SNL MWL

National Nuclear Security Administration
Sandia Field Office
P. O. Box 5400
Albuquerque, NM 87185

ENTERED

**CERTIFIED MAIL-RETURN RECEIPT REQUESTED**

RECEIVED

JAN 15 2014

JAN 22 2014

NMED
Hazardous Waste Bureau

Mr. John E. Kieling
Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Bldg. 1
Santa Fe, NM 87505

Subject: Department of Energy/National Nuclear Security Administration Sandia National Laboratories Environmental Restoration Operations *Work Plan for the Installation of Three Soil-Vapor Monitoring Wells (MWL-SV03, MWL-SV04, and MWL-SV05) at the Mixed Waste Landfill, January 2014*

Dear Mr. Kieling:

Enclosed is the *Work Plan for the Installation of Three Soil-Vapor Monitoring Wells (MWL-SV03, MWL-SV04, and MWL-SV05) at the Mixed Waste Landfill, January 2014.* This Work Plan describes the procedures and construction specifications for the installation of three multiport soil-vapor monitoring wells at the Mixed Waste Landfill (MWL) as required by the *Long-Term Monitoring and Maintenance Plan for the Mixed Waste Landfill.* Installation fieldwork will begin after the New Mexico Environment Department approves this Work Plan.

If you have questions, please contact me at (505) 845-5398 or John Weckerle of my staff at (505) 845-6026.

Sincerely,

Geoffrey L. Beausoleil
Manager

Enclosure

cc:
See Page 2

**cc w/enclosure :**
William Moats, NMED-HWB (**Certified Mail**)
5500 San Antonio Dr., NE
Albuquerque, NM 87109

Laurie King, EPA, Region 6 (**Certified Mail**)
1445 Ross Ave., Ste. 1200
Dallas, TX 75202

Thomas Skibitski, NMED-OB, MS-1396

Zimmerman Library, UNM
MSC05 3020
1 University of New Mexico
Albuquerque, NM 87101-0001

SNL ES&H Records Center, SNL/NM, MS-0718

**cc w/o enclosure:**
Amy Blumberg, SNL/NM, MS-0141
John Cochran, SNL/NM, MS-0718
Peter Davies SNL/NM, MS-0721
David Miller, SNL/NM, MS-0718
Mike Mitchell, SNL/NM, MS-0719
Joanna Serra, NA-00-10, HQ/FORS
Joe Estrada, SFO/ENG, MS-0184
John Weckerle, SFO/ENG, MS-0184
13-394-506456

# CERTIFICATION STATEMENT FOR APPROVAL AND FINAL RELEASE OF DOCUMENTS

**Document title:** **Work Plan for the Installation of Three Soil-Vapor Monitoring Wells (MWL-SV03, MWL-SV04 and MWL-SV05) at the Mixed Waste Landfill, January 2014**

**Document author:** **John Copland, Department 06234**

---

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations.

Signature: _____ 1/13/14
Date

**Peter Davies, Director**
Nuclear Energy & Fuel Cycle Programs
Center 6200
Sandia National Laboratories/New Mexico
Albuquerque, New Mexico 87185
Operator

and

Signature: _____ 15 JAN 2014
Date

**Geoffrey Beausoleil**
U.S. Department of Energy
National Nuclear Security Administration
Sandia Site Office
Owner and Co-Operator

Sandia National Laboratories

# Work Plan for the Installation of Three Soil-Vapor Monitoring Wells (MWL-SV03, MWL-SV04, and MWL-SV05) at the Mixed Waste Landfill

