

553993

IMPORTANT NOTICE: The current, official version of this document is available on the Sandia National Laboratories WIPP Online Documents web site. A printed copy of this document may not be the version currently in effect.

Sandia National Laboratories
Waste Isolation Pilot Plant

Test Plan TP 06-01

Monitoring Water Levels in WIPP Wells

Task 1.4.2.3

Revision 3

Effective Date: 07/13/10

Michael D. Schuhen
Repository Performance Department 6712
Sandia National Laboratories
Carlsbad, NM 88220

APPROVALS

Author: Michael Schuhen 7-13-10
Michael Schuhen
Repository Performance, Org. 6712 Date

Technical Reviewer: P.B. Johnson 7-13-10
P.B. Johnson
Repository Performance, Org. 6712 Date

SNL QA: S.R. Johnson 7-13-10
S.R. Johnson
Quality Assurance, Org. 6710 Date

SNL ES&H: R. T. Parsons 7/13/10
R. T. Parsons
Environmental Safety & Health, Org. 6710 Date

SNL Management: C.D. Leigh 7/13/10
C.D. Leigh, Manager
Repository Performance, Org. 6712 Date

Information Only

TABLE OF CONTENTS

1	ABBREVIATIONS, ACRONYMS, AND INITIALISMS.....	5
2	REVISION HISTORY.....	6
3	PURPOSE AND SCOPE.....	7
4	EXPERIMENTAL PROCESS RATIONALE AND DESCRIPTION.....	13
4.1	Overall Strategy.....	13
4.2	Strategy Implementation.....	13
4.2.1	Monitoring Activities.....	13
4.3	Monitoring Requirements and Procedures.....	14
4.3.1	Measurement and Test Equipment.....	14
4.3.2	Monitoring Requirements.....	15
4.3.3	Monitoring Procedures.....	15
4.3.4	Data-Collection Plan.....	16
4.3.4.1	Scientific Notebooks.....	16
4.3.4.2	Electronic Data Acquisition.....	17
4.3.4.3	Manual Data Acquisition.....	17
4.3.4.4	Data Validation.....	17
4.4	Quality Assurance.....	17
4.4.1	Hierarchy of Documents.....	17
4.4.2	Quality Assurance Program Description.....	18
4.4.3	Data Integrity.....	19
4.4.4	Records.....	19
4.4.4.1	Required QA Records.....	19
4.4.4.2	Miscellaneous Non-QA Records.....	19
4.4.4.3	Submittal of Records.....	20
5	HEALTH AND SAFETY.....	21
6	TRAINING.....	22
7	PERMITTING AND LICENSING.....	23
8	REFERENCES.....	24

Information Only

LIST OF FIGURES

Figure 3-1. Diagram of the general stratigraphy of the WIPP site	9
Figure 3-2. Map showing the locations of current WIPP groundwater monitoring wells completed to the Culebra Member of the Rustler Formation	10
Figure 3-3. Map showing the locations of current WIPP groundwater monitoring wells completed to the Magenta Member of the Rustler Formation.....	11
Figure 3-4. Map showing the locations of current SSW monitoring wells completed to the Santa Rosa Formation-Dewey Lake Formation contact and the middle Dewey Lake Formation (WQSP-6a).....	12

1 ABBREVIATIONS, ACRONYMS, AND INITIALISMS

ASME	American Society of Mechanical Engineers
CCA	Compliance Certification Application
CMR	Central Monitoring Room
DOE	(U.S.) Department of Energy
DTW	Depth-To-Water
EPA	(U.S.) Environmental Protection Agency
ES&H	Environmental Safety and Health
FY	Fiscal Year
GET	General Employee Training
GMI	GeoMechanics, Inc.
HA	Hazard Analysis
JHA	Job Hazard Analysis
LTM	Long-Term Monitoring
MOC	Management and Operating Contractor
MTL	Monitoring Team Lead
MMR	Monthly Monitoring Run
M&TE	Monitoring and Test Equipment
NP	(SNL WIPP) Nuclear Waste Management (QA) Procedure
PHS	Primary Hazard Screening
PI	Principal Investigator
P-T	Pressure-Temperature
QA	Quality Assurance
QAPD	Quality Assurance Program Document
SA	Scientific Advisor
SN	Scientific Notebook
SNL	Sandia National Laboratories
SRN	SNL Restricted Network
SP	(SNL WIPP) Activity/Project Specific Procedure
SSW	Shallow Subsurface Water
SMN	SSW Monitoring Network
TP	(SNL WIPP) Test Plan
WIPP	(U.S. DOE) Waste Isolation Pilot Plant
WMN	WIPP Groundwater Monitoring Network
WTL	Well Test Lead

Information Only

2 REVISION HISTORY

The following is the third revision of this Test Plan (TP). The purpose and content of any future changes and/or revisions to the previous version of the document will be described and appear in this section of revised editions. Changes to this TP, other than those defined as editorial changes per SNL WIPP Quality Assurance (QA) procedure NP 20-1 *Test Plans*, shall be reviewed and approved by the same organization that performed the original review and approval. All TP revisions will have at least the same distribution as the original document.

Changes to this document include:

- Expanded monitoring scope to include collection of depth-to-water (DTW) and pressure-head data from wells that monitor the formations where Shallow Subsurface Water (SSW) may exist.
- Updated description of WIPP Groundwater Monitoring Network (WMN) and added description of the Shallow Subsurface Monitoring Network (SMN).

