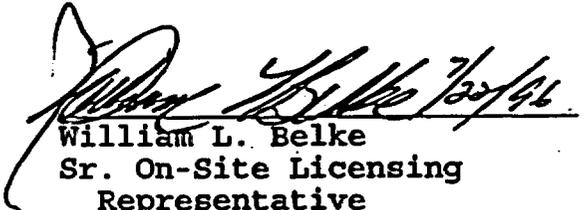


U.S. NUCLEAR REGULATORY COMMISSION

ON-SITE LICENSING REPRESENTATIVE REPORT

NUMBER OR-96-06

FOR THE REPORTING PERIOD OF JUNE 1-30, 1996


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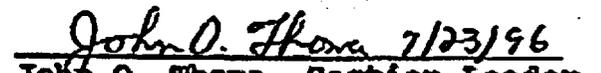

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REPORT DETAILS

1.0 INTRODUCTION

The principal purpose of the On-Site Licensing Representative (OR) reports is to alert NRC staff, managers and contractors to information on the U.S. Department of Energy (DOE) programs for site characterization, repository design, performance assessment, and environmental studies that may be of use in fulfilling NRC's role during pre-licensing consultation. The principal focus of this and future OR reports will be on DOE's programs for the Exploratory Studies Facility (ESF), surface-based testing, performance assessment, data management systems and environmental studies. Relevant information includes new technical data, DOE's plans and schedules, and the status of activities to pursue site suitability and ESF development. In addition to communication of this information, any potential licensing concerns, or opinions raised in this report represent the views of the ORs and not that of NRC headquarters' staff. The reporting period for this report covers June 1-30, 1996.

2.0 OBJECTIVES

The function of the OR mission is to principally serve as a point of prompt informational exchange and consultation and to preliminarily identify concerns about site investigations relating to potential licensing issues. The ORs accomplish this function by communicating, consulting and identifying concerns. Communication is accomplished by exchanging information on data, plans, schedules, documents, activities and pending actions, and resolution of issues. The ORs consult with the DOE scientists, engineers, or managers with input from NRC Headquarters management on NRC policy, philosophy, and regulations. The ORs focus on such issues as QA, design controls, data management systems, performance assessment, and key technical issue resolution. A principle OR role is to identify areas in site characterization and related studies, activities, or procedures that may be of interest or concern to the NRC staff.

3.0 SUMMARY AND CONCLUSIONS

For this reporting period, DOE appears to be taking proper corrective action to resolve and correct the deficiencies identified with the implementation of the U.S. Geological Survey (USGS) QA program. In this report, the ORs have also identified a concern with the reduction of site characterization activities under the study plan "Characterization of the Yucca Mountain Saturated Zone Hydrochemistry." The information originally planned to be

collected under this study plan was designed to characterize the flux and degree of mixing in the upper part of the saturated zone. The absence of this type of information could adversely impact DOE's ability to characterize the upper part of the saturated zone and limit its ability to take credit for dilution. The ORs also intend to monitor how major changes in DOE's site characterization program are documented.

Progress at the ESF remained steady and the tunnel boring machine (TBM) advanced from station 55+72 meters (18,282 feet) to station 58+83 meters (19,301 feet) during the month of June 1-30, 1996. The C-Hole complex hydraulic interference testing and G-2 pump tests continue to be monitored. Pneumatic data recording and gas sampling continues at boreholes UZ-4, UZ-5, NRG-6, UZ-7a, SD-7, SD-9, SD-12, UZ-6s, and NRG-7a.

4.0 QUALITY ASSURANCE, ENGINEERING, AND NRC KEY TECHNICAL ISSUES

In the April/May 1996, OR report, the ORs expressed concern about the lack of effectiveness of the USGS QA program both from a QA and technical perspective. The concerns were in the areas of QA Program Elements 4.0 (Procurement), 7.0 (Purchased Items and Services), and 16.0 (Corrective Action). These program elements were found to be unsatisfactory in DOE audits conducted in 1994, 1995, and 1996 which indicates that the deficiencies are of a repetitive nature. The NRC OR questioned the effectiveness of the overall trending program. There was also a concern expressed in the OR report that reviews conducted under the USGS QA program may not adequately verify the correctness, technical adequacy, completeness, accuracy, and compliance with established requirements of technical documents. As a result, DOE recognized there were problems associated with the effective implementation of the USGS QA program and initiated aggressive corrective action measures.

One of the corrective action measures DOE has initiated is as of July 1, 1996, there will be a full time DOE QA liaison stationed at the USGS offices in Denver, CO. In the areas of Procurement and Purchased Items and Services (QA Program Elements 4.0, 7.0) the general concern was that a USGS implementing procedure permitted suppliers to be approved for services without having an approved QA program. During the March 25-29, 1996, DOE audit of USGS, Corrective Action Request (CAR) YMQAD-96-C-004 was issued and identified numerous problems in procurement. USGS responded and DOE rejected the response. The preparation of the amended response to the CAR by USGS is in process.

