

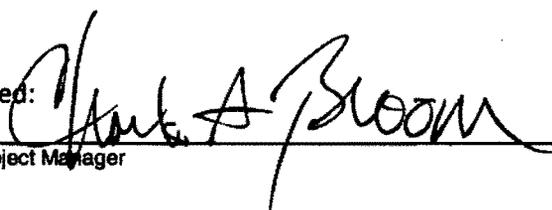


FIP-10005-CdV-16-4ip

Aquifer Test and Pumped Water Remediation of Well CdV-16-4ip, TA-16, Los Alamos National Laboratory

Task Order 5 In accordance with Master Task Order Agreement 72006-000-09

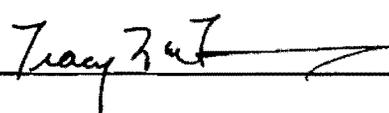
Revision 0
January 20, 2011

Approved: 
NWL Project Manager

1/20/2011
Date

Accepted By: 
LANL Project Manager

1-24-2011
Date

Accepted By: 
LANL STR

1/20/2011
Date



REVISION HISTORY

Revision No.	Effective Date	Sections Affected	Description
0	01/20/11	All	Baseline document

CONTENTS

ACRONYMS	V
1.0 INTRODUCTION & OBJECTIVES	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 and Traffic Control	3
1.1.4 Schedule	3
1.1.5 Permits	4
1.1.6 New Mexico Environment Department Field Visits	4
2.0 FIELD ACTIVITIES	4
2.1 DESIGNATED TRAVEL ROUTE	4
2.2 PROJECT SITE PREPARATION AND SITE MAINTENANCE	4
2.2.1 Field Office and Site Services	4
2.2.2 Lay-Down Area	4
2.3 AQUIFER TESTING DESIGN	5
2.3.1 GAC System (Design and Construction)	5
2.3.2 Treatment of Development Water	6
2.3.3 Aquifer Testing Procedure	6
2.3.4 Pumping Test Equipment	7
2.3.5 Contingencies	7
2.4 GROUND WATER QUALITY PARAMETERS	7
2.5 GROUNDWATER SAMPLE COLLECTION	8
2.5.1 Groundwater Sample Collection Procedures	8
2.5.2 Groundwater Sample Handling Procedures	9
2.6 INVESTIGATION-DERIVED WASTE	9
2.7 STANDBY	9
2.8 SITE RESTORATION	9
3.0 FINAL DOCUMENTATION	10
4.0 REFERENCES	10

TABLES

Table 1.1-1	NWI Project Staff and Roles	12
Table 1.1-2	LANL Project Staff and Roles.....	13
Table 1.1-3	Pump Test Schedule	14
Table 2.6-1	Sampling and Analysis Plan for pump tests at CdV-16-4ip	15
Table 2.9-1	Waste Characterization for Pump Tests at CdV-16-4ip.....	16

FIGURES

Figure 1.0-1	Location of CdV-16-4ip.....	19
Figure 1.1-1	Project field organization chart.....	20
Figure 2.1-1	Designated route within TA-16.	21
Figure 2.3-1	Schematic of GAC system	23
Figure 2.3-2	As built diagram for CdV-16-4ip.....	24

APPENDICES

Appendix A	Drilling Forms	A-1
Appendix B	Security Plan	B-1
Appendix C	Traffic Control Plan	C-1

ACRONYMS

ACO	Access Control Office
bgs	below ground surface
CFR	Code of Federal Regulations
DOE	Department of Energy
EP	Environmental Programs
FIP	Field Implementation Plan
FOM	Field Operations Manager
GAC	Granular Activated Carbon
GGRL	Geochemistry and Geomaterials Research Laboratory
HAZWOPER	Hazardous Waste Operations and Emergency Response
HE	High Explosives
HIF	Harmsco Industrial Filter
HP	Horse Power
HSD	Health and Safety Director
HSR	Health and Safety Representative
IDW	investigation-derived waste
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security, LLC
Layne	Layne Christensen Company
LLC	Limited Liability Contractor
LWI	LANL work instruction
MSW	Municipal Solid Waste
NM	New Mexico
NMED	New Mexico Environment Department
NOI	notice of intent
NTU	nephelometric turbidity unit
NWI	North Wind, Inc.
ORP	Oxidation-Reduction Potential
PCB	Polychlorinated Biphenyl
PCS	Petroleum Contaminated Soil
PIC	person in charge
PM	Project Manager

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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

Printed 1/24/2011

POC	point of contact
PPE	Personal Protective Equipment
psi	pounds per square inch
PVC	Polyvinyl chloride
RDX	Research Department Explosive
SMO	Sample Management Office
SOP	standard operating procedure
SVOC	Semi-Volatile Organic Carbon
HASP	Health and Safety Plan
STR	Subcontract Technical Representative
SWP	Safe Work Permit
SWPPP	Storm Water Pollution Prevention Plan
TA	technical area
TAL	Target Analyte List
TOC	total organic carbon
QA	Quality Assurance
QAP	Quality Assurance Program
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
VFD	variable frequency device
WCSF	waste characterization strategy form
WM	Waste Management
WMC	Waste Management Coordinator

1.0 INTRODUCTION & OBJECTIVES

This Field Implementation Plan (FIP) describes field work to be accomplished for aquifer testing and pumped water remediation at well CdV-16-4ip in Technical Area 16 (TA-16) at Los Alamos National Laboratory (LANL or the Laboratory). LANL Management and Operations contracted North Wind, Inc. (NWI) to provide services associated with aquifer testing and pumped water treatment at well CdV-16-4ip. Aquifer testing is being conducted in accordance with the New Mexico Environmental Department (NMED) approved Hydrologic Testing Work Plan for Consolidated Unit 16-021(c)-99 (260 Outfall) for the Los Alamos National Security, LLC (LANS) under the direction of the Environmental Programs (EP) Directorate.

All work will be performed in accordance with the March 1, 2005, Compliance Order on Consent (Consent Order) agreed to by the NMED and the Department of Energy (DOE) for environmental remediation at LANL.

Well CdV-16-4ip is located in TA-16 in the southwest corner of Los Alamos National Laboratory. (Figure 1.0-1). Well CdV-16-4ip was drilled and installed by NWI and Layne Christensen Company (Layne), and was completed in August, 2010.

The primary purpose of the aquifer testing is to obtain field scale measurements of aquifer parameters and characterize the hydrogeologic properties of the deep-perched groundwater zone near R-25. The aquifer tests will allow estimation of the large-scale hydraulic conductivity and storage coefficient (specific yield) of the perched zone. The tests will also provide information about the relative degree of hydraulic connection between the perched groundwater and the regional aquifer, based on pressure responses within the regional screens of R-25. Data from the aquifer tests, coupled with response in nearby wells, will be used to assess the potential for additional pumping and treatment of the contaminated perched groundwater. Key objectives of this work include:

- Acquiring field scale measurements of hydrogeologic properties, such as formation transmissivity and storage coefficient, necessary to evaluate the viability of further pump-and-treat alternatives for groundwater remediation;
- Evaluating lateral and vertical hydraulic connectivity within the perched zone;
- Potentially providing information about the hydraulic connectivity between the deep-perched zone and the regional aquifer.
- Providing contaminant concentration data in the vicinity of the test well;
- Potentially evaluating heterogeneity/anisotropy of the flow medium;
- Evaluating boundary conditions to assess the lateral extent of the deep-perched zone; and
- Evaluating the viability of the Granular Activated Carbon (GAC) remediation system for the treatment of water containing Research Department Explosive or 1, 3, 5-Trinitro-1, 3, 5-triazacyclohexane (RDX).

A more in-depth discussion of the objectives for the aquifer testing of CdV-16-4ip, as well as the hydrogeologic conceptual model in the TA-16 area, can be found in "Hydrologic Testing Work Plan for Consolidated Unit 16-02(c)-99" (LANL 2010, LA-UR-10-0404). Approval of Hydrologic Testing Work Plan was provided by NMED in February 2010 (NMED 2010).

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 FIP. 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 FIP and will assist the field team with any technical, operational, or other project-related issues.

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

- Conduct daily safety meetings and oversight;
- Maintain detailed field notes describing general site activities during aquifer testing and remediation;
- Record aquifer test data, and compile and submit daily field reports and pumping forms (examples included in Appendix A);
- Collect and deliver screening samples from designated points within the GAC system; and
- Record pump and packer types, lengths, and specifications and inspect and calibrate test equipment.

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

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:

- Lead NWI Field Geologist,
- Associate NWI Geologist / Environmental Scientist.

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);
- Workover Rig Supervisor

1.1.2 Health and Safety Training

Though CdV-16-4ip is not a hazardous waste site, NWI on-site personnel will be trained in the requirements of Occupational Safety and Health Administration Hazardous Waste Operations and Emergency Response (HAZWOPER). In addition, at least two site personnel will be trained in first aid/cardiopulmonary resuscitation.

Additional project and site-specific training is documented in the Environmental Health and Safety Plan (HASP) for CdV-16-4ip Aquifer Pumping Test In Support of Task Order 5 & Drilling and Installation of Well R-63 in support of Task Order 6 (HASP-10005-005/6). Before mobilization into the field all staff will be trained to the HASP and all other mandated training requirements, as outlined in the NWI training matrix.

1.1.3 Security and Traffic Control

Well CdV-16-4ip is located within the limited access area of TA-16. Security escorts will be required for entry (one escort per a maximum of five individuals/three vehicles on site). At least two security escorts per shift will be necessary. The escorts will maintain a log of personnel on site at all times.

No personal cell phones or electronic communication devices are allowed in TA-16. Communications will be conducted using two-way radios provided by the LANL Environmental Programs – Field Services and a two-way radio and/or pager provided by the TA-16 Access Control Office (ACO). A LANL-issued cellular phone will be provided for emergency use only. The cellular phone will be stored with the battery removed to comply with TA-16 security regulations.

A security zone will be designated surrounding the drill site. All site personnel will remain within the security zone, and at least one security escort will be present within this area at all times. If un-cleared site personnel leave the security zone, an escort must accompany them. Site personnel must always remain within sight of the security escort.

Restrictions on smoking, eating, welding, and cellular phone use will be rigorously enforced. Combustion powered equipment will be equipped with spark arresters on the exhaust systems, as necessary. Security requirements are further outlined in Appendix B.

There are no roads passing through the well site that require access control. The well site access road is marked with signs describing the PPE and visitor sign-in requirements for entry onto the site. Access to existing LANL sampling locations in Cañon de Valle can be accessed by skirting the well site on the existing roadway. If sampling personnel must pass through the drill site boundaries, they will be required to sign in and out with the NWI PIC. Well site personnel and visitors will be required to park vehicles on graveled, established areas only. No parking on naturally vegetated or rehabilitated areas will be allowed. Traffic control requirements are further outlined in Appendix C.

1.1.4 Schedule

Table 1.1-3 shows the tentative well CdV-16-4ip aquifer testing schedule. Aquifer testing is planned for completion by no later than February 28, 2011.

