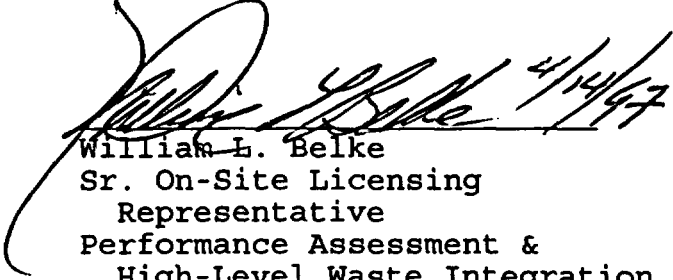



U.S. NUCLEAR REGULATORY COMMISSION
ON-SITE LICENSING REPRESENTATIVE REPORT

NUMBER OR-97-03

FOR THE REPORTING PERIOD OF MARCH 1-31, 1997


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ON-SITE LICENSING REPRESENTATIVE REPORT
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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 maybe 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 March 1-31, 1997.

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

The ORs continue to monitor ESF and surface-based testing activities. The ESF activities include: geologic mapping and sampling; data gathering on the Single Element Heater Test, and ongoing work to prepare for the Heated Drift Test in Alcove 5; data gathering on the Ghost Dance Fault in Alcoves 6 and 7; and the initiation of planning for the construction of an East-West Drift. Surface-based

activities include: data gathering on the Large Block Heater Test at Fran Ridge; pneumatic monitoring in boreholes; saturated zone tracer testing at the C-Hole Complex; and planning for drilling two new boreholes in the vicinity of Yucca Mountain.

Bill Belke attended the Spring meeting of the American Society of Mechanical Engineers Committee on Nuclear Quality Assurance in Houston, Texas, on March 24-25, 1997. Meetings with the ORs and DOE QA Director and staff have been initiated for the purpose of resolving QA open items.

4.0 QUALITY ASSURANCE, ENGINEERING, AND NRC KEY TECHNICAL ISSUES

- The ORs met with the DOE QA Director and staff and instead of discussing QA issues in detail at the monthly Yucca Mountain Site Characterization Office (YMSCO) Project Manager level, it was agreed to meet monthly with the QA management and staff for QA matters. A list (See Enclosure 1) and status of current open items discussed at the December 5, 1996, QA meeting was presented to the QA Director. This list will serve as the basis for tracking and closing open items in the area of QA. As open items are resolved and closed, they will be documented in the OR Report.
- From March 24-25, 1997, attended the Spring session of the American Society of Mechanical Engineers (ASME)/Nuclear Quality Assurance (NQA-1) meeting in Houston, Texas. The OR has been a member of the ASME/NQA-1 Subcommittee on Program Management Processes (SPMP) since 1981. Enclosure 2 provides a list of the agenda items discussed at this meeting.

At the previous SPMP meeting in October 1996, the OR volunteered to prepare a Task Proposal Notice (TPN) for developing guidance for a graded QA program approach for systems, structures, and components with the intent of making it part of the national consensus standard, ASME/NQA-1. The TPN was prepared and discussed at this meeting.

In concert with the NQA-1 Committee effort, there is a pilot effort underway by the NRC Office of Nuclear Reactor Regulation to develop and provide a framework for evaluating structures, systems, and components. Three nuclear power plants volunteered to participate in this interactive effort and as a result, a draft Regulatory Guide (RG) was developed. After going through extensive internal NRC reviews, this draft RG is scheduled to be released for public comment in April 1997.

At the NQA-1 SPMP meeting, the NRR representative gave the SPMP an excellent overview of this effort and progress to date. The SPMP elected to postpone their task in this area until the draft RG is published. The SPMP will then review this guidance and decide whether all or part of this RG can be incorporated into the ASME/NQA-1 Standard and be applied to nuclear facilities including the area of the high-level waste geologic repository.

At the NQA-1 SPMP meeting, there was a brief discussion among the panel members concerning what appears to be at least two different QA standards DOE applies to its various programs. One set of standards satisfies the ASME/NQA-1 requirements. For example, the Civilian Radioactive Waste Management Program, applies the requirements of the Quality Assurance Requirements and Description (QARD) document. The QARD is designed to meet the requirements of ASME/NQA-1 and Title 10 of the Code of Federal Regulations (10 CFR), Part 60, Subpart G (which references 10 CFR Part 50, Appendix B). ASME/NQA-1 evolved from a series of American National Standards Institute documents dating back to the early 1970's. This series and the ASME/NQA-1 Standard, when properly implemented can successfully meet the requirements of 10 CFR Part 50, Appendix B. However, for other areas of certain DOE and DOE contractor elements, the QA standards applied by DOE are contained in DOE Order 5700.6C, "Quality Assurance." Consequently, some SPMP members did not fully understand from a consistency and standardization aspect, why DOE has not chosen to implement the applicable portions of ASME/NQA-1 for all of their programs. This is especially true where there are standardized procedures in place (e.g., auditing, qualifications of inspection and test personnel, design etc.) which could be utilized. Fortunately, as described above, this discrepancy is not a problem for DOE's HLW program.