For Corrective Action (QA Program Element 10), the major concern was that USGS failed to initiate and follow-up for timely corrective action. During the March 25-29, 1996, DOE audit of USGS, CAR YMQAD-96-C002 was issued for failure to initiate and follow-up for timely corrective action. USGS has responded to this CAR and DOE has found it acceptable. The DOE On-Site QA Liaison will provide assistance and expertise to USGS for implementation of the corrective action proposed in the response to the CAR.

In the technical area, CAR YMQAD-96-C002 was issued mainly for incomplete disposition of technical report reviews. The NRC OR's main concern, based on its observations during the audit process, was whether the USGS technical reports are technically correct. The DOE investigative action for this CAR involved three independent assessors which selected 143 reports to independently evaluate the technical reviewer independence, qualifications, and probable adequacy of the technical reviews. The three assessors generally concluded that the USGS document review process selected adequately qualified and independent reviewers. They also generally concluded that these publications received an adequate review. In another effort, 12 USGS publications were selected and independently reviewed to determine whether the comment resolution process was adequate. This review uncovered minor concerns but indicated that the USGS comment resolution process was not unduly compromised. Based on the above reviews, DOE accepted the USGS response stated in CAR YMQAD-96-C002.

To date, the NRC OR has not had the opportunity to ascertain the adequacy and accuracy of the above corrective actions. It is our understanding that when all of the above corrective actions are fully implemented by USGS, DOE intends to perform a comprehensive audit or surveillance. This should occur prior to the end of FY96. At this time, the NRC may consider sending a team of observers to verify corrective action implementation.

In the technical area, a May 24, 1996, DOE letter to USGS, requires resolution of comments associated with a technical review of 12 USGS technical reports. The NRC OR intends to monitor these actions and provide feedback on its progress in future OR Reports. At this time, it is not known what overall effect, if any, these QA problems will have on certain of the NRC Key Technical Issues.

5.0 EXPLORATORY STUDIES FACILITY (ESF) AND KEY TECHNICAL ISSUES

Exploratory Studies Facility Testing

As of June 30, 1996, the TBM advanced to station 58+83 meters. Geologic mapping and sampling were completed to approximate station 57+60 meters. The location of alcoves and preliminary tunnel stratigraphy is summarized in Enclosure 1.

Investigators have recently identified 2 small faults along the ESF North-South drift. Based on preliminary information, the first fault is present at station 57+14 meters on the right spring line of the tunnel. This fault trends NW-SE and is near-vertical (strike 289 degrees, dip 86 degrees). The vertical offset on this fault is approximately one meter (down to the northeast). The second fault is present at station 57+30 meters on the right spring line of the tunnel. This fault trends NE-SW and is near vertical (strike 205 degrees, dip 90 degrees). The vertical offset on this fault is approximately two meters (down to the northwest). This second fault parallels the expected trace of the Ghost Dance Fault, however the offset is less than what was anticipated for this fault. Horizontal striations (slickensides) have also been reported on the plane of this fault. A zone of fracturing, requiring Category 4 ground support, extends from approximately station 56+20 meters to these faults.

ESF Testing:

Alcove 1 (Upper Tiva Canyon Alcove)

This alcove was constructed to conduct radial borehole and hydrochemistry testing in the Tiva Canyon Tuff. All testing in this alcove has been completed.

Alcove 2 (Bow Ridge Fault Alcove)

The purpose of this alcove is to investigate the hydrochemistry and hydrologic properties of the Bow Ridge Fault. Single-hole air-permeability testing has been completed. Scientists set-up and initiated cross-hole air-permeability testing between the two radial boreholes in this alcove.

Alcove 3 (Upper Paintbrush Tuff [non-welded] Contact Alcove)

Testing in this alcove is designed to investigate the pneumatic and hydrologic properties of the lithologic contact between the Tiva Canyon welded units and the Paintbrush bedded units. Over this reporting period there was no activity conducted in this alcove other than radon monitoring.

Alcove 4 (Lower Paintbrush Tuff [non-welded] Contact Alcove)

Alcove 4 is designed to investigate the hydrochemical properties between the Upper Paintbrush nonwelded tuff and the Topopah Spring welded tuff. Over this reporting period there was no activity conducted in this alcove other than radon monitoring.

