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Los Alamos
National Laboratory

Environment and Remediation Support Services Division

Quality Assurance Project Plan

for the

Drilling Operations Project

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General Information about this plan

Table of Contents

Appendices

This plan has the following appendices:

General Information, continued

History of revision

This table lists the revision history of this plan.

Revision	Date	Description Of Changes
0	12/21/06	New document.

Section 1 Quality Program

Organization

Policy

The Drilling Operations (DO) Project will achieve the goals set forth by various programs and projects served by the Project. An integrated quality program and this tiered Quality Assurance Project Plan (QAPP) will assist in meeting this objective.

Purpose of the Project

The Los Alamos National Laboratory (LANL) DO Project supports a number Environmental Programs Directorate missions by

- providing logistics and technical support for drilling operations.
- assisting the drilling contractor to successfully achieve specified goals.

Purpose of this plan

This QAPP describes the policies and requirements that ensure the DO Project portions of the Water Stewardship Program (WSP) processes are conducted in a consistent, agreed-upon manner.

Structure of the quality program

The quality program is a set of tiered documents that, when used in concert, provide the basis for performing work consistently and ensure customer objectives are met. Together, these plans and procedures describe or prescribe all the planned and systematic activities believed necessary to provide adequate confidence that DO Project processes perform satisfactorily. The following documents make up the tiered quality program:

- ERSS Division quality program requirements
- QAPP for the DO Project (this document)
- Project Specific Drilling Plan (DP)
- Implementing procedures

Organization, continued

Program organization

The Water Stewardship Program (WSP) supports the environmental restoration program and characterization efforts within the Environmental Programs Directorate of LANL. The program consists of a number of projects providing remediation support services.

The program is organized by projects or teams under the line management direction of the program manager. Projects and teams provide services, deliverables, or products to support overall WSP missions. Project leaders have the responsibility to ensure the project is completed.

Appendix A provides the program organizational chart. The organization of the WSP is shown at http://erinternal.lanl.gov/contacts/docs/WSP_OrgChart.pdf.

Project organization

A project organization chart is provided in Appendix A. The DO Project provides a specific service that supports a number of EP Directorate missions, mostly related to compliance with provisions of the Consent Order. The scope of work to be done is defined by programs, while services to accomplish the work are provided by teams under line supervision of group leaders. The DO Project Leader guides the work as part of these supporting services and disseminates data and other deliverables associated with the work scope. The DO Project Leader reports to the Field Operations Integration Manager who in turn reports to the Operations Program Manager. The WSP Operations Program Manager reports to the WSP Program Director. A program QA specialist is assigned to work for the program to provide QA assistance, advice, and review. Drilling projects are not always running, so to achieve efficiency in staff allocation and use, program resources are matrixed to the project on an as-needed basis. LANL staff provide logistical and technical support to the drilling subcontractor.

A Drilling Operations Task Leader is appointed by the DO Project Leader to perform assigned tasks.

Note: The Canyons Project Leader will be the customer requesting most drilling operations, but other project leaders may request work by the DO Project.

Organization, continued

Technical Support Team

A Technical Support Team, led by the Canyons Project Leader or other requesting project leader and composed of appropriate technical subject matter experts, will provide technical review and decision-making for all technical issues that affect or may affect compliance with Consent Order requirements or otherwise affect proper completion of the work. The team will meet as needed at the request of the DO Project Leader to make decisions on all well design, installation, or sampling issues. See the chapter *Drilling Technical Support Team.*

Applicable quality criteria

The driver for the quality plan is the U.S. Department of Energy (DOE) Order 414.1C, which has been interpreted within the following documents:

- LANL Quality Assurance Program (IP 300-SD3.3)
- ERSS Quality Assurance Plan (EP-ERSS-QAP-0001)
- ERSS Quality Plan Description (EP-ERSS-QAP-0002)
- ERSS Quality Plan Implementing Matrices (EP-ERSS-QAP-0003).

Implementation

The following table lists specific responsibilities.

Who	What
DO Project Leader	Oversee all field operations of the drilling subcontractor. Guide the work scope completed as part of these supporting services and disseminate data and other deliverables associated with the work scope Report to the Operations Program Manager.
Requesting PL or Canyons Project Leader	Lead and convene the Technical Support Team when requested by the DO Project Leader to make decisions on well design, installation, sampling, and other technical issues. Request subject matter experts, with appropriate technical expertise in the geosciences, to be members of the Technical Support Team. Ensure all technical decisions and the reasoning for the decisions are documented as a record to the DO Project Leader.

Organization, continued

Who	What
Drilling Operations Task Leader	Assist the drilling subcontractor with the PR-ID review process and ensure requirements are passed on in the SOW and/or drilling plan. Prepare or assist subcontractor in preparation of LANL work permits. Coordinate LANL borehole logging operations. Arrange for LANL or KSL support services as needed and as specified in the drilling plan. Ensure the drilling subcontractor complies with the drilling plan.
Program QA Specialist	Provide quality assurance assistance, advice, and work review for the DO Project Leader.
LANL staff	Provide logistical and technical support to the drilling project as requested by the DO Project Leader.
Subcontractor Technical Representative	Review provisions of the contract, approve invoices for payment, ensure compliance with contract provisions, and perform other required duties as the technical representative for the drilling contract with LANL, as required by the LANL contracting oversight organization.
Drilling subcontractor	Perform drilling operations in accordance with the drilling plan.