Information Only

3 PURPOSE AND SCOPE

The Waste Isolation Pilot Plant (WIPP) site is a U.S. Department of Energy (DOE) facility designed for the safe disposal of transuranic waste resulting from U.S. defense programs. The WIPP repository is excavated in bedded halite of the Salado Formation, approximately 2150 feet (ft) below land surface. At the center of the WIPP site, the Salado is ~2000 ft thick and is overlain by the ~300-ft-thick Rustler Formation, the 500-ft-thick Dewey Lake Formation, and ~50 ft of surficial sedimentary and eolian deposits (Figure 3-1). Groundwater is found principally in three horizons above the Salado: the Culebra and Magenta Members of the Rustler and the Dewey Lake Redbeds (over the southern portion of the WIPP site only). Groundwater is also found in a perched lens (or lenses) at the Santa Rosa-Dewey Lake contact in the immediate area of the WIPP site. This water is anthropogenically derived and was first observed in 1996.

The activities described in this TP constitute one component of the Sandia National Laboratories (SNL) program to evaluate monitoring data collected at the WIPP site to demonstrate compliance with U.S. Environmental Protection Agency regulations (EPA 1993, 1996) and address concerns that may result from the New Mexico Environment Department Discharge Permit (DP-831) requirements (NMED, 2010).

In the WIPP Compliance Certification Application (CCA; U.S. DOE, 1996), the DOE made commitments to conduct a number of monitoring activities to comply with U.S. EPA (1996) and to insure that important deviations from the expected long-term performance of the repository are identified at the earliest possible time. One of these commitments is to monitor groundwater levels in the Culebra and Magenta, as well as the Dewey Lake. Groundwater levels are currently monitored in 84 wells and piezometers located within and around the WIPP site. The wells are typically configured to monitor one particular hydrologic unit, though there are some dual-completion wells. The wells are completed to the water-bearing horizons listed above, as well as other units of interest. The majority of wells, however, are completed to either the Culebra or Magenta (Figures 3-2 and 3-3, respectively). New wells are being added to the network as they are drilled or identified, while older wells are being plugged and abandoned. It is expected in the foreseeable future that the total number of wells will remain relatively constant in the Culebra and Magenta, but they should increase in the SSW in the immediate vicinity of the WIPP.

The SNL long-term monitoring program consists of an integrated approach to monitor water levels in the WIPP groundwater monitoring network (WMN), collect rainfall data, and gather information about other activities that may affect water levels in the WIPP vicinity. Information gathered from the wells is input into compliance models used in the assessment of the hydrologic system in which the WIPP is situated. Some of the data for modeling come from well tests (conducted by SNL), which provide information about hydraulic parameters [e.g., flow dimension, storativity, and transmissivity], transient head responses from observation wells during multipad pumping tests, direct measurements of the rates and directions of groundwater flow through wells, and water-quality analyses. Other data are generated by the long-term water-level monitoring activities conducted by both the WIPP managing and operating contractor (MOC) and SNL.

The SSW will include the addition of approximately 10-20 monitoring wells (see figure 3-4) which will be installed either in existing boreholes or new boreholes as they are drilled. This shallow monitoring network (SMN) will provide input into the understanding of these shallow waters, to include the extent of the groundwater present in the shallow formations and the hydraulic parameters [e.g., flow dimension, storativity, and transmissivity] associated with the shallow geologic formations in the near vicinity of WIPP. The DOE is especially interested in the shallow water movement in and around the exhaust shaft of the WIPP facility. The Shallow Subsurface wells will be incorporated as part of the existing SNL monitoring network.

The details of this test plan will outline the general strategies used by SNL to provide both temporal and spatial data to complement information collected by the WIPP MOC. The monthly/quarterly DTW measurements collected by the WIPP MOC provide information about long-term water-level trends; however, the temporal spacing of these DTW measurements does not allow for the study of transient/short-term variations in water levels. Therefore, more detailed information is desired. To this end, SNL has installed a number of pressure-temperature (P-T) gauges into WIPP wells. The gauges are capable of recording changes in pressure head and temperature at intervals ranging from seconds to days on a continuous basis over long periods of time. Collection of high-frequency, continuous pressure-head data in a specific well, or set of wells, will allow SNL to better constrain estimates of hydraulic parameters and freshwater head used in flow and transport modeling of the WIPP's various hydrologic formations. In addition, SNL will collect rainfall data in the WIPP vicinity, which will further enhance the understanding of the hydrologic processes that affect these water levels.

Information Only

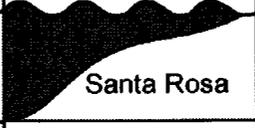
SYSTEM/ Series		Group	Formation	Members
QUATER- NARY	Holocene	Dockum	surficial deposits	
	Pleisto- cene		Mescalero caliche	
	Pliocene		Gatuña	
	Miocene			
TERTIARY				
TRIASSIC				
			Santa Rosa	
PERMIAN	Ochoan	Dockum	Dewey Lake	
			Rustler	<i>Forty-niner</i> <i>Magenta Dolomite</i> <i>Tamarisk</i> <i>Culebra Dolomite</i> <i>Los Medaños</i>
			Salado	<i>upper</i> <i>Vaca Triste Sandstone</i> <i>McNutt potash zone</i> <i>lower</i>
			Castile	
	Guadalupian	Delaware Mountain	Bell Canyon	
			Cherry Canyon	
			Brushy Canyon	

Figure 3-1. Diagram of the general stratigraphy of the WIPP site.