**January 2014**

U.S. DEPARTMENT OF ENERGY

## Environmental Restoration Operations
## Sandia National Laboratories/New Mexico

*Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.*

## Table of Contents

Acronyms and Abbreviations ..... ii
1. PROJECT AND SITE INFORMATION ..... 1
2. REGULATORY CRITERIA ..... 3
3. PRE-FIELD ACTIVITIES ..... 4
4. HEALTH AND SAFETY ..... 4
5. EQUIPMENT DECONTAMINATION ..... 5
6. DRILLING AND WELL INSTALLATION ..... 5
6.1 FLUTe™ Well Design ..... 6
6.2 Equivalent Well Design ..... 6
6.3 Acceptance Criteria ..... 7
6.4 Well Head Design ..... 7
7. WASTE MANAGEMENT ..... 7
8. RECORDS MANAGEMENT ..... 9
9. REPORTING ..... 9
10. SCHEDULE ..... 9
11. REFERENCES ..... 10

## Figures

Figure 1. The Mixed Waste Landfill at Sandia National Laboratories/New Mexico ..... 2
Figure 2. Existing and Proposed Soil-Vapor Monitoring Wells at the Mixed Waste Landfill ..... 8

## Acronyms and Abbreviations

| | |
|---|---|
| AOP | Administrative Operating Procedure |
| ARCH | Air-Rotary Casing-Hammer |
| bgs | below ground surface |
| CSSP | Contract-Specific Safety Plan |
| DC | Drilling Contractor |
| DOE | U. S. Department of Energy |
| ER | Environmental Restoration |
| ET | Evapotranspirative |
| FLUTe™ | Flexible Liner Underground Technologies |
| FOP | Field Operating Procedure |
| ft | feet or foot |
| HASP | health and safety plan |
| HWB | Hazardous Waste Bureau |
| LTMMP | Long Term Monitoring and Maintenance Plan |
| MWL | Mixed Waste Landfill |
| NMED | New Mexico Environment Department |
| NMOSE | New Mexico Office of the State Engineer |
| NNSA | National Nuclear Security Administration |
| PVC | polyvinyl chloride |
| RCRA | Resource Conservation and Recovery Act |
| Sandia | Sandia Corporation |
| SNL/NM | Sandia National Laboratories/New Mexico |
| SFO | Sandia Field Office (formerly Sandia Site Office) |
| SS | stainless steel |
| SWMU | Solid Waste Management Unit |
| TA | Technical Area |
| VOC | volatile organic compound |
| WMP | Waste Management Plan |