Alcove 5 (Thermal Testing Facility)

Constructors completed the excavation of the Thermo-mechanical Alcove for the single-hole heater test. The single-hole heater test is designed to test thermomechanical properties of rock in the potential repository horizon. All planned instrumentation holes have been drilled into the 10 X 13 meter block of rock that will be used for this test. Investigators continue to install test instrumentation in these boreholes. This heater test is expected to start in August 1996. The Access Observation Drift (AOD) has been excavated to 136 meters from the center line of the ESF North-South drift and geologic mapping of the AOD is proceeding. Excavation of the crossover drift from the AOD to the Thermal Drift is not scheduled to start until early FY 97.

Alcoves 6 and 7 (Northern and Southern Ghost Dance Fault Alcoves)

Alcove 6 and 7 testing is designed to investigate the hydrochemistry and hydrologic properties of the Ghost Dance Fault. Over this reporting period the excavation of Alcove 6 (station 37+37) advanced to 22.4 meters via drill and blast. In late June 1996, the Alpine Miner was moved into this alcove to proceed with the excavation. Alcove 7 (station 51+15) excavation is scheduled to start in FY 97.

SURFACE-BASED TESTING

Borehole Testing:

The location of boreholes referenced in this section is provided in Enclosure 2.

C-Hole Complex

A third in series of 6 tracer tests started on June 18, 1996, to establish residence time and recoverable concentration of tracer to determine hydrologic properties in the saturated zone. This testing is being conducted in the Bullfrog interval of the Crater Flat Tuff. A sodium iodide tracer (conservative tracer) was injected in the C#1 borehole on this date and scientists continue to monitor C#3 for the detection of this tracer. As of June 30, 1996, no breakthrough of tracer has been detected in the C#3 production well (currently pumping at a rate of approximately 150 gallons per minute). In July 1996, investigators plan to inject lithium bromide (reactive

tracer) and microspheres into the C#2 borehole to simulate radionuclide transport characteristics.

G-2 Testing

Automatic recording of water-level recovery data from the pump test conducted in April 1996 continues. On June 24, 1996, the fluid level in this borehole had risen to within 2 meters of the level at the start of this test.

Gas Sampling and Pneumatic Testing in Boreholes

Pneumatic data recording and or gas sampling continues at boreholes UZ-4, UZ-5, NRG-6, UZ-7a, SD-7, SD-9, SD-12, UZ-6s and NRG-7a. Nye County is also recording pneumatic data in NRG-4 and ONC-1. Pneumatic-pressure effects associated with construction of the ESF have been observed in all monitored boreholes. A brief summary of preliminary results on the initial pneumatic-disturbance in monitored boreholes from TBM excavation is provided below.

NRG-4 was the first borehole to register a pneumatic-disturbance to the ambient pressure system. This disturbance was first observed on June 16, 1995 when the TBM was at station 10+68 meters in the pre-Pah Canyon Tuff. At the time of this event, the horizontal offset distance from NRG-4 to the face of the North Ramp tunnel was 25 meters.

At UZ-4 and UZ-5, pneumatic-disturbances were first observed on August 12, 1995 when the TBM was at station 12+62 meters in the Upper Nonlithophysal unit of the Topopah Spring. At the time of this event, the horizontal offset distance from UZ-4 and UZ-5 to the face of the North Ramp tunnel was 462 meters and 424 meters respectively.

The first indication of a pneumatic-disturbance in NRG-5 occurred on September 14, 1995 when the TBM was at station 16+56 meters in the lower section of the Upper Nonlithophysal unit of the Topopah Spring. At the time of this event, the horizontal offset distance from NRG-5 to the face of the North Ramp tunnel was approximately 60 meters.

A pneumatic-disturbance at NRG-6 was first observed on October 1, 1995 when the TBM was at station 20+02 meters in the lower section of the Upper Nonlithophysal unit of the Topopah Spring. At the time of this event, the horizontal offset distance from NRG-6 to the face of the North Ramp tunnel was 497 meters.

The first indication of a pneumatic-disturbance in NRG-7a occurred on October 21, 1995 when the TBM was at station 23+46 meters in the Upper Lithophysal unit of the Topopah Spring and within 48 meters of this borehole.

A pneumatic-disturbance at SD-9 was first observed on November 7, 1995, when the TBM was at station 26+54 meters. At the time of this event, the TBM was 109 meters from this borehole and excavating the Middle Nonlithophysal unit of Topopah Spring.

At SD-12, the first indication of a pneumatic-disturbance occurred on February 26, 1996. At the time of this event, the TBM was approximately 335 meters from SD-12 and excavating the Middle Nonlithophysal unit of Topopah Spring.

To date, pneumatic-pressure monitoring of borehole UZ-7a indicates that the TBM has not yet had any obvious effect on pressure measurements in the borehole. Atmospheric pressure changes are detected in the Topopah Spring welded unit slightly before or about the same time they are detected in the Paintbrush nonwelded unit. Investigators indicate that this suggests that the pneumatic signal is being "short-circuited" by the Ghost Dance Fault.