Section 2 Personnel Development

Personnel Training and Qualification

Policy

Personnel selection, training, and qualification requirements will be established for each function. The DO Project Leader will establish training plans for LANL staff. These will include the minimum, applicable requirements for education, experience, skill level, and physical condition. In general, staff conducting the work will require HAZWOPER, DOE Rad-Worker II, and General Employee Training. All personnel doing work for the project will be trained to the site-specific health and safety plan (SSHASP) and applicable ERSS standard operating procedures (SOPs). Subcontractor staff will be trained to the subcontractor's quality management plan, subcontractor work instructions, and applicable quality procedures as appropriate to their assigned roles. The DO Project Leader will review subcontractor training documents and provide input regarding required training.

Training of personnel

Training will be done in accordance with procedure EP-ERSS-SOP-2011, "Personnel Training and Qualification."

Training effectiveness

Training effectiveness will be monitored. Worker performance will be evaluated to ensure that the training program conveys all required knowledge and skills. DOE's contractor will monitor training efficacy through established, internal, policies and procedures. The DO Project Leader will monitor training efficacy for assigned LANL staff.

Implementation

The following table lists responsibilities.

Who	What
DO Project Leader	Ensure contractor staff is trained to the SSHASP, applicable LANL SOPs, work instructions, and applicable quality procedures as appropriate to their assigned roles. Establish training plans for assigned LANL staff. Review contractor training documentation and provide input on required training. Ensure training efficacy for assigned LANL staff.
Well Operations Project Leader	Ensure training efficacy for assigned LANL staff.

Section 3 Quality Improvement

Improving Quality

Policy

The DO Project subscribes to the WSP Quality Management Program principles of problem prevention and continuous improvement. All personnel are encouraged to identify and suggest improvements in all processes and activities, without fear of ridicule or retaliation. The objective of the improvement process is to prevent problems, improve the quality of products and services, and reduce the variability of the product of all processes. The DO Project Leader will evaluate improvement opportunities identified by trending and reporting. Regular meetings will be held to keep personnel informed.

Team meetings

Project performance will be monitored through regular meetings with project personnel including the drilling subcontractor site representative and Subcontract Technical Representative, to be held at least weekly whenever drilling operations are occurring. Weekly topics will include:

- Project related improvements and issues
- Current status of the drilling operations
- Equipment needs and issues
- Personnel needs and issues
- Review of project priorities and requirements.

Monthly status reports

The DO Project Leader will provide monthly status reports to the WSP Operations Program Manager and the Canyons Project Leader or requesting PL outlining drilling project status, issues identified, and planned corrective actions. The reports will address items such as:

- Contractor performance
- Issues identified during inspections
- Safety concerns and incidents
- Resolution of technical issues
- Issues identified during assessment activities or during routine performance of work, and corrective action plans

Improving Quality, continued

Performance monitoring and reporting

The DO Project Leader will periodically collect input from those organizations that use the data and other products associated with this project. These updates will be used to keep LANL management apprised of the DO Project policies and procedures and to identify any shortcomings that may be identified. This feedback will also be used to evaluate subcontractor performance and will provide input regarding potential changes to the drilling plan.

Performance report distribution

The following receive copies of performance reports:

- Canyons Project Leader
- WSP Operations Program Manager
- WSP Quality Specialist

Corrective actions

Corrective actions for all WSP projects will be initiated, tracked, corrected, and documented according to procedure EP-ERSS-SOP-3001, "Issues Management."

Implementation

The following table lists responsibilities.

Who	What
DO Project Leader	Ensure an atmosphere exists that allows employees to suggest improvements and opportunities to prevent problems, improve environmental compliance, reduce environmental impacts, and enhance safety and security. Apprise LANL management of the DO Project policies and procedures. Hold regular project meetings at least weekly when drilling operations are occurring to discuss needs, problems, corrective actions, and other project-related issues. Prepare monthly status reports to the WSP Operations Program Manager and Canyons Project Leader. Monitor and trend program performance and ensure issues are corrected in a timely manner. Perform trend analysis of deficiencies or issues at least annually and report in a memo or status report. Collect input from those organizations that use the data and other products associated with this project. Ensure corrective actions are initiated and documented according to applicable ERSS procedures.

Section 4 Documents and Records

Project Documents

Policy

Project documents resulting from the project will be maintained as records in accordance with ERSS records requirements. Documents to be generated include the Work Plan, Statement of Work, sampling and analysis plan, drilling plan, submittals to NMED as required by the Consent Order, and this QA plan. Specific requirements for the generation of these documents are described elsewhere in this plan. Implementing procedures specify records, forms, logbook entries, or information to be kept as documentation of the performance of the procedure.

Revising this plan

The DO Project Leader and the WSP Operations Program Manager will approve all revisions to this plan. Revisions to the plan will be provided to the QA Specialist.

Quality procedure development is specified in procedure EP-ERSS-SOP-5001, "Preparation, Review, Approval, Revision, and Cancellation of Procedures." Other documents will be developed in accordance with procedure EP-ERSS-SOP-4002, "Document Development, Review, and Production."

