.

NO 401/404 PERMIT REQUIRED:

Per review of the site maps and conversations with project personnel the proposed activities associated with R-29 and 30 will not take place within a watercourse and will not require a New Mexico Section 401 Water Quality Certification or an Army Corps of Engineers 404 Dredge and Fill Permit.

BMPs:

Utilize and maintain appropriate BMPs (Best Management Practices) to contain excavated materials, and all other pollutants, such as oil from machinery/vehicles, within the work site limits and away from potential storm water flow and storm sewer inlets. Provide secondary containment for items such as oil and fuel containers. Provide specific contained areas for concrete washout products as well as for stockpiled materials and waste. Provide measures as needed to prevent vehicles from tracking dirt/mud from the work site onto roadways (i.e., lined and graveled construction site entrance, sweep sediment back onto site on a daily basis). Additionally, utilize non-structural BMPs such as good housekeeping practices, use of properly trained personnel and proper waste materials disposal to help prevent discharge of pollutants from the site. Stabilize disturbed areas (re-vegetate, concrete, asphalt, etc.) as appropriate at end of project. Properly dispose of all wastes generated by this project. Contact Terrill Lemke, (Office: 665-2397, or Cell: 699-0725, or email: tlemke@lanl.gov) or Tim Zimmerly (Office: 664-0105, Cell: 699-7621, or email: tzimmer@lanl.gov) with questions regarding BMP applications, installation, and maintenance.

DRILLING MUD BMPs and NOTIFICATIONS

Drilling mud must be placed within a lined retention pond until the liquids evaporate or immediately properly disposed of. Properly dispose of solids. Mud from drilling operations involving a SWMU or PRS must first be evaluated for contaminants before disposal occurs.

Contact Tim Zimmerly (Office: 664-0105, Cell: 699-7621, Email: tzimmer@lanl.gov) for evaluation and approval of liquid discharges to the ground. Contact Terrill Lemke, (Office: 665-2397, or Cell: 699-0725, or email: tlemke@lanl.gov) with questions regarding BMP applications, installation, and maintenance.

SITE STABILIZATION:

Stabilize all disturbed areas (re-vegetate, concrete, asphalt, etc) as appropriate at end of project. With regards to vegetative stabilization, choose seed mix and perform re-vegetation activities in strict accordance with the LANL Seeding Specifications 32 9219. Vegetative stabilization is defined by NPDES regulations as perennial vegetation that has grown to a density of 70 percent of native background vegetative cover. The permitted construction site operator cannot be released from NPDES responsibilities until ENV-RCRA has confirmed that final stabilization has been achieved, or until another NPDES permit holder (i.e., LANL) assumes control over all areas of the site that have not been finally stabilized. Achieving vegetative stabilization may require watering vegetated areas of site, and/or multiple growing seasons, until sufficient growth has occurred. Contact Tim Zimmerly (Office: 664-0105, Cell: 699-7621, or email: tzimmer@lanl.gov) or Terrill Lemke, (Office: 665-2397, or Cell: 699-0725, or email: tlemke@lanl.gov) with questions regarding application of seed, vegetation applications, installation, and maintenance and LANL Seeding Specifications 32 9219.

FFC Reviewer

(10/6/2009) by LYNDIA HARTMAN
Not Approved/Action Required.

Based on a review to identify possible impacts and concerns for ENV-RCRA water quality per requirements listed on the 2009

Individual Permit (IP No. NM0030759); your project is located in PRS 49-005(a) within Ancho Canyon Site Monitoring Area (SMA) A-SMA-2 on the Individual Permit.

The work site will need further evaluation for potential site visit and/or coordination with IP personnel to determine BMP type and maintenance schedule.

Please ensure that your project uses appropriate Best Management Practices (BMPs) to protect watercourses and drainages from the project site to maintain compliance with the Individual Permit (IP). Your project is responsible for BMP installation to control erosion and sediment from the site. BMP requirements/guidance is also listed in the LANL Civil Engineering Standards Manual ISD 341-2, Chapter 3, Section G10, Subsection 6-E, please follow the instructions; http://engstandards.lanl.gov/esm/civil/Ch3_G10-R2.pdf.