The first indication of a pneumatic-disturbance in SD-7 occurred on June 5, 1996. At that time, the TBM was advancing from station 55+98 meters to 56+11 meters which is past the location of SD-7 along trace of ESF. This may indicate that the pneumatic signal is controlled by a particular set of fractures/faults.

OTHER ACTIVITIES

Characterization of Yucca Mountain Saturated Zone

Hydrochemistry

Over this reporting period an effort was made to establish what site characterization work is expected to be completed for the Study Plan entitled "Characterization of the Yucca Mountain Saturated Zone Hydrochemistry." The objective of this study plan is to 1) describe the chemical composition and its spatial variability in the upper part of the saturated zone; and 2) estimate groundwater flux to, from, and within the saturated zone. The OR reviewed the scope of work outlined in this study plan and then met with DOE staff and contractors to compare this scope of work with the data and measurements presently expected to be completed. DOE staff and contractors cooperated fully in providing complete and timely information on this matter.

The major differences identified between work outlined in the study plan and work currently expected to be completed are provided below. First, this study plan called for the collection of water samples from 14 existing and 8 planned Water Table (WT) wells. To date, water samples have been collected from only 2 WT wells and only one of the 8 planned

WT wells (WT-24) is still under consideration. Water samples however will be collected for the C-Holes and the G-2 borehole. Second, the study plan called for the collection of gas samples from 14 existing and 8 planned WT wells. To date, no gas samples have been collected from these wells and there is currently no plans to collect gas samples from these wells. Third, the study plan called for the collection of in-situ EH, PH, and temperature measurements in each of these 22 WT wells via chemical and isotopic analysis of samples. To date, no measurements of EH or PH have been made and there is currently no plan to collect these measurements.

At this time, it is not clear what impact the absence of these data may have on demonstrating the suitability or performance of a potential repository. However, the current version of DOE's Waste Containment and Isolation Strategy and TSPA 95 both indicate that dilution is an important parameter in predicting performance of potential repository. The type of information originally planned to be collected under this study plan was designed to characterize the flux and degree of mixing in the upper part of the saturated zone. Based on discussions with NRC staff, the absence of this type of information could limit DOE's ability to take credit for dilution.

Finally, it is understood that DOE's site characterization has changed and has become more focused on issues important to repository performance as a result of information gained from site characterization and from Congressional budget constraints. However, it is important that DOE document decisions leading to significant changes in its site characterization program. DOE has informed the ORs that this documentation will be included in its Semi-Annual Progress Reports. The ORs will monitor these reports for information documenting significant changes to DOE's site characterization program.

Closure and Reclamation of Trenches, Pits and Pavements

Over the next 5 years, DOE is planning to close and complete final reclamation of trenches, pits, or pavements at a number of sites in the vicinity of Yucca Mountain. Twenty two of these sites (Enclosure 3) are presently planned to be closed before the end of FY 96. Other trenches or pits which support ongoing investigations, such as DOE's Probability Seismic Hazard Assessment, are scheduled to be closed in FY 97 or beyond when these activities are completed. The ORs suggest that NRC staff consider the enclosed list and notify DOE if the staff needs to examine any of these sites before closure.

6.0 GENERAL

1. Meetings/Interactions

- Attended the regularly scheduled meeting with W. Barnes (Yucca Mountain Site Characterization Office (YMSCO) Project Manager, Deputy Project Manager, YMSCO Assistant Managers, and the YMSCO QA Manager. See Enclosure 4 for subject matter discussed at this meeting.
- Attended the July 1, 1996, NRC/DOE management meeting. The purpose of this meeting was to present and discuss current activities and concerns.

2. Appendix 7 Site Interactions

- Conducted a June 19, 1996, site visit with two members from the Center for Nuclear Waste Regulatory Analyses. This site visit included a tour of the ESF facility, and examination of surface features in the Calico Hills area. There were no outstanding issues raised on this visit.

7.0 REPORTS

Over this reporting period the following reports were received in the NRC Las Vegas office.

