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National Nuclear Security Administration
Sandia Site Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

NOV 16 2009

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

James Bearzi, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Road East, Bldg. 1
Santa Fe, NM 87505

Dear Mr. Bearzi:

On behalf of the U. S. Department of Energy/National Nuclear Security Administration (DOE/NNSA) and Sandia Corporation (Sandia), DOE/NNSA is submitting "DOE/Sandia Responses to New Mexico Environment Department's (NMED) Notice of Disapproval: DOE/Sandia Responses to NMED's Notice of Disapproval for Corrective Measures Evaluation Report for Technical Area-V Groundwater, July 2005 Sandia National Laboratories," EPA ID# 5890110518 HWB-SNL-05-027," received on August 12, 2009.

Should you have any questions regarding this response, please contact me at (505) 845-6036, or John Gould of my staff at (505) 845-6089.

Sincerely,

Patty Wagner
Manager

Enclosure (1)

cc (w/enclosure):
W. Moats, NMED (Via Certified Mail)
L. King, EPA, Region 6 (Via Certified Mail)
T. Skibitski, NMED-OB
B. Birch, NMED-OB
Records Center, SNL/NM, MS-1089
Zimmerman Library, UNM (c/o SNL/NM)
J. Gould, SSO, MS-0184

November 2009

DOE/Sandia Responses to NMED's

"NOTICE OF DISAPPROVAL: DOE/SANDIA RESPONSES TO NMED'S NOTICE OF DISAPPROVAL FOR CORRECTIVE MEASURES EVALUATION REPORT FOR TECHNICAL AREA-V GROUNDWATER, JULY, 2005 SANDIA NATIONAL LABORATORIES, EPA ID# NM5890110518 HWB-SNL-05-027"

INTRODUCTION

This document responds to the comments received in a Notice of Disapproval (NOD) letter from the New Mexico Environment Department (NMED) to the U.S. Department of Energy (DOE) and Sandia Corporation (Sandia) on August 12th, 2009 regarding the response to the July 2008 NOD on the Corrective Measures Evaluation Report for the Technical Area V (TA-V) study area at Sandia National Laboratories, New Mexico (SNL/NM). The letter is entitled: "*Notice Of Disapproval: DOE/Sandia Responses to NMED's Notice of Disapproval for Corrective Measures Evaluation Report For Technical Area-V Groundwater, July, 2005 Sandia National Laboratories, EPA ID# NM5890110518 HWB-SNL-05-027,*" (NMED August 2009).

For the benefit of the reader, the NMED letter received in July 2008 is hereinafter refered to as the "first NOD" and the NMED letter received in August 2009 is hereinafter refered to as the "second NOD". The second NOD letter from the NMED contained six specific comments and one general comment that are addressed in this response. This document lists each NMED comment in boldface, followed by the DOE/Sandia response written in normal font under "Response". Appendix A to this reponse to comments is a revised Technical Area V Groundwater Investigation Work Plan.

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Sandia is a multiprogram laboratory managed and operated by Sandia Corporation, a wholly-owned subsidiary of Lockheed Martin Corporation, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

SPECIFIC COMMENTS

As Appendix A of the response, the Permittees submitted: *Technical Area V Groundwater Investigation Work Plan, Installation of Groundwater Monitoring Wells TAV-MW11, TAV-MW12, and TAV-MW13, Installation of Soil-Vapor Monitoring Wells TAV-SV01, TAV-SV02, and TAV-SV03,* dated April, 2009 (hereinafter referred to as the Work Plan). NMED has the following comments regarding the Work Plan.

Comment 1

Figure 1 of the Work Plan shows the proposed locations of the three new groundwater monitoring wells. TAV-MW11 is proposed to be approximately 850 feet from the nearest existing monitoring well. NMED considers this too far to the east for the well to be effective at characterizing the extent of the plume. An appropriate location for the installation of TAV-MW11 is closer to the proposed location of TAV-SV03, about 425 feet from the nearest well (see Figure 1 enclosed with this letter).

Response: DOE/Sandia do not agree with the NMED's proposed location for TAV-MW11, not only for the logistical reasons previously discussed with NMED (SNL/NM September 2008), but also for technical reasons. DOE/Sandia do not believe this location will be effective at characterizing the extent of the plume. NMED believes this area to be a potential source of VOCs in the vadose zone and have required DOE/Sandia to install a soil vapor monitoring well. If this is a source of VOCs in the vadose zone, then a groundwater monitoring well at NMED's proposed location will not bound the plume as intended. DOE/Sandia believe the aerial extent of the plume would be bounded by the location originally proposed in the Work Plan. However, groundwater monitoring well TAV-MW11 will be installed as directed by the NMED. The Work Plan (Appendix A) has been modified to accommodate the revised location of TAV-MW11.

Reference cited:

Sandia National Laboratories/New Mexico (SNL/NM), September 2008. "Notes of Meeting—September 18, 2008 Meeting Between NMED, DOE, and SNL/NM to Discuss the Notice of Disapproval for the TA-V CME Report," Internal Memorandum from Michael Skelly (Dept 6765) to John Cochran (Dept. 6765), Sandia National Laboratories/New Mexico, Albuquerque, New Mexico. September 26, 2008.

Comment 2

As proposed in Figure 1 of the Work Plan, TAV-MW12 would be located approximately 625 feet from the nearest existing monitoring well. NMED considers this too far to the south for the well to be effective at characterizing the extent of the plume. An appropriate location for TAV-MW12 is considered to be a few hundred feet to the northwest of the proposed location (see Figure 1 of this letter).

Response: DOE/Sandia do not agree with the NMED's proposed location for TAV-MW12. DOE/Sandia prepared and submitted the Work Plan with the proposed location for TAV-MW12 based on verbal concurrence with the NMED (SNL/NM September 2008).

Based on technical considerations, DOE/Sandia do not believe this location will be effective at characterizing the extent of the plume. As shown on Figure 1 of the second NOD, NMED's proposed location may be very near, or within the 5 μg/L contour for TCE. If that is the case, DOE/Sandia would be required to install an additional well to bound the plume. DOE/Sandia believes the information obtained at the location originally proposed is sufficient to protect human health. Considering the depth to groundwater is approximately 500 ft and the nearest receptor/drinking water well is greater than 4 miles away, DOE/Sandia believe that installing groundwater monitoring wells on a 300 or 400 ft spacing is excessive.

DOE/Sandia believes the aerial extent of the plume would be bounded by the location originally proposed in the Work Plan. However, groundwater monitoring well TAV-MW12 will be installed as directed by the NMED. The Work Plan (Appendix A) has been modified to accommodate the revised location of TAV-MW12. It should be noted that approximately 40% of the polygon labeled "NMED suggested location – TAV-MW12" on Figure 1 of the second NOD is within the controlled area of the Sandia Pulsed Reactor Facility, and groundwater monitor wells can not be installed within this area for security reasons. Much of the remainder of the suggested location polygon is occupied by aboveground and underground structures and utilities that preclude well installation.

Comment 3

Groundwater at TAV-MW10 exhibits TCE above the maximum concentration limit (MCL) and has an increasing nitrate-concentration trend suggesting that nitrate levels are beginning to exceed the MCL (see Figure 2 enclosed with this letter). This well can therefore no longer be used to delineate the outline of the plume (i.e., the area of the plume where concentrations are below MCLs). Another well is needed to characterize the plume in this area of Technical Area V (TA-V). Even if groundwater samples from TAV-MW11 and TAV-MW12 are nondetect with respect to TCE and nitrate, TAV–MW10 would show the plume outline is not resolved. A suggested location for this additional well is shown in Figure 1 of this letter.

Response:

For reasons similar to those outlined above in the response to Comment 2, DOE/Sandia do not believe the location of NMED's proposed "new" well (hereinafter identified by TAV-MW14) will be effective in characterizing the extent of the plume. As with NMED's proposed location for TAV-MW12, NMED's proposed location of TAV-MW14 may be very near, or within the 5 μg/L contour for TCE. DOE/Sandia suggest that installing TAV-MW14 at a location 200 to 300 feet southeast of NMED's proposed location would sufficiently characterize the plume while being protective of human health. However, groundwater monitoring well TAV-MW14 will be installed as directed by the NMED. The Work Plan (Appendix A) has been modified to accommodate the addition of TAV-MW14. It should be noted that approximately 70% of the polygon labeled "NMED suggested location – new well" on Figure 1 of the second NOD is within the controlled area of the Sandia Pulsed Reactor Facility, and groundwater monitor wells can not be installed within this area for security reasons. Much of the remainder of the suggested location polygon is occupied by aboveground and underground structures and utilities that preclude well installation.