Document control

This document will be controlled under the ERSS Division's document control system (procedure EP-ERSS-SOP-4001, "Document Control and Distribution") to ensure that those performing work for the project will receive a controlled copy and all revisions. Those who will receive or have nearby access to a controlled copy include the:

- DO Project Leader
- Drilling Operations Task Leader
- Canyons Project Leader
- WSP Program Director
- WSP Operations Program Manager
- Assigned QA specialist
- DO project members
- Assistant Area Manager, Office of Environment and Projects, DOE Los Alamos Area Office

Procedures

Procedures will be developed as necessary and in accordance with applicable procedures.

Project Documents, continued

Implementation The following table lists responsibilities.

Who	What
DO Project Leader	Initiate plan revisions as needed. Ensure necessary procedures are developed as needed. Ensure review of plan revisions by required reviewers and approval by WSP Operations Program Manager. Ensure documents listed in the policy above are maintained.

Project Records

Policy

Records will be kept of critical operations and work. The number, type, and detail of all records to be kept will provide sufficient information to allow an individual with sufficient education and training to verify or reconstruct the results. The types of field records to be kept are detailed below. All records will be submitted to the records processing center for storage and maintenance in accordance with procedure EP-ERSS-SOP-4004, "Records Transmittal and Retrieval." The DO Project Leader will ensure records requirements are passed on the drilling subcontractor in the SOW.

Field documentation

The table below lists documentation that will be completed during the course of fieldwork. The content and format of most of these documents are well established.

Required Field Documentation	
Documentation	Frequency
Daily activity report	Daily
Field logbook	Daily
Driller's log	Daily
Geological field log	As needed
Sample collection log	As needed
Chain of custody, request for analysis	As needed
Tailgate meeting attendance form	Daily
Visitor's sign-in log	Ongoing
Miscellaneous waste management forms	As needed
Weekly summary report	Weekly
Field photographs	As needed
Water-level measurement data sheet	As needed
Pipe tally sheets	Ongoing
Borehole status form (geophysics)	As needed
Borehole geophysical logs	Within five days of logging
As-built well-design drawing	As needed

Project Records, continued

Well summary fact sheets

The Consent Order requires the submission of a well summary fact sheet to NMED within 30 days of completion of each regional and intermediate aquifer well. Installation of all wells will be considered complete when the well casing has been installed to its final position and the casing rim can be measured relative to the ground surface. The drilling subcontractor will compile and assemble the fact sheets. The Technical Support Team will review and comment on the fact sheets, and the Canyons Project Leader or other requesting project leader will submit the completed well summary fact sheets to NMED. The fact sheets require information about

- the well owner
- the location
- the drilling contractor
- well construction and geology
- water-bearing strata
- contaminants detected in screening samples
- other general information (such as drilling method or depth to water).

Well completion reports

The Consent Order requires the submission of well completion reports to NMED within 150 days of completion of each regional and intermediate aquifer well. The drilling subcontractor will be responsible for compiling and assembling the well completion reports. The reports will include summaries of drilling, well construction (including as-built well-design drawings), development, wellhead protection, site restoration, waste management, radiological and geodetic surveys, and lithologic logs. The Technical Support Team will review and comment on the well completion reports, and the Canyons Project Leader or other requesting project leader will submit them to NMED.

Project records

Other records to be kept will include:

- Statement of Work
- Drilling plan
- Memos approving changes to the drilling plan
- Memos documenting Technical Support Team decisions
- Correspondence to and from NMED
- Reviews and approvals from managers for significant policy-affecting decisions
- Checklists of inspections for compliance with drilling plan
- Logs of inspections conducted at drilling site
- Other memos, emails, and correspondence that provides a history of decisions made and documentation of results.

Project Records, continued

Implementation The following table lists responsibilities.

Who	What
DO Project Leader	Ensure requirements for well summary fact sheets and well completion reports are passed on to the drilling subcontractor and geologist in the contracting statement of work and drilling plan. Ensure review by the TST of the well summary fact sheets and well completion reports before submittal to NMED.
Technical Support Team	Review and comment on well completion reports, well summary fact sheet, and other documentation required by the Consent Order and prepare a record of the reviews.
Requesting project leader or Canyons Project Leader	Submit completed well completion reports and completed well summary fact sheets to the NMED within specified deadlines.

Electronic Media

Policy

The project will utilize electronic means as necessary to maintain data and perform calculation on these data. Electronic means will not replace paper copy. All records that must be maintained to meet regulatory requirements will be kept in hard copy as the official record.

Databases

Should databases be developed to manage or track work performed by the Groundwater Drilling Project, the following requirements will be met:

Backups—All databases will be backed up daily to minimize potential losses of data.
Verification of data—Data entered into project databases from paper copy will be verified. Someone other than the data entry person must perform 100% review. This review should be documented.
Verification of calculations—A person other than the person who generates the query will review for accuracy all the calculations performed in a database through queries. This review should be documented.
Software—The integrity of any databases created to support the project will be ensured by maintaining them on a common server. This will enable the database administrator to control access to these databases, allowing only trained and authorized persons to access the database.
Procedure EP-ERSS-SOP-5091, "Database Permissions and Change Management," will be followed for all database activities.

Spreadsheets

All spreadsheets used to support the project will be maintained in a secure location. Spreadsheets will be backed up at least weekly.

Implementation

The following table lists responsibilities.

Who	What
DO Project Leader	Ensure requirements for electronic data management are communicated and followed.