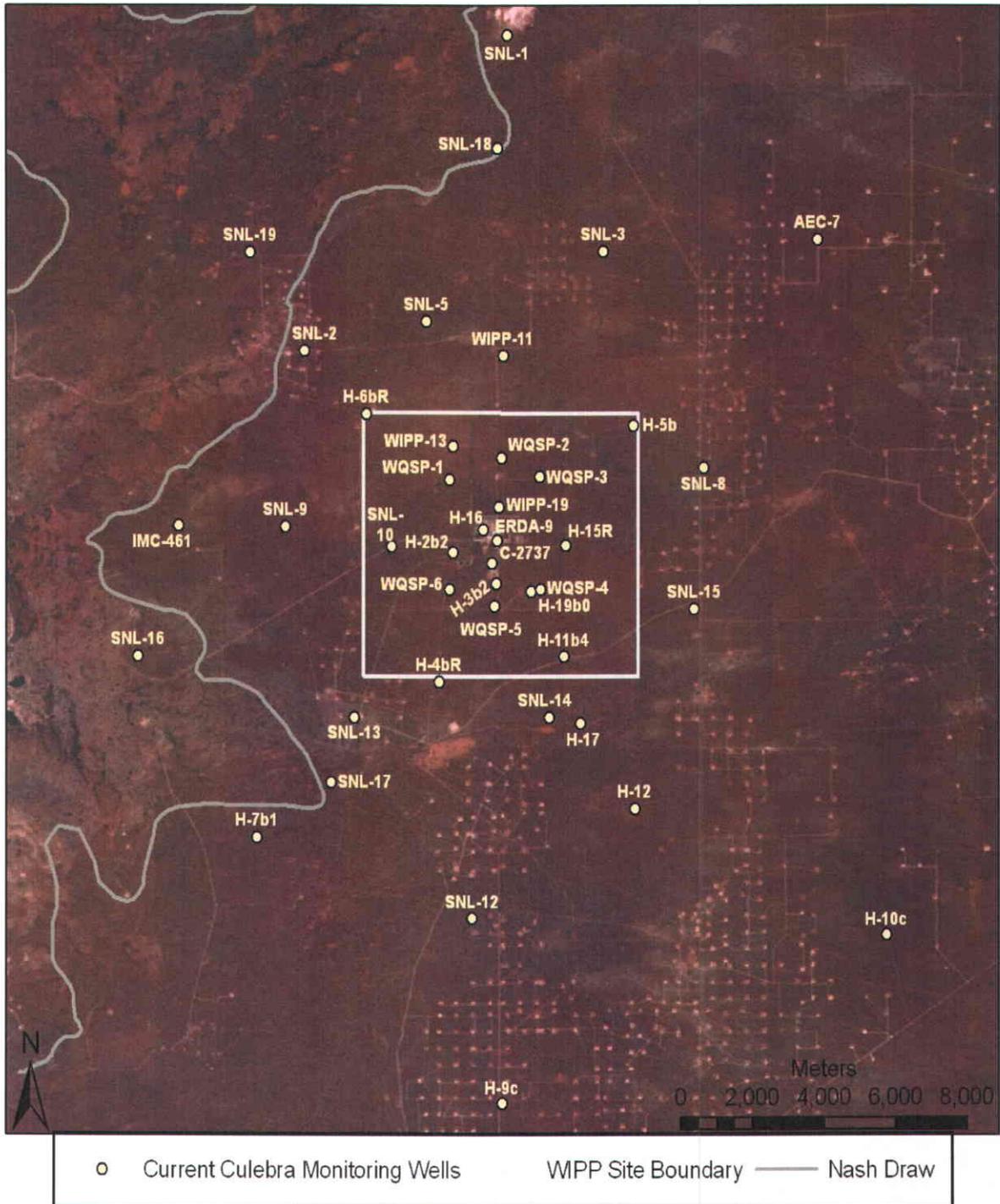


Figure 3-2. Map showing the locations of current WIPP groundwater monitoring wells completed to the Culebra Member of the Rustler Formation. **Note:** the H-19 well pad consists of seven wells, H-19b0 and H-19b2 to H-19b7.