Mobilization to well CdV-16-4ip will be conducted on a 12-hour schedule (7 am to 7 pm). Aquifer testing will be conducted on a 24-hour schedule with shift changes at 7 am and 7 pm until pumping is complete.

1.1.5 Permits

A Storm Water Pollution Prevention Plan (SWPPP) permit has been implemented by LANL. The SWPPP notice of intent (NOI) has been submitted to the United States Environmental Protection Agency (USEPA).

Copies of permits, notifications, inspection reports, and site access authorization will be maintained at the well site as required.

1.1.6 New Mexico Environment Department Field Visits

If NMED personnel visit the site, the PIC will notify the STR or other appropriate LANL personnel (Table 1.1-2). 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 Designated Travel Route

A designated travel route through TA-16 is shown in Figure 2.1-1. This route has been designated by LANL and must be followed to avoid the potential of inadvertently entering areas at TA-16 where prior authorization is necessary.

2.2 Project Site Preparation and Site Maintenance

Construction of the well pad and cuttings pits was completed by LANL personnel prior to drilling and installation of well CdV-16-4ip. Berms have been constructed to surround the work areas to prevent run-on and run-off of precipitation from the well site, in accordance with the SWPPP.

NWI and Layne crews will stage the work-over rig, frac tanks, GAC water treatment system, and all other equipment onsite in a manner that will allow the most ergonomic, efficient, and safe work environment. If necessary, additional materials and supplies may be staged at the CdV lay-down Yard (Figure 2.2-1).

NWI will ensure the placement of secondary containment basins beneath the work-over rig and other equipment prior to commencement of pumping activities.

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

2.2.1 Field Office and Site Services

A cargo trailer will be used as a field office, and will also serve as a designated eating area for field crews working on site.

A Safe Work Permit (SWP) shall be obtained from TA-16 ACO for all motorized equipment before it enters the well site, and a Major Equipment Declaration will be approved by the STR.

2.2.2 Lay-Down Area

The Pajarito Lay-down Yard (also known as the White Rock Lay-down Yard) is the primary lay-down area for all drilling contractors. It is located on the northwest corner of the intersection of NM State Highway 4 and Pajarito Road. An additional lay-down area on 340 Loop Road near well

R-48 will be used to allow for expedient access to tooling and materials. The route to the lay-down area is shown on Figure 2.2-1.

2.3 Aquifer Testing Design

Layne Christensen Co. and David Schafer and Associates, under contract to, and direct supervision of NWI, will perform the aquifer tests of both the upper and lower screens. The aquifer testing procedures are described below.

The design and implementation for the pumping tests will include the construction and operation of the GAC system, allowing for treatment of development water as well as water generated during step drawdown tests and aquifer tests in both the upper and lower screens at well CdV-16-4ip. Approximately 80,000 gallons of water generated during development will be treated with the GAC system, and an additional 216,000 gallons are expected to be generated during the aquifer testing of both screens, for a total of 296,000 gallons of water that will be treated with the GAC system.

Aquifer testing is scheduled to begin on or before February 9, 2011. Every reasonable effort will be made to minimize the time that the two screens are in hydrologic communication. Necessary pumping equipment, frac tanks, filters, and GAC vessels will be situated within the project site in a safe and secure manner. The orientation and placement of this equipment is presented in a schematic diagram in Figure 2.3-1. The CdV-16-4ip as-built well construction diagram is presented in Figure 2.3-2.

2.3.1 GAC System (Design and Construction)

The GAC system was designed per request by LANL to remove expected concentrations of RDX from pumped development and aquifer testing water at a rate of 10 to 25 gallons per minute (gpm). No other known contaminants are expected to require reduction prior to land application of the treated effluent.

During development at CdV-16-4ip, RDX concentrations observed in the upper and lower screened zones were approximately 265 µg/L and 205 µg/L, respectively.

At the design flow rate of 25 gpm, the GAC system is designed to process an influent RDX concentration of 320 µg/L, while producing a maximum effluent RDX concentration of 3 µg/L. Based on carbon usage estimates achieved through both predictive and experimental models, the calculated amount of GAC per 1000 gallons of this water at the specified flow rate is 0.0112 lbs. Multiplying this number by a factor of safety of 1.75, the total calculated amount of GAC to reduce RDX concentrations to at or below 3 µg/L for approximately 296,000 gallons of water is 5.83 lbs. To achieve RDX concentration of ≤ 3 µg/l, the residence time within the GAC vessel system is estimated to be 20 minutes. The GAC system will be designed and operated within parameters that will meet this residence time, including a factor of safety.

A duplex set of pumps (including a spare) will be provided by NWI. These pumps will be set up as a redundant system, in the event of failure of one pump; the system can be switched over to the alternate, to avoid lost time awaiting pump repairs or replacement. These pumps will be capable of providing the required capacity to meet the specified treatment flow rates and the necessary head requirements of the GAC vessels. The pumps will direct water for treatment through a pressure gauged Harmsco HIF 7 up-flow pre-filter through the GAC treatment system and into the effluent frac tanks.

The GAC treatment system for CdV-16-4ip consists of two Siemens PV500 GAC vessels, each containing 500 lbs of virgin Westates® AquaCarb® 1230C high activity coconut shell based GAC. The vessels will be plumbed in series using 2-in diameter Polyvinyl Chloride (PVC), and will utilize pressure gauges before and after each vessel. A sample port will be located immediately

after each GAC vessel, allowing for evaluation of RDX concentrations at multiple points within the system ensuring adequate treatment, as well as to facilitate monitoring of each treatment vessel separately.

A total of six frac tanks (3 each for influent and effluent) will be provided for containment of remediation water.

2.3.2 Treatment of Development Water

Approximately 80,000 gallons of water generated during well development of CdV-16-4ip will be treated with the GAC system. Following treatment, this water will be sampled for high explosives (HE) screening analysis at LANL's GGRL at a minimum rate of 1 sample per frac tank, prior to land application. Upon completion of treatment of the development water, and verification of RDX concentrations $\leq 3 \mu\text{g/L}$, aquifer testing of both upper and lower screens at CdV-16-4ip will commence.

2.3.3 Aquifer Testing Procedure

NWI, Layne, and David Schafer and Associates will conduct aquifer testing at CdV-16-4ip. Aquifer test data will be collected and recorded consistent with requirements in the LANL Pumping Tests SOP, EP-ERSS-SOP-5039.

2.3.3.1 Upper Screen

The upper screen in CdV-16-4ip is set between 815.6 and 879.2 ft bgs, and is currently isolated from the lower screen by an inflatable TAM packer (Figure 2.3-2).

The TAM bridge packer that is currently installed in well CdV-16-4ip will be removed and sent off-site to the manufacturer to be re-set. A 4-in. diameter Grundfos™ 16 gpm, 10 HP submersible pump with Variable Frequency Device (VFD) controller and an inflatable packer will be placed in the well using Layne's mild steel pipe, rather than LANL's stainless steel pipe, due to pipe joint leak problems encountered during previous testing at CdV-16-4ip and other LANL wells. A 200 psi non-vented transducer (as recommended by David Schafer and Associates) will be placed above and below the packer for the upper screen.

A step draw down test will first be conducted to a maximum flow rate of 25 gpm.

Upon completion of the step tests, a pumping test will be conducted on the upper screened interval. The test will run for at least five days, pumping at an estimated 5 gpm, 24 hours per day. If necessary, the pumping test may be extended up to 15 days, but will likely be completed by day 10. Test duration will be determined by LANL personnel after analysis of the pumping effects seen in nearby wells.

During the aquifer test, field water quality parameters will be measured hourly via a flow-through cell for the duration of the pumping test (see Section 2.4). In addition, samples will be collected for HE screening analysis during the pump test twice daily. NWI personnel will assist LANL's Groundwater Sampling Team in the collection of characterization groundwater samples at the end of the pumping test for the upper screen.

Approximately 10 days will be allowed for recovery of the upper screen at well CdV-16-4ip before proceeding with pumping tests for the lower screen.

2.3.3.2 Lower Screen

Following recovery of the upper screen and before the lower screen is pumped, water will be pumped from the drop pipe in to a separate container (likely a poly tank or drum) to flush any

accumulated dissolved or particulate iron-oxide from the system, in order to prevent iron-oxide contamination in the frac tanks.

The lower screen in CdV-16-4ip is set between 1110.0 to 1141.1 ft bgs, and is currently isolated from the upper screen by an inflatable TAM packer (Figure 2.3-2).

The pump and packer assembly used for the upper screen will be removed and reconfigured for pumping tests of the lower screen. A 200 psi non-vented transducer (as recommended by David Schafer and Associates) will be placed above and below the packer for the lower screen.

A step draw down test will first be conducted to a maximum flow rate of 25 gpm.

Upon completion of the step tests, a pumping test will be conducted on the lower screened interval. The test will run for at least five days, pumping at an estimated 3 gpm, 24 hours per day. If necessary, the pumping test may be extended up to 15 days, but will likely be completed by day 10. Test duration will be determined by LANL personnel after analysis of the pumping effects seen in nearby wells.

During the aquifer test, field water quality parameters will be measured hourly via a flow-through cell for the duration of the pumping test (see Section 2.4). In addition, samples will be collected for HE screening analysis during the pump test twice daily. NWI personnel will assist LANL's Groundwater Sampling Team in the collection of characterization groundwater samples at the end of the pumping test for the upper screen.

2.3.4 Pumping Test Equipment

NWI, Layne, and David Schafer and Associates will provide necessary equipment for the pumping tests. This includes the Semco S15000 work-over rig, transducers, pump/packer assembly, including the mild steel pipe, and associated testing equipment.

2.3.5 Contingencies

As described above, the duration of both upper and lower screen tests will be determined during the tests, upon analysis of the effects seen in nearby wells. Duration of recovery periods will likewise be determined during testing.

The pumping rate is estimated to be approximately 10 gpm for the upper screen, and 5 gpm for the lower screen, but actual pumping rates will be determined by LANL, with input from David Schafer, based on well production and drawdown data. GAC system flow-through rate will be adjusted for maximum effectiveness based on field data, and filtration media replaced if deemed necessary by analytical results.

2.4 Ground Water Quality Parameters

Field water quality parameters will be measured hourly via a flow-through and a YSI 556 MPS Multiparameter probe for the duration of the pumping test. Turbidity will be measured using a LaMotte 2020e Turbidimeter. The water quality parameters that will be monitored during the pumping test include:

- pH,
- Specific conductance,
- Temperature,

- oxidation-reduction potential (ORP)
- Turbidity, and,
- Dissolved Oxygen

All equipment will be calibrated by qualified and trained personnel at least once per day in accordance with the following NWI QAPs:

- NWI QAP-121, Control of Measuring and Test Equipment

2.5 Groundwater Sample Collection

During treatment of development water, samples will be collected twice daily at the sample port located downstream of the first GAC vessel and at the sample port downstream of the second GAC vessel. The first sample will be used to determine the efficiency of the first GAC vessel, and also serve as a sentinel in case of breakthrough occurrence within the first vessel. The sample collected downstream of the second vessel will ensure that the development water has met the requisite maximum effluent RDX concentration of <3µg/L.