TRW for USDOE

B00000000-01717-5705-00028 DIET OF DESERT TORTOISES AT YUCCA MOUNTAIN, NV, AND IMPLICATIONS FOR HABITAT RECLAMATION, 12/95, D. Rakestraw, E. Holt, K. Rautenstrauch

B00000000-01717-5705-00016 THERMAL LOADING STUDY FOR FY 1995, 1/96

LOS ALAMOS

LA-12959-MS PROGRESS REPORT ON COLLOID-FACILITATED TRANSPORT AT YUCCA MOUNTAIN (YMSC Program Milestone 3383), I. Triay, C. Degueldre, A. Wistrom, C. Cotter, W. Lemons

LA-13096-MS PETROGRAPHY, MINERALOGY, AND CHEMISTRY OF CALCITE-SILICA DEPOSITS AT EXILE HILL, NEVADA, COMPARED WITH LOCAL SPRING DEPOSITS, 12/95, D. Vaniman, S. Chipera, D. Bish

NUREG

CP-0150 WORKSHOP ON ROCK MECHANICS ISSUES IN REPOSITORY DESIGN AND PERFORMANCE ASSESSMENT, 9/94, CROWNE PLAZA

CR-6392 THE EFFECTS OF AGING ON COMPRESSIVE STRENGTH OF
LOW-LEVEL RADIOACTIVE WASTE FORM SAMPLES, 6/96, J.
McConnell, Jr., R. Neilson, Jr.

USNWTRB REPORT TO THE U.S. CONGRESS AND SECRETARY OF
ENERGY, 1995 Findings and Recommendations

MONTHLY REPORTS - Los Alamos Monthly Management Analysis,
USGS Progress Report

ESF TUNNEL STRATIGRAPHY*

STATION

0+00 to 0+99.5m	Tiva Canyon crystal poor upper lithophysal zone. <u>Alcove #1</u> (centerline station intersection): 0+42.5
0+99.5 to 1+90m	Tiva Canyon crystal poor middle nonlithophysal zone <u>Alcove #2</u> (centerline station intersection): 1+68.2
1+90 to 1+99.5m	Tiva Canyon crystal poor lower lithophysal zone.
1+99.5 to 2+02m	Bow Ridge fault zone (placing Pre-Ranier Mesa Tuff against Tiva Canyon Tuff)
2+02 to 2+20m	pre-Ranier Mesa Tuff
2+20	Fault (4.3m offset)***
2+20 to 2+63.5m	pre-Ranier Mesa Tuff
2+63.5 to 3+37m	Tuff "X"
3+37 to 3+49.5m	pre-Tuff "X"
3+49.5 to 3+59.5m	Tiva Canyon vitric zone
3+59.5 to 4+30m	Tiva Canyon crystal rich nonlithophysal zone
4+30m	Fault (~10m offset)***
4+30 to 4+34	Tiva Canyon crystal rich nonlithophysal zone
4+34 to 4+39m	Tiva Canyon crystal rich lithophysal zone
4+39 to 5+50m	Tiva Canyon crystal poor upper lithophysal zone
5+50m	Fault (~5m offset)***
5+50 to 5+53	Tiva Canyon crystal poor upper lithophysal zone
5+53 to 5+87m	Tiva Canyon crystal poor middle nonlithophysal zone