Section 5 Work Processes

Planning and Performing Work

Policy

Work that contributes to achieving the quality specifications of the DO Project deliverables will be planned and documented as described in this plan and appropriate implementing procedures. Work will be performed according to applicable plans and implementing procedures. The DOE contractor performing the drilling will provide first-line supervision of personnel assigned to program tasks to ensure work is performed to achieve program quality specifications. Before changing a work process that affects program quality specifications, the project leader will ensure the same level of planning and review as used in the initial program-planning steps.

Work processes

All work will be regarded as a process. Each process consists of a series of actions and is planned and carried out by qualified workers using specific work processes and equipment under administrative, technical, and environmental controls established by management to achieve an end result. Workers are the best resource for contributing ideas for improving work processes and will be involved in work process design, process evaluation, and provision of feedback necessary for improvement. All work will be planned using the principles of Integrated Safety Management and in compliance with applicable Laboratory Implementation Requirements (LIRs) and applicable quality documents, as appropriate.

Work performance

Management will ensure that the following are clearly identified and conveyed to workers prior to beginning work:

- Customer and data requirements for the work and final product.
- Acceptance criteria applicable to work and final product.
- Hazards associated with the work.
- Technical standards applicable to work and final product safety, administrative, technical, and environmental controls to be employed during the work.

Planning and Performing Work, continued

Description of work processes

The work processes used to meet the regulatory requirements and the requirements of this plan generally follow this sequence:

- Obtain approval for Work Plan from NMED
- Prepare sampling and analysis plan for sampling of the completed well
- Prepare SOW for procuring drilling services
- Work with selected drilling subcontractor to write drilling plan
- Review drilling plan
- Review proposed changes and drilling findings by technical support team
- Revise drilling plan as needed on recommendation of support team
- Conduct weekly inspections using checklists
- Review all required records and documentation
- Close out operation

Each of these processes and associated subprocesses are described in this section.

Implementation

The following table lists responsibilities.

Who	What
DO Project Leader	Ensure the same level of planning and review as used in the initial program planning steps before changing a work process that affects the program quality specifications. Plan all work using the principles of Integrated Safety Management and in compliance with applicable LIRs and the division quality requirements, as appropriate. Ensure that work performance requirements are clearly identified and conveyed to workers prior to beginning work.
All personnel	Contribute ideas for improving work processes. Be involved in work-process design, process evaluation, and provision of feedback necessary for improvement.

Work Plan

Policy

A work plan will be prepared in accordance with Consent Order requirements and approved by the NMED that defines the objectives for the well. The work plan will be used as the basis for the Statement of Work (SOW) used to procure a drilling subcontractor. Note that the Work Plan will usually refer to requirements in the Consent Order, but the work plan may approve deviations from the Consent Order. Thus, the work plan is the final authority regarding specific requirements.

Implementation

The following table lists responsibilities.

Who	What
Canyons Project Leader	In compliance with Consent Order requirements, prepare and submit the work plan to the NMED and obtain approval by NMED for the proposed work. Forward the approved work plan to the DO Project Leader for use in developing the SOW or task order (when a "master drilling contract" is in place).

Development of Statement of Work

Policy

A Statement of Work (SOW) will be prepared to fully describe the drilling work to be done by the subcontractor. Previous SOWs may be used as a template. The SOW will be based on the work plan approved by the NMED and will have sufficient detail to allow a subcontractor to make a suitable bid for the work. The SOW will include:

- Details of the sampling and analysis plan (SAP).
- Requirements for waste management.
- Requirement to develop a drilling plan (DP) according to the content requirements specified in the chapter *Content of Drilling Plan*.
- Other details as appropriate for the specific well location and type of well to be drilled.
- Requirements for records to be kept as listed in Section 4 of this document.
- List of specific procedures that the subcontractor must follow for certain operations or processes.
- Specific permits, approvals, or other requirements identified in the Project Review and Requirements Identification System (PR-ID) review.
- Hold points for NMED review of certain proposed changes or encountered conditions.
- General health and safety requirements.
- Quality requirements.
- Specific deliverables with schedule.

Content of the sampling and analysis plan

The sampling and analysis plan portion of the SOW will address all requirements for sample collection specified in the Consent Order that are applicable to the drilling and well installation phase. The plan will include a brief description of the overall objectives for the well(s) to be installed; the roles and responsibilities of those responsible for each part of the listed sampling activities (if not all to be done by the drilling subcontractor); the type and frequency of data to be collected; and information about the types, frequency, volumes, and containerization of samples that will be collected.

Development of Statement of Work, continued

Well construction

Well construction specifications will be in accordance with requirements of the Consent Order and procedure EP-ERSS-SOP-5032, "Well Construction." Current regulatory requirements, including those specified in the Consent Order with NMED, are promulgated in this SOP. A copy of the Consent Order sections that are applicable to the drilling, well construction, and well completion operations will be attached to the SOW.

The Canyons Project Leader or other requesting project leader will prepare a proposed well design and specifications to be included in the SOW. NMED provides guidelines for well specifications. Procedure EP-ERSS-SOP-5032 provides a summary of those specifications and a drawing of the typical well design.

Sampling system

The SOW will specify the type of Consent Order-compliant sampling system to be installed in the well upon completion and the testing and acceptance criteria for the sampling system.

Well video and geophysics

The SOW will specify what Consent Order-compliant geophysics will be performed in accordance with procedure EP-ERSS-SOP-5030, "Contract Geophysical Logging." The geophysical logs required will be specified and will include an alternate suite of logs for cased holes. Geophysics may include downhole video, natural gamma, and induction array logging. In addition, LANL may run Laboratory-owned tools to supplement the contractor logging.