Comment 4

Section 10 of the Work Plan, Sampling (page A-9, last paragraph), states "the existing groundwater monitoring wells (AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW3, TAV-MW4, TAV-MW5, TAV-MW6, TAV-MW7, TAV-MW8, TAV-MW9 and TAV-MW10) will be sampled annually". Those wells which have a history of no TCE detections in groundwater can be sampled two times a year as long as groundwater samples continue to have no TCE detections. These wells include AVN-1, LWDS-2 [sic], TAV-MW3, TAV-MW5, TAV-MW7, and TAV-MW9.

The other wells which have a history of TCE detections in groundwater shall be sampled quarterly, because contaminant trends are an important part of determining stability of the plume and effectiveness of natural attenuation. These wells include LWDS-MW1, TAV-MW2, TAV-MW4, TAV-MW6, TAV-MW8 and TAV-MW10. If a well with no history of TCE detections has a TCE detection in groundwater, sampling of groundwater at the well shall revert to a quarterly frequency. If a well that is not sampled on a quarterly frequency has a nitrate detection in groundwater at or above the nitrate MCL in a sampling event, or at 80% or greater of the nitrate MCL in two consecutive sampling events, sampling at the well shall revert to a quarterly frequency. New wells shall be sampled quarterly for at least eight events, as stated in Section 10 of the Work Plan.

Response: Section 10 of the Work Plan (Appendix A) has been modified per NMED requirements.

Comment 5

Section 10.1 of the Work Plan, Groundwater Sampling (page A-10, last paragraph), states " ... samples will be collected and analyzed for VOCs and nitrate plus nitrite .... " General chemistry parameters (nitrate/nitrite, sulfate, chloride, sodium, carbonate/bicarbonate, calcium, potassium, magnesium, total organic carbon, Eh, pH, dissolved oxygen, dissolved manganese, dissolved iron, sulfide, alkalinity, temperature, and any other parameter that may be useful in implementing monitored natural attenuation (MNA)) and perchlorate must be added to the list of analytes for the new groundwater monitoring wells.

Response: Section 10.1 of the Work Plan (Appendix A) has been modified per NMED requirements.

Comment 6

There is no mention of geophysically logging the wells in the Work Plan. The Permittees must conduct geophysical logging through the PVC-casing in both new and existing groundwater monitoring wells using induction, neutron, and gamma logging techniques. Lithologic information above, at, and below the water table is critical in understanding the geohydrologic conditions at TA-V (screened lithologies, major units, bedding continuities and orientations). Presently, catching and

describing cuttings being blown up the borehole approximately every 10 vertical feet, geologic boring logs produced by different geologists and geophysically logging through steel casing provides inconclusive data. Geophysically logging through the PVC casing in the wells using appropriate sized tools should yield more complete and objective data. In addition, the Permittees may conduct neutron and gamma logs through the drive casing of the new wells, as they have at other wells, for consistency.

Response: Section 12, "Geophysical Logging" has been added to the Work Plan (Appendix A) per NMED requirements.

General Comment
Because MNA is the Permittees' preferred remedial alternative, any supporting testing and/or documentation that can be conducted during the time of the drilling and groundwater sampling activities that shows that MNA is actually occurring at the site and that can be used for site specific half-life estimates are encouraged by NMED. These may include comparison of appropriate groundwater and geochemical parameters both within and outside the plume and noting any relevant hydrochemical changes with time, and comparison with existing data. TCE reduction by MNA in aerobic environments is a relatively new and active field, and recent and upcoming developments may prove helpful in showing active natural attenuation.

NMED also notes that of the first 8 comments in the original NOD letter, which concerned further characterization and miscellaneous comments, some are not resolved now (Comments 2, part of 4, 6, and 7) but will be addressed in the revised conceptual model and revised corrective measures evaluation (CME) report. Also comments 9 through 21 of the original NOD letter, which were comments concerning revisions to the CME report, were not resolved now, but need to be addressed in the revised conceptual model or revised CME Report. NMED reserves the right to comment on such unresolved issues when the revised conceptual model and revised CME Report are submitted in the future, or through any other exchange of information.

The Permittees must submit a revised Work Plan that proposes well locations consistent with comments 1, 2, and 3, and addresses the other comments contained in this letter. The revised Work Plan, in consideration of all of the comments above, must describe the work that will be performed to adequately characterize the contaminated groundwater and hydrogeology at TA-V. The revised Work Plan must also contain a schedule of the work to be completed, including the dates of submission to the NMED of an investigation report and revised CME Report. The revised Work Plan shall be submitted to NMED by November 16, 2009.

Response: Comment noted; the Work Plan (Appendix A) has been modified based on NMED requirements.

Appendix A

Technical Area V Groundwater Investigation Work Plan

Installation of Groundwater Monitoring Wells TAV-MW11, TAV-MW12, TAV-MW13, and TAV-MW14

Installation of Soil-Vapor Monitoring Wells TAV-SV01, TAV-SV02, and TAV-SV03

Revision 1

November 2009

Environmental Restoration Project
Sandia National Laboratories, New Mexico

Sandia is a multiprogram laboratory managed and operated by Sandia Corporation, a wholly-owned subsidiary of Lockheed Martin Corporation, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Table of Contents

1 Project and Site Information

Task Description: Sandia National Laboratories/New Mexico (SNL/NM) Technical Area V (TA-V) installation of groundwater and soil-vapor monitoring wells; quarterly sampling of groundwater and soil vapor.

Case No.: 98026.01.01

Project Leader/Department No.: John Cochran/6765

Scheduled Start Date: January 2010—New Mexico Environment Department (NMED) Approval of this Work Plan

Estimated Completion Date: February 2013—Re-submittal of the Corrective Measures Evaluation (CME) Report and Current Conceptual Model

Operations/Technical Area: Operable Unit 1330, Groundwater Initiative

2 Regulatory Criteria

In April 2004 the NMED issued a Compliance Order on Consent (the Order) (NMED April 2004) to the U.S. Department of Energy (DOE) and Sandia Corporation (Sandia), which identified TA-V as an area of groundwater contamination at SNL/NM requiring completion of a CME. The Order directed that a CME Work Plan be developed to identify and outline a process to evaluate remedial alternatives for implementation at TA-V. The CME Work Plan was submitted in April 2004 (SNL/NM April 2004a), was formally approved with modifications by the NMED in October 2004 (NMED October 2004), and was revised in December 2004 (SNL/NM December 2004). The performance and compliance goals and objectives for TA-V groundwater were developed in the TA-V CME Work Plan (SNL/NM April 2004a).

The Order also stated that an evaluation of remedial alternatives for contaminants of concern in groundwater at TA-V requires a current conceptual model of groundwater flow and contaminant transport. Therefore, a current conceptual model was also provided in April 2004 (SNL/NM April 2004b) as the basis for a technically defensible evaluation that was developed and documented in the CME. No comments have been received from NMED on the *Current Conceptual Model of Groundwater Flow and Contaminant Transport at Sandia National Laboratories/New Mexico Technical Area-V* (SNL/NM April 2004b) submitted in April 2004.

Results of activities performed under the TA-V CME Work Plan were documented in the CME Report (SNL/NM July 2005). The purpose of the CME Report was to select a preferred remedial alternative for implementation at TA-V based on the results of information gathered during the CME process. The CME was conducted to ascertain which remedial alternative would most effectively meet the project goals and objectives for cleanup within the regulatory framework. As a result of the CME, it was determined that monitored natural attenuation of all contaminants of concern was the preferred remedial alternative for implementation as the corrective measure to remediate contaminated groundwater at TA-V (SNL/NM July 2005).