During aquifer testing, samples will be collected twice daily at three locations, at the port between the well head and the influent tanks, at the port downstream of the first GAC vessel, and at the port downstream of the second GAC vessel.

Additionally, prior to land application of water in an effluent full frac tank, a characterization sample will be collected from the tank, to ensure that all analytes specified in ENV-RCRA-QP-010.2 meet land application requirements.

2.5.1 Groundwater Sample Collection Procedures

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

- Filtering and Chemical Preservation of Water Samples, ENV-WQH-SOP-066;
- Field Water Quality Analyses, ENV-DO-203;
- Field Decontamination of Equipment, EP-ERSS-SOP-5061;
- Sample Containers and Preservation, EP-ERSS-SOP-5056;
- Handling, Packaging, and Transporting Field Samples, EP-ERSS-SOP-5057;
- Groundwater Sampling, EP-ERSS-SOP-5232;
- Sample Control and Field Documentation, WES-EDA-QP-219;
- Field Quality Control Samples, EP-ERSS-SOP-5059;
- Chain of Custody Documentation, NWI ENVP-021 and;
- Filtering and Chemical Preservation of Water Samples, NWI LWI-010.

The Sampling and Analysis Plan in Table 2.6-1 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.

2.5.2 Groundwater Sample Handling Procedures

Groundwater samples will be preserved in coolers with blue ice and delivered to the Sample Management Office (SMO) for processing. After processing, NWI personnel or available LANL personnel will transport the RDX screening samples to LANL's GGRL lab for analysis. The characterization samples from the frac tanks will be sent to an offsite laboratory for analysis. The GGRL will provide rapid turn-around analyses for the screening analytes (see Table 2.6-1).

2.6 Investigation-Derived Waste

Investigation-derived waste (IDW) will be managed in accordance with Standard Operating Procedure (SOP) EP-SOP-5238, Characterization and Management of Environmental Program Waste. This SOP incorporates the requirements of applicable USEPA and NMED regulations, U.S. Department of Energy orders, and Laboratory requirements. The primary waste streams include contact waste, pump test water, decontamination water, storm water, residual solids from secondary containments, spent granular activated carbon, petroleum contaminated soils (PCS), and municipal solid waste (MSW). Where Resource Conservation and Recovery Act constituents are detected and duplicate samples are collected during the same sampling event and one is a non-detect and the other is detected, the Laboratory assumes the detection is the result of laboratory or field contamination. The detection will not be used for waste determination and/or land application.

Ordering of sample paperwork from the SMO will be coordinated through the LANL waste generator and WMC. A confirmation sample will be collected from approximately every 20,000 gallons of water (per frac tank) treated through the GAC treatment system. The samples will be collected from an aliquot of pump test water as it is generated (incremental sampling) by diverting the material to a smaller container (i.e., clean 55-gallon drum). The samples will be collected in accordance with LANL SOP-06.15, *COLIWASA Sampler for Liquids and Slurries* or subcontractor equivalent procedure. If the SOP is not used, the type of sampling equipment and methods used will be consistent with the EPA 530-D-02-002. Samples will at a minimum be analyzed for target analyte list (TAL) metals; radionuclides (by alpha and gamma spectroscopy); isotopic uranium, isotopic plutonium, americium-241, tritium, and strontium-90; volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs); pH; explosive compounds; polychlorinated biphenyl (PCB); cyanide; nitrates/nitrites; and perchlorates.

Pumping 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 and any other waste generated 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 Waste Characterization Strategy Form (WCSF) (see Table 2.9-1).

2.7 Standby

2.8 Site Restoration

- Upon completion of well development (pumping) activities and final demobilization, LANL will perform the site restoration activities including grading, seeding, and/or replacement of vegetation per the contractor's Engineering Design Standards on seeding and site stabilization and the site-specific approved SWPPP.

3.0 FINAL DOCUMENTATION

David Schafer and Associates will provide a final summary report of the aquifer test data and results to LANL by March 27, 2011. If LANL deems necessary, NWI will provide an additional final executive summary report to LANL by March 27, 2011.

4.0 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, 2010, "Drilling Work Plan for CdV-16-4ip," LA-UR-10-2147, EP2010-0177, Los Alamos National Laboratory, April 2010.

LANL, 2009, Security Plan

NMAC, 2005. "Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells (19.27.4 NMAC)," New Mexico Administrative Code, Adopted August 31, 2005.

NMED, 2010, "Approval with Modifications Drilling Work Plan for Perched-Intermediate Pumping Well CdV-16-4ip," New Mexico Environment Department, May 2010.

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, 2010, "Environmental Health and Safety Plan for CdV-16-4ip Aquifer Pumping Test In Support of Task Order 5 & Drilling and Installation of Well R-63 In Support of Task Order 6 in accordance with Master Task Order Agreement # 72006-000-09, North Wind, Inc., December 2010.

LANL, 2007. "Environment and Remediation Support Services Standard Operating Procedure for Handling, Packaging, and Transporting Field Samples". Rev 0.0. EP-ERSS-SOP-5057, Los Alamos National Laboratory, October 2007.

LANL, 2007. "Environment and Remediation Support Services Standard Operating Procedure for Field Quality Control Samples". Rev 0.0. EP-ERSS-SOP-5059, Los Alamos National Laboratory, February 2007.

LANL, 2010. "Environment and Remediation Support Services Standard Operating Procedure for Well Development". Rev 0.0, IPC-1. EP-ERSS-SOP-5033, Los Alamos National Laboratory, November 2010.

LANL, 2010. "Environmental Programs Directorate Standard Operating Procedure for Groundwater Sampling". Rev 0.0, IPC-2. SOP-5232, Los Alamos National Laboratory, November 2010.

LANL, 2008. "Environmental Programs Directorate Standard Operating Procedure for Manual Groundwater Level Measurements". Rev 0. SOP-5223, Los Alamos National Laboratory, October 2008.

LANL, 2010. "Environmental Programs Standard Operating Procedure for Field Decontamination of Equipment". Rev 1. EP-ERSS-SOP-5061, Los Alamos National Laboratory, June 2010.

LANL, 2010. "Environment, Safety, Health & Quality Directorate Waste and Environmental Services Standard Operation Procedure for Sample Control and Field Documentation". Rev 0. WES-EDA-QP-219, Los Alamos National Laboratory, October 2010.

LANL, 2001. "Environmental Restoration Project Standard Operating Procedure for Field Logging, Handling, and Documentation of Borehole Materials". Rev 4. SOP-12.01, Los Alamos National Laboratory, April 2001.

LANL, 2007. "Environment and Remediation Support Services Standard Operating Procedure for Contract Geophysical Logging". Rev 0.0. EP-ERSS-SOP-5030, Los Alamos National Laboratory, February 2007.

LANL, 2004. "Environmental Restoration Project Standard Operating Procedure for Transportation and Admittance of Borehole Materials to the Field Support Facility". Rev 4. SOP-12.02, Los Alamos National Laboratory, June 2001.

LANL, 2009. "Environmental Programs Directorate (ADEP) Standard Operating Procedure for Characterization and Management of Environmental Program Waste". Rev 0. SOP-5238, Los Alamos National Laboratory, September 2009.

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)	Charles Broom	Responsible for ensuring all project activities are performed safely and within applicable requirements.
Field Operations Manager (FOM)	Thomas Klepfer	Primary communicator between the NWI integrated team and LANL STR. Responsible for the protection of employees, the public, and the environment. In addition, the FOM shall be responsible for following: 1) oversee the day-to-day pumping and pumping-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 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 sample collection, waste management, daily field progress reporting, and interacting with the LANL STR.
Environmental Health & Safety Representative (HSR)	Steven Gunther 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 HASP.
Health and Safety Director (HSD)	Bruce Miller	Corporate HSD responsible for NWI HSPs and HASP approvals.
Environmental Professional	Melanie Lamb	Implements and administers SUBCONTRACTOR'S required environmental deliverables and CONTRACTOR'S environmental requirements.
Geologist/Sample Technician	Desiree Staires Randall Boyle Liz Mockbee	Perform general field activities including sampling, documentation, drilling oversight, and waste management per the LG and the WMC.
Waste Management Coordinator (WMC)	Jon Roberson	Responsible for segregation, characterization, packaging and management of waste generated by the project; Provides real-time support to the field team; Prepares packages for shipment, as necessary.

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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

Printed 1/24/2011

Table 1.1-1 (Continued)

Role	Name	Description
Waste Management (WM) Technician	Melanie Lamb Jon Roberson	Assists the LG and field team with supervision and implementation of waste management requirements and shall be directed in their work by the WMC.
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.
Project Manager	John McCann	Project management and oversight.
STR	Tracy McFarland	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	Tim Goering 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
Waste Generator	John McCann	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	Victor Garde	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.

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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

Printed 1/24/2011



Table 1.1-3 Pump Test Schedule

Activity ID	Activity Name	Start	Finish	2010																								2011					
				December							January							February							March			April			May		
LANL Drilling -- Task Order 5				[Gantt bars for Dec 2010 - May 2011]																													
CdV-16-4ip Pumping Test				[Gantt bars for Dec 2010 - May 2011]																													
Readiness Activities				[Gantt bars for Dec 2010 - Mar 2011]																													
Readiness				[Gantt bars for Dec 2010 - Jan 2011]																													
A1000	Readiness	02-Dec-10	22-Jan-11	[Gantt bar]																													
A1230	Long Lead Procurement	02-Dec-10	22-Jan-11	[Gantt bar]																													
Mobilization & Demobilization				[Gantt bars for Jan 2011 - Mar 2011]																													
A1010	Mobilize Pump Rig from Pajarito Laydown Yard to CdV-16-4ip	27-Jan-11	30-Jan-11	[Gantt bar]																													
A1020	Demobilization of Pump Rig	23-Mar-11	28-Mar-11	[Gantt bar]																													
Granulated Activated Carbon System Design				[Gantt bars for Dec 2010 - Jan 2011]																													
A1030	GAC System Design	02-Dec-10	22-Jan-11	[Gantt bar]																													
Development Water Treatment				[Gantt bars for Jan 2011 - Jan 2011]																													
A1040	GAC System Set-up	23-Jan-11	26-Jan-11	[Gantt bar]																													
A1050	Treat Cd-16-4ip Development Water & Sample 6 Frac Tanks	27-Jan-11	30-Jan-11	[Gantt bar]																													
Aquifer Testing				[Gantt bars for Feb 2011 - Mar 2011]																													
Upper Screen Testing				[Gantt bars for Feb 2011 - Feb 2011]																													
A1090	Conduct Step Draw Down Test	06-Feb-11	08-Feb-11	[Gantt bar]																													
A1080	Run Upper Screen Pumping Test	08-Feb-11	18-Feb-11	[Gantt bar]																													
A1090	Upper Screen Recovery Data Collection / Packer Pressure Check	18-Feb-11	28-Feb-11	[Gantt bar]																													
Lower Screen Testing				[Gantt bars for Feb 2011 - Mar 2011]																													
A1100	Remove Pump & Packer Assembly - Prepare for Lower Screen Draw Down test	28-Feb-11	01-Mar-11	[Gantt bar]																													
A1110	Conduct Step Draw Down Test	01-Mar-11	02-Mar-11	[Gantt bar]																													
A1130	Run Lower Screen Pumping Test	02-Mar-11	12-Mar-11	[Gantt bar]																													
A1140	Lower Screen Recovery Data Collection / Packer Pressure Check	12-Mar-11	22-Mar-11	[Gantt bar]																													
A1240	Pull Pump String & Replace TAM Packer	22-Mar-11	23-Mar-11	[Gantt bar]																													
CdV-16-4i Investigation Derived Waste Management				[Gantt bars for Jan 2011 - May 2011]																													
A1150	CdV-16-4ip IDW Management	27-Jan-11	31-May-11	[Gantt bar]																													
A1250	Frac Tank Mobilization	24-Jan-11	24-Jan-11	[Gantt bar]																													
A1260	Frac Tank Rental Cost	24-Jan-11	10-Mar-11	[Gantt bar]																													
A1270	Frac Tank Demobilization	14-Mar-11	16-Mar-11	[Gantt bar]																													
Final Reporting				[Gantt bars for Jan 2011 - Mar 2011]																													
A1180	Prepare 95% Draft Pumping Test Report	27-Jan-11	17-Mar-11	[Gantt bar]																													
A1190	95% Draft Pumping Test Report Submitted to LANL		17-Mar-11	[Gantt bar]																													
A1200	LANL 95% Draft Pumping Test Report Review Comments Received		22-Mar-11	[Gantt bar]																													
A1210	Incorporate LANL Review Comments into Final Pumping Test Report	23-Mar-11	27-Mar-11	[Gantt bar]																													
A1220	Final Pumping Test Report Submitted to LANL		27-Mar-11	[Gantt bar]																													
Security Escorts				[Gantt bars for Jan 2011 - May 2011]																													
A1280	Security Escorts	24-Jan-11	31-May-11	[Gantt bar]																													