Well development

The SOW will require Consent Order-compliant well development on all newly constructed wells to remove suspended sediment from the water until turbidity is less than 5 nephelometric turbidity units (NTU) and less that 2 ppm total organic carbon (TOC) for three consecutive samples. Additional water quality parameters to be measured during development include pH, temperature, and specific conductance. The SOW will specify the definition of the well development endpoint.

Aquifer testing

The SOW will provide specifications for Consent Order-compliant aquifer testing after the well is completed.

Development of Statement of Work, continued

Radiation screening

Many drilling sites require equipment to be radiation screened by the Health Physics Operations Group (RP-1) before being allowed onsite, and upon completion of activities for release to public roads or to other sites. The SOW will specify when rad screening is required for a drilling operation. The DO Project Leader will determine if rad screening will be required pursuant to the chapter *RCT Support*. If required, such screening may involve continuously monitoring core material while drilling is taking place and submitting core samples for analytical testing by Acoustic Resonance Spectroscopy prior to submission to the Sample Management Office (SMO).

Site restoration

Restoration specs in the SOW will conform to requirements of the Storm Water Pollution Prevention Plan and will include:

- Road improvements and the drilling pad will be left in place to facilitate future well sampling and maintenance.
- The drill pad area will be reduced by approximately 50% during site restoration.
- The cuttings pit will be backfilled, and the ground surface will be recontoured.
- Metal posts will be installed to identify the perimeter of the cuttings pit after burial and appropriately marked or connected by chain to prevent vehicles from driving over the cuttings pit area and getting stuck.
- Erosion control will be accomplished in accordance with LANL's best management practices (BMPs) guidance document.
- The site will be reseeded according to LANL specs.
- BMPs will not be removed until vegetative cover is 70% of predrilling conditions.
- Waste will be properly disposed in accordance with the WCSF and all applicable State and Federal requirements.

Subcontracting

The SOW will allow the drilling subcontractor to subcontract certain work processes to other subcontractors. All applicable requirements in the SOW and the approved drilling plan must be passed on to each subcontractor and the drilling subcontractor will remain responsible for the compliance of hired subs to all DP requirements.

Implementation

The following table lists responsibilities.

Development of Statement of Work, continued

Who	What
DO Project Leader	Prepare a SOW, to be bid upon by potential drilling subcontractors, that meets the content requirements given above. Include the SAP, developed by the Canyons Project Leader or other project leader, in the SOW. Obtain formal review of the SOW by the Technical Support Team, other affected project leaders, and WSP Operations Program Manager. Submit the proposed well drilling operation to the PR-ID system for review and identification of permits, approvals, and other requirements that may be needed for the work; ensure these requirements are incorporated into the SOW.
Canyons Project Leader or other requesting project leader	Write the SAP portion of the SOW by conferring with internal customers and referring to agreed-upon requirements in the work plan. Include all requirements for sample collection specified in the Consent Order that are applicable to the drilling and well installation phase. Ensure a copy of the Consent Order requirements applicable to well drilling, construction, and installation is attached to the SOW. Review the draft SOW and provide feedback to the DO Project Leader.
Technical Support Team	Review the SOW and provide technical advice, through the requesting PL, on well design, sampling, development, and completion issues.

Content of Drilling Plan

Policy

The successful subcontractor for a drilling project will be required to develop a drilling plan (DP) that will specify how the subcontractor will comply with all requirements in the SOW and applicable sections of the Consent Order. The drilling plan will address the drivers given in the SOW, include required elements as specified in this chapter and elsewhere in this plan, list the specific equipment and supplies the driller proposes to use, and will be approved by the DO Project Leader before implementation. The drilling subcontractor is expected to work closely with the project leader during development of the plan.

Well drilling

The DP will provide for contingency drilling methods if the preferred drilling method is not executable. The DP will specify what drilling additives will be available for use, if needed. Only approved Baroid or Cetco brand drilling products will be employed during drilling and completion of wells. In the event that a corehole collapses or circulation is lost, the DP will specify how permission for an alternate drilling method will be obtained.

Site preparation

The DP will include specifications for

- radiological survey of the access roads, drill sites, and drilling equipment by LANL radiological control technicians (RCTs)
- site preparation requirements in procedure EP-ERSS-SOP-5055, "General Instructions for Field Investigations"
- installation of mobile field offices (geotrailer) and site services
- construction of drill pads and lay-down areas
- implementation of road improvements along access roads.
- requirements identified during the PR-ID (project requirements identification) review process.

Waste management

The project will follow procedure EP-ERSS-SOP-5023, "Waste Characterization" which describes detailed requirements for waste management including the development of the Waste Characterization Strategy Form (WCSF). This procedure will be implemented when developing strategies for the storage, handling, and characterization of wastes generated during field activities. The DP will require that the WCSF be completed as part of the final review for readiness prior to initiation of field projects that are expected to result in waste generation.