In July 2008, the NMED issued the first Notice of Disapproval (NOD) to the DOE and Sandia regarding the CME Report for the TA-V study area at SNL (NMED July 2008). The NMED's first NOD letter contained 21 comments, and the closing paragraph states:

"The U.S. Department of Energy and Sandia Corporation ("Permittees") must submit a revised CME Report. However, before submittal of a revised CME Report, the Permittees must respond to comments 1-8 above and submit a work plan to the NMED for approval to adequately characterize groundwater at TA-V by October 1, 2008. The work plan, in consideration of all of the comments above, must describe the work that will be performed to adequately characterize the contaminated groundwater and hydrogeology at TA-V. The work plan must also contain a proposed schedule of the work to be completed, subject to NMED review and approval including the dates of submission to the NMED of an investigation report and revised CME Report."

The first NOD letter required that DOE/Sandia respond to the NOD and prepare a work plan for NMED approval to adequately characterize groundwater at TA-V. DOE/Sandia requested a meeting with the NMED to clarify specific information (e.g., the number and location of additional groundwater wells required by NMED), and several meetings were held between NMED, DOE and Sandia (SNL/NM September 2008). The results of the discussions at those meetings were incorporated into the TA-V Groundwater Investigation Work Plan and submitted to NMED in April 2009 (SNL/NM April 2009).

In August 2009, DOE/Sandia received a second NOD letter from the NMED entitled: "*Notice Of Disapproval: DOE/Sandia Responses to NMED's Notice of Disapproval for Corrective Measures Evaluation Report for Technical Area-V Groundwater, July, 2005 Sandia National Laboratories, EPA ID# NM5890110518 HWB-SNL-05-027."* (NMED August 2009). The second NOD contained six specific comments and one general comment that pertained to the number and location of groundwater monitoring wells, sampling frequency, and analytical parameters.

This TA-V Groundwater Investigation Work Plan (Revision 1) outlines the activities and procedures to install and sample groundwater and soil-vapor monitoring wells to comply with the requirements of the first and second NODs and requirements of the New Mexico Office of the State Engineer (NMOSE) (NMOSE August 2005). To meet these regulatory requirements, the following tasks will be completed at SNL/NM:

- Submit this TA-V Groundwater Investigation Work Plan (Revision 1) to the NMED and NMOSE for review and approval.
- Use a licensed well driller and approved materials to install groundwater monitoring wells.
- Use a licensed well driller and approved materials to install soil-vapor monitoring wells.
- Upon completion of the well-installation field activities, submit a report describing the field activities to the NMED.
- Conduct geophysical logging using induction, neutron, and gamma logging techniques of the groundwater monitoring wells through the casing.
- Sample the newly installed groundwater and soil-vapor monitoring wells for eight consecutive quarters.
- Prepare an Investigation Report (revised Current Conceptual Model) and submit to the NMED.
- Reevaluate the corrective measures and submit a revised CME Report to the NMED.

Based on the requirements established by the NMED, four groundwater monitoring wells and three soil-vapor monitoring wells will be installed. Applicable Field Operating Procedures (FOPs) and Administrative Operating Procedures (AOPs) are listed in Table 1; however, this site-specific TA-V Groundwater Investigation Work Plan (Revision 1) should be used as the primary guidance in the field.

Table 1. Applicable Operating Procedures

Number of Procedure	Title of Procedure
FOP 94-01	Safety Meetings, Inspections, and Pre-Entry Briefings Rev. 1, 12/16/96
FOP 94-05	Borehole Lithologic Logging, Rev. 0, 2/10/94
FOP 94-22	Deep Soil Gas Sampling, Rev. 0, 3/31/94
FOP 94-25	Documentation of Field Activities, Rev. 0, 11/4/94
FOP 94-28	Health and Safety Monitoring of Organic Vapors (FID and PID), Rev. 2, 4/27/97
FOP 94-38	Drilling Methods and Drill Site Management, Rev. 0, 4/14/94
FOP 94-41	Well Development, Rev. 0, 11/21/94
FOP 94-42	Integration of the design, Installation, Rehabilitation, and Decommissioning of Environmental Restoration Wells, Rev. 1, 5/31/94
FOP 94-45	Designing and Installing Groundwater Monitoring Wells, Rev. 0, 5/31/94
FOP 94-57	Decontaminating Drilling and Other Field Equipment, Rev. 0, 5/31/94
FOP 94-68	Field Change Control, Rev. 2 (in revision)
FOP 94-69	Personnel Decontamination (Level D, C, and B Protection), Rev. 1, 1/23/98
FOP 97-01	Well Registry and Tracking System, Rev. 0, 2/1/97
FOP 05-01	Groundwater Monitoring Well Sampling and Field Analytical Measurements
FOP 05-03	General Sampling Equipment Decontamination
AOP 94-24	System and Performance Audits, Rev. 0, 1/12/95
AOP 94-25	Deficiency Reporting, Rev. 0, 1/12/95
AOP 95-16	Administrative Operating Procedure for Sample Management and Custody, Rev. 1, 4/18/96
AOP 08-05	Long Term Environmental Stewardship (LTES) Monitoring Well Installation, Decommissioning, and Planning

3 Groundwater Monitoring Well Installation

Four 5-inch nominal diameter polyvinyl chloride (PVC) casing groundwater monitoring wells (TAV-MW11, TAV-MW12, TAV-MW13, and TAV-MW14) will be installed to provide representative groundwater samples. The groundwater monitoring well boreholes will be drilled using Air-Rotary Casing-Hammer (ARCH) drilling methods, at the following locations (Figure 1):

- TAV-MW11 will be installed approximately 425 feet (ft) east of TAV-MW6;
- TAV-MW12 will be installed approximately 350 ft south-southwest of TAV-MW10;
- TAV-MW13 will be installed approximately 50 ft north of TAV-MW5; and
- TAV-MW14 will be installed approximately 250 ft southeast of TAV-MW10.

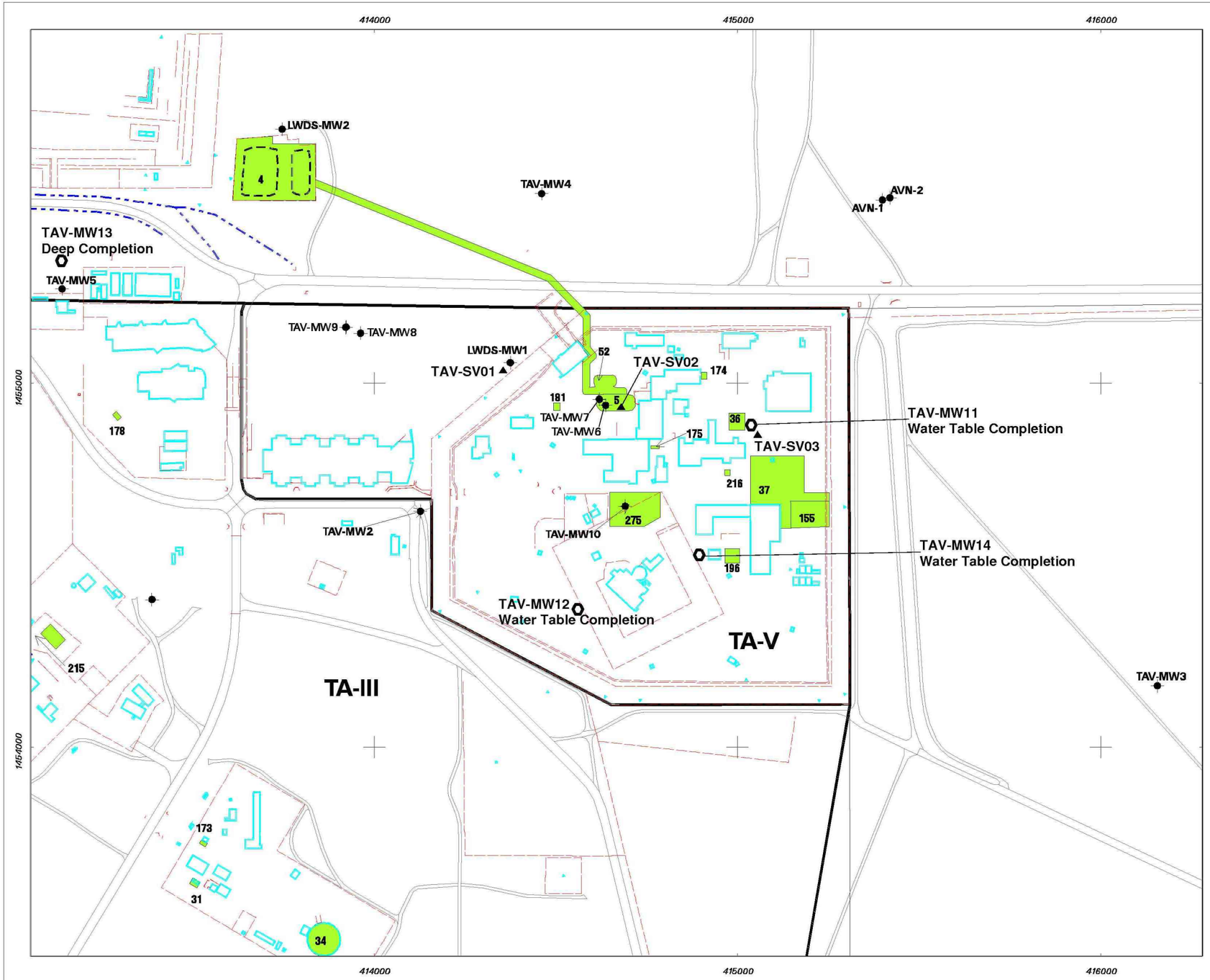
The precise location of these wells will be determined in the field to ensure they are outside of secured nuclear facility buffer zones, and to avoid existing above-ground and underground utilities and structures.