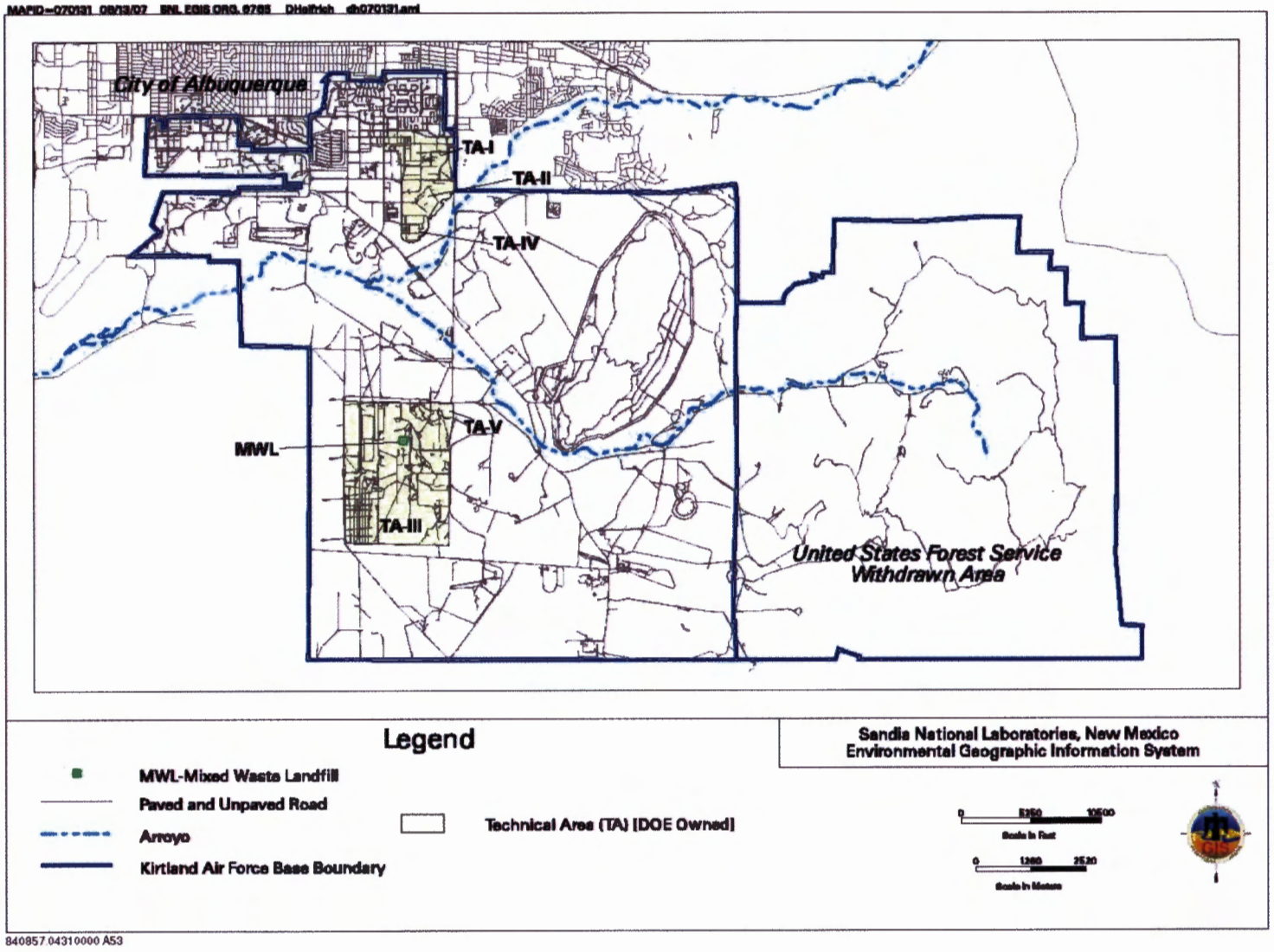
## 1. PROJECT AND SITE INFORMATION

This Work Plan describes the procedures that will be followed to by the U.S. Department of Energy/National Nuclear Security Administration/Sandia Field Office (DOE/NNSA/SFO) and Sandia Corporation (Sandia), hereafter referred to as DOE/Sandia, for the installation of three soil-vapor monitoring wells at the Mixed Waste Landfill (MWL), Sandia National Laboratories/New Mexico (SNL/NM). The MWL is located in Technical Area (TA) III as shown on Figure 1. The MWL is managed as Solid Waste Management Unit (SWMU) 76.

| | |
|---|---|
| Task Description: | SNL/NM SWMU 76 – installation of three soil-vapor monitoring wells (MWL-SV03, MWL-SV04, and MWL-SV05) at the MWL and the preparation of a Well Installation Report |
| Scheduled Start Date of Work: | May 2014 – start of field work is contingent upon New Mexico Environment Department (NMED) Approval of this Work Plan |
| Estimated Completion Date: | September 2014 – submittal of the Well Installation Report to NMED |

As noted above, the tentative start date for the field work is May 2014. After installation, the three new soil-vapor monitoring wells will be used for the collection of vadose-zone samples for volatile organic compound (VOC) analyses. Each monitoring well will be constructed of either a Flexible Liner Underground Technologies (FLUTe™) borehole liner or an equivalent multi-port well constructed using a bundle of stainless-steel (SS) tubing. Each monitoring well will have five soil-vapor sampling ports set at depths ranging from 50 to 400 feet (ft) below ground surface (bgs). Soil-vapor sampling will be conducted in accordance with the Sampling and Analysis Plan presented in Appendix D of the *Long Term Monitoring and Maintenance Plan for the Mixed Waste Landfill* (LTMMP) (SNL/NM March 2012).