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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

Table 2.6-1 Sampling and Analysis Plan for pump tests at CdV-16-4ip

Sample Type	Analysis	Lab	Method	Container	Preservative	Interval
Pump Test Daily Water Sampling ¹	RDX	GGRL	Grab	N/A	N/A	At each screen interval. Collect twice daily (at shift change, 0700 and 1900 h) from: 1) well head, 2) between 1 st and 2 nd GAC treatment vessels, and 3) the treated water storage tank/aliquot drum
Pump Test Confirmation Water Sampling	See Table 2.9-1	Off-Site	Grab	N/A	N/A	Confirmation sample collected every ~20,000 gallons of effluent (per frac tank) after treatment by GAC treatment system. Collect from an aliquot of pump test water as it is generated (incremental sampling) by diverting the material to a smaller container (i.e., clean 55-gallon drum) ¹
Aquifer Test screening water*	pH	Field	Grab	N/A	N/A	Hourly at each screen interval
	ORP	Field	Grab	N/A	N/A	
	Specific conductance	Field	Grab	N/A	N/A	
	Temperature	Field	Grab	N/A	N/A	
	Dissolved Oxygen	Field	Grab	N/A	N/A	
	Turbidity	Field	Grab	N/A	N/A	
GGRL= Earth and Environmental Sciences Division's Geochemistry, and Geomaterials Research Laboratory (formerly known as EES-14)						

Notes: Rinsate samples will be collected on tanks not certified as clean.
 N/A = Not applicable.

¹Samples will be collected with the type of sampling equipment and methods used consistent with EPA 530-D-02-002. Sampling information will be recorded in accordance with EP-ERSS-SOP-5058, *Handling, Packaging, and Transporting Field Samples* and EP-ERSS-SOP-5181, *Notebook and Logbook Documentation for Environmental Directorate Technical and Field Activities*.

* Use of flow-through cell required for measuring field parameters

Table 2.9-1 Waste Characterization for Pump Tests at CdV-16-4ip

TABLE 1- CHARACTERIZATION TABLE

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

Waste Description	Waste # 1 Contact Waste	Waste # 2 Pump Test Water	Waste #3 Decontamination Fluids	Waste #4 Storm Water
Estimated Volume	100 Gallons	400,000 gallons	200-gallons	200-gallons
Packaging	Drums/Roll Offs	Frac Tanks/Drums	Drums/Tanks	Drums/Tanks
Regulatory classification:				
Radioactive Waste	X	X	X	X
Reusable Material		X (Land Applied)		X (Released; Used Oil for Recycle)
Municipal Solid Waste (MSW)				
Waste destined for LANL's SWWS or RLWTF ¹			X	X
Hazardous Waste	X	X	X	X
Mixed (hazardous and radioactive) Waste	X	X	X	X
Toxic Substances Control Act (TSCA)				
New Mexico Special Waste				
Industrial Waste	X	X	X	X
Characterization Method				
Acceptable knowledge (AK): Existing Data/Documentation	X	X	X	X
AK: Site Characterization				
Direct Sampling of Waste		X	X	X
Analytical Testing				
Volatile Organic Compounds (EPA 8260-B)		X	X	X
Semivolatle Organic Compounds (EPA 8270-C)		X	X	X
Organic Pesticides (EPA 8081-A)			X	X
Organic Herbicides (EPA 8151-A)			X	X
PCBs (EPA 8082)		X	X	X
Total Metals (EPA 6010-B/7471-A)		X	X	X
Total Cyanide (EPA 9012-A) ²		X	X	X
Nitrates/Nitrites (EPA 300.09)		X	X	X
Dioxins/Furans (EPA 1613B)				
Oil/Grease (EPA 1665)			X	X
Fluoride, Chlorine, Sulfate (EPA 300)		X	X	X
TTO (EPA 8260-B and EPA 8270-C) ³				
Total Suspended & Dissolved Solids (TSS) and Total Dissolved Solids (TDS) (EPA 160.1 and 160.2)		X	X	X
Chemical Oxygen Demand (COD) (EPA 410.4)			X	X
pH (EPA 904c)		X	X	X
Microtox or Biological Oxygen Demand (BOD) ⁴			X	X
Perchlorates (EPA 6850)		X	X	X
High Explosives Constituents (EPA 8330/8321-A)		X	X	X
Asbestos				
BTEX (EPA-8021b)				
Total petroleum hydrocarbon (TPH)-GRO (EPA 8015-M) TPH-DRO (EPA 8015-M)				
Toxicity characteristic leaching procedure (TCLP) Metals (EPA 1311/6010-B)				
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
Gross Beta (beta counting) (EPA 900)		X	X	X
Tritium (liquid scintillation) (EPA 906.0)		X	X	X
Gamma spectroscopy (EPA 901.1)		X	X	X
Isotopic plutonium (Chem. Separation/alpha spec.) (HASL-300)		X	X	X
Isotopic uranium (Chem. Separation/alpha spec.) (HASL-300)		X	X	X
Total uranium (EPA 6020)		X	X	X
Strontium-90 (EPA 905)		X	X	X
Americium-241 (Chem. Separation/alpha spec.) (HASL-300)		X	X	X
Isotopic Thorium		X	X	X
Waste Profile Form #	TBD	TBD	TBD	TBD

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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

Printed 1/24/2011

Table 2.9-1 (Continued)

Waste Description	Waste #5 Residual Solids from Secondary Containments	Waste #6 Spent Granular Activated Carbon	Waste #7 Petroleum Contaminated Soils (PCS)	Waste #8 Municipal Solid Waste (MSW)
Estimated Volume	1-yd ³	150 Gallons	1-yd ³	2-yd ³
Packaging	Drums	Drums	Drums	Plastic Trash Bags/Trash Cans/Dumpsters
Regulatory classification:				
Radioactive Waste	X	X	X	
Reusable Material				
Municipal Solid Waste (MSW)				X
Waste destined for LANL's SWWS or RLWTF ¹				
Hazardous Waste	X	X		
Mixed (hazardous and radioactive) Waste	X	X		
Toxic Substances Control Act (TSCA)				
New Mexico Special Waste			X	
Industrial Waste	X		X	
Characterization Method				
Acceptable knowledge (AK): Existing Data/Documentation	X	X	X	X
AK: Site Characterization				
Direct Sampling of Waste	X	X	X	
Analytical Testing				
Volatile Organic Compounds (EPA 8260-B)	X	X	X	
Semivolatile Organic Compounds (EPA 8270-C)	X	X	X (As needed)	
Organic Pesticides (EPA 8081-A)	X			
Organic Herbicides (EPA 8151-A)	X			
PCBs (EPA 8082)	X			
Total Metals (EPA 6010-B/7471-A)	X	X	X	
Total Cyanide (EPA 9012-A) ²	X			
Nitrates/Nitrites (EPA 300.09)	X			
Dioxins/Furans (EPA 1613B)				
Oil/Grease (EPA 1665)				
Fluoride, Chlorine, Sulfate (EPA 300)				
TTO (EPA 8260-B and EPA 8270-C) ³				
Total Suspended & Dissolved Solids (TSS) and Total Dissolved Solids (TDS) (EPA 160.1 and 160.2)				
Chemical Oxygen Demand (COD) (EPA 410.4)				
pH (EPA 904c)				
Microtox or Biological Oxygen Demand (BOD) ⁴				
Perchlorates (EPA 6850)	X	X		
High Explosives Constituents (EPA 8330/8321-A)		X		
Asbestos				
BTEX (EPA-8021b)				
Total petroleum hydrocarbon (TPH)-GRO (EPA 8015-M) TPH-DRO (EPA 8015-M)	X (As needed)	X	X	
Toxicity characteristic leaching procedure (TCLP) Metals (EPA 1311/6010-B)	X (As needed)	X (As needed)	X (As needed)	
TCLP Organics (EPA 1311/8260-B & 1311/8270-C)	X (As needed)	X (As needed)	X (As needed)	
TCLP Pest. & Herb. (EPA 1311/8081-A/1311/8151-A)				
Radium 226 & 228 (EPA 9320)	X	X	X (As needed)	
Gross Alpha (alpha counting) (EPA 900)	X	X	X (As needed)	
Gross Beta (beta counting) (EPA 900)	X	X	X (As needed)	
Tritium (liquid scintillation) (EPA 906.0)	X	X	X (As needed)	
Gamma spectroscopy (EPA 901.1)	X	X	X (As needed)	
Isotopic plutonium (Chem. Separation/alpha spec.) (HASL-300)	X	X	X (As needed)	
Isotopic uranium (Chem. Separation/alpha spec.) (HASL-300)	X	X	X (As needed)	
Total uranium (EPA 6020)	X	X	X (As needed)	
Strontium-90 (EPA 905)	X	X	X (As needed)	
Americium-241 (Chem. Separation/alpha spec.) (HASL-300)	X	X	X (As needed)	
Isotopic Thorium	X	X	X (As needed)	
Waste Profile Form #	TBD	TBD	TBD	TBD

- In addition to other analytes needed to characterize the waste (e.g., VOC, SVOC, total metals), analyze for TSS, TDS, Oil and Grease, gross alpha gross beta, tritium, and pH for liquids destined for the LANL SWWS. For wastes destined for the RLWTF additional constituents include TTO, TSS, COD, pH, total nitrates/nitrites, and gross alpha, gross beta (not including tritium), and gross gamma or the sum of individual alpha-, beta-, and gamma-emitting nuclides.
- Filtered metals and filtered Cyanide are required for land application, with the exception of mercury (hg).