ESF TUNNEL STRATIGRAPHY CONTINUED*

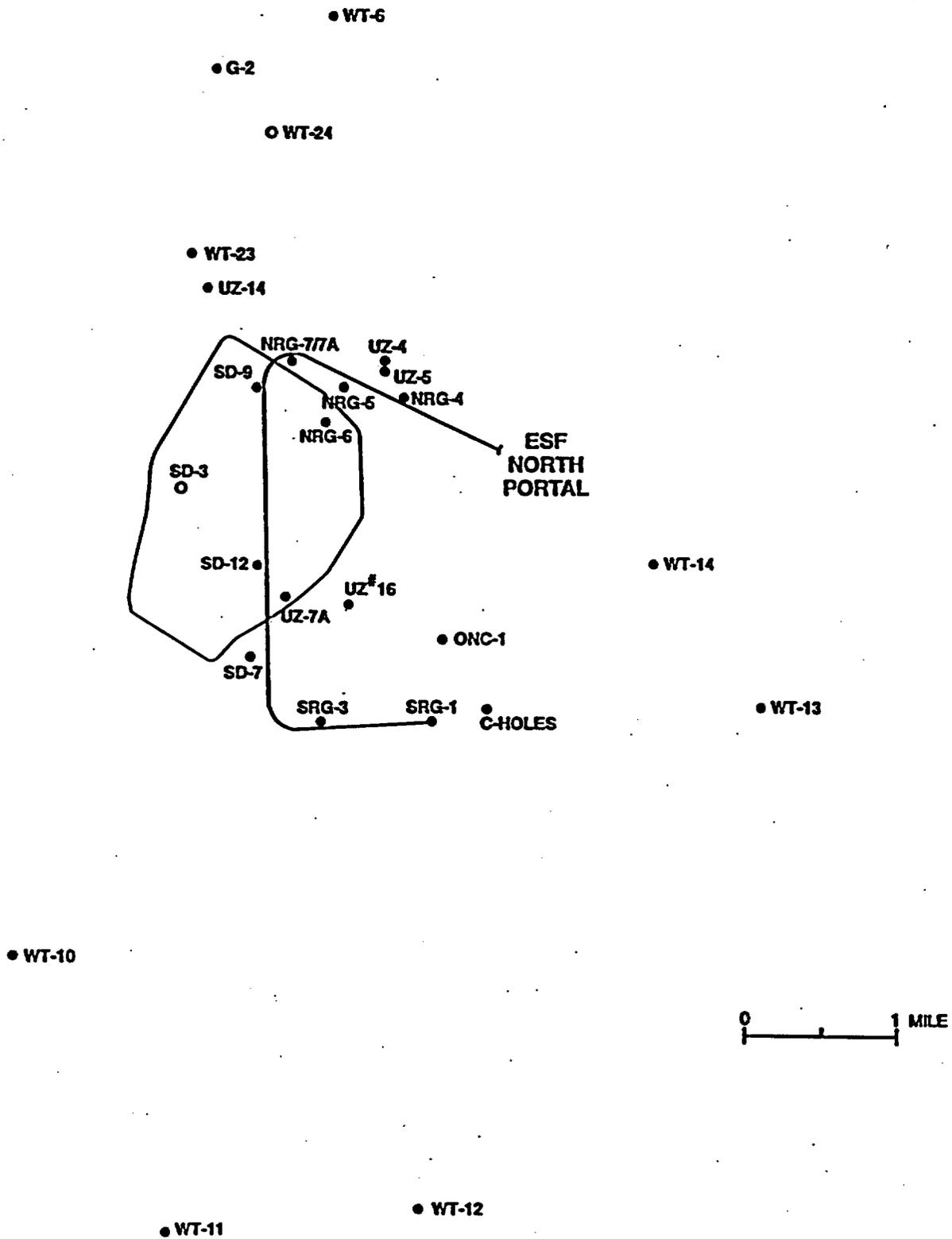
5+87 to 6+19m	Tiva Canyon crystal poor lower lithophysal zone
6+19 to 7+00m	Tiva Canyon crystal poor lower nonlithophysal zone
7+00m	Fault (~20m? offset)***
7+00 to 7+77m	Tiva Canyon crystal poor lower nonlithophysal zone. <u>Alcove #3</u> (centerline station intersection): 7+54.
7+77 to 8+69m	Tiva Canyon crystal poor vitric zone
8+69 to 9+12m	Bedded tuffs (including thin Yucca Mountain member)
9+12 to 10+20m	Pah Canyon Member.
10+20 to 10+51.5m	Pre-Pah Canyon tuffs <u>Alcove #4</u> (centerline station intersection): 10+27.8
10+51.5 to 11+93m	Topopah Spring crystal rich vitric zone
11+93 to 17+17m	Topopah Spring crystal rich nonlithophysal zone
17+17 to 17+97m	Topopah Spring crystal rich lithophysal zone
17+97 to 27+20m	Topopah Spring crystal poor upper lithophysal zone
27+20 to 35+93m	Topopah Spring crystal poor middle nonlithophysal zone <u>Alcove #5</u> (centerline station intersection): 28+27
35+93m	Sundance fault (most prominent fault plane, minor fracturing reported between Stations 35+85 and 36+40)
35+93 to face	Topopah Spring crystal poor middle nonlithophysal zone

* All stations given are referenced to the right springline unless otherwise noted. Station 0+00 is located at coordinates N765352.7, E569814.4.

** Indicates that contact is preliminary and has not been verified.

*** Only faults with greater than 4 meters offset are noted on the table.

Selected Borehole Locations



List Of Trenches and Test Pits Scheduled to be Backfilled

Activity	Activity Number	Trench/Pit Name	Date When Site Can Be Decommissioned
Stagecoach Road Trenches		Trench 1, 2, 3	now-FY 96
Midway Valley Pits - Phase I		MWV-P5	now -FY 96
		MWV-P6	now -FY 96
		MWV-P13	now -FY 96
		MWV-P14	now -FY 96
		MWV-P15	now -FY 96
		MWV-P22	now -FY 96
		MWV-P23	now -FY 96
		MWV-P24	now -FY 96
		MWV-P25	now -FY 96
		MWV-P26	now -FY 96
Midway Valley Pits - Phase II		MWV-P7	now -FY 96
		MWV-P8	now -FY 96
		MWV-P10	now -FY 96
		MWV-P12	now -FY 96
		MWV-P16	now -FY 96
		MWV-P17	now -FY 96
		MWV-P19	now -FY 96
		MWV-P20	now -FY 96
		MWV-P21	now -FY 96
		MWV-P27	now -FY 96
		MWV-P28	now -FY 96