3.1 Borehole Drilling

The ARCH drilling method will use environmentally-friendly lubricants and will be able to penetrate highly variable lithologies such as cobbles, boulders, gravel, sand, clay, and caliche while maintaining an open, competent borehole. The borehole lithology will be logged by the SNL/NM field geologist during drilling. The total depth of the borehole will be determined by the SNL/NM field geologist, but the depth is anticipated to be 20 to 25 ft deeper than the water table. The depth of the first encounter with regional groundwater and any perched groundwater will be noted and recorded during drilling. After reaching total depth, the cased borehole will be logged using natural gamma and neutron wire-line geophysical methods.

Minimal water (but no other foams/liquids) in the form of “mist” may be introduced into the borehole to aid in the removal of cuttings. Waste generation will be kept to a minimum. Borehole cuttings will be contained within an area adjacent to the well. Water produced from the well during drilling or development will be contained in 55-gallon drums and placed on spill control pallets. Management and final disposition of cuttings and water will be performed as stipulated in the project Waste Management Plan.

Based on current conditions in TA-V and recent groundwater level measurements, the three water table completion monitoring wells (TAV-MW11, TAV-MW12, and TAV-MW14) are anticipated to be drilled to approximately 530 ft below ground surface (bgs). Twenty foot PVC well screens will be placed so that the top of the screen is approximately 5 ft above the water table. The anticipated depth to water at these locations is approximately 510 ft bgs; therefore, the screen completion intervals are expected to be approximately 505 to 525 ft bgs with a 5-ft sump placed below the screen.



Legend

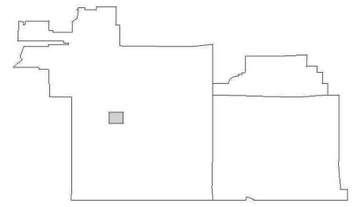
- Proposed Soil-Vapor monitoring well
- Proposed groundwater monitoring well
- Existing groundwater monitoring well
- Surface drainage
- Fence
- Road
- Impoundment boundary
- Solid waste management unit (SWMU)
- SNL/NM technical area
- Building

0 300 600

Scale in Feet

0 72 144

Scale in Meters



Sandia National Laboratories, New Mexico
Environmental Geographic Information System

Figure 1
Existing TA-V Monitoring Wells and Proposed Soil-Vapor and Groundwater Monitoring Wells

Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone, 1927 North American Horizontal Datum, 1929 North American Vertical Datum

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For the deeper completion well (TAV-MW13), the 20-ft PVC well screen will be completely submerged at a depth not to exceed 100 ft below the water table. The anticipated depth to water at this location is approximately 480 ft bgs; therefore, the maximum screen completion interval is expected to be approximately 560 to 580 ft bgs with a 5-ft sump placed below the screen. Based on NMED requirements, this well is being installed to monitor Ancestral Rio Grande (ARG) deposits (higher permeability fluvial lithofacies) near TAV-MW5. Therefore, the screened interval will be determined in the field by the geologist based on lithologic information.

3.2 Well Construction

The groundwater monitoring wells will be installed through the temporary steel drive casing (nominal 10-inch diameter), and completed using 5-inch nominal diameter, flush-threaded, PVC Schedule-80 water well casing. No solvents, cleaners, or lubricants will be used for construction of the monitoring well. The casing will be delivered pre-cleaned and bagged, or steam-cleaned on site prior to installation. To preserve the integrity of the well materials, the well screen and riser pipe will be suspended in the borehole until the primary filter pack, bentonite pellet seal and annular seal are installed.

A 20-ft length of PVC screen with a 0.010-inch or 0.020-inch slot size will be used for the four wells. A 5-ft sump will be placed at the base of the screen and sealed with a threaded end cap. PVC centralizers will be placed at the base and top of the well screen and then at intervals not to exceed 100 ft up to the ground surface. As discussed above, the screens will be placed so that the top of the screen is approximately 5 ft above the water table (TAV-MW11, TAV-MW12, and TAV-MW14) or completely submerged (TAV-MW13).

The appropriate screen slot size and gradation of the filter pack material will be based on the gradation of the sediments in the screen interval as determined in the field by the geologist logging the borehole. If the predominant water-bearing interval consists mostly of clay and silt, a 0.010-inch screen slot and a primary filter pack of clean 20-40 silica sand will be placed in the annulus. However, if the predominant water-bearing interval consists mostly of silt and sand, a 0.020-inch screen slot and a primary filter pack of clean 10-20 silica sand will be placed in the annulus. The primary filter pack will extend from the bottom of the sump to at least 5 ft above the top of the screen. A 5-ft thick layer of clean 60 silica sand will be placed above the primary filter pack. Both sand packs will be tagged using a tag line to verify their depth. Preliminary well development using a surge block will be performed at this time to help settle the filter pack.

An approximately 30-ft thick layer of 1/4-inch bentonite pellets or 3/8-inch bentonite chips will be placed and hydrated above the filter pack prior to emplacement of the bentonite-grout annular seal. The bentonite pellets/chips will be allowed to set for a time adequate for hydration (at least one hour). The remaining annular space to ground surface will then be filled with bentonite grout. To prevent overloading, the bentonite grout will be installed in multiple lifts. The first bentonite grout lift will be approximately 100 ft thick and will be allowed to set a minimum of 24 hours before installation of the next lift. Subsequent bentonite grout lifts will each be approximately 200 ft thick. The bentonite grout will be topped off to within 6-inches to 1-ft bgs.

The well casing will extend approximately 30 inches above ground surface with a water-tight cap. The monitoring well will be completed with a 36-inch high protective steel casing with a hinged locking cap. The protective casing will be primed and painted yellow. A 3-ft by 3-ft, sloped concrete pad will be constructed around the casing. The pad will contain a 3-inch brass cap stamped with the well identification. Three, 4-inch diameter concrete-filled, steel guard posts (also primed and painted yellow) will be placed around the pad, equidistant from the well.

3.3 Well Development

Well development will be completed no sooner than 48 hours after grouting. Each well will be developed for approximately 10 hours, and will consist of pumping, surge-block, swabbing, and/or bailing techniques. During development, the groundwater field parameters (pH, specific conductivity (SC), temperature, and turbidity) will be continuously monitored, and development will continue until parameters have stabilized. All development water will be contained in drums and will not be allowed to discharge to the ground surface. The method of development, the volume of water added or removed, the parameters measured, the results of the measurements, and the time these activities take place will be documented in writing during well development. If required, only potable water shall be added to the well during development.

During well development, a minimum of five well bore volumes will be removed. After the minimum volume has been removed, development will continue until representative water is obtained. Representative water is assumed to be obtained when pH, temperature, turbidity, and SC readings stabilize (less than 10% variability over three consecutive well bore volumes) and the water is visually clear of suspended solids with a target turbidity of less than five Nephelometric Turbidity Units.