Information Only

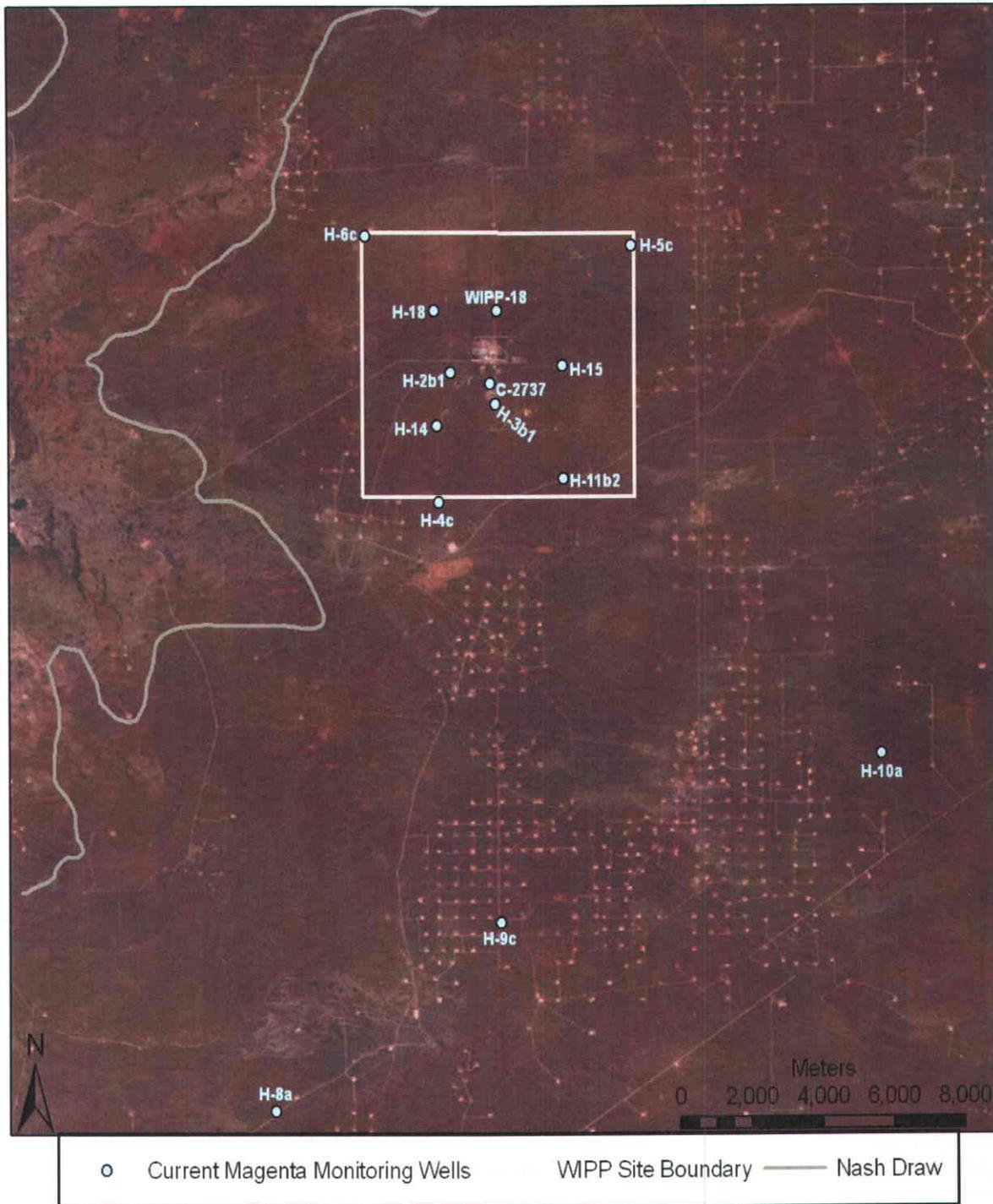


Figure 3-3. Map showing the locations of current WIPP groundwater monitoring wells completed to the Magenta Member of the Rustler Formation. Wells H-9c and C-2737 are dual (Culebra-Magenta) completions.