AGENDA FOR JULY 2, 1996 W. BARNES-OR MEETING

- Feedback/follow-up from 7/1/96 NRC-DOE management meeting
- Possible Upcoming Appendix 7 visits:
 1. Thermal test plans (Summer 96)
 2. 3D site-scale geologic model (Summer 96)
- DOE response to recommendations from Peer Review on Thermohydrologic Processes
- Status of DOE's Waste Isolation Strategy
- Any new information on Chlorine 36 in ESF?
- What method of excavation is planned for the construction of the Thermal Drift and Ghost Dance Fault Alcoves?
- Does DOE have any plans for additional characterization of Calico Hills?
- Any other feedback from DOE on pending issues?

ESF TUNNEL STRATIGRAPHY*

STATION

0+00 to 0+99.5m	Tiva Canyon crystal poor upper lithophysal zone. <u>Alcove #1</u> (centerline station intersection): 0+42.5
0+99.5 to 1+90m	Tiva Canyon crystal poor-middle nonlithophysal zone <u>Alcove #2</u> (centerline station intersection): 1+68.2
1+90 to 1+99.5m	Tiva Canyon crystal poor lower lithophysal zone.
1+99.5 to 2+02m	Bow Ridge fault zone (placing Pre-Ranier Mesa Tuff against Tiva Canyon Tuff)
2+02 to 2+20m	pre-Ranier Mesa Tuff
2+20	Fault (4.3m offset)***
2+20 to 2+63.5m	pre-Ranier Mesa Tuff
2+63.5 to 3+37m	Tuff "X"
3+37 to 3+49.5m	pre-Tuff "X"
3+49.5 to 3+59.5m	Tiva Canyon vitric zone
3+59.5 to 4+30m	Tiva Canyon crystal rich nonlithophysal zone
4+30m	Fault (~10m offset)***
4+30 to 4+34	Tiva Canyon crystal rich nonlithophysal zone
4+34 to 4+39m	Tiva Canyon crystal rich lithophysal zone
4+39 to 5+50m	Tiva Canyon crystal poor upper lithophysal zone
5+50m	Fault (~5m offset)***
5+50 to 5+53	Tiva Canyon crystal poor upper lithophysal zone
5+53 to 5+87m	Tiva Canyon crystal poor middle nonlithophysal zone