4 Soil-Vapor Monitoring Well Installation

The soil-vapor monitoring system will provide data regarding vadose-zone volatile organic compound (VOC) profiles with depth, and will consist of three Flexible Liner Underground Technologies (FLUTe™) soil-vapor monitoring wells (hereinafter referred to as FLUTe™ wells). The FLUTe™ wells will be constructed in ARCH boreholes at the three locations shown in Figure 1 (TAV-SV01, TAV-SV02, and TAV-SV03). Soil-vapor sampling ports will be installed in each FLUTe™ well at targeted depths of approximately 50 ft, 100 ft, 150 ft, 200 ft, 250 ft, 300 ft, 350 ft, 400 ft, 450 ft, and 500 ft bgs. A schematic of a typical FLUTe^{TM} well installation is shown in Attachment 1.

The FLUTe™ liners will be installed as directed by the manufacturer. Boreholes for the FLUTe™ wells will be drilled using ARCH in order to minimize the addition of water or drilling fluid to the borehole. The FLUTe™ installation requires the following steps:

- Remove a 10--ft length of steel casing. Unroll the liner and lower through the ARCH drive casing to the bottom of the borehole.
- Lower a 4-inch diameter PVC tremie pipe inside the liner to the bottom of the borehole to ensure the liner is deployed. Pull the tremie pipe off the bottom of the borehole approximately 10 ft.
- Install silica sand through the tremie pipe (adding no water) to expand the liner and force the fabric against the inside wall of the steel casing.
- Tag the top of the sand within the FLUTe™.
- Simultaneously pull the 10 ft joint of steel casing and 10 ft joint of tremie allowing the calculated volume of sand to fall through the tremie and forcing the fabric liner against the borehole wall.
- Repeat this process until the FLUTe™ is full of sand and the fabric liner is pressed against the borehole wall to within approximately 5 ft of the ground surface.
- Pour bentonite pellets into and around the FLUTe™ for the final 5 ft of completion, and hydrate.
- Install a multi-port completion PVC cap to accommodate the soil vapor discharge lines.
- Install a 6-ft long steel protective casing that extends approximately 3 ft above the ground surface, a 4 ft by 4 ft, sloped concrete pad, 3 inch brass cap, and three 4-inch diameter, concrete-filled, steel posts.

5 Equipment Decontamination

The drill rig and related equipment will be decontaminated at the decontamination pad in Technical Area III prior to the beginning of drilling operations. Decontamination of equipment will also be required after completing each well. Decontamination waste will be kept to a minimum and contained in drums placed on spill control pallets at the decontamination pad.

6 Health and Safety

Level D personal protective equipment is required for all drilling operations. Health and Safety records associated with drilling and development personnel will be maintained on site and will be available from the commencement of drilling activities. All field personnel will operate under an SNL/NM Health and Safety Plan (HASP) and will have SNL/NM-required training, including 40-Hr Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) training and subsequent yearly refresher courses. An SNL/NM Subject Matter Expert will perform a safety inspection of the drill rig before drilling commences.

7 Pre-field activities

Pre-field activities that must be completed prior to drilling include:

- Preparation of the Statement of Work for drilling and monitoring well installation;
- SNL/NM digging permit request and approval;
- SNL/NM site-specific HASP preparation, review, and signatures;
- National Environmental Policy Act review and signatures;

- Sample bottle order for waste samples through Sample Management Office;
- Waste Management Plan preparation;
- Field checklist completion, review, and approval; and
- Readiness review meeting.

8 Mobilization and Site Setup

SNL/NM personnel will ensure that containers for cuttings have been obtained and are ready for drilling operations. If required, roll-off bins supplied by SNL/NM will be used to collect drill cuttings for waste management purposes.

9 Reporting

Based on the requirements established by the NMED, NMOSE and SNL/NM FOPs, the field activities associated with decommissioning and installation of the monitoring wells will be documented.

All well installation field activities will be documented in a field log book per guidance in FOP 94-45. Upon completion of the well installation, the Field Report will document all site activities and provide final as-built well completion diagrams developed from the Groundwater Monitoring Well Data Sheets (Attachment 2). The Field Report will contain a brief narrative describing work performed at the site and any variances to the Technical Area-V Groundwater Investigation Work Plan. Information to be contained in the Field Report include: (1) daily field activity notes, (2) all materials used, (3) a final "as-built" well completion diagram, and (4) documentation of notification of SNL/NM Geographic Information System group and the appropriate regulatory agencies. The documentation will also include the 37 information elements required in Section VIII.D of the Order (NMED April 2004). The following list of documents and records that are generated as part of the well installation process will be provided to the SNL/NM Well File Coordinator who, in turn, will submit them to the SNL/NM Customer-Funded Records Center:

- Well permit agreement
- Well file contents checklist
- Well data summary sheet
- Statement of work for drilling the well
- Drilling permit
- Lithologic (boring) log
- Well construction diagram and completion parameters
- Well development data and groundwater parameters
- Copies of field logbook (geologist, driller)
- Surveyed elevations and location in New Mexico state plane coordinates (with a degree of accuracy of ± 0.01 ft)
- Location map
- Water level measurements
- Aquifer test data
- Analytical data
- Waste management documentation
- Photographs

10 Sampling

SNL/NM will perform at least eight quarters of groundwater sampling at the four new TA-V groundwater monitoring wells, and eight quarters of soil-vapor sampling at the three new TA-V FLUTe^{TM} wells (Table 2). The existing groundwater monitoring wells will be sampled at various intervals depending on the history of detections for individual wells. Wells with a history of TCE detections in groundwater shall be sampled quarterly, including LWDS-MW1, TAV-MW2, TAV-MW4, TAV-MW6, TAV-MW8 and TAV-MW10. Wells which have a history of no TCE detections in groundwater will be sampled semiannually, including AVN-1, LWDS-MW2, TAV-MW3, TAV-MW5, TAV-MW7, and TAV-MW9. In addition, if a semiannual well has a nitrate detection in groundwater at or above 10 mg/L in one sampling event (or at 8 mg/L or greater in two consecutive sampling events), sampling at the well shall revert to a quarterly frequency.

Groundwater and soil-vapor sampling will be conducted in conformance with Sampling and Analysis Plans prepared for each quarterly/semiannual sampling event.

Table 2. Groundwater and Soil-Vapor Monitoring Well Sampling Frequency

Well	Sampling Frequency	Rationale
AVN-1	quarterly	NPN > 8 mg/L no history of TCE detections
LWDS-MW1	quarterly	historical TCE detections
LWDS-MW2	quarterly	NPN > 8 mg/L no history of TCE detections
TAV-MW2	quarterly	historical TCE detections
TAV-MW3	semiannually	no history of TCE detections
TAV-MW4	quarterly	historical TCE detections
TAV-MW5	semiannually	no history of TCE detections
TAV-MW6	quarterly	historical TCE detections
TAV-MW7	semiannually	no history of TCE detections
TAV-MW8	quarterly	historical TCE detections
TAV-MW9	semiannually	no history of TCE detections
TAV-MW10	quarterly	historical TCE detections
TAV-MW11	quarterly, for at least 8 events	new well

Table 2. Groundwater and Soil-Vapor Monitoring Well Sampling Frequency (concluded)

Well	Sampling Frequency	Rationale
TAV-MW12	quarterly, for at least 8 events	new well
TAV-MW13	quarterly, for at least 8 events	new well
TAV-MW14	quarterly, for at least 8 events	new well
TAV-SV01	quarterly, for at least 8 events	new well
TAV-SV02	quarterly, for at least 8 events	new well
TAV-SV03	quarterly, for at least 8 events	new well

10.1 Groundwater Sampling

Sampling will be conducted in accordance with the NMED Position Paper "Use of Low-Flow and other Non-Traditional Sampling Techniques for RCRA Compliant Groundwater Monitoring" (NMED October 2001) or in accordance with U.S. Environmental Protection Agency (EPA) guidance "RCRA Groundwater Monitoring Technical Enforcement Guidance Document" (EPA September 1986a).