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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

- 3 TTO is the total of volatile organic and semi-volatile organic compound contaminants. Request methods EPA 8260-B (VOCs) and EPA 8270-C (SVOCs).
- 4 If Microtox analysis is not available, request BOD.
- 5 Based on direct sampling of associated sediment (Waste #1).
- 6 Only if other analyses indicate material constitutes a mixed waste.
- 7 Only if total concentrations of RCRA toxicity characteristic constituents exceed 20 times their regulatory limit.

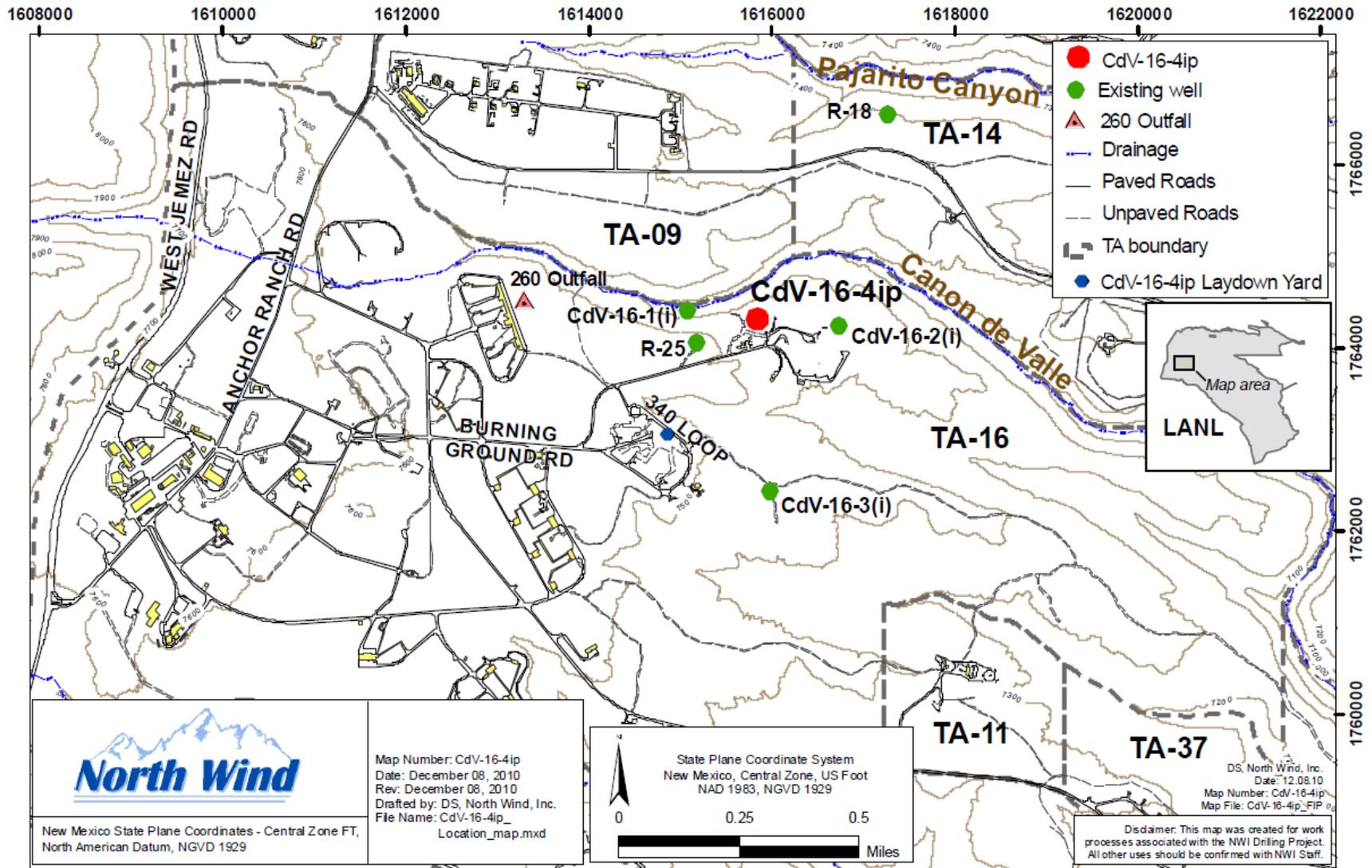


Figure 1.0-1 Location of CdV-16-4ip.

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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

Printed 1/24/2011

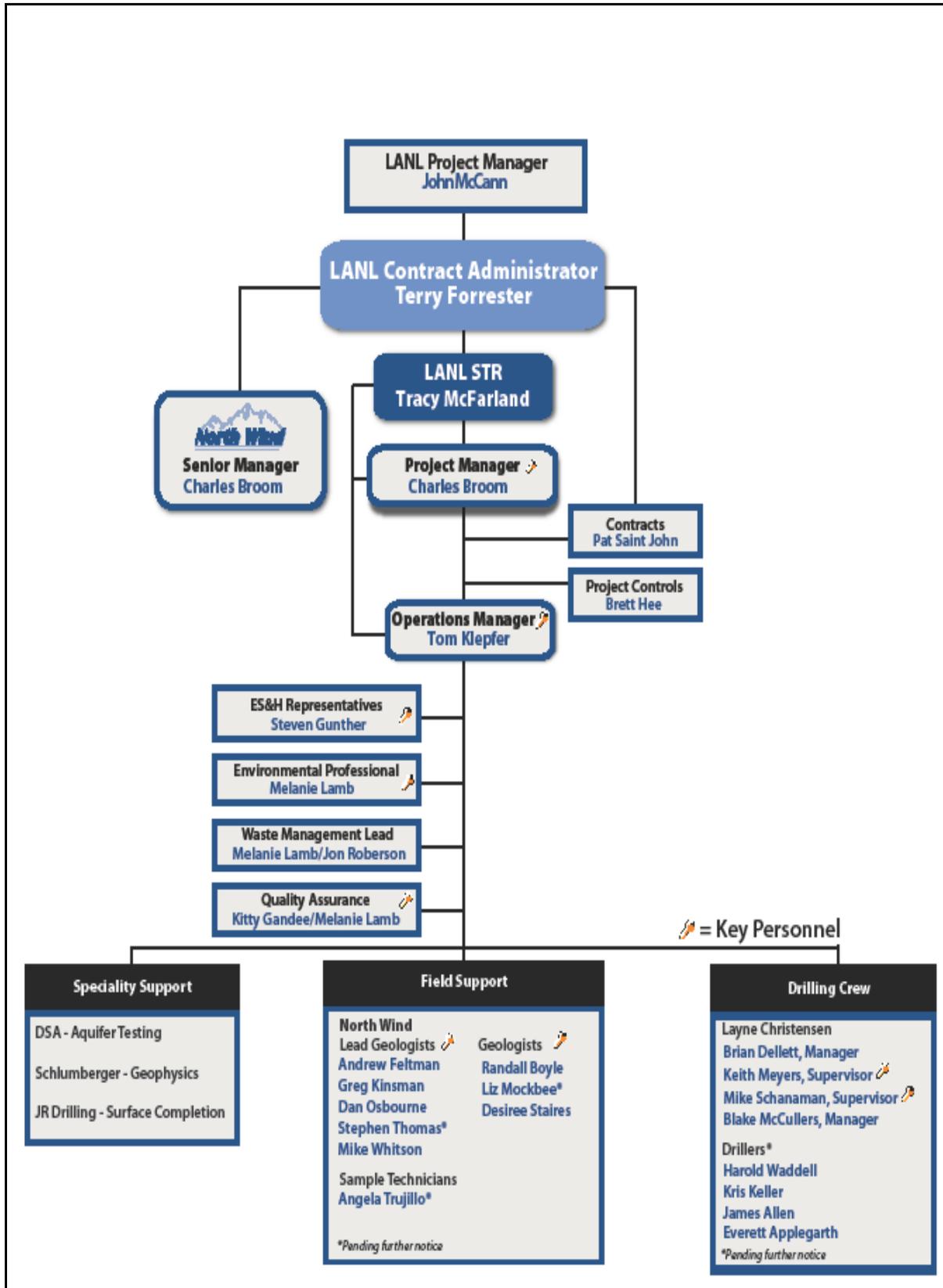


Figure 1.1-1 Project field organization chart.

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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

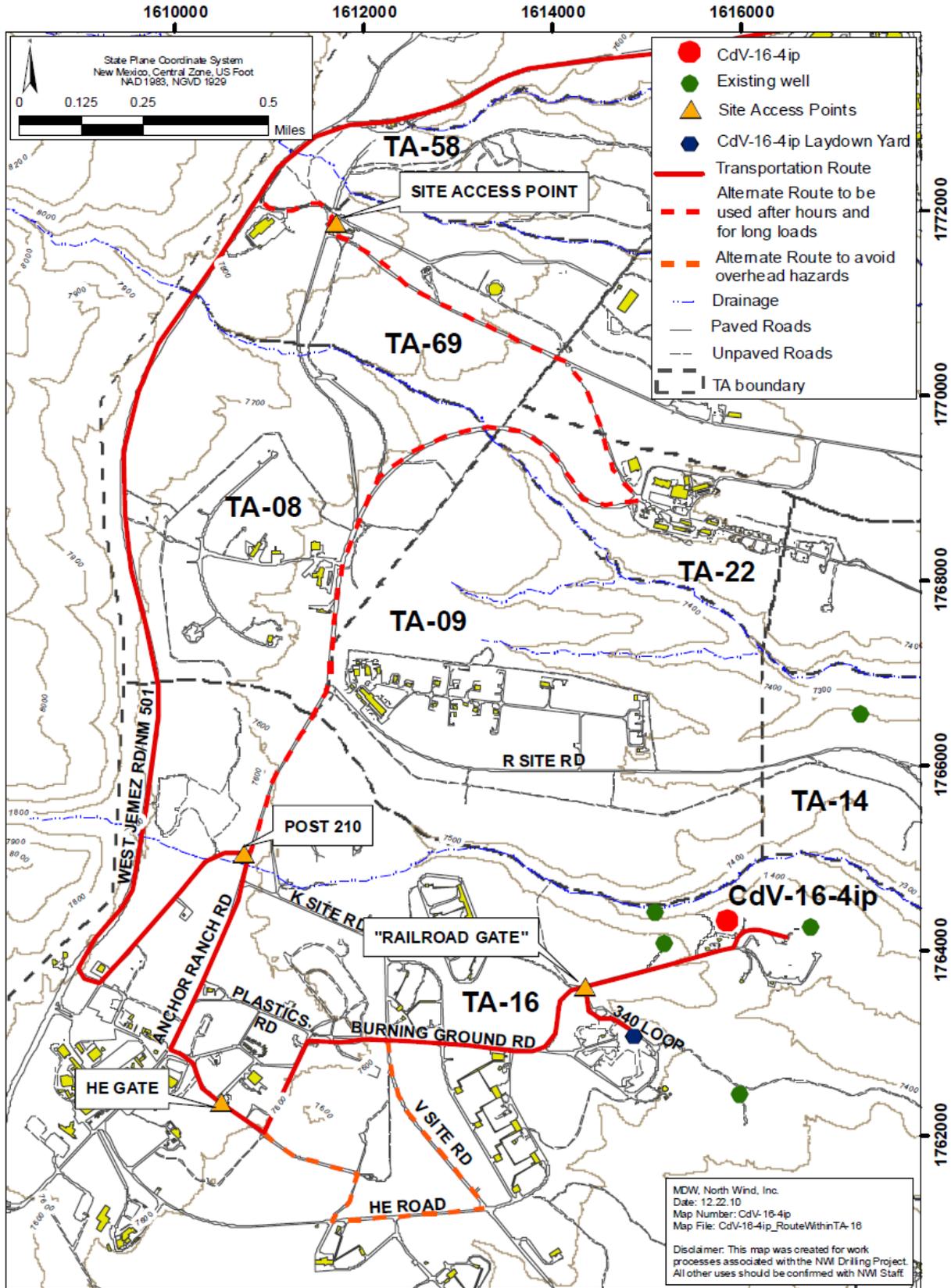


Figure 2.1-1 Designated route within TA-16.