Information Only

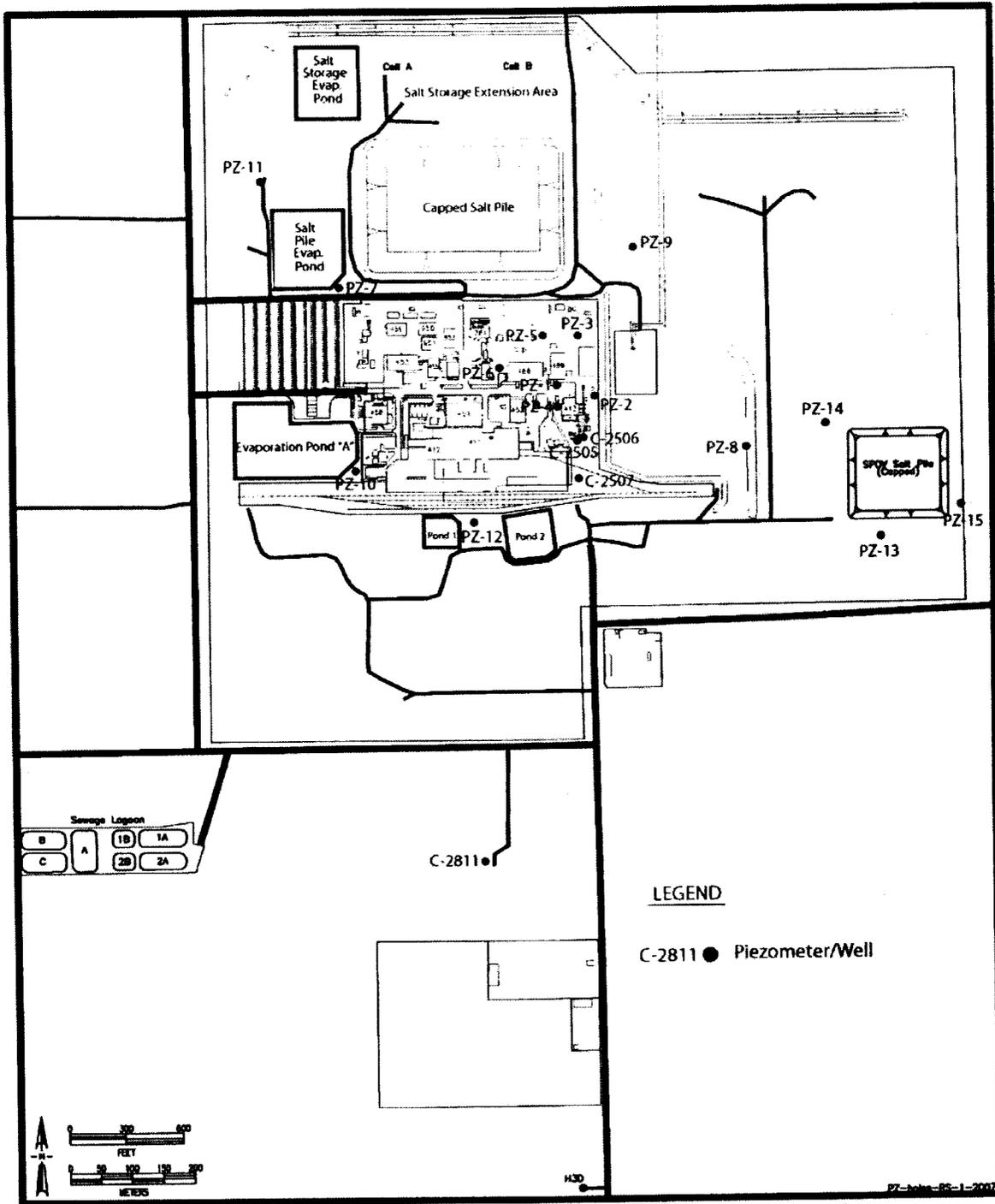


Figure 3-4. Map showing the locations of current SSW monitoring wells completed to the Santa Rosa Formation-Dewey Lake Formation contact and the middle Dewey Lake Formation (WQSP-6a).

Information Only

4 EXPERIMENTAL PROCESS RATIONALE AND DESCRIPTION

4.1 Overall Strategy

The overall strategy of the activities outlined in this TP can be defined by a series of objectives. The first objective is to collect high-quality water-level data that are relevant to the task at hand (e.g., well testing). The second objective is to collect continuous data sets that capture both short- and long-term changes in water levels, and variations in rainfall amount on various spatial and temporal scales. The third objective is to have a dynamic monitoring system in order to meet the needs of the SNL monitoring and testing programs as they change. Ultimately, these objectives will allow SNL personnel to refine their understanding of the WIPP area hydrology.

The overall SNL strategy for water-level monitoring in WIPP wells is defined by the Sandia Principal Investigator (PI). Either the PI or the SNL Monitoring Team Lead (MTL), designated by the PI, may make decisions about monitoring equipment placement, test parameters and duration, and deviations from the activities outlined in this TP.

4.2 Strategy Implementation

This TP is applicable to both existing and future WIPP wells. Monitoring will focus primarily on the Culebra and Magenta Members of the Rustler Formation. However, existing and future SSW wells may be added to the monitoring network as deemed appropriate by the MTL/PI.

Well activities fall under two general categories: well testing and long-term monitoring (LTM). SNL monitoring activities are controlled by the MTL/PI. Monitoring of a particular well begins when a P-T gauge is installed in a well and ends when the logging is deemed complete and the gauge is removed. Well testing, described in TP 03-01, "Test Plan for Testing of Wells at the WIPP Site", begins when the test equipment (e.g., pump) is installed and ends when the equipment is removed; this includes any reconfiguration activities needed for the well test to work properly. During a well test, the well is under the control of the PI or Well Test Lead (WTL). After a well test is completed, monitoring typically resumes and control of the well reverts back to the MTL/PI.

Rainfall will be monitored using data-logging rain gauges (i.e., tipping buckets) and installed at various locations in the WIPP vicinity as determined by the PI/MTL.

4.2.1 Monitoring Activities

The initiation of monitoring activities in a particular well is controlled by a number of factors that fall into two general categories: planned/unplanned human-induced stresses (e.g., pumping or slug tests) or some other, unknown or natural mechanism (e.g., recharge). Examples of factors that may initiate monitoring include, but are not limited to:

- Well testing (see TP 03-01, Section 4.3.2 for description), especially a multipad pumping test, which requires the monitoring of observation wells located at distances of

up to several miles from the well that is being pumped; **Note:** During a multipad pumping test, the well being pumped is controlled by the WTL/PI, while observation wells are still under the jurisdiction of the MTL/PI; therefore, it is important that the WTL/PI and MTL/PI communicate with regards to monitoring equipment placement and frequency of data collection/download in order to assure the highest-quality data for analysis;

- review of WIPP MOC and SNL monthly DTW measurements, which may indicate a significant change in water level in a well or wells that cannot be readily explained by known well activities;
- analysis of oil and gas industry activities with regards to impact on groundwater levels in the WIPP vicinity; and/or
- a request for monitoring to be conducted in a particular well or set of wells by the customer or stakeholder.

Wells that are to be monitored are determined by the SNL MTL/PI. All quality-affecting information about activities associated with monitoring will be documented in the LTM Scientific Notebooks (SNs). At the direction of the MTL/PI, monitoring equipment will be placed in wells deemed important for the task at hand. Due to budget and time constraints, not all WIPP wells will be instrumented by SNL at any given time. SNL will, however, strive to monitor as many wells as possible in response to the needs of both the SNL WIPP well monitoring and testing programs and ongoing EPA and NMED requirements.