A portable Bennett™ sampling system will be used to collect the groundwater samples. The Bennett™ sampling pump and tubing bundle shall be decontaminated prior to installation in monitoring wells according to procedures described in FOP 05-03 "General Sampling Equipment Decontamination." After decontamination, the pump intake will be set near the bottom of the screen interval at all well locations.

In accordance with procedures described in FOP 05-01 "Groundwater Monitoring Well Sampling and Field Analytical Measurements," all wells will be purged a minimum of one saturated casing volume (the volume of one length of the saturated screen plus the borehole annulus around the saturated screen interval). After the minimum volume is removed, purging will continue until four consecutive measurements of water quality parameters (turbidity, pH, temperature, and SC) exhibit stabilized conditions. Groundwater stability is considered acceptable for monitoring when measurements are within 10 % (or $\leq$ 5) nephelometric turbidity units for turbidity, 0.1 pH units, 1.0 degrees Celsius, and SC is within 5 %. Additional field parameters to be collected for all wells may include redox potential, dissolved oxygen, and water level measurements. Dissolved oxygen units shall be reported in both percent saturation and milligrams per liter. The static water level will be measured at each well prior to well purging, and water levels will be measured during purging and recorded on the field measurement log.

Groundwater samples will be collected directly from the sample discharge tube into laboratory--prepared sample containers. If chemical preservatives are required, the analytical laboratories will the preservatives to the sample containers prior to shipping them to the field crew. Immediately after collection, all sample containers will be custody-taped, sealed in plastic bags, and placed on blue ice in shipping containers. Analytical

Request/Chain-of-Custody forms will be completed at the time of collection and will accompany the sample containers to the analytical laboratories.

Groundwater samples that are collected will be analyzed for the parameters listed in Table 3. Samples will be sent to General Engineering Laboratories (or another EPA-certified contract laboratory) for analysis. Quality control samples will include trip blank samples, duplicate samples, equipment blank samples, and field blank samples.

Table 3. Analytical Parameters for Groundwater Samples

Analyte	Analytical Method	Reference
Alkalinity as Carbonate/Bicarbonate	SM2320B	APHA-AWWA-WEF 2005
Calcium	SW846-6020	EPA 1986b (and updates)
Chloride	SW846-9056	EPA 1986b (and updates)
Dissolved Iron	SW846-6020	EPA 1986b (and updates)
Dissolved Manganese	SW846-6020	EPA 1986b (and updates)
Dissolved Oxygen	Field Instrument	None
Eh	Field Instrument	None
Magnesium	SW846-6020	EPA 1986b (and updates)
Nitrate plus Nitrite	EPA 353.2	EPA 1983
Perchlorate[a]	EPA 314.0	EPA 1999
pH	Field Instrument	None
Potassium	SW846-6020	EPA 1986b (and updates)
Sodium	SW846-6020	EPA 1986b (and updates)
Sulfate	SW846-9056	EPA 1986b (and updates)
Sulfide	SW846-9034	EPA 1986b (and updates)
Temperature	Field Instrument	None
Total Alkalinity, as CaCO3	SM2320B	APHA-AWWA-WEF 2005
Total Organic Carbon	SW846-9060	EPA 1986b (and updates)
Volatile Organic Compounds	SW846-8260	EPA 1986b (and updates)

Notes:
[a] = Perchlorate will be analyzed for the first four quarters at the newly installed wells.

10.2 Soil-Vapor Sampling

Soil-vapor sampling field activities consist of preparation, purging, VOC monitoring, sample collection, and sample shipping. The SNL/NM AOPs and FOPs for these activities are listed in Table 1.

Pre-field preparations include a vacuum check of the Summa canister and calibration of the photo ionization detector (PID). At the FLUTe™ wellhead, a vacuum pump connected to the sample tubing via a Swagelok® or equivalent fitting will be used to purge soil vapor from the monitoring ports and sample tubing. The stream of soil vapor extracted from the sampling port during purging will be monitored with the PID and the readings recorded in the field logbook. Samples will be collected through the multiport manifold provided by the FLUTe™ well manufacturer, which allows uniform purging at each sampling depth.

The soil-vapor samples will be transferred directly from the vapor discharge line to Summa® canisters. Summa® canisters are reusable containers provided with a permanent identification number. The number will be recorded in the logbook and the Analysis Request/Chain of Custody form. The canisters will be placed in shipping boxes and returned to the Sample Management Office for shipment to the laboratory.

The soil-vapor samples will be analyzed for VOCs by EPA Compendium of Methods for the Determination of Toxic Organic (TO) Compounds in Ambient Air (Method TO-14A) (EPA January 1999). The off-site laboratory is responsible for implementing the requirements of the method, including analytical methodology, target analytes for quantification, and internal Quality Assurance/Quality Control procedures.

11 Aquifer Parameters

Aquifer testing within a well provides estimates of hydraulic parameters by measuring the effects of induced stress in an aquifer around a well. Stress can be induced by either withdrawing or injecting water into the well, creating a change in the water level in the well. Such a change in water level can be made instantaneously with a discrete column, referred to as a slug test.

Slug tests will be performed on TAV-MW11, TAV-MW12, TAV-MW13, and TAV-MW14 with a solid aluminum rod “slug” lowered into the well to raise and lower the water level in the well. Water-level changes induced in the wells will be measured using a Solinst™ electronic pressure transducer (or equivalent) and data logger software. The “slug out” (removal of slug from the water column) portion of the test for each well will be recoded and analyzed. The Hvorslev analytical method (Hvorslev 1951) will be applied to the slug test data and the hydraulic conductivities calculated from the slug tests performed on the three wells will be presented in the revised TA-V Current Conceptual Model.

12 Geophysical Logging

Geophysical logging will be completed through the PVC-casing in both new and existing groundwater monitoring wells using induction, neutron, and gamma logging techniques. This

well logging will be completed after the new wells have been developed and before the Current Conceptual Model is updated.

13 Schedule

The basis for the schedule shown in Figure 2 is the logical development of project tasks and activities to implement the tasks described in this TA-V Groundwater Investigation Work Plan (Revision 1). Per the requirements of the first NOD (NMED July 2008) the schedule includes the date of submission to the NMED of the Well Installation Report (July 2010); and TA-V Groundwater Investigation Report (revised Current Conceptual Model)/revised CME Report (February 2013).

14 References

American Public Health Association, American Water Works Association, and Water Environment Federation (U.S.), 2005. "Standard Methods for the Examination of Water and Wastewater." 21st Edition, SM2320B.

Hvorslev, M.J., 1951. Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 26, Waterways Experiment Station, Corps of Engineers, U.S. Army, Vicksburg, Mississippi.

New Mexico Environment Department (NMED), October 2001. "Use of Low-Flow and Other Non-Traditional Sampling Techniques for RCRA Compliant Groundwater Monitoring," New Mexico Environment Department, Santa Fe, New Mexico. October 30, 2001.