Content of Drilling Plan, continued

Investigation-derived wastes

Investigation-derived waste generated during drilling, well development, and testing (e.g., drill cuttings, water, drilling additives) will be sampled and analyzed for the suite of constituents that are listed on the WCSF. Cuttings and water samples will be collected and submitted under chain-of-custody documentation to the sample management office (SMO). All water produced during drilling and development will be containerized, sampled, and evaluated. Decisions regarding the disposal of drilling and development water will be made in accordance with the "NOI Decision Tree" (revised July 26, 2006) and in coordination with ENV-RCRA and will be documented for the project records. Drilling and development water approved for discharge will be applied to the land surface or used for dust suppression on access roads or the drill site in accordance with the terms and conditions of the original Notice of Intent (August 2, 2001). Cuttings will be evaluated for either disposal as waste or for use in site rehabilitation, as described in LANL's September 29, 2006 letter to NMED (EP2006-0868). This evaluation will be performed in coordination with ENV-RCRA. If cuttings are determined to be suitable for site restoration/land application at the drill site, the rationale for this determination will be documented for the project file. Cuttings approved for site restoration/land application will be used to backfill the cuttings pit (if not land-applied on site for other site restoration purposes) after the cuttings pit liner has been removed.

Waste disposal

Waste may be disposed of by coordinating with LANL Waste Management organizations or by directly negotiating with the receiving facility. Methods of disposal should be outlined in the WCSF.

Process for modifications to the DP

The DP will specify the process to be followed to request, review, and document approval for changes to the drilling plan specs. Changes to the plan must be approved by the DO Project Leader; changes that affect borehole drilling, well installation, sampling design, and other significant changes will require review by the Technical Support Team. Some changes will require review by NMED.

Implementation

The following table lists responsibilities.

Content of Drilling Plan, continued

Who	What
DO Project Leader	Ensure requirements for content, preparation, review, and use of the drilling plan are passed on to the drilling subcontractor in the SOW or other contract documents. Work with the drilling subcontractor to develop the DP and ensure it meets content requirements given in this chapter and elsewhere in this plan. Obtain formal review of the DP according to requirements in the chapter *Review of DP*.

Review of Drilling Plan

Policy

The drilling plan (DP) will be prepared by the drilling subcontractor with input from LANL projects, programs, or groups that will rely on the outcome of the work. The project leader will coordinate the development of the plan and ensure it is reviewed by the Technical Support Team and other appropriate technical and compliance subject matter experts.

Reviewers

The Drilling plan will be subject to formal review by:

- Technical Support Team
- WSP Operations Program Manager
- Subcontractor Technical Representative
- QA
- Safety
- Surface water (for site remediation aspects)

Implementation

The following table lists responsibilities.

Who	What
DO Project Leader	Coordinate the preparation, review, and approval of the drilling plan with the drilling subcontractor. Ensure the plan is reviewed by appropriate safety, quality, and the requesting PL. Ensure the appropriate LANL organization responsible for overseeing the lab's Storm Water Pollution Prevention Plan reviews the plan for compliance with site restoration requirements. Act as mediator to resolve comments on the DP. Appropriately mark or identify draft versions of the plan so they will not be confused with the final version. Ensure customers participate in the development and review of the drilling plan and their comments and concerns are addressed. Ensure final version of the drilling plan is distributed as a controlled document.
Subcontractor Technical Representative	Review DP to ensure it meets and does not exceed contract provisions.

Review of Drilling Plan, continued

Who	What
Technical Support Team	Review the DP and provide technical advice on well design, sampling, development, and completion issues.

Changes to Drilling Plan

Policy

The drilling plan (DP) will be implemented by drilling subcontractor personnel during drilling operations. The DP will not be changed once approved; deviations from the approved plan will be documented in formal memos which will be incorporated into the DP according to the general process below. The DP will specify conditions under which deviations from the plan may be requested and conditions that would trigger contingencies in the plan. All reasonably expected potential triggers and the contingent actions will be described in the DP. Significant changes to technical or compliance aspects of the drilling operations will require review by the Technical Support Team.

Examples of contingencies or action triggers

Examples of conditions that would trigger contingencies and require approvals by the DO Project Leader and Technical Support Team:

- discovery of perched water
- need for new well design/screen placement
- need for new hydrologic testing design
- change in drilling method
- need for different permanent sampling system.

Implementation

The following table lists responsibilities.

Who	What
DO Project Leader	Identify all reasonably expected potential trigger actions and define contingent actions in the DP during review of the DP. Communicate discovery of unusual conditions via internal distribution to technical staff. Include DOE and LANL Management in distribution. Request review by the Technical Support Team of major proposed changes to the DP, including changes to the borehole installation, well design, and sampling design. Give formal written approval to drilling subcontractor to implement an approved deviation or contingent process. Document decisions made and communicate to DOE. Contact DOE Oversight Bureau for split sampling, as necessary. If required by Consent Order, notify NMED of unexpected conditions.

Changes to Drilling Plan, continued

Who	What
Technical Support Team	When requested by the DO Project Leader, review major proposed changes to the DP and provide technical advice on the proposed changes. Document all decisions and the reasoning for a decision in a formal memo the DO Project Leader.

Oversight of drilling subcontractor

Policy

Compliance with all requirements of the drilling plan and the Consent Order will be assured by regular oversight of the drilling operations. Checklists will be developed to be used during inspections to ensure compliance with critical requirements in the drilling plan and Consent Order. A log will be kept to document each inspection and the status of compliance with each aspect of the drilling plan. Inspections will be done at least weekly, but may be conducted as frequently as daily for some drilling conditions, at the direction of the DO Project Leader. Inspection checklists and logs will be maintained as records.