The selection of the well type (FLUTe™ or equivalent) will be determined by DOE/Sandia after completion of the contracting process with the drilling contractor (DC). Both types of soil-vapor wells have been successfully used at other SWMUs/Areas of Concern (AOCs) at SNL/NM. The FLUTe™ well design has proven to be successful in providing representative soil-vapor samples for the Tijeras Arroyo Groundwater investigation since 2001. The equivalent well design has proven to be successful in providing representative soil-vapor samples for the TA-V investigation since 2004.




840857.04310000.A53

**Figure 1. Location of the Mixed Waste Landfill at Sandia National Laboratories/New Mexico and Kirtland Air Force Base**

## 2. REGULATORY CRITERIA

The NMED Hazardous Waste Bureau (HWB) provides regulatory oversight of DOE/Sandia's Environmental Restoration (ER) efforts and implements and enforces regulations mandated by the Resource Conservation and Recovery Act (RCRA). All ER Operations SWMUs and Areas of Concern are listed in Module IV of the SNL/NM RCRA Part B Operating Permit, *Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments (HSWA) to RCRA for Sandia National Laboratories* (NMED 1993). In April 2004, a Compliance Order on Consent (the Order) (NMED April 2004) became effective between the NMED and DOE/Sandia, which specifically identified SWMU 76 (the MWL) as requiring corrective action. The MWL is also subject to corrective action under 20.4.1.500 New Mexico Administrative Code incorporating 40 CFR 264.101. The NMED HWB is the lead regulatory agency and oversees corrective action at the MWL under the provisions of the Order (NMED April 2004) issued pursuant to the New Mexico Hazardous Waste Act and addresses requirements concerning nitrate and perchlorate pursuant to the New Mexico Solid Waste Act.

The NMED Final Order on the MWL (Curry May 2005) and the related Class 3 Permit Modification require an LTMMP to address monitoring, inspection, maintenance, physical and institutional controls, and reporting for the MWL following remedy implementation. This Work Plan describes the proposed installation of three soil-vapor monitoring wells as required by the LTMMP (SNL/NM March 2012). The LTMMP was approved by NMED on January 8, 2014 (Kieling January 2014).

This Work Plan outlines the activities and procedures to install three multiport soil-vapor monitoring wells at the MWL. The following tasks will be completed:

- Submit this Work Plan to the NMED for review and approval.
- Conduct the drilling and well-installation activities in accordance with the NMED-approved Work Plan using a DC licensed by the New Mexico Office of the State Engineer (NMOSE).
- Submit a Well Installation Report to the NMED that describes the field activities for the three monitoring wells.
- Collect soil-vapor samples from the three monitoring wells in accordance with the NMED-approved LTMMP Sampling and Analysis Plan.

Because the soil-vapor monitoring wells will not reach groundwater, a well permit from the NMOSE is not required (NMOSE August 2005). The applicable SNL/NM Field Operating Procedures (FOPs) and Administrative Operating Procedures (AOPs) will be used. The requirements of this Work Plan and the LTMMP will take precedence over any FOPs and AOPs.

## 3. PRE-FIELD ACTIVITIES

The pre-field activities that will be completed prior to drilling operations include the preparation, review, and approval of:

- The contract (Statement of Work),
- SNL/NM excavation (dig) permit,
- SNL/NM site-specific Health and Safety Plan (HASP),
- DC's Contract-Specific Safety Plan (CSSP),
- SNL/NM National Environmental Policy Act Checklist,
- SNL/NM Waste Management Plan (WMP),
- SNL/NM Field Work Checklist (punchlist), and
- SNL/NM Readiness Review.

## 4. HEALTH AND SAFETY

The field personnel will perform field activities safely in accordance with the HASP and CSSP. Level D personal protective equipment is anticipated for all drilling and well installation operations. Training records associated with the drilling personnel will be maintained on site and will be available at the commencement of drilling activities. The field personnel will operate under both the HASP and CSSP and will have SNL/NM-required training, including 40-hour Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response training and a current 8-hour annual-refresher course.