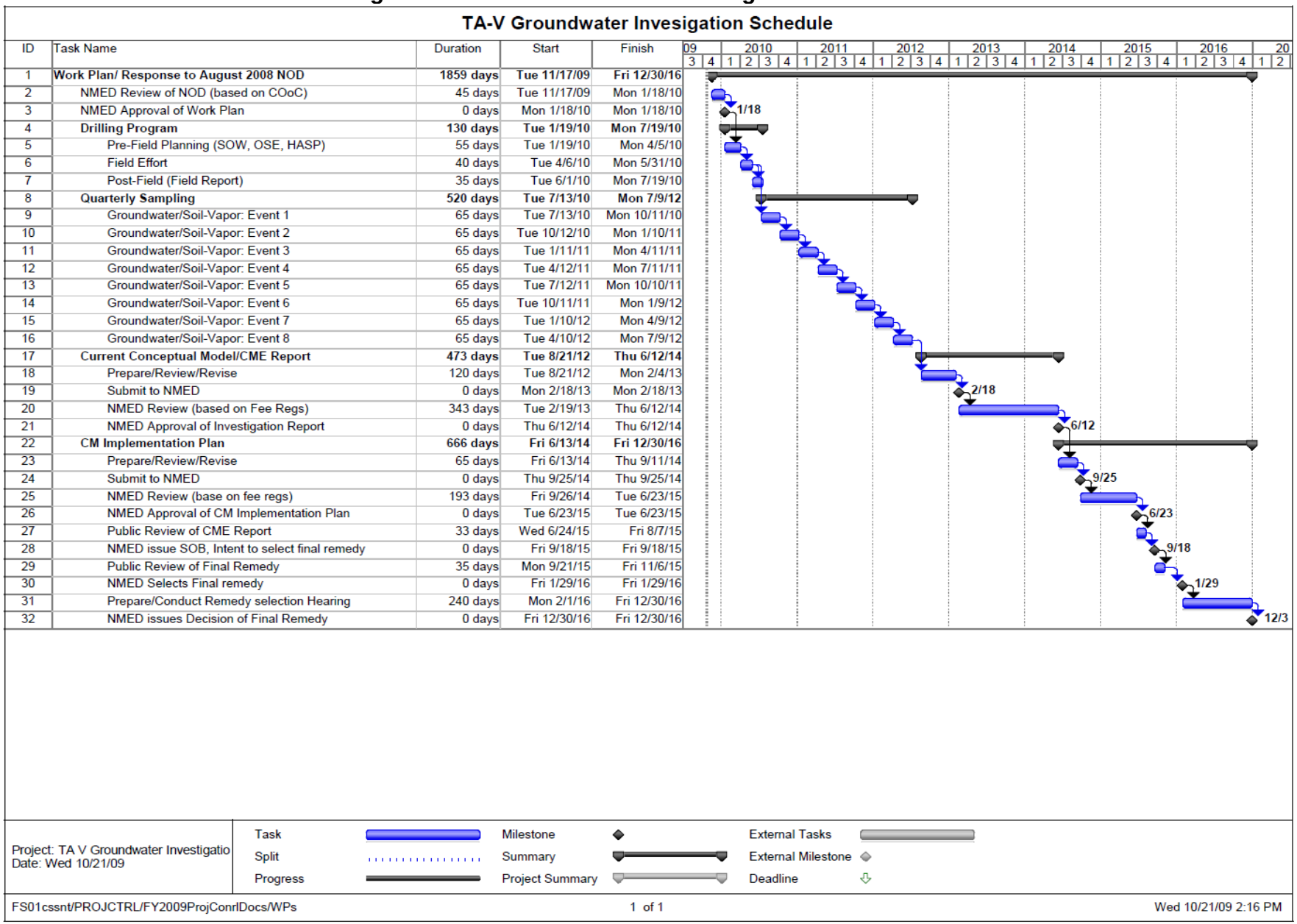
New Mexico Environment Department (NMED), April 2004. "Compliance Order on Consent Pursuant to the New Mexico Hazardous Waste Act 74-4-10: Sandia National Laboratories Consent Order," New Mexico Environment Department, Santa Fe, New Mexico. April 24, 2004.

New Mexico Environment Department (NMED), October 2004. "Approved with Modifications: Corrective Measures Evaluation Work Plan for Technical Area V Groundwater, July 2004," New Mexico Environment Department, Santa Fe, New Mexico. October 22, 2004.

New Mexico Environment Department (NMED), July 2008. "Notice Of Disapproval: Corrective Measures Evaluation Report for Technical Area-V Groundwater, July, 2005; Sandia National Laboratories, EPA ID# NM5890110518; HWB-SNL-05-027," New Mexico Environment Department, Santa Fe, New Mexico. July 28, 2008.

New Mexico Environment Department (NMED), August 2009. "Notice Of Disapproval: DOE/Sandia Responses to NMED's Notice of Disapproval for Corrective Measures Evaluation Report for Technical Area-V Groundwater, July, 2005; Sandia National Laboratories, EPA ID# NM5890110518; HWB-SNL-05-027," New Mexico Environment Department, Santa Fe, New Mexico. August 12, 2009.

Figure 2. TAV Groundwater Investigation Schedule



ID	Task Name	Duration	Start	Finish
1	**Work Plan/ Response to August 2008 NOD**	**1859 days**	**Tue 11/17/09**	**Fri 12/30/16**
2	NMED Review of NOD (based on COoC)	45 days	Tue 11/17/09	Mon 1/18/10
3	NMED Approval of Work Plan	0 days	Mon 1/18/10	Mon 1/18/10
4	**Drilling Program**	**130 days**	**Tue 1/19/10**	**Mon 7/19/10**
5	Pre-Field Planning (SOW, OSE, HASP)	55 days	Tue 1/19/10	Mon 4/5/10
6	Field Effort	40 days	Tue 4/6/10	Mon 5/31/10
7	Post-Field (Field Report)	35 days	Tue 6/1/10	Mon 7/19/10
8	**Quarterly Sampling**	**520 days**	**Tue 7/13/10**	**Mon 7/9/12**
9	Groundwater/Soil-Vapor: Event 1	65 days	Tue 7/13/10	Mon 10/11/10
10	Groundwater/Soil-Vapor: Event 2	65 days	Tue 10/12/10	Mon 1/10/11
11	Groundwater/Soil-Vapor: Event 3	65 days	Tue 1/11/11	Mon 4/11/11
12	Groundwater/Soil-Vapor: Event 4	65 days	Tue 4/12/11	Mon 7/11/11
13	Groundwater/Soil-Vapor: Event 5	65 days	Tue 7/12/11	Mon 10/10/11
14	Groundwater/Soil-Vapor: Event 6	65 days	Tue 10/11/11	Mon 1/9/12
15	Groundwater/Soil-Vapor: Event 7	65 days	Tue 1/10/12	Mon 4/9/12
16	Groundwater/Soil-Vapor: Event 8	65 days	Tue 4/10/12	Mon 7/9/12
17	**Current Conceptual Model/CME Report**	**473 days**	**Tue 8/21/12**	**Thu 6/12/14**
18	Prepare/Review/Revise	120 days	Tue 8/21/12	Mon 2/4/13
19	Submit to NMED	0 days	Mon 2/18/13	Mon 2/18/13
20	NMED Review (based on Fee Regs)	343 days	Tue 2/19/13	Thu 6/12/14
21	NMED Approval of Investigation Report	0 days	Thu 6/12/14	Thu 6/12/14
22	**CM Implementation Plan**	**666 days**	**Fri 6/13/14**	**Fri 12/30/16**
23	Prepare/Review/Revise	65 days	Fri 6/13/14	Thu 9/11/14
24	Submit to NMED	0 days	Thu 9/25/14	Thu 9/25/14
25	NMED Review (base on fee regs)	193 days	Fri 9/26/14	Tue 6/23/15
26	NMED Approval of CM Implementation Plan	0 days	Tue 6/23/15	Tue 6/23/15
27	Public Review of CME Report	33 days	Wed 6/24/15	Fri 8/7/15
28	NMED issue SOB, Intent to select final remedy	0 days	Fri 9/18/15	Fri 9/18/15
29	Public Review of Final Remedy	35 days	Mon 9/21/15	Fri 11/6/15
30	NMED Selects Final remedy	0 days	Fri 1/29/16	Fri 1/29/16
31	Prepare/Conduct Remedy selection Hearing	240 days	Mon 2/1/16	Fri 12/30/16
32	NMED issues Decision of Final Remedy	0 days	Fri 12/30/16	Fri 12/30/16

New Mexico Office of the State Engineer (NMOSE), August 2005. “Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells” New Mexico Office of the State Engineer, August 2005.

Sandia National Laboratories/New Mexico (SNL/NM), April 2004a. “Corrective Measures Evaluation Work Plan Technical Area-V Groundwater,” SAND2004-1417, Environmental Restoration Project, Sandia National Laboratories/New Mexico, Albuquerque, New Mexico. April 23, 2004.

Sandia National Laboratories/New Mexico (SNL/NM), April 2004b. “Current Conceptual Model of Groundwater Flow and Contaminant Transport at Sandia National Laboratories/ New Mexico Technical Area-V,” SAND2004-1470, Environmental Restoration Project, Sandia National Laboratories/New Mexico, Albuquerque, New Mexico. April 22, 2004.

Sandia National Laboratories/New Mexico (SNL/NM), December 2004. “Corrective Measures Evaluation Work Plan Technical Area-V Groundwater, Revision 0,” SAND2004-6113, Environmental Restoration Project, Sandia National Laboratories/New Mexico, Albuquerque, New Mexico. December 1, 2004.

