Department of Energy
Washington, DC 20585

QA: L

APR 0 2 1998

D. R. Wilkins, Technical Project Officer
for Yucca Mountain Site
Characterization Project
TRW Environmental Safety Systems, Inc.
1180 Town Center Drive, M/S 423
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ISSUANCE OF SURVEILLANCE RECORD SNL-SR-98-018 RESULTING FROM THE OFFICE OF QUALITY ASSURANCE (OQA) SURVEILLANCE OF SANDIA NATIONAL LABORATORIES (SNL) AT THE EXPLORATORY STUDIES FACILITY (ESF) AT THE YUCCA MOUNTAIN SITE, NEVADA

Enclosed is the record of Surveillance SNL-SR-98-018, conducted by the OQA of SNL at the ESF at the Yucca Mountain Site, Nevada.

The purpose of the surveillance was to verify compliance with implementing procedures for the Goodman jack borehole testing.

The results of the surveillance are that SNL is adequately implementing the Quality Assurance Program as it applies to the activities conducted in association with Work Breakdown Structure Number 1.2.3.14.2, specifically the Goodman jack testing.

There were no deficiency documents issued as a result of this surveillance. One deviation was noted and corrected during the surveillance.

This surveillance is considered completed and closed as of the date of this letter. A response to this surveillance record is not required.

If you have any questions, please contact either James Blaylock at (702) 794-1420 or Kenneth T. McFall at (702) 295-2832.

R. W. Cole

for Donald G. Horton, Director
Office of Quality Assurance

OQA:JB-1365

Enclosure:
Surveillance SNL-SR-98-018

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Surveillance No. SNL-SR-98-018

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

QUALITY ASSURANCE SURVEILLANCE RECORD

SURVEILLANCE DATA

1. ORGANIZATION/LOCATION:	2. SUBJECT:	3. DATE:
Sandia National Laboratories (SNL) at the Exploratory Studies Facility (ESF) at the Yucca Mountain Site, Nevada	Goodman Jack Borehole Testing	January 29 and February 12, 1998

4. SURVEILLANCE OBJECTIVE:

Verify compliance with implementing procedures.

5. SURVEILLANCE SCOPE:

Verify compliance with American Society for Testing and Materials (ASTM) Standard D 4971-89, "Standard Test Method for Determining the In Situ Modulus of Deformation of Rock Using the Diametrically Loaded 76-mm (3-in) Borehole Jack" and SNL Quality Assurance Implementing Procedure (QAIP) 20-2, Revision 01, "Scientific Notebooks."

6. SURVEILLANCE TEAM:

Team Leader:

Kenneth T. McFall

Additional Team Members:

John R. Doyle

7. PREPARED BY:		8. CONCURRENCE:	
Kenneth T. McFall	1/28/98	Donald G. Horton	1/29/98
Surveillance Team Leader	Date	Director, OQA	Date

SURVEILLANCE RESULTS

9. BASIS OF EVALUATION/DESCRIPTION OF OBSERVATIONS:

Surveillance SNL-SR-98-018 was conducted on January 29 and February 12, 1998 in Alcove 5 in the ESF. The purpose of the surveillance was to verify compliance with QAIP 20-2, Revision 01, "Scientific Notebooks," and ASTM Standard D 4971-89. The objective of this activity is to provide supporting data for the coupled thermal-mechanical-hydrological-chemical process in the Single Heater Test, specifically, the in situ modulus of the rock after heating to be used in rock mechanics value determinations. No samples are taken during this testing.

See Page(s) 2 through 4

10. SURVEILLANCE CONCLUSIONS:

Based on examination of objective evidence and interviews with SNL personnel, it is determined that SNL is adequately implementing the Quality Assurance Program as it applies to the activities conducted in association with Work Breakdown Structure Number 1.2.3.14.2, specifically the Goodman jack testing. No deficiencies were issued as a result of this surveillance. One deviation was corrected during the surveillance and is described in Block 9 of this report.

11. COMPLETED BY:		12. APPROVED BY:	
Kenneth T. McFall	3/12/98		4/2/98
Surveillance Team Leader	Date	Director, OQA	Date

Block 9: BASIS OF EVALUATION/DESCRIPTION OF OBSERVATIONS: (Continued)

The following requirements were examined for compliance:

QAIP 20-2, Revision 01, "Scientific Notebooks"

Paragraph 4.1, Step 2

If a Scientific Notebook (SN) is used without a Technical Procedure (TP) to implement the work, then the elements listed below shall be addressed, as applicable to the work activity, and documented in the SN.