An SNL/NM Subject Matter Expert will perform a safety inspection of the drill rig and associated equipment before drilling commences. If any of the items are found to be in poor repair, significantly different than bid by the DC, or inadequate, the SNL/NM representative may delay commencement of drilling until the DC provides the equipment/services required. Daily equipment inspections for the drill rig and support equipment shall be documented by the DC and the records maintained on site. Noticeable drips of hydraulic oil, fuel, or other fluids will be contained by plastic sheeting placed under the rig at each drilling location. The leaks will either be repaired immediately at the site, the rig will be removed from the site for required repairs, or the DC will provide a substitute rig.

Prior to the start of drilling operations, SNL/NM Facilities Engineering will complete an Excavation (dig) Permit for the vicinity of the three proposed wells. SNL/NM personnel will mark on the ground surface the buried utilities that may be present at each of the drilling locations. The DC will physically verify that buried utilities are not present by "potholing" with a hand shovel to a depth of 3 ft bgs at each drilling location. If needed, the DC can adjust each drilling location by a maximum of 10 ft laterally to ensure safe drilling operations relative to buried utilities and/or other features (i.e., adjacent monitoring wells or fence) that limit adequate working space. However, buried utilities or overhead power lines are not anticipated to be a concern at the MWL.

## 5. EQUIPMENT DECONTAMINATION

The drill rig and associated equipment will be decontaminated with a pressure washer or steam cleaner prior to use at each drilling location. The decontamination work will be conducted at either the SNL/NM decontamination pad in TA-III or at Building 9925 - Environmental Resources Field Operations. Decontamination waste (water and soil) will be contained in polyethylene drums and placed on spill control pallets. The waste will be managed in accordance with the site-specific WMP. The drill rig and associated equipment will be decontaminated after the last well is installed and prior to leaving SNL/NM property.

## 6. DRILLING AND WELL INSTALLATION

The proposed locations of the three multiport soil-vapor monitoring wells (MWL-SV03, MWL-SV04, and MWL-SV05) are shown on Figure 2, and on Figure 3.4.1-1 of the LTMMP (SNL/NM March 2012). The FLUTe™ or equivalent wells will be installed in vertical boreholes located immediately outside the perimeter of the Evapotranspirative (ET) Cover near locations where the highest concentrations of VOCs have been detected during soil-vapor studies at the MWL. Figure 2 also shows the existing locations of the two single-port soil-vapor monitoring wells (MWL-SV01 and MWL-SV02) previously installed in 2009. Soil-vapor sampling ports will be installed in each multiport soil-vapor monitoring well at depths of approximately 50, 100, 200, 300, and 400 ft bgs. None of the boreholes will reach groundwater, which is approximately 500 ft bgs at the MWL.

The boreholes will be drilled using the Air-Rotary Casing-Hammer (ARCH) method. Temporary steel drive casing will be run to total depth in order to prevent borehole sloughing. The unconsolidated lithologies are anticipated to consist of clay, silt, sand, gravel, and cobbles. Environmentally-friendly lubricants such as Matex Thread Compound ES (a vegetable oil based material) will be used for lubricating the drive-casing joints. Minimal amounts of water (but no other foams/liquids) in the form of "mist" may be introduced into the borehole or drive casing to aid in the lifting of cuttings to the ground surface. The potable water will be obtained from fire hydrants or drop pipes that are connected to the Kirtland Air Force Base water distribution system.

The soil-vapor monitoring wells will be constructed of either a FLUTe™ liner (Section 6.1) or equivalent well materials (Section 6.2). The wells will be installed through the temporary steel drive casing (nominal 6-inch or 10-inch diameter depending on installation method used), and completed using either the FLUTe™ liner (6-inch diameter) or the equivalent bundle of SS tubing (10-inch diameter). No solvents, cleaners, or lubricants will be used for construction of the monitoring wells. To preserve the integrity of the well materials and ensure accurate completion depths, the FLUTe™ liner or the SS bundle will be suspended in the drive casing/borehole as the sand packs, bentonite-pellet seal, and annular seal are installed.