Sandia National Laboratories/New Mexico (SNL/NM), July 2005. “Corrective Measures Evaluation Report for Technical Area-V Groundwater,” SAND2005-5297, Environmental Restoration Project, Sandia National Laboratories/New Mexico, Albuquerque, New Mexico. July 21, 2005.

Sandia National Laboratories/New Mexico (SNL/NM), September 2008. “Notes of Meeting—September 18, 2008 Meeting Between NMED, DOE, and SNL/NM to Discuss the Notice of Disapproval for the TA-V CME Report,” Internal Memorandum from Michael Skelly (Dept 6765) to John Cochran (Dept. 6765), Sandia National Laboratories/New Mexico, Albuquerque, New Mexico. September 26, 2008.

Sandia National Laboratories/New Mexico (SNL/NM), April 2009. “DOE/Sandia Responses to NMED’s Notice of Disapproval for Corrective Measures Evaluation Report for Technical Area-V Groundwater, July, 2005; Sandia National Laboratories, EPA ID# NM5890110518; HWB-SNL-05-027,” Environmental Restoration Project, Sandia National Laboratories/New Mexico, Albuquerque, New Mexico. April 14, 2005.

U.S. Environmental Protection Agency (EPA), 1983, “The Determination of Inorganic Anions in Water by Ion Chromatography-Method 300.0,” EPA-600/4-84-017. U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 1986a, “RCRA Ground-Water Monitoring Technical Enforcement Guidance Document,” U.S. Environmental Protection Agency, Washington, D.C. September 1986.

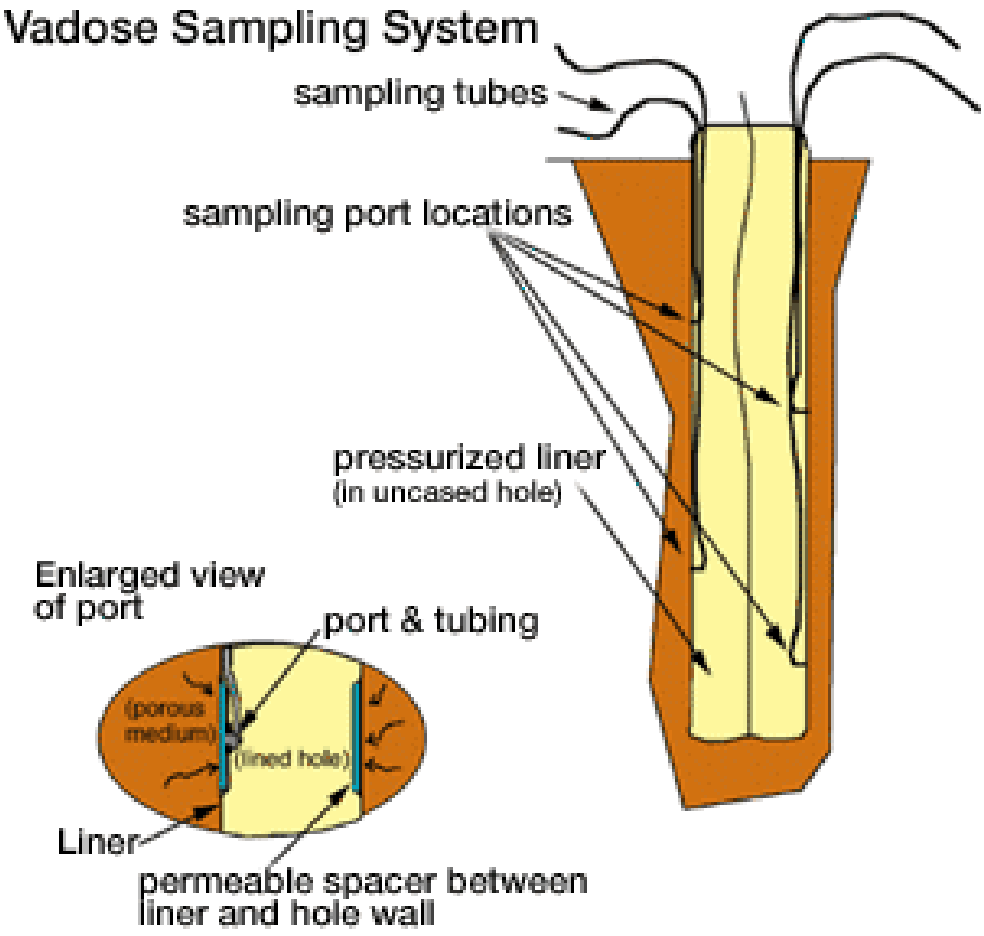
U.S. Environmental Protection Agency (EPA), 1986b (and updates), “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” SW-846, 3rd ed. U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), January 1999, “Compendium of Methods for Determination of Toxic Organic Compounds in Ambient Air,” 2nd ed., EPA/625/R-96/010b, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), November 1999, “Perchlorate in Drinking Water using Ion Chromatography,” EPA/815/R-00-014, U.S. Environmental Protection Agency, Washington, D.C.

Attachment 1

Schematic of FLUTe™ Soil-Vapor Monitoring Well



Attachment 2

Groundwater Monitoring Well Data Sheet

SNL/NM Groundwater Monitoring Well Data Sheet

PROJECT NAME: _____
ER ADS #: _____
WELL NAME: _____
OWNER: _____
DATE DRILLING BEGAN: _____
DRILLING CONTRACTOR: _____
DRILLING METHOD: _____
BOREHOLE DEPTH: _____
BOREHOLE DIAMETERS: _____

GEOGRAPHIC LOCATION: _____
WELL COMPLETION DATE: _____
COMPLETION ZONE: _____
FORMATION OF COMPLETION: _____
REMARKS: _____

Survey Data

Survey Date: _____
Surveyed by: _____

State Plane Coordinates
(X) Easting = _____
(Y) Northing = _____

Surveyed Elevations
(feet above sea level)

Protective Casing: _____
(Elev. D - FOP 94–71)

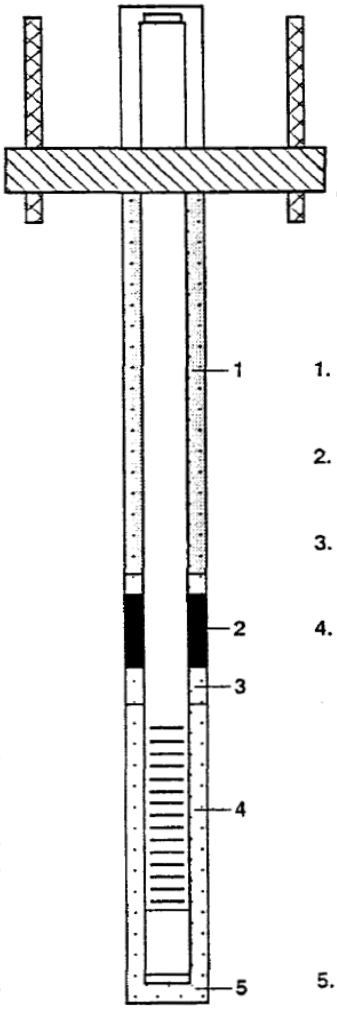
Top of Inner Well Casing: _____
(Elev C - FOP 94–71)

Concrete Pad: _____
(Elev B - FOP 94–71)

Ground Surface: _____
(Elev A - FOP 94–71)

Calculated Elevations
(feet above sea level)
Initial Water Level: _____
Other: _____
Comments: _____

Form Completed by: _____
Verified by: _____



Completion Data

Measured Depths
(feet below ground surface)

Initial Water Level: _____

Casing Stickup: _____
(above ground level)

Casing OD (in.): _____
Casing ID (in.): _____

1. Grout/Backfill Interval: _____
   Material: _____
2. Seal Interval: _____
   Material: _____
3. Secondary Pack Interval: _____
   Secondary Pack Size: _____
4. Primary Pack Interval: _____
   Primary Pack Size: _____

Screen Interval: _____
Slot Size: _____
Material: _____

Sump Length: _____

Casing Depth: _____
Material: _____

5. Plug Back Interval (if used): _____
   (Casing TD-Hole TD) _____
   Plug Material (if used): _____

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