- In view of the adverse to quality conditions that have surfaced with the U.S. Geological Survey (USGS) QA program effectiveness, DOE has initiated a technical review of three USGS documents for technical adequacy. In addition, DOE QA personnel have been working extensively with USGS to better integrate the QA program with USGS technical activities to improve the quality and consistency of technical reports. The ORs have been following this effort and meeting with DOE to keep informed of the progress from a licensing perspective.

5.0 EXPLORATORY STUDIES FACILITY AND KEY TECHNICAL ISSUES

Exploratory Studies Facility (ESF) Testing:

As of 8:00 a.m. March 31, 1997, the Tunnel Boring Machine (TBM) advanced to station 77+43 meters (25,403 feet), or 442 feet from the South Portal. Blocky ground conditions encountered over this reporting period have significantly slowed the TBM advance. Geologic mapping and photogrammetry progressed approximately to 76+60 meters. ESF construction and testing activities continue to be focused in Alcoves 5, 6, 7, and the South Ramp. However, investigators also collect barometric pressure, temperature, and relative humidity data in Alcove 4 and monitor an evaporation test outside Alcove 3. Temperature, pressure, and relative humidity data continues to be collected at several locations in the ESF main drift. Tensiometers and heat dissipation probes installed at two locations in the South Ramp continue to measure the dry-out of tunnel wall rock. In March 1997, investigators also initiated infrared imaging in the ESF as part of the moisture monitoring program. A specially designed camera was used to take infrared images of the ESF tunnel wall every 50 meters from the North Portal to the TBM. This activity is being conducted to measure the change in tunnel wall temperature over time as a means of estimating the relative humidity and evaporation rate resulting from construction activities. Seismographs in Alcoves 1 and 5 continue to monitor seismicity. There was no new testing activity conducted in Alcoves 1 and 2 over this reporting period. The location of alcoves and preliminary tunnel stratigraphy is summarized in Enclosure 3.

Alcove 5 (Thermal Testing Facility Access/Observation Drift, Connecting Drift, and Heated Drift)

Constructors installed a concrete floor (or invert) in the Heated Drift over this reporting period. Air permeability testing was completed in instrumented boreholes in the Access/Observation Drift to establish baseline conditions for the Heated Drift Test. The location of instrument holes that will be used to monitor the Heater Drift Test continue to be surveyed and instrumented. The Heated Drift test is designed to heat approximately 15,000 cubic meters of rock in the repository horizon to 100 degrees centigrade or greater to investigate coupled thermal-hydrologic-mechanical-chemical processes. This test is scheduled to begin in December 1997.

Alcove 5 (Thermomechanical Alcove)

The Single Element Heater Test started on August 26, 1996. All instrumentation, with the exception of some chemistry probes, are reported to be working properly and the

collection of test data continues. On March 19, 1997, preliminary instrumentation measurements in the block indicated a rock mass temperature of approximately 76 degrees centigrade at a distance of 1.5 meters from the midpoint of the heater element. The heat-up of this block of rock continues to mobilize water as evidenced by the accumulation of condensate in one of the instrumentation boreholes. This test is designed to heat approximately 25 cubic meters of rock to 100 degrees centigrade or greater to investigate thermomechanical properties of rock in the potential repository horizon.

Alcove 6 (Northern Ghost Dance Fault Alcove)

Testing in Alcove 6 is designed to investigate the hydrochemical and pneumatic properties of the Ghost Dance Fault. This alcove was previously excavated to station 1+34 meters. Investigators have completed geothermal logging, gas sampling, pneumatic monitoring and air permeability testing across this fault from a horizontal radial borehole drilled from the end of this alcove. Investigators plan to extend this alcove through the Ghost Dance Fault to prepare for the next phase of testing of this fault. On March 31, 1997, the excavation of this alcove advanced to station 1+40 meters.

Alcove 7 (Southern Ghost Dance Fault Alcove)

Constructors excavated this alcove to station 1+34 meters. A horizontal radial borehole is being drilled from the end of this alcove through the Ghost Dance Fault to prepare for the first phase of testing of this fault. On March 31, 1997, this borehole had advanced to a depth of approximately 62 meters.