The Drilling Operations Task Leader will provide assistance and act as the facilitator with LANL organizations as needed. Such assistance could include requesting KSL services, obtaining permits for spark-producing activities during extreme fire conditions, requesting radiation surveys, obtaining excavation permits, facilitating sample analyses, etc.

Implementation

The following table lists responsibilities.

Who	What
DO Project Leader	Develop checklists from the approved drilling plan and the applicable section of the Consent Order that list critical requirements. Assign appropriate personnel, including managers for some aspects, to conduct inspections using checklists at least weekly at each drilling operation. Require more frequent inspections for certain drilling operations.
Subcontractor Technical Representative	Perform reviews of contractor invoices and other information to ensure compliance with contract provisions. Review daily reports from the drilling subcontractor.
Drilling Operations Task Leader	Conduct inspections, using the checklists provided by the DO Project Leader, to help ensure compliance with requirements of the DP. Interface with the drilling subcontractor to arrange assistance from LANL support organizations (e.g., excavation permits, radiation surveys, fire permits, electrical installations, sample analyses, etc.), as needed.

Drilling Technical Support Team

Policy

A Technical Support Team composed of a combination of technical experts appropriate for the requested drilling operation (e.g., geologists, hydrologists, and geochemists) will provide technical review and decision-making for all technical issues that affect or may affect the customer's requested work. Some of the documents the team will review include:

- SOW
- Sampling and analysis plan
- Drilling plan
- Final well design after borehole completion
- Proposed changes to drilling plan due to unexpected and expected events.

Leadership and meetings

The team will be led by the Canyons Project Leader or other requesting PL who is the customer for the drilling operation. The requesting project leader will request appropriate subject matter experts to participate on the team. Team members will be expected to stay current on the status of drilling operations and borehole conditions (e.g., through regular communication with field personnel, reading daily drilling reports, and/or visits to the drilling site) in order to facilitate efficient decision-making. The team will meet as needed at the request of the DO Project Leader to make decisions on all well design, installation, drilling method, sampling issues, or other topics as decided by the requesting project leader. All decisions and the logic for each decision will be documented (e.g., as a memo) and forwarded to the DO Project Leader to be maintained as a record. Recommendations of the team will be reviewed by the Subcontractor Technical Representative to determine if changes are within contract provisions and whether additional costs are incurred.

Possible actions

Examples of outcomes from Technical Support Team reviews could include:

- collecting additional samples with split sampling with NMED DOE Oversight Bureau.
- revision of sampling and analysis plan portion of DP.
- re-design of well installation and permanent sampling system.
- formal review by LANL program managers of proposed actions.
- re-negotiation of drilling subcontract provisions to allow additional work.
- discussion with customers about inability to meet sampling requirements.
- notifying NMED of unexpected conditions as required by Consent Order.

Implementation

The following table lists responsibilities.

Drilling Technical Support Team, continued

Who	What
DO Project Leader	Bring all major issues and triggers to the Technical Support Team for their review. Coordinate all reviews and responses between the team and the Subcontractor Technical Representative. Formalize all approved changes to the drilling plan as specified in the chapter *Changes to the Drilling Plan*.
Canyons Project Leader or requesting project leader	Appoint subject matter experts in the fields of geology, geochemistry, and geophysics, or other technical fields as appropriate for the purpose of the drilling operation, to be members of the team. When requested by the DO Project Leader, convene the team to review the SOW, DP, well design, sampling plan, and other technical issues.
Technical Support Team	Use professional judgment to make decisions based on knowledge of the well location, well conditions, local geology, borehole lithology, purpose of the well, Consent Order requirements, etc. Submit recommendations to the Subcontractor Technical Representative for review. Document all decisions and the basis or logic for the decisions in a formal memo to the DO Project Leader. Stay current on well progress and borehole drilling issues through regular contacts with the drilling subcontractor, DO Project Leader, Drilling Operations Task Leader, and others as appropriate.
Subcontractor technical representative	Review recommendations by the Technical Support Team to determine if changes are within contract provisions and whether additional costs are incurred.

RCT Support

Policy

Many drilling sites require equipment to be radiation screened by the Health Physics Operations Group (RP-1) before being allowed onsite, and upon completion of activities for release to public roads or to other sites. The DO Project Leader will determine if Radiation Work Permits are required for the well drilling and will ensure such requirements are included in the SOW. Such requirements could include:

- Request RP-1 personnel at least 24 hr in advance of moving equipment to schedule radiological screening.
- Record the screening in the logbook and keep a copy of RP-1 screening paperwork in the project files.
- Require an RP-1 Radiation Control Technician (RCT) to screen core and cuttings before they are removed from the site or submitted to the Field Support Facility.
- Stop work and contact an RCT if screening results are at or above established action levels.

Implementation

The following table lists responsibilities.

Who	What
DO Project Leader	Determine whether radiation monitoring support is required for a drilling operation (PR-ID process). Ensure appropriate rad screening requirements are included in the SOW and drilling plan.

Site closeout

Policy

After drilling operations are complete, compliance with the conditions of the drilling plan will be assessed and the well formally turned over to LANL.

Implementation

The following table lists responsibilities.

Who	What
Drilling Operations Task Leader	Ensure all site restoration is complete in accordance with the specifications in the drilling plan and/or contract. Coordinate with KSL to provide a permanent electrical installation at well. Ensure all required documentation is provided, especially well as-built drawings.
Technical Support Team	Review the required documentation from the drilling subcontractor and provide input to the Drilling Operations Task Leader and the DO Project Leader on its accuracy and compliance with requirements for the document.