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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

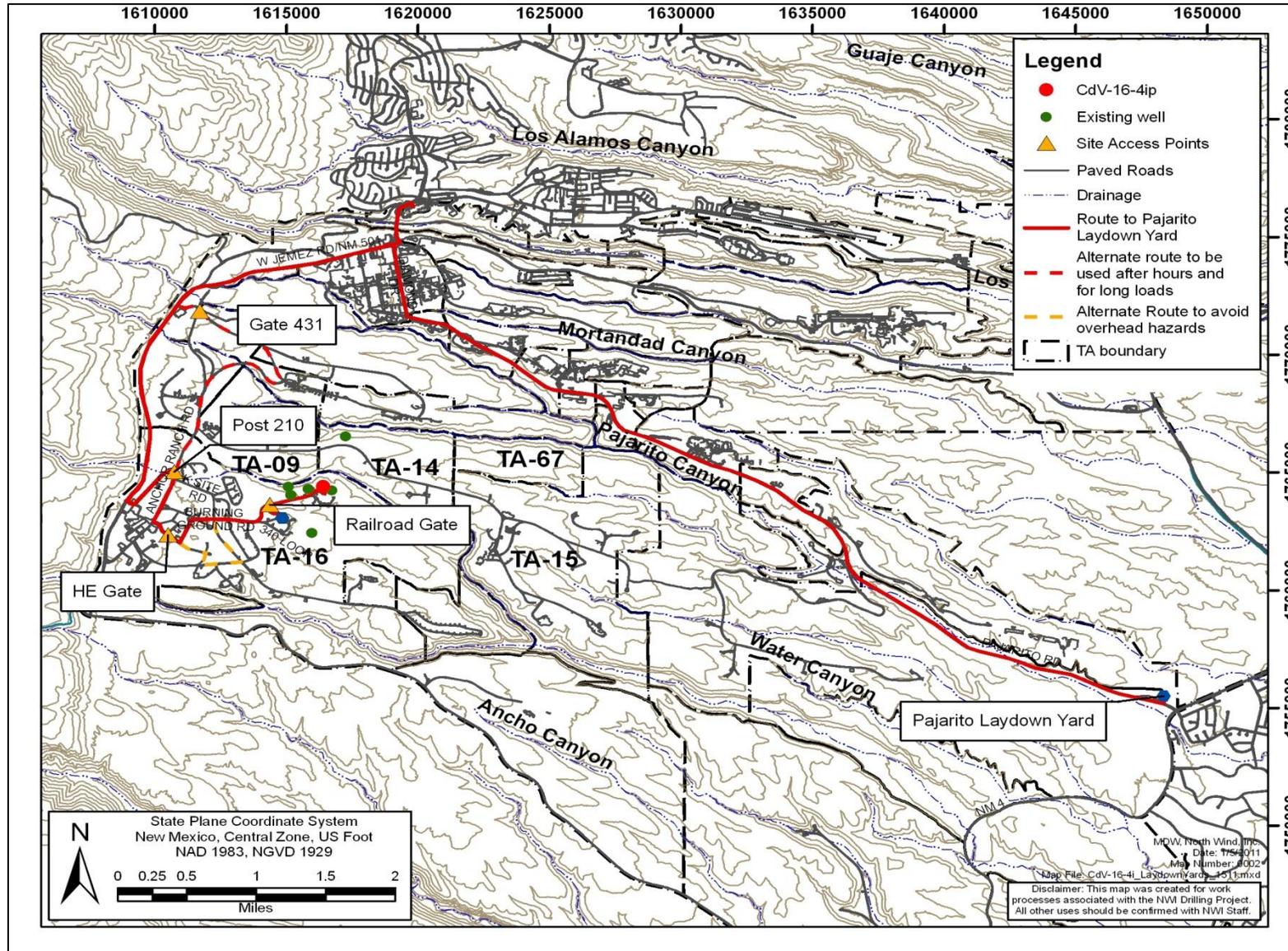


Figure 2.2-1 Route to the Pajarito lay-down yard from Well CdV-16-4ip.

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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

Printed 1/24/2011

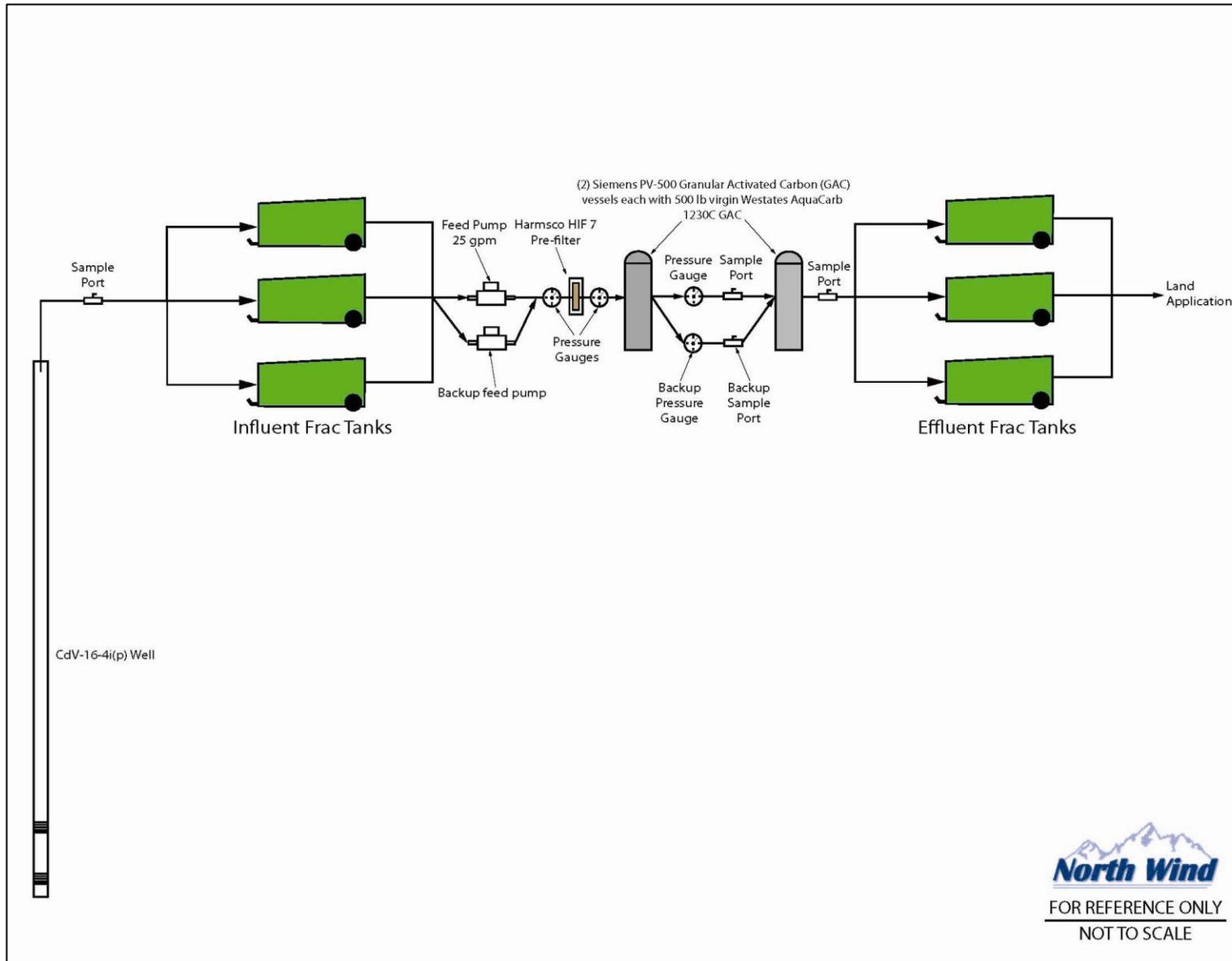


Figure 2.3-1 Schematic of GAC system

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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