In addition to pressure-head monitoring, SNL will monitor atmospheric barometric pressure and temperature using a P-T gauge. At least one barometric-pressure gauge must be operating at all times at the SNL Port-a-Camp located near the WIPP facility. The barometric-pressure data collected by the gauge(s) will be used to compensate pressure-head data for barometric-induced fluctuations.

4.3 Monitoring Requirements and Procedures

The activities described in this TP are designed so that the data collected are of the highest quality and are more than adequate to meet specific programmatic objectives.

4.3.1 Measurement and Test Equipment

Measurement and Test Equipment (M&TE) includes electric water-level sounders, programmable P-T memory gauges, barometric pressure gauges, and data-logging rain gauges, which are maintained following the requirements of NP 12-1, *Control of Measuring and Test Equipment*. The operation, maintenance, and field check of the electric water-level sounders currently used by SNL are described in SP 12-5, *Depth-to-Water Measurement using a Solinst Brand Electric Sounder*. The installation, operation, and maintenance instructions, as well as the calibration requirements, for the programmable P-T gauges and barometric pressure gauges currently used by SNL are outlined in SP 9-7, *WIPP Well Water-Level Monitoring*. The installation, operation, and maintenance instructions, as well as the field check requirements, for the rain gauge data loggers used by SNL are outlined in SP 12-23, *Rainfall Measurements Using*

Information Only

an ONSET Brand Data-Logging Rain Gauge.

SNL may also use a self-leveling borehole tiltmeter manufactured by Applied Geomechanics, Inc. (GMI) to measure changes in subsurface deflection (GMI, 2006). The first planned location for installation of a tiltmeter is at the SNL-16 pad. The tiltmeter comes with a life-time calibration from the manufacturer, therefore it will not be maintained per NP 12-1, *Control of Measuring and Test Equipment* requirements and will be used for indication-only purposes. Additional tiltmeters maybe added to the program based on the value of the data from the initial installation at the SNL-16 pad. This determination will be made by the PI in conjunction with the WTL/MTL. The justification for each new installation and the installation process will be documented in the applicable SN. The User's Manual for the tiltmeter provides information about the installation, test setup, and data collection processes (GMI, 2006). Data should be downloaded from the tiltmeter(s) at least quarterly and documented in the appropriate SN.

4.3.2 Monitoring Requirements

Data-collection activities described in this TP require specific initial and operational conditions for maximum success. The test equipment used for data collection must:

- provide quality data to support the monitoring objectives;
- perform according to design specifications; and
- be calibrated, as appropriate, according to NP 12-1.

4.3.3 Monitoring Procedures

SNL WIPP LTM activities consist of the placement of P-T gauges at depth in wells coupled with DTW measurements, as well as installing pressure gauges to collect barometric-pressure data. The depth at which the P-T gauge is set is generally identified by the MTL and is based on placing the gauge at the mid-formation depth of the water bearing unit of interest. This depth is typically referenced to the top of casing, but can also be referenced to other markers on the well. In general, P-T gauges will be programmed to record data on a set time interval (e.g., hourly) ignoring intermediate readings (e.g., every 5 minutes) unless the trigger value for pressure (e.g., 0.1 psi) is exceeded. Pressure transducers used to measure barometric pressure will record a reading at least every 15 minutes, regardless of the amount of pressure change. Data files will be downloaded from the various data loggers on an approximately monthly basis in conjunction with DTW measurements, as part of the Monthly Monitoring Run (MMR). These data, as well as those collected by the WIPP MOC, will be evaluated by the MTL/PI prior to the next MMR in order to ensure that the objectives of this TP are being met.

Modifications to monitoring procedures may be necessary during LTM activities. These modifications must be conducted at the direction of the MTL/PI or the WTL/PI and must be documented in the SN as part of the QA records. Such modifications are anticipated as normal operational procedures and will not be reported as nonconformances that require corrective action.

Information Only

4.3.4 Data-Collection Plan

Both manually and electronically collected data will be acquired during LTM activities. The following types of data will be recorded:

- electronically collected downhole pressure-head data;
- electronically collected barometric-pressure data;
- electronically collected rainfall data;
- electronically collected subsurface deflection information;
- electronically collected photographs of well head configuration and tools used in well configuration (i.e., bridge plugs, packers, PIPs, etc.);
- manually collected DTW measurements; and
- manually collected information on equipment and instrument configurations in the well and at the surface.

4.3.4.1 SCIENTIFIC NOTEBOOKS

Scientific Notebooks will be used in accordance with NP 20-2 *Scientific Notebooks* to document all activities and decisions made during LTM activities. Scientific Notebooks associated with this TP will contain the words “Long-Term Monitoring” in the title in order to differentiate them from other field Scientific Notebooks. Specific information to be recorded in the scientific notebooks includes:

- a statement of the objectives and description of the work to be performed at each well, as well as a reference to this TP;
- a list, with sample signatures and initials, of all personnel authorized to enter information into the SN;
- a written account of all activities associated with each well;
- a list of all equipment used at each well, including make, model/serial number, and software (if applicable);
- a sketch, showing all dimensions, of tools used in well maintenance/reconfiguration;
- tubing tallies and other equipment measurements;
- manually collected DTW measurements;
- entries providing the file names, start time, and completion times of all data files; and
- discussion of the information and/or observations leading to decisions to initiate, terminate, or modify activities.