## 6.1 FLUTe™ Well Design

The FLUTe™ liners will be assembled at the factory prior to shipment to SNL/NM. The liners will be constructed of approximately 6-inch diameter, 400-ft long nylon tubes. Sampling ports will be set at the prescribed depths and attached to 0.25-inch diameter polyethylene tubing. Each sampling interval will span a minimum depth interval of 5 ft. A FLUTe™ technician will assist the DC personnel in the installation of the FLUTe™ liners at each of the drilling locations. At each location, the FLUTe™ liner will be set to the total depth of the borehole. Clean silica sand will be gravity fed into the liner so that the liner and sampling ports are firmly pressed against the borehole wall. The drive casing will be progressively pulled from the borehole as sand is added. The upper end of the FLUTe™ liner will be attached to a 5-ft length of 6-inch diameter Schedule 40 polyvinyl chloride (PVC) blank casing and sealed with a PVC cap. The polyethylene tubing will be terminated with quick-connect couplings. Each piece of tubing will be clearly and permanently labeled to indicate the depth of the respective sampling port. The well head completion design is discussed below in Section 6.4.

## 6.2 Equivalent Well Design

The equivalent well design will incorporate five SS soil-vapor screens that are connected to individual lengths of 0.25-inch diameter SS tubing. For each well, the tubing will be attached to a SS cable that has a tensioning weight on the lower end. The screens, tubing, and weight will be attached to the cable using SS hose clamps. Each screen will be connected to its individual piece of tubing using a Swagelok® fitting.

Ten linear ft of sand pack will be placed adjacent to each of the soil-vapor screens. To limit the potential for bentonite chips to obstruct the screens, 6 ft of sand will be placed above the mid-point of the screen, and 4 ft of sand will be placed below the mid-point of the screen. Each soil-vapor screen will be 1-ft long and constructed of SS woven mesh. The sand packs will be separated by bentonite chips that are installed in 10-ft lifts and individually hydrated.

To aid in the proper depth placement of materials, the tubing bundle will be installed in temporary 4-inch diameter PVC casing that will be centered inside the drive casing. The PVC casing will allow for accurate depth measurements with a tag line. Clean silica sand and bentonite chips will be gravity fed into the annulus between the PVC casing and the drive casing. Water for hydrating the bentonite chips will be poured into the PVC casing. As the backfilling progresses, successive sections of PVC casing and drive casing will be pulled from the borehole.

The upper end of each segment of SS tubing will be terminated with a quick-connect coupling. Each segment will be clearly and permanently labeled to indicate the depth of the respective sampling port. The well head completion design is discussed below in Section 6.4.

### 6.3 Acceptance Criteria

SNL/NM personnel will use the following acceptance criteria to ensure that each soil-vapor monitoring well is installed in compliance with the NMED-approved LTMMP:

- The DC's drill rig and associated equipment (drive casing, rods, bits, etc.) must be adequately decontaminated based upon visual inspections.
- Well materials must be in "new" condition with no observable contamination (spills, stains, paint, dirt, etc.) and arrive at the drill site in unopened, factory sealed plastic bags or similar containers.
- After well installation, each sampling port must be located within plus or minus 10 vertical ft of the planned depth.
- Each sampling port must be functional for sample collection. This will be verified using a vacuum pump after well installation. If any port fails the test, NMED will be notified and the sampling port will be replaced if required.
- Well head completions must meet industry standards for strength and appearance.
- The ground surface must be smoothed and the drilling equipment removed following well installation at all three locations and at any temporary storage/lay down areas.