Surface-Based Testing:

Fran Ridge Large Block Heater Test

The Fran Ridge Large Block Test (LBT) started on February 28, 1997, and continues its heat-up phase. The duration of this test (heat-up and cool-down) is expected to be completed within a time frame of approximately 8 months. Rock mass temperatures are projected to be approximately 140 degrees centigrade (near heaters) and 60 degrees centigrade (away from heaters). Coupons of candidate waste package materials and microorganism (cultured in laboratory) have been introduced into the block to evaluate the performance of these waste package materials under this test. The purpose of this test is to gather data to evaluate thermal-hydrologic-mechanical-chemical processes in rock similar to potential repository horizon. This test will investigate: the development of a dry-out region around the heaters and a rewetting front after cessation of boiling; the development of heat pipes and the role of fractures in the reflux of

condensed water; and the effects of changes in chemistry and mineralogy and their effect on hydrology. This test will also help to discriminate among alternate conceptual models.

Borehole Testing:

The location of boreholes referenced in this section is provided in Enclosure 4.

C-Hole Complex

Tracer testing at the C-Hole Complex is conducted in the Bullfrog-Upper Tram interval of the Crater Flat Tuff for the purpose of determining hydrologic properties in the saturated zone. Conservative (non-sorbing) tracer testing continues at the C-Hole Complex. On January 9, 1997, investigators injected up to 4 kilograms of the tracer pyridone into borehole C#1 and up to 15 kilograms of the tracer 2,6 difluorobenzoic acid (DFBA) into borehole C#2. Breakthrough of DFBA occurred on January 16, 1997. Peak concentration values of DFBA were measured on January 21, 1997. Over this reporting period, there was no breakthrough of the pyridone tracer. Sampling and analyses of water pumped at C#3 continues.

New Boreholes Planned

DOE is proceeding with plans to drill two new boreholes in the Yucca Mountain area in FY97. One borehole (SD-6) will be located on the crest of Yucca Mountain and will penetrate the potential repository block. This borehole will provide information to support DOE's 3-dimensional geologic framework model, unsaturated model, design work, and to evaluate drilling cost for the performance confirmation program. A second borehole (WT-24) will investigate the large hydraulic gradient north of the potential repository block. Based on current planning, these boreholes will be dry-drilled to depths ranging from 2500 to 3000 feet, and selected stratigraphic intervals will be cored in these boreholes. A standard suite of geophysical logs will also be run in each of these boreholes.

Pneumatic Testing

Pneumatic data recording continues at boreholes UZ-4, UZ-5, UZ-7a, SD-12, NRG-7a, SD-7 and NRG-5. Nye County continues to record pneumatic data in NRG-4 and ONC-1 and collect temperature, pressure, and humidity data from instrumentation installed on the TBM.

OTHER ACTIVITIES

Construction of East-West Drift at Yucca Mountain

DOE is proceeding with plans to construct an East-West Drift

within the ESF at Yucca Mountain. The purpose of the East-West Drift is to investigate the subsurface geology west of the existing ESF tunnel. Excavation of the drift will begin after the necessary design and construction plans are finalized. DOE is presently considering potential locations for this drift and what testing activities to conduct in this drift. DOE's schedule for completing this drift will be an outcome of the current planning process.

Integrated Site Area Model

A Yucca Mountain Project contractor recently submitted the Integrated Site Area Model version 2.0 (ISM2.0) to DOE. This model is intended to serve as the geologic framework model for use by all DOE project participants. The model encompasses an area extending from Prow of Yucca Mountain on the north to Busted Butte on the south, and from Windy Wash on the west to Fortymile Wash on the east. DOE is presently conducting an acceptance review of this deliverable. If accepted by DOE, ISM2.0 would likely be available to outside parties within several months. ISM2.0 includes the 3-dimensional geologic framework consisting of key stratigraphic and structural features down to the Paleozoic horizon. Major block bounding faults are projected with estimated dips rather than vertical dips as in the previous model versions. This version of the model also includes rock properties (bulk porosity, bulk density, thermal conductivity, and saturated hydrologic conductivity), mineralogy data on zeolites, and water table data. DOE expects to issue an updated version of the model (ISM3.0) in Spring 1998.

Unsaturated Zone Hydrochemistry at Yucca Mountain

DOE recently received and accepted a synthesis report on unsaturated zone hydrochemistry entitled "Hydrochemical Investigations and Geochemical Modeling in Characterizing the Unsaturated Zone at Yucca Mountain, NV". The report documents a study to obtain hydrochemical data such as chemical compositions of pore and perched water, flow mechanisms and residence times of gas and water, percolation flux, and extent of fracture/matrix interactions for waters. Information from this report will be used to calibrate the unsaturated zone flow and transport models which support DOE's total system performance assessment. The use of Q and non-Q data in this report is clearly identified.