All entries in the SN will be signed or initialed, and dated by the person making the entry. Continuous blocks of entries by the same individual do not all need to be initialed and dated, but

Information Only

the first entry on every page must always be initialed and dated. A monthly MTL/PI review of the SN will be conducted, while technical and QA reviews will be done every six months. When a SN is completed, the closeout process specified in NP 20-2 *Scientific Notebooks* will be followed. This process will include final MTL/PI, technical and QA reviews. Technical reviews must be completed by an independent, technically qualified individual within three months of the completion of the SN to verify sufficient detail has been recorded to retrace the activities and confirm results.

Manually collected water-level information may also be recorded on specially prepared forms (see SP 9-7) rather than directly into the SN when that would provide a more efficient means of data collection and tracking. Any such forms must be inserted (i.e., pasted) into the SN as they are completed.

4.3.4.2 ELECTRONIC DATA ACQUISITION

P-T memory gauges, barometric pressure gauges, data-logging rain gauges, and tiltmeter (s) will be used for monitoring activities. Electronic data files generated by the gauges or DAS systems hooked to the gauges will be documented in the SN.

4.3.4.3 MANUAL DATA ACQUISITION

Manual data collection will be documented in a SN. The use of forms specified in the SNL WIPP procedures is not mandatory. The MTL/PI will determine the best means of documenting manually acquired data and will ensure that all quality-affecting information is documented.

4.3.4.4 DATA VALIDATION

The MTL/PI will evaluate the data prior to the next MMR, and document the results in the SN. The evaluation is done to ensure that the data are usable for interpretation, conditions can be maintained over the planned duration of the activity, and that monitoring will not be terminated before the minimum objectives for the task at hand are achieved under the given time constraints. In addition, the data will be analyzed for quality-affecting errors due to equipment failure. Data found to be of poor quality (i.e., erroneous data) will be denoted in an appropriate manner. The MTL/PI will take action (if required) to make any necessary changes to the equipment or the procedures to assure the data quality is consistent with the objectives outlined in the TP. If at any time the MTL/PI determines that an objective cannot be accomplished due to time constraints or problems concerning the performance of the equipment, the MTL/PI may terminate the activity.

4.4 Quality Assurance

4.4.1 Hierarchy of Documents

Several types of documents will be used to control work performed under this TP. If inconsistencies or conflicts exist among the requirements specified in the documents, the following hierarchy (in decreasing order of authority) shall apply.

Information Only

- memoranda or written instructions used to modify or clarify requirements of the TP (most recent instructions having precedence over previous instructions);
- this TP;
- SPs (i.e., SP 12-5, SP 12-23, and SP 9-7); and
- NPs (i.e., NP 2-1, NP 12-1, NP 13-1 and NP 20-1).

SNL QA concurrence will be obtained and document control forms will be completed for modifications to QA procedures implemented for work conducted under this TP.

4.4.2 Quality Assurance Program Description

SNL activities are conducted in accordance with the requirements specified in the Quality Assurance Program Document (QAPD; U.S. DOE, 2009), or subsequent revisions of this document. The requirements and guidance specified in the QAPD are based on criteria contained in American Society of Mechanical Engineers (ASME) (1989a), ASME (1989b), ASME (1989c), and U.S. EPA (1993). The requirements of U.S. DOE (2006) are passed down and implemented through the SNL WIPP QA procedures.

4.4.3 Data Integrity

Care will be taken throughout the performance of the operations for this TP to ensure the integrity of all data collected, including documentation on hard copy and data collected on electronic media. Scientific Notebooks will be handled as prescribed in NP 20-2. Electronic data files collected with gauges will be uploaded on the SNL WIPP Hydrology Group's server and placed in the appropriate directory/folder. This information, in turn, will be backed-up onto a directory, located on the SNL Restricted Network (SRN) server. Data collected shall not be released unless and until the data are reviewed and approved by the MTL/PI.

4.4.4 Records

Records shall be maintained as described in this TP and applicable QA implementing procedures. These records may consist of bound Scientific Notebooks, loose-leaf pages, forms, printouts, or information stored on electronic media. The MTL/PI will ensure that the required records are maintained and are submitted to the SNL WIPP Records Center according to NP 17-1, *Records*.

4.4.4.1 REQUIRED QA RECORDS

At a minimum, QA records will include:

- Scientific Notebooks;
- NPs and SPs used;
- calibration records for controlled equipment and/or equipment specification or information sheets supplied by the manufacturer; and
- electronic data files collected by the P-T gauges, barometric pressure gauges, and data-logging rain gauges.

4.4.4.2 MISCELLANEOUS NON-QA RECORDS

Additional records that are useful in documenting the history of the activities but are considered non-QA records may be maintained and submitted to the SNL WIPP Records Center. These records include:

- Electronic data files collected by tiltmeter(s) (indication-only);
- equipment manuals and specifications; and
- photographs taken of the well heads, equipment, and activities with descriptions.

These records do not support performance assessment or regulatory compliance and, therefore, are not quality-affecting information.

Information Only

4.4.4.3 SUBMITTAL OF RECORDS

Records resulting from work conducted under this TP, including forms and data stored on electronic media, will not be submitted to the SNL QA staff for review and approval individually. Instead, the records will be assembled into a records package or packages, which will be reviewed by the MTL/PI before being submitted for QA review.