### 6.4 Well Head Design

Each well will be completed with a monument (stovepipe) and a concrete pad. The stovepipe will be constructed of a 6-ft length of 10-inch diameter, steel casing. The stovepipe will extend approximately 30 inches above the concrete pad. A locking lid will be attached to the stovepipe. The pad will be 3-ft by 3ft square and 10-inches thick. The concrete forms will be constructed of 2x12-inch lumber. Each pad will contain steel rebar (#4, 0.5-inch diameter) set on plastic supports in a square pattern around the stovepipe. The top of the each concrete pad will be set approximately 2 inches above grade and sloped to direct precipitation away from the well. A brass identification marker will be set in the concrete before it fully cures. Three, 4-inch diameter concrete-filled, steel guard posts (bollards) will be placed around the pad, equidistant from the stovepipe. A padlock will secure the stovepipe lid. The stovepipe and bollards will be painted high-visibility yellow.

## 7. WASTE MANAGEMENT

A site-specific WMP will be prepared for this well installation task. Waste generation will be kept to a minimum. Borehole cuttings will be contained within an area adjacent to the well. Management and final disposition of cuttings will be in accordance with the site-specific WMP. The waste will be managed in accordance with federal, state, and local regulations. The cuttings will be managed as non-regulated waste, unless sample analytical results or process knowledge indicates that the waste needs to be managed as hazardous and/or radioactive waste. Analytical data from previous drilling activities will be used as applicable.