Printed 1/24/2011

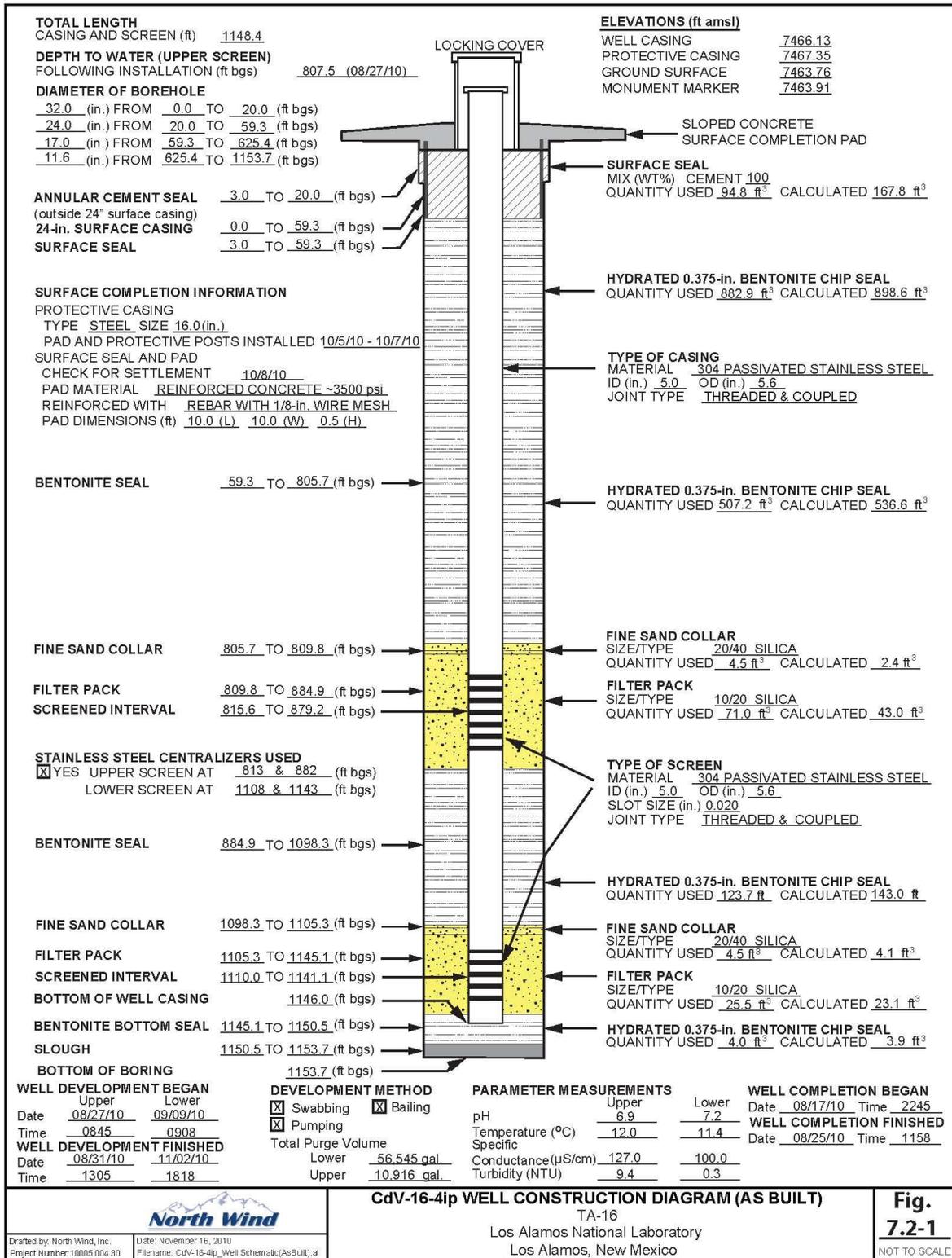


Figure 2.3-2 As built diagram for CdV-16-4ip.

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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

APPENDIX A**Pumping Test Forms**

Approved pump test, health and safety, and other appropriate forms for LANL Pump Tests are posted on the NWI intranet website (<http://portal.northwind-inc.com/corporate/documents>). Look for related forms (e.g., "DPF-10005-00x) under the "Project Specific Docs" tab project name of "10005 Drilling."

The following forms are posted:

DPF-10005-001 Rev0 Daily Drill Rig Inspection Form
DPF-10005-002 Rev0 Daily Fork Lift Inspection Form
DPF-10005-003 Rev0 Daily Field Report
DPF-10005-004 Rev0 Material Tally Sheet
DPF-10005-007 Rev0 Well Development and Aquifer Testing Data Sheet
DPF-10005-008 Rev0 Pump Test Tally Sheet
DPF-10005-009 Rev0 Monitoring Well Pump Installation Data Form
DPF-10005-011 Rev0 Seven Day Sampling System Pressure Test

Links to commonly used Health and Safety forms.

Go to <http://portal.northwind-inc.com/corporate/documents> for additional forms and procedures:

HSF-015.1 Stop Work Action
HSF-100 Tailgate Safety Briefing
HSF-103 Safety Walkthrough Checklist

APPENDIX B

Security Plan for TA-16, CdV-16-4ip Pump Test

Security Plan

TA-16 Well CdV-16-4ip is located in a Limited Area within LANL. As such, the Exhibit G, "Security Requirements For Task Order/Release" has been provided and addresses the security requirements for performing work at CdV-16-4ip during the Pump Test.

The following are the applicable sections of Exhibit G, "Security Requirements" and their implementation.

<p>All requirements of section G2.0, Security Requirements, are applicable</p>	<p>SUBCONTRACTOR shall:</p> <ul style="list-style-type: none"> • Strive to eliminate all security events, incidents, and adverse impacts to national security. • Promote security objectives as a constant value through the Integrated Safeguards and Security Management (ISSM) process. • Spread ownership for effectiveness of the security program throughout SUBCONTRACTOR'S employees and lower-tier subcontractors. • Enhance employee awareness and involvement in their security program implementation. • Enforce employees' consistent use of secure practices in their daily work activities. • Optimize the use of continuous improvement practices as the basis for "Zero Incident Performance" initiatives. • Demonstrate to CONTRACTOR that SUBCONTRACTOR is dedicated to security compliance excellence. • Expect SUBCONTRACTOR'S senior management to demonstrate leadership and direction for "Zero Incident Performance" implementation. • Ensure that all SUBCONTRACTOR employees are empowered to implement and consistently strive for the "Zero Incident Performance" goal. • Ensure that SUBCONTRACTOR Management is accessible to employees with security concerns.
<p>Only the following specified subsections of section G3.0, General Security, are applicable.</p>	
<p>Section 3.2, <i>Integrated Safeguards and Security Management (ISSM)</i></p>	<p>ISSM five-step process to ensure that security expectations are established, implemented, and measured and reinforced in every work activity.</p> <ol style="list-style-type: none"> 1) Define Work Scope: Conducting a pumping test and remediation of development and pumped aquifer test water at TA-16 2) Analyze the Security Risk: 3) Develop and Implement Security Controls: NWI OPSEC plan, Security Training, Aquifer Test Field Implementation Plan documenting designated travel route, escort requirements, prohibited items and communication devices 4) Perform Work within Security Controls: Stay on designated route, do not bring prohibited items into TA-16, do not bring personal cell

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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

Printed 1/24/2011

	<p>phones into TA-16, do not bring personal electronic devices into TA-16, stay within sight of your escort at all times, maintain personnel on-site record.</p> <p>5) Provide Feedback and Continuous Improvement</p>
<p>Subsection 3.3.1, <i>Operations Security (OPSEC) Plan</i></p>	<p>SUBCONTRACTOR shall develop (with assistance from CONTRACTOR'S Office of Counterintelligence, Operations Security Program Office), implement and sustain a DOE OPSEC Plan.</p> <p>NWI OPSEC PLAN for the Drilling Project Link: NWI-OPSEC-10005.002-Rev 0.pdf</p>
<p>Section 3.3.2, <i>Safeguards, Security and Counterintelligence Awareness</i></p>	<p>SUBCONTRACT workers shall report all of the following situations to the Office of Counterintelligence and inform the RLM or STR and CA. Situations may range from pointed questions to subtle elicitation.</p> <ul style="list-style-type: none"> • Professional contacts and relationships with sensitive country foreign nationals, whether they occur at one's worksite or abroad. • All unofficial travel to any sensitive country. • Any suspicious or provocative actions encountered while on travel. • Suspicious or provocative actions or behaviors on the part of foreign nationals visiting or assigned to LANL. • Substantive personal relationships with sensitive country foreign nationals (who are not lawful permanent residents), other than family members. • Business transactions including financial transactions, partnerships, or other business interests or investments with citizens of sensitive countries who are not lawful permanent residents, whether they involve one-time interactions or ongoing financial relationships. Small payments for things such as house cleaning or other such personal services or financial support provided to family members are not included. • Any attempts by unauthorized persons to gain access to classified information.
<p>Section 3.3.3, <i>Safeguards, Security and Counterintelligence Awareness</i></p>	<p>SUBCONTRACTOR shall be alert to and report the following to the RLM and STR:</p> <ul style="list-style-type: none"> • attempts by unauthorized persons to obtain information; • unexplained/excessive use of copiers by workers; • workers living beyond their means; • unusual foreign travel patterns of workers; and • personal problems of workers that could affect security or fitness for duty.
<p>Section 3.5, <i>Security Stop Work</i></p>	<p>When any Subcontract Worker observes a security related hazard or unmitigated risk, the worker has the authority and responsibility to inform any worker engaged in the security related hazard or unmitigated risk of his/her concern and request that the work be stopped.</p>
<p>Section 3.6, <i>Reporting Security Incidents</i></p>	<p>Requirements for identifying and reporting known and potential incidents of security concern. Such incidents may involve issues associated with classified matter, computer systems, nuclear materials, secure communications, personnel security, and physical security occurring on LANL property, Laboratory-leased property or SUBCONTRACTOR-owned property. Subcontract Workers shall comply with the following requirements.</p> <p>3.6.1 Immediately upon discovery of a potential incident of security concern, report such concern to the Security Inquiry Team (SIT) and then inform the RLM, STR, and SPL or DSO. During normal</p>

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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

Printed 1/24/2011

	<p>business hours, notifications shall be made only in person or through secure communications (STU or STE) to the SIT, RLM, STR, and DSO or SPL as required below. A non-secure telephone, non-secure fax, non-secure voice mail, or non-secure electronic mail shall not be used to report a potential incident of security concern.</p> <p>3.6.1.1 After discovery of a potential incident of security concern involving the possible improper electronic transmission of data, report the incident immediately to the SIT and then inform the RLM, STR and the assigned OCSR.</p> <p>3.6.1.2 After discovery of any incident involving the loss, compromise, or unauthorized disclosure of classified matter, report the incident immediately to the SIT and then inform the OCSR, RLM and STR.</p> <p>3.6.1.3 After discovery of any incident involving the loss, theft, diversion, or unauthorized use of nuclear material, report the incident immediately to Material Control & Accountability Group or the SIT.</p> <p>3.6.2 Outside normal business hours, SUBCONTRACTOR shall contact the ADSS on-call duty officer through the Protective Force central alarm station at 667-4437, immediately after discovery of a potential incident of security concern. The ADSS on-call duty officer may be asked to meet with the SUBCONTRACTOR in person so that SUBCONTRACTOR may report such known or potential incidents of security concern, if secure communications are not available.</p>
<p>Only the following specified subsections of section G4.0, Physical Security, are applicable</p>	
<p>Subsection 4.1, <i>Prohibited and Controlled Articles</i></p>	<p>Prohibited Articles are those not permitted on DOE property (i.e., LANL) including parking lots.</p> <p>SUBCONTRACTOR shall ensure that prohibited articles are not brought on DOE property. Prohibited articles include:</p> <ul style="list-style-type: none"> • dangerous weapons (e.g., guns and knives), explosives, or other instruments or material likely to cause substantial injury or damage to persons or property; • alcoholic beverages, including unopened bottles or cans; • controlled substances such as illegal drugs and associated paraphernalia, but not prescription medicine; and • other items prohibited by law. <p>Controlled Articles are items not permitted in Security Areas without prior authorization.</p> <p>SUBCONTRACTOR shall ensure that controlled articles are not brought into a Security Area without prior written approval from the Cyber Security Office and concurrence by the RLM or STR. Controlled articles include:</p> <ul style="list-style-type: none"> • cell phones, two way pagers, personal electronic devices (e.g. iPODs), blackberries, palm pilots, and palm-top computers;