Additional guidance on the appropriate use of BMPs should be coordinated through Melanee Hand or appointed IP personnel. For information regarding IP work requirements, or for questions or concerns, please contact Melanee Hand (Cell: 505-231-0520, Email: melanee@lanl.gov). The SMA can be viewed using GIS mapping tool located at http://gis-arcimps-p/PRID_Test/default.aspx

OLIVER WILTON, IP-SIS

(9/28/2009) by OLIVER WILTON
Approved with Conditions.

Field activities shall not be conducted until all applicable health and safety documentation has been submitted and approved by the LANL EP H&S Team. Documentation shall be developed in accordance with applicable LANL and DOE 851 requirements.

Points-of-contact:

- Dave Dixon (665-5295)
- Sam Rogers (665-1919 / 664-5396)
- Beryl Cruz (665-1262 / 699-5662)
- Oliver Wilton (665-0731 / 231-5858)

No Comments from Facility Conditions Director.

KURT ANDERSON, IP-SIS

JAMES HAUGEN, ES-UI

JAMES WYRK, IP-SPPI

BELL SMITHOUR, ES-UI

[INDEX](#) | [REQUEST A REVIEW](#) | [FRAMES](#) | [99X-0679](#) | [VIEW MAP](#) | [REVIEWER TICKLER](#) | [COMMENTS](#) | [SME COMMENT FORM](#) | [FM COMMENT FORM](#) | [REVIEWER LIST](#)

These pages are maintained by the Operation & Facility (H&S) Support System Software Development Team. Please contact the [Excavation Team](#) with questions regarding the web review process.

APPENDIX E

**Spark and Flame Permit
(copy)**



The World's Greatest Science Protecting America

Spark Or Flame Producing Operations Permit

Request Date 3/3/10	Starting Date 3/4/10	Expiration Date 3/4/11	Laboratory Job Number	Work Order Number 72006-000-09
Safety-Responsible Line Mgr./Supervisor Mike Alexander		Telephone 699-1336	Mail Stop K497	Organization LWSP
Work Location: Technical Area TA-49	Building N/A	Room N/A	<input type="checkbox"/> Indoors <input checked="" type="checkbox"/> Outdoors	Building Construction <input type="checkbox"/> Combustible <input checked="" type="checkbox"/> Non-Combustible
Description of work to be performed and equipment to be used: Cutting/grinding/welding in support of LWSP drilling operations at regional groundwater monitoring well R-30 located outside of TA-49				
Special Requirements/Controls: LIR 402.840.01.0 Welding, Cutting or other Spark or Flame Producing Operations. All spark or flame producing operations will be conducted in an area cleared of combustible material for a 35 ft radius.				
Initial Risk (Non-facility work only) LOW		Residual Risk (Non-facility work only) LOW		
Work Statements				
Safety and Environment-Responsible Line Manager/Supervisor I have reviewed the requirements on the back of this form and the work site meets those requirements (where applicable). A fire watch is <u>is not</u> required. The fire protection system will / will not be taken out of service or be potentially affected. <i>Mike Alexander</i>				
Name		Signature		Date
Fire Watch (if required) Appropriate fire extinguisher equipment and emergency communications are available at the work site. I will watch for fires during the operation and for 30 minutes after completion of the operation. I will inspect the operator's apparel for the presence of hot slag and smoldering fabric before the operator leaves the area.				
Name		Signature		Date
<i>* See next page</i>				
Operator I am aware of the hazards of the operation and the controls required to perform the work safely. I will place welding cables and other equipment so that it is clear of passage ways, ladders, and stairwells. I will shut off and/or de-energize equipment before leaving the work area and during periods when the equipment is not in use. If I act as my own fire watch, I will watch for fires during the operation and inspect the work area carefully after completion of the operation and prior to leaving.				
Name		Signature		Date
<i>* See next page</i>				
REVIEWS				
EOO-Fire Required if fire protection system will be taken out of service or potentially affected. Recommended if fire watch has been determined not to be required.				
Name		Signature		Date
		<i>N/A</i>		
ES&H Personnel Required if operation is conducted in a confined space; if the operation is to be performed near a chlorinated solvent; if the operation involves the use of cleaning compounds or the use of materials containing cadmium, fluorine, zinc, lead, beryllium, or mercury; or the operation involves drums, barrels, tanks, pipes, or other containers which have contained or been cleaned with flammable materials or substances which, when subjected to heat, produce flammable or toxic vapors, or flammable or explosive material, or the operation will be conducted in or on a filter plenum used to filter radioactive or other hazardous materials.				
Name		Signature		Date
		<i>N/A</i>		
Authorization				
Safety and Environment-Responsible Line Manager/Supervisor				
Name		Signature		Date
<i>Mike Alexander</i>		<i>[Signature]</i>		<i>3/3/10</i>