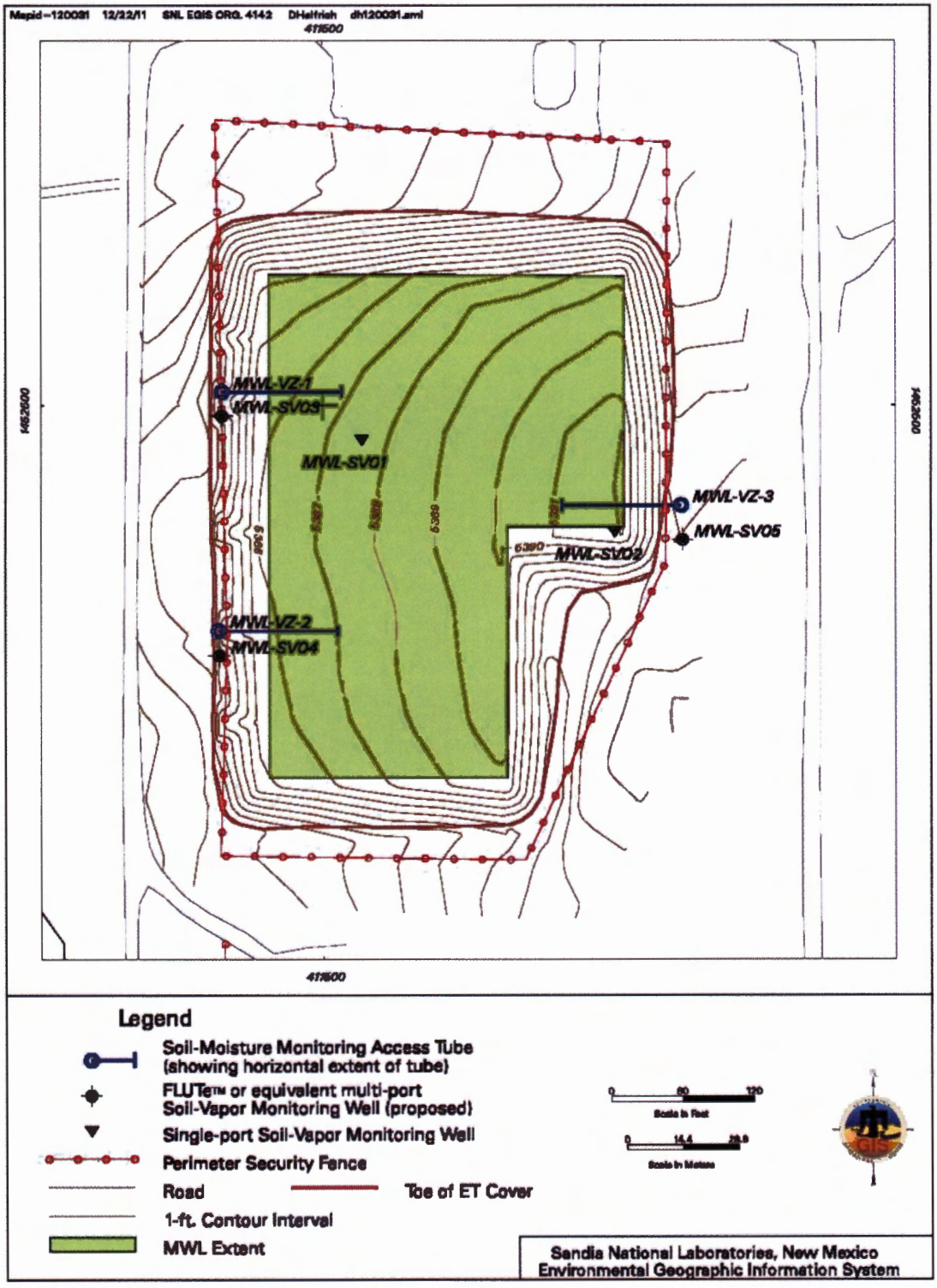



**Figure 2. Proposed Soil-Vapor Monitoring Wells at the Mixed Waste Landfill**

## 8. RECORDS MANAGEMENT

Records associated with the drilling and well installation activities will be submitted to and maintained by the SNL/NM Customer Funded Records Center. The following list of documents will be prepared as part of the drilling and well installation activities:

- Well-file contents checklist,
- Statement of Work,
- Lithologic (borehole) logs,
- Well construction data summary sheets,
- Well construction diagrams,
- Copy of geologist's field logbook,
- DC daily reports,
- Survey coordinates/elevations from a State of New Mexico licensed surveyor,
- Location map,
- Waste management documentation, and
- Photographs.

## 9. REPORTING

A Well Installation Report will be prepared following the well installations and will document the field activities. The Well Installation Report will contain a narrative describing the work performed and any variances to this Work Plan. The report will also include the relevant portions of 37 informational elements as required in Section VIII.D of the Order (NMED April 2004).

## 10. SCHEDULE

Initiation of field work is dependent upon NMED's approval of this Work Plan. However, pre-field activities will commence prior to NMED approval to expedite the installation schedule, but will not be completed until NMED approval is received. The monitoring wells will be installed as soon as possible after NMED's approval of the Work Plan. Per the requirements of the Order, DOE/Sandia will notify the NMED in writing, by e-mail, or by fax a minimum of 15 days prior to commencing field work. Soil-vapor sampling will commence after successful well installation and vadose-zone equilibration. The Well Installation Report will be submitted within three months after completion of the wells.

## 11. REFERENCES


Curry, R., May 2005. "Final Order, State of New Mexico Before the Secretary of the Environment in the Matter of Request for a Class 3 Permit Modification for Corrective Measures for the Mixed Waste Landfill, Sandia National Laboratories, Bernalillo County, New Mexico," EPA ID# 5890110518." May 26, 2005.

Kieling January 2014. Letter to G. Beausoleil (U.S. Department of Energy) and S. Orrell (Sandia Corporation), "Approval: Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan, March 2012, Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-12-007." January 8, 2014.

New Mexico Environment Department (NMED), 1993. *Module IV: Hazardous and Solid Waste Amendment (HSWA) Portion for Solid Waste Management Units (Module IV to the RCRA Part B Permit, NM5890110518),* New Mexico Environment Department, Santa Fe, New Mexico. 1993.

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 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, Santa Fe, New Mexico. August 31, 2005.

Sandia National Laboratories, New Mexico (SNL/NM), March 2012. *Long-Term Monitoring and Maintenance Plan for the Mixed Waste Landfill*, Environmental Restoration Operations, Sandia National Laboratories, Albuquerque, New Mexico.