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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

	<ul style="list-style-type: none"> • recording equipment (audio, video, optical, or data); • radio frequency transmitting equipment, two-way radios; • electronic equipment with a data exchange port capable of being connected to automatic information system equipment (thumbdrives); • computers and associated media, including but not limited to thumb drives; • cameras - video, still, digital, film or in cell phones. If the use of cameras, either inside or outside of a security area, is deemed mission essential, the use of cameras must be authorized via coordination among the STR, the RLM and the Physical Security Team prior to the use of such cameras.
<p>Subsection 4.2, <i>Escorting</i></p>	<p>All US citizens escorted into a Security Area shall wear one of the following:</p> <ul style="list-style-type: none"> • An uncleared DOE standard badge; • An uncleared temporary badge; • An uncleared LANL specific US visitor badge; or • A generic uncleared US visitor badge. <p>An escort shall not escort more than five (5) individuals at any one time, unless otherwise approved by LANL in writing.</p>
<p>Subsection 4.3, <i>Security Areas</i></p>	<p>SUBCONTRACTOR shall comply with all requirements for designated Security Areas. In addition, SUBCONTRACTOR shall ensure that all Subcontract Workers:</p> <ul style="list-style-type: none"> • Have the appropriate clearance (i.e., access authorization) for the Security Area or be properly escorted within the Security Area. • Adhere to the posted requirements for entering any Security Area (clearance status, badge, access status, and searches). • Report physical security and access control discrepancies to the SIT and inform the RLM and STR. Examples of a discrepancy include breaches of fences or walls, or attempts to circumvent security barriers. • Use only the badge valid for the Security Area to be entered and occupied, and display the valid badge at all times photo side out, above the waist, and in front of the body while in that area. • Cooperate with Protective Force personnel during badge checks. • Cooperate with Protective Force personnel during searches of vehicles, persons, and/or hand-carried items being brought into or out of a Security Area. All persons and their personal property are subject to search when on LANL property or leased facilities. • Protect keys to facilities within Security Areas at all times. • Return keys to the responsible organization key custodian who issued the keys when no longer required, and inform the RLM and STR. • Report lost or stolen keys to the key custodian who issued the keys. • Adhere to all requirements for escorting individuals who are not authorized to be in a Security Area unescorted. • Do not tailgate, piggyback, or vouch, nor allow another person to do so.
<p>Subsection 4.4, <i>Acknowledgement/Control of Vehicles On Site</i></p>	<p>Acknowledgement / Control of Vehicles On Site</p> <ul style="list-style-type: none"> • If requested, SUBCONTRACTOR shall submit to the STR or RLM the make, year, and license number of all vehicles that will be used on site. • Vehicles driven by uncleared drivers delivering construction materials or other supplies will be permitted to enter unsecured areas provided they are under escort by personnel possessing a Q or L access authorization as appropriate for the delivery site. • Heavy duty vehicles driven by Subcontract Workers may be required to

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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

	<p>proceed to Post 10 (east end of the Truck Route Road, East Jemez Rd.) for a search conducted by the Protective Force. If the search does not disclose anything of concern, the driver will receive an appropriate pass that will allow entry into the Security Area to perform their subcontract work.</p>
<p>Only the following specified subsections of section G5.0, Personal Security, are applicable</p>	
<p>Subsection 5.1, <i>Substance Abuse</i></p>	<p>All Subcontract Workers shall be required to complete and pass a pre-employment drug test and participate in random testing, regardless of the duration of their work assignment.</p> <p>Subcontract Workers shall:</p> <ul style="list-style-type: none"> • Be fit for duty and avoid behavior that compromises the health or safety of others or the security of the Lab; • Notify Personnel Security, the RLM, STR and CA immediately if arrested or convicted of a drug or alcohol violation; • Notify Personnel Security, the RLM, STR, and CA immediately after any treatment for drug or alcohol abuse, if worker possess a security clearance; • Meet with Personnel Security or Occupational Medicine promptly when asked to perform a drug and/or alcohol test; • Immediately report accidental ingestion of illegal drugs to Personnel Security, the RLM, and the STR so the appropriate action can be taken <p>Failure to Show or Refusal to Drug and/or Alcohol Test</p> <ul style="list-style-type: none"> • If a worker fails to show up for a test after being contacted, such failure shall be treated as if the worker had tested positive. • If the worker refuses to be tested, such refusal shall be reported and treated as a confirmed positive. <p>The RLM or STR will take the following actions if a Subcontract Worker has a confirmed positive drug test:</p> <ul style="list-style-type: none"> • Immediately stop the worker from performing any additional work on site; • Immediately notify SUBCONTRACTOR'S management that the worker's badge is being pulled; • Ask the worker to report back to his/her employer because his/her assignment is being terminated; • Confiscate the worker's badge and return it to Personnel Security; • Coordinate with the CA to ensure proper notifications are made.
<p>Subsection 5.2, <i>Badges</i></p>	<p>All Subcontract Workers, except as otherwise provided herein, must have a badge issued by the LANL Badge Office prior to commencement of work at LANL.</p> <p>Subcontract Workers shall:</p> <ul style="list-style-type: none"> • Complete training required by Personnel Security before receiving a badge; • Wear the badge, photo-side out, above the waist, on the front side of the body, at all times while on DOE-owned property (i.e., LANL) or on CONTRACTOR leased or rented premises; • Remove the badge and protect it from public view when leaving DOE-owned property or CONTRACTOR leased or rented premises; • Present the badge whenever requested by Protective Force personnel; • Minimize the number of instances of temporary badge issuance and

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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

	<p>replacement of lost badges;</p> <ul style="list-style-type: none">• Ensure the badge is never photocopied;• Return an issued badge to the Badge Office (via the RLM or STR as appropriate) following termination of employment, badge expiration, end of assignment, or completion of a visit. Subcontract Workers are not permitted to retain badges for any reason. <p>Lost or stolen badges shall be reported to the Badge Office within 24 hours or the next business day after discovery of the loss, whichever is soonest. The RLM or STR shall also be notified. The individual badge holder shall go to the LANL Badge Office and complete a written affidavit (Form 1672) <i>Notification of Permanent Inactivation of Badge</i> in order to obtain a replacement badge.</p> <p>In addition to the above, if a badge is stolen, the individual badge holder shall report the theft to the SIT and inform the STR or CA by the next business day of discovery of the loss.</p>
--	--

<p>All requirements of section G7.0, Cyber Security, are applicable</p>	<p><i>No computers or data recording devices will be allowed at CdV-16-4ip. Personnel will not have unescorted access to office buildings where computers may be located. Personnel performing geodetic surveys of completed well will be required to submit a Portable Electronic Device request for exemption and receive approval prior to performing work.</i></p> <p>Cyber Security requirements apply to any information system or network that SUBCONTRACTOR may use to collect, create, process, transmit, store or disseminate information for CONTRACTOR</p> <p>Failure of SUBCONTRACTOR to comply with the requirements of Section 7 may result in the imposition of a criminal and civil penalty. Activities on LANL systems are monitored and recorded and subject to audit. Use of LANL systems and data is expressed consent to such monitoring and recording. Any unauthorized access or use of LANL systems and data is prohibited and could subject the SUBCONTRACTOR to criminal and civil penalties.</p> <p>Required training for use of LANL information system resources</p> <table border="1" data-bbox="581 779 1430 1398"> <thead> <tr> <th>Course Name</th> <th>Course Number</th> <th>Frequency</th> <th>All Computer Users</th> <th>Classified Computer Users</th> <th>Training Type</th> </tr> </thead> <tbody> <tr> <td>General Employee Training (GET)</td> <td>15503</td> <td>One time</td> <td>X</td> <td>X</td> <td>Live</td> </tr> <tr> <td>Initial Computer Security Briefing</td> <td>9369</td> <td>One time</td> <td>X</td> <td>X</td> <td>Online</td> </tr> <tr> <td>Annual Security Refresher</td> <td>1425</td> <td>Annually</td> <td>X</td> <td>X</td> <td>Online</td> </tr> <tr> <td>Classified Computer Security</td> <td>17846</td> <td>One time</td> <td></td> <td>X</td> <td>Online</td> </tr> <tr> <td>Annual Classified Computer Security Briefing</td> <td>Unassigned</td> <td>Annually</td> <td></td> <td>X</td> <td>Online</td> </tr> </tbody> </table>	Course Name	Course Number	Frequency	All Computer Users	Classified Computer Users	Training Type	General Employee Training (GET)	15503	One time	X	X	Live	Initial Computer Security Briefing	9369	One time	X	X	Online	Annual Security Refresher	1425	Annually	X	X	Online	Classified Computer Security	17846	One time		X	Online	Annual Classified Computer Security Briefing	Unassigned	Annually		X	Online
Course Name	Course Number	Frequency	All Computer Users	Classified Computer Users	Training Type																																
General Employee Training (GET)	15503	One time	X	X	Live																																
Initial Computer Security Briefing	9369	One time	X	X	Online																																
Annual Security Refresher	1425	Annually	X	X	Online																																
Classified Computer Security	17846	One time		X	Online																																
Annual Classified Computer Security Briefing	Unassigned	Annually		X	Online																																
<p>All requirements of section G8.0, Contacts, are applicable</p>	<p>Contacts (Dec 2007)</p> <p>Badge Office.....667-6901 badge@lanl.gov Chief Information Office667-0961 Chief Information Office on-call pager.....996-0242 Classification Group.....667-5011 Classified Matter Protection & Control.....665-1802 cmpc@lanl.gov Clearance Processing.....667-7253 clearance@lanl.gov Cyber Security Office / Helpline.....665-1795 Emergency Management & Response.....667-6211 Fire, Bomb Threat, etc.....911 Foreign Visits and Assignments.....665-1572</p>																																				

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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



	Fraud, Waste and Abuse.....665-6159 Material Control & Accountability Group.....667-5886 Office of Counterintelligence.....665-6090 Operations Security Program Office.....665-5561 Personnel Security POC.....665-1624 Personnel Security.....667-5897 Physical Security Team667-2510 Protective Force.....665-1279 Protective Force After Hours.....667-4409 Safety Help Desk.....665-7233 Security Help Desk.....665-2002 security@lanl.gov
All requirements of section G9.0, Required Notifications, are applicable	SUBCONTRACTOR shall notify the Requester, STR and the CA immediately, whenever a change in the scope of the work to be performed has been identified or requested. The STR shall then notify the appropriate security expert so that any security modifications can be made to the approved Exhibit G in response to the change in the scope of work.

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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

Printed 1/24/2011

APPENDIX C

Traffic Control Plan

The following general traffic safety and site specific requirements apply:

- **Visitors, including LANL sampling personnel passing through the drill site boundaries, will be required to sign in and out with the NWI PIC.**
- **Traffic safety will be observed at all times when traveling on Laboratory property.**
- **Do not drive or park on natural vegetated or reclaimed areas, i.e., stay on graveled roads and parking areas.**
- **Observe posted speed limits**
- **Wear seat belts whenever motor vehicles are in operation**