Section 6 Design

Design

Policy

Design is normally not required for this project. "Well design" as used for this project does not meet the definition of design that requires engineering approvals. In cases where formal engineering design is required, the DO Project Leader will comply with all LANL requirements. Revisions of any formal designs will undergo the same level of review as the original design.

Implementation

The following table lists responsibilities.

Who	What
DO Project Leader	For issues that require formal design, follow all applicable LANL engineering division requirements.

Section 7 Procurement

Procurement

Policy

The DO Project will provide specifications for a well drilling operation to potential drilling subcontractors via an SOW. The SOW will specify requirements to be met as described in the chapter *Statement of Work* and will include other contractual requirements. Subcontractors will be solicited through a competitive bid process coordinated through the responsible LANL procurement and contracting organization or through inter-agency agreement. The procurement process will follow all LANL requirements and in accordance with procedure EP-ERSS-SOP-7001, "Procurement Document Content and Revision Process," and procedure EP-ERSS-SOP-7002, "Control of Procured Items and Services."

Implementation

The following table lists responsibilities.

Who	What
DO Project Leader	Ensure the SOW for the procurement process is completed according to requirements in this plan. Follow all LANL requirements for procurements and subcontracting.
Subcontractor Technical Representative	Be responsible for ensuring compliance with contract provisions; approve invoices; and perform other duties required of an STR by LANL requirement documents.

Section 8 Inspection and Acceptance Testing

Inspection and Acceptance Testing

Policy

Materials or services will be inspected and/or tested prior to acceptance for use by the project. Supplies used during performance of activities that are commercial grade in nature will require no special acceptance practices or procedures. Inspection and testing activities will be conducted in accordance with the ERSS Quality Plan Description (EP-ERSS-QAP-0002).

Inspection and acceptance testing will be required for certain installed equipment, such as sampling systems installed in the well. The DO project leader will develop inspection criteria to be included in the SOW and drilling plan.

Implementation

The following table lists responsibilities.

Who	What
DO Project Leader	Prepare inspection and acceptance testing criteria for critical equipment or systems, including well sampling systems. Assign personnel to perform required inspection and acceptance testing.

Section 9 Management Assessment

Project Management Assessments

Internal assessments

The project will conduct internal management assessments of the services it provides. Management assessments will be conducted in accordance with LANL Implementation Support Document (ISD) 322-1.0, "Management Assessment." Management assessments of the project will be documented and filed as records.

Responding to assessments

When violations of requirements are found during a management assessment, a corrective action report will be initiated to document the violation. Corrective actions will be tracked and documented in accordance with the applicable ERSS procedure.

Implementation

The following table lists responsibilities.

Who	What
DO Project Leader	Plan and conduct management assessments of the project and drilling subcontractor at least semi-annually. Document all assessments and submit as project records.

Section 10 Independent Assessment

Project Assessments

Policy

Independent assessments are those assessments conducted by organizations external to ERSS and WSP. In addition, the project may be assessed by outside organizations. These assessments will be performed in accordance with LANL ISD 330-3.1, "Quality Audits." Personnel performing assessments will be qualified in accordance with procedure EP-ERSS-SOP-0002, "Assessor Qualification/Lead Assessor Certification."

Informal verification processes (e.g., conducting surveillance activities) will be conducted in accordance with procedure EP-ERSS-SOP-0003, "Surveillance Activities."

In addition to these assessments, the project will also be subject to additional audits/assessments as required by LANL policy and/or program managers.

Implementation

The following table lists responsibilities.

Who	What
DO Project Leader	Encourage regular external assessments as a principle of openness and continuous improvement. Document all assessments and submit as project records.

Assessing Suppliers

Policy

The DO Project Leader (in coordination with the QA specialist) will ensure that periodic assessments are conducted to determine whether required information from the following organizations meets quality specifications:

- Analytical laboratories supplying data
- Other Laboratory organizations supplying information used in compliance or other reports
- Drilling subcontractor
- Other organizations supplying services

Selection of suppliers will be in accordance with EP-ERSS-SOP-7002, "Control of Procured Items and Services."

Personnel performing supplier assessments will be qualified in accordance with procedure EP-ERSS-SOP-0002, "Assessor Qualification/Lead Assessor Certification."

Response to assessments

If problems are found with a supplier's product, the DO Project Leader will work with that supplier until the problem is corrected or will obtain alternate suppliers. Assessments of the suppliers are documented and filed as records.

Implementation

The following table lists responsibilities.

Who	What
DO Project Leader	Document all assessments and submit as project records. Approve audit schedules. Provide input to QA specialist as to the content of internal audits. Review audit reports for factual accuracy. Address all findings and implement corrective actions as appropriate.
QA Specialist	Identify areas to be addressed during internal audits If appropriate, contract with the Quality Management Group to perform internal audits Review audit procedures to ensure they meet the requirements in this section

Assessing Suppliers, continued

Who	What
Project members	Cooperate with auditors by providing information, data, etc., that are relevant to the determination of compliance with procedures, etc. Implement corrective actions as directed by the DO Project Leader.

Using a CRYPTOCard, click here to record "self-study" training to this procedure.

If you do not possess a CRYPTOCard or encounter problems, contact the ERSS training specialist.

Appendix A

Drilling Project Organization