Information Only

5 HEALTH AND SAFETY

The activities described in this TP shall conform to SNL Environmental Safety and Health (ES&H) programs. For detailed, site-specific ES&H information, refer to Carlsbad Programs Group (CPG) Hydrologic Monitoring Activities Standard Operating Procedure (SOP). This document also links to the Primary Hazard Screening (PHS), Job Safety Analysis (JSA) and National Environmental Policy Act (NEPA) documents developed by SNL. Because the SNL monitoring operations described in this TP are conducted on WIPP-controlled land, all activities described in this TP are also subject to ES&H requirements governed by the WIPP Industrial Safety Program and the WIPP Industrial Hygiene Program.

Additional and specific safety issues include:

- activities described in this TP performed in conjunction with other work such as well testing or maintenance using a work-over rig must be coordinated with the equipment supervisors in order to determine the appropriate personal protective equipment (PPE) needed and if any other specific safety procedures are required;
- following the appropriate SPs and equipment users manuals for well testing and monitoring equipment;
- ensuring adequate fuel is available for all field vehicles, especially those traveling to remote locations;
- familiarity with on- and off-site road conditions and driving regulations;
- awareness of biting/stinging insects that may reside in the well heads;
- familiarity with the locations of first-aid supplies, medical support facilities, and fire extinguishers and other safety equipment; and
- familiarity with the location of emergency contact lists including telephone numbers, people, and offices to notify in the event of emergencies.

All field personnel assigned to the operations described in this TP are required to be up-to-date with the safety procedures listed above. In case of accident, injury, or sudden illness, the WIPP Central Monitoring Room (CMR) will be notified immediately. The CMR will coordinate emergency response activities.

Information Only

6 TRAINING

All personnel involved in the monitoring activities will be trained and qualified to their assigned work following NP 2-1. In addition, personnel should read the Hydrologic Monitoring Activities ES&H SOP (CPG-HYD-SOP-01). As required by WIPP, any personnel working in the WIPP vicinity (i.e., within the Land Withdrawal Boundary) should either have an up-to-date WIPP General Employee Training (GET) or be with someone who does.

Applicable Documents

NPs: 12-1, 13-1, 20-2

SPs: 9-7, 12-5, 12-23, 13-1

Information Only

7 PERMITTING AND LICENSING

WRES is responsible for ensuring that WIPP-site activities are conducted in accordance with applicable federal, state, and local regulatory requirements. WRES is responsible for all permitting and licensing requirements associated with activities outlined in this TP. SNL will abide by all permitting and licensing rules and regulatory requirements as indicated by WRES. SNL is responsible for ensuring that all contracted experimental work performed for SNL at the WIPP site meets all applicable federal, state, and local regulatory requirements.

Information Only

8 REFERENCES

- ASME. 1989a. *Quality Assurance Program Requirements for Nuclear Facilities*. ASME NQA-1-1989 Ed. New York, NY: American Society of Mechanical Engineers.
- ASME. 1989b. *Quality Assurance Requirements for Nuclear Facility Applications*. ASME NQA-2-1989 Ed. New York, NY: American Society of Mechanical Engineers.
- ASME. 1989c. *Quality Assurance Program Requirements for the Collection of Scientific and Technical Information for Site Characterization of High-Level Nuclear Waste Repositories*. ASME NQA-3-1989 Ed. New York, NY: American Society of Mechanical Engineers.
- GMI. 2006. *User's Manual: LILY Self-Leveling Borehole Tiltmeter*. ERMS# 549191. SNL WIPP Records Center, Carlsbad, NM. 34 pp.
- NMED, 2010, Department of Energy, Waste Isolation Pilot Plan (WIPP) Discharge Permit (DP-831), New Mexico Environment Department Hazardous Waste Bureau, April 1 2010.
- U.S. DOE. 1996. *Title 40 CFR Part 191 Compliance Certification Application for the Waste Isolation Pilot Plant*. DOE/CAO-1996-2184. Carlsbad, NM: US DOE Waste Isolation Pilot Plant, Carlsbad Area Office.
- U.S. DOE. 2009. *Quality Assurance Program Document, Rev. 8*. DOE/CBFO-94-1012. Carlsbad, NM: U.S. Department of Energy Carlsbad Field Office.
- U.S. EPA. 1993. "40 CFR Part 191: Environmental Radiation Protection Standards for the Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes; Final Rule." *Federal Register*. Vol. 58, no. 242, 66398-66416.
- U.S. EPA. 1996. "40 CFR Part 194: Criteria for the Certification and Re-Certification of the Waste Isolation Pilot Plants Compliance With the 40 CFR Part 191 Disposal Regulations: Final Rule." *Federal Register*. Vol. 61, no. 28, 5224-5245.

NOTICE: This document was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness or any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government, any agency thereof or any of their contractors or subcontractors. The views and opinions expressed herein do not necessarily state or reflect those of the United States Government, any agency thereof or any of their contractors.

This document was authored by Sandia Corporation under Contract No. DE-AC04-94AL85000 with the United States Department of Energy's National Nuclear Security Administration. Parties are allowed to download copies at no cost for internal use within your organization only provided that any copies made are true and accurate. Copies must include a statement acknowledging Sandia Corporation's authorship of the subject matter.

Information Only