operator
name

signature

date

Harold Waddell

Harold Waddell

2-28-10

Keith Johns

Keith Johns

2-28-10

firewatch

name

signature

date

Stephen Thomas

Stephen Thomas

02/28/2010

Thomas Klepper

Thomas Klepper

02/28/2010

Requirements For Spark-Or Flame-Producing Operations Permit

The spark-or flame-producing operations permit must be used for facility management work control and may be used in lieu of, or in addition to a hazard control plan for programmatic work to authorize spark-or flame-producing operations.

The following requirements shall be in place for spark-or flame-producing operations (where applicable):

- Combustible, flammable, or hazardous materials shall be moved at least 35 ft horizontally from the spark-or flame producing operation or shall be protected from ignition by suitable fire-resistant covers or guards;
- Openings in walls or floors within 35 ft of the operation shall be protected with suitable fire-resistant covers or guards;
- Required fire extinguisher equipment (other than existing fire extinguishers) shall be maintained in a state of readiness and shall be accessible;
- A trained fire watch shall be assigned, if required. A fire watch is required whenever spark-or flame-producing operations are performed in locations where other than a minor fire might develop, or any of the following conditions exists:
 - Combustible material, in building construction or contents, is closer than 35 ft to the point of operation;
Guidance Note: Protecting combustible materials by suitable fire-resistant covers or guards, or the use of fire-retardant lumber, within the 35-ft radius of the hot work activity does not eliminate the need for a fire watch.
 - Combustibles are more than 35 ft away but are easily ignited by sparks or hot slag;
 - Wall or floor openings within a 35 ft radius expose combustible material in adjacent areas including concealed spaces in walls or floors; and
 - Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and are likely to be ignited by conduction or radiation.
- Combustible floors within a 35-ft radius shall be kept wet, covered with damp sand, or protected by fire-resistant shields. If the spark-or flame-producing operation will be conducted outdoors, the area around the operation within a 35-ft radius shall be clear of combustible ground cover or otherwise protected from ignition;
- If the spark-or flame-producing operation will be performed on items such as used drums, barrels, tanks, pipes, or other containers, the container shall be cleared or purged of any flammable materials, or any substances such as grease, tars, acids, or other materials which when subjected to heat might produce flammable or toxic vapors, or flammable or explosive material;
- Welding, cutting, burning or brazing operations on a pressure vessel system shall be reviewed by the Pressure Vessel and Piping Committee to determine if welding certification is required;
- Shielding shall be in place to protect personnel in the general vicinity from bright light rays or exposure to flames and
- The required personal protective equipment shall be available and used.

In addition, reviews shall be requested as indicated below if any of the following conditions apply to the operation:

- The operation is in a confined space; is to be performed near a chlorinated solvent; the operation involves the use of cleaning compounds or the use of materials containing cadmium, fluorine, zinc, lead, beryllium, or mercury; the operation involves drums, barrels, tanks, pipes, or other containers which have contained or been cleaned with flammable materials or substances which, when subjected to heat, produce flammable or toxic vapors, or flammable or explosive material or the operation will be conducted in or on filter plenums used to filter radioactive or other hazardous materials. Contact ES&H core or distributed personnel for support.
- The fire protection system will be taken out of service or will be potentially affected. Contact the FM Designee. The FM Designee shall coordinate review by FWO-Fire. FWO-Fire review is also recommended if a fire watch has been determined not to be required.
- Other hazards associated with the operation and the required controls shall be included under "special requirements/control."