ESE TUNNEL STRATIGRAPHY CONTINUED*

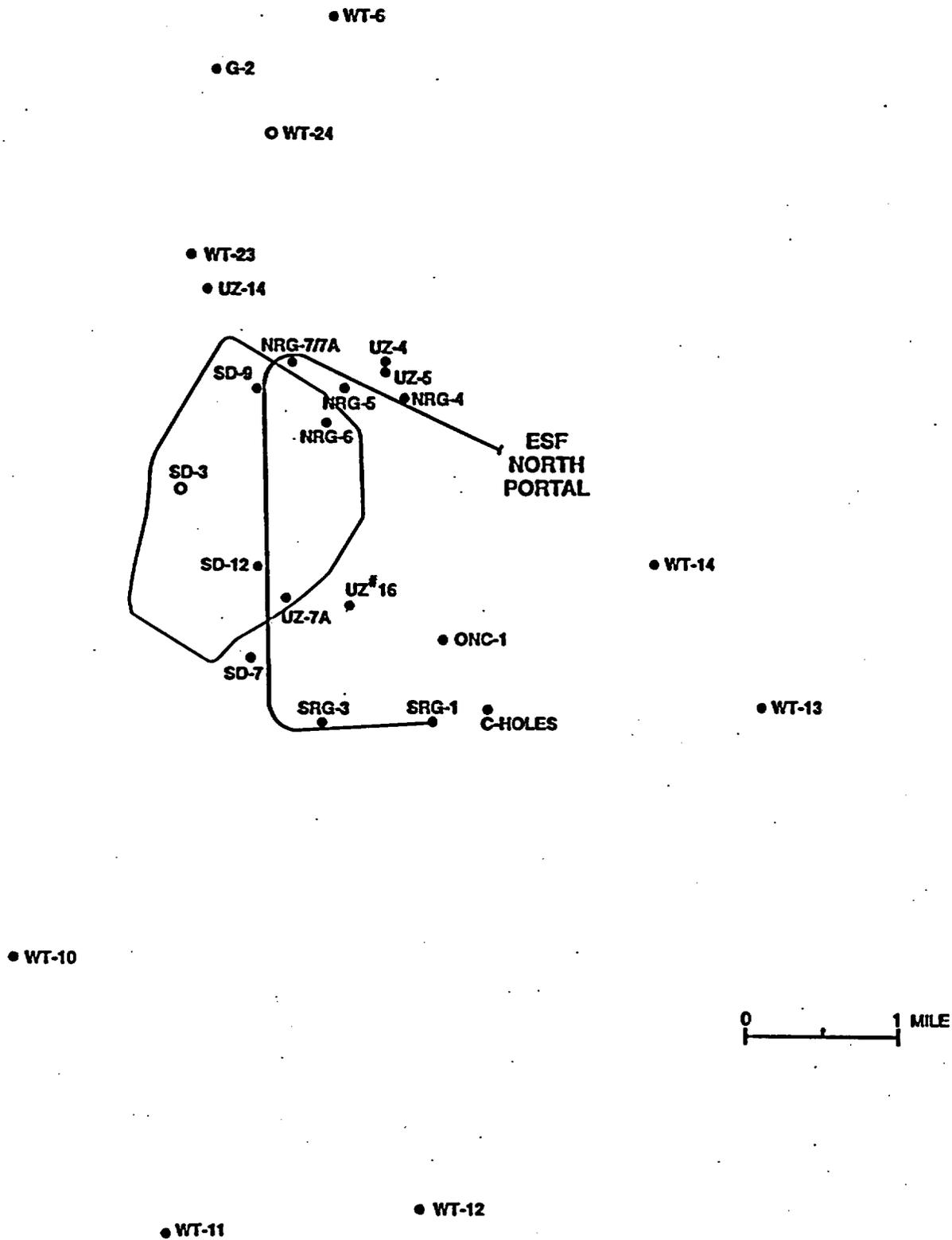
5+87 to 6+19m	Tiva Canyon crystal poor lower lithophysal zone
6+19 to 7+00m	Tiva Canyon crystal poor lower nonlithophysal zone
7+00m	Fault (~20m? offset)***
7+00 to 7+77m	Tiva Canyon crystal poor lower nonlithophysal zone. <u>Alcove #3</u> (centerline station intersection): 7+54.
7+77 to 8+69m	Tiva Canyon crystal poor vitric zone
8+69 to 9+12m	Bedded tuffs (including thin Yucca Mountain member)
9+12 to 10+20m	Pah Canyon Member.
10+20 to 10+51.5m	Pre-Pah Canyon tuffs <u>Alcove #4</u> (centerline station intersection): 10+27.8
10+51.5 to 11+93m	Topopah Spring crystal rich vitric zone
11+93 to 17+17m	Topopah Spring crystal rich nonlithophysal zone
17+17 to 17+97m	Topopah Spring crystal rich lithophysal zone
17+97 to 27+20m	Topopah Spring crystal poor upper lithophysal zone
27+20 to 35+93m	Topopah Spring crystal poor middle nonlithophysal zone <u>Alcove #5</u> (centerline station intersection): 28+27
35+93m	Sundance fault (most prominent fault plane, minor fracturing reported between Stations 35+85 and 36+40)
35+93 to face	Topopah Spring crystal poor middle nonlithophysal zone

* All stations given are referenced to the right springline unless otherwise noted. Station 0+00 is located at coordinates N765352.7, E569814.4.

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Stagecoach Road Trenches		Trench 1, 2, 3	now-FY 96
Midway Valley Pits - Phase I		MWV-P5	now -FY 96
		MWV-P6	now -FY 96
		MWV-P13	now -FY 96
		MWV-P14	now -FY 96
		MWV-P15	now -FY 96
		MWV-P22	now -FY 96
		MWV-P23	now -FY 96
		MWV-P24	now -FY 96
		MWV-P25	now -FY 96
		MWV-P26	now -FY 96
Midway Valley Pits - Phase II		MWV-P7	now -FY 96
		MWV-P8	now -FY 96
		MWV-P10	now -FY 96
		MWV-P12	now -FY 96
		MWV-P16	now -FY 96
		MWV-P17	now -FY 96
		MWV-P19	now -FY 96
		MWV-P20	now -FY 96
		MWV-P21	now -FY 96
		MWV-P27	now -FY 96
		MWV-P28	now -FY 96

AGENDA FOR JULY 2, 1996 W. BARNES-OR MEETING

- Feedback/follow-up from 7/1/96 NRC-DOE management meeting
- Possible Upcoming Appendix 7 visits:
 1. Thermal test plans (Summer 96)
 2. 3D site-scale geologic model (Summer 96)
- DOE response to recommendations from Peer Review on Thermohydrologic Processes
- Status of DOE's Waste Isolation Strategy
- Any new information on Chlorine 36 in ESF?
- What method of excavation is planned for the construction of the Thermal Drift and Ghost Dance Fault Alcoves?
- Does DOE have any plans for additional characterization of Calico Hills?
- Any other feedback from DOE on pending issues?