- *a. Identify the scientific approach or technical methods used to collect, analyze, or study information developed by the work activity.*
- *b. Identify applicable standards and criteria that apply to the work, for example: ASTM Standards.*
- *d. Identify prerequisites, limits, precautions, special controls, environmental conditions, processes (e.g., drilling) or special skills that may be required of personnel.*
- *e. Identify computer software used, including non-SES software.*
- *g. Identify a sequential description of the work to be performed including controls for altering the sequence of required inspections, tests, and other operations. The Principal Investigator (PI) responsible for preparing the SN shall determine the appropriate level of detail.*
- *h. Identify methods for demonstrating that the work was performed as required (such as provisions for recording and inspection of test results, check-off lists, or sign-off blocks).*

Paragraph 4.2, Step 3:

The PI or Designee shall document or cause to be documented in the SN the following items:

- *a. A brief summary statement of the work objectives and a description of the work to be performed. Reference the approved Work Agreement (WA) that describes the work*
- *b. Method(s) to be used.*
- *c. Identification of any samples, field and laboratory testing equipment, and/or measuring and test equipment used.*
- *d. Description of the work performed and the results obtained and names of individuals performing the work.*
- *e. Description and justification of changes to methods used, as appropriate.*

ASTM Standard: D 4971-89, "Standard Test Method for Determining the In Situ Modulus of Deformation of Rock Using the Diametrically Loaded 76-mm (3-in.) Borehole Jack"

Section 7.2 states that a hydraulic gage or electronic transducer may be used to measure the hydraulic system pressure. The gage shall have an accuracy of at least 280 kilopascals (kPa) (40 psi), including errors introduced by the readout equipment, and a resolution of at least 140 kPa (20 psi).

Section 9.1 states in part that all personnel involved in performing the test, including technicians and test supervisors, should be under the guidance of someone thoroughly familiar with the use of the jack.

Section 9.2 states that the compliance of all equipment and apparatus with performance specifications of this procedure shall be verified. Performance verification is generally done by calibrating the equipment and measurement systems according to established procedures.

Section 10.1 states in part that the borehole jack shall be calibrated before and at the completion of the program according to the manufacturer's or equivalent directions.

Section 11.4 states in part that when the jack is at the test location and in the desired orientation, the hydraulic pressure is raised to 350 kPa (50 psi) to seat the platens against the borehole wall.

There is no procedure used to conduct this activity. ASTM Standard D 4971 is used to direct activities in conjunction with an SNL SN. Data is the product of the Goodman jack testing method. In the Goodman jack test, a tool consisting of pressuriseable platens is inserted into a horizontal borehole in the alcove wall and pressurized in stages up to 8,000 pounds per square inch (PSI) by a hydraulic pump. This pressure causes the platens to separate and put pressure on the surrounding rock. The stress this puts on the rock can be measured and compared to the stresses encountered in the same location before the rock was heated during the Single Heater Test. This provides information on the behavior of the rock when heated to the temperatures anticipated in the repository due to the implaced waste.

The SN for the Goodman jack testing was not on site during the surveillance. The notebook was in Albuquerque, New Mexico, in the possession of the PI, Ray Finley. The SNL personnel performing the test had the ASTM standard on hand and filled out "Goodman Jack Field Data Sheets" as testing progressed. These field data sheets were witnessed being filled out during the test. SNL personnel stated that the sheets would be placed in the SN upon return to Albuquerque.

The surveillance could not verify implementation of the SN requirements from QAIP 20-2 in the field so compliance with the ASTM standard was witnessed. The SNL personnel were working under the guidance of Tim George, an experienced Goodman jack tester. It was verified that the Goodman jack was calibrated by Bechtel Nevada as a system on 4/16/97 with the next calibration due on 4/16/98. The initial seating of the platens in borehole ESF-TMA-BJ-1 at 50 PSI was witnessed. The test deviated from the standard in that the pressure gage did not conform to the requirements. The standard calls for a calibrated pressure gage with an accuracy of +/- 40 PSI. The pressure gage supplied by the Goodman jack manufacturer and used by SNL personnel on the test had a calibrated accuracy of +/- 100 PSI, as verified by examination of Bechtel Nevada Calibration Report Number 998825 and the calibration sticker attached to the Goodman jack. Deviations from the ASTM standard are allowable per QAIP 20-2 if they are documented with the justifications for the changes in an SN.

On February 12, 1998, copies of the pertinent pages of the Goodman jack SN were faxed from Albuquerque. These pages contained the required planning documentation and initial entries. Additionally, the documentation for the deviation from the standard and the required justification were included. The introduction of the SN contained the information called for in Step 4.1 of QAIP 20-2. Supporting pages of the SN provided the information called for in Step 4.2 of QAIP 20-2. One discrepancy was found in that the SN listed the accuracy of the pressure gage as +/- 50 PSI, when in actuality it was +/- 100 PSI. This was discussed with the PI who agreed to single line through, initial and date, and enter the correct information. The corrected page was received by fax on 2/20/98. This occurrence is considered as corrected during the course of the surveillance.

Recommendations:

It is recommended that during the conduct of scientific investigations on the Yucca Mountain Project, the PIs and their staffs have in their possession the pertinent SNs. If the activity poses a physical threat to the safety of the SN it is suggested that some sort of field notebook that is directly tiable to the SN be used. The lack of a notebook on site could lead to problems in the documentation of unusual occurrences, errata, or other problems.

Personnel Contacted During the Surveillance:

Ray Finley	SNL	PI (by telephone interviews)
Jeffery Daniels	SNL	Member of the Technical Staff
Tim George	SNL	Senior Member of the Technical Staff
Roy Johnston	SNL	Member of the Technical Staff
Moo Lee	SNL	Principal Member of the Technical Staff
Ronnie Taylor	SNL	Member of the Technical Staff