Conclusions from this report include: 1) pore-water chemical compositions are similar among boreholes and vary according to lithologic units; 2) unsaturated zone pore-water has significantly larger concentrations of major ions and dissolved solids than do the saturated zone waters (suggesting if chemically dilute infiltrating waters recharge perched or saturated zone waters, they must flow

rapidly through fractures or permeable zones in the unsaturated zone to avoid mixing with the chemically concentrated pore-water in the unsaturated zone); 3) gas-phase ¹⁴C age profiles across the unsaturated zone indicate that ¹⁴C ages increase with depth suggesting that gas transport in the unsaturated zone occurs through a diffusion mechanism; 4) the reaction-corrected ¹⁴C age of perched water ranges from 2,200 to 6,200 years; and, 5) winter precipitation is the likely source of recharge in the unsaturated zone at Yucca Mountain.

6.0 GENERAL

1. Meetings/Interactions

- The regularly scheduled meeting with W. Barnes YMSCO Project Manager, YMSCO Deputy Project Manager, YMSCO Assistant Managers, YMSCO QA Representative, and various YMSCO staff was held on March 18, 1997 (See Enclosure 5 for the subject matter discussed at this meeting).

One of the agenda items discussed pertained to the Public Hearing on the General Guidelines for the Recommendation of Sites for Nuclear Repositories Title 10 of the Code of Federal Regulations (10 CFR) Part 960. It was indicated that the public comment period has been extended once again to April 16, 1997, (a full 120 day public comment period).

- The ORs attended the regularly scheduled Director's Program Review Meeting as presented to Mr. Lake Barrett, Acting Director of the Office of Civilian Radioactive Waste on March 6, 1997. The agenda and subjects discussed at this meeting are provided in Enclosure 6.
- Attended the DOE/NRC ESF Technical Meeting on March 13, 1997. The agenda and subject matter discussed at this meeting are provided in Enclosure 7.

2. Appendix 7 Site Interactions

- The ORs will be accompanying visitors to the ESF/Yucca Mountain Site by the NRC Inspector General and staff (April 10, 1997) and NRC Commissioner Kenneth Rogers and NRC staff members (April 30, 1997).

3. Other

- Attended the Devils Hole Workshop on March 26, 1996 in Amargosa Valley. This annual meeting provides a forum

for the presentation and exchange of information on water-related issues of the area. See Enclosure 8 for the subject matter discussed in this meeting.

- On March 27, 1997, the ORs and a member of the NRC Division of Waste Management's Engineering and Geosciences Branch visited the Yucca Mountain Site. There were no outstanding issues raised during this visit.

7.0 REPORTS

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

U.S. DEPARTMENT OF ENERGY

DOE/OSTI--3406 (Suppl.5), 8/96 YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT BIBLIOGRAPHY, 1994-1995

STATE OF NEVADA

A REPORT SUMMARIZES THE STATISTICAL MODELING OF VOLCANIC RISK STUDIES AT THE YUCCA MOUNTAIN NUCLEAR WASTE REPOSITORY SITE, 12/96, CHIH-HSIANG HO

EVALUATION OF THE GEOLOGIC RELATIONS AND SEISMOTECTONIC STABILITY OF THE YUCCA MOUNTAIN AREA, NV NUCLEAR WASTE SITE INVESTIGATION, Final Summary Report for 1987-1996, 12/96, Mackay School of Mines

FINAL REPORT - SUMMARY OF THE ACTIVITIES OF THE CENTER FOR VOLCANIC AND TECTONIC STUDIES, UNIVERSITY OF NEVADA, LAS VEGAS, FOR THE PERIOD 1986-1996, VOLCANISM STUDIES RELATED TO PROBABILISTIC VOLCANIC HAZARD ASSESSMENT, 1/97, E. SMITH, S. MORIKAWA, A. SANCHEZ (Center for Volcanic & Tectonic Studies)

SUMMARY OF STATE OF NEVADA-FUNDED STUDIES OF THE SATURATED ZONE AT YUCCA MOUNTAIN, NEVADA, PERFORMED BY L. LEHMAN with T BROWN

TRAC (FOR STATE OF NEVADA)

TRAC-NA FINAL REPORT, RESEARCH CONDUCTED DURING FY'92 THROUGH FY'95, 5/96, J. SZYMANSKI AND C. ARCHAMBEAU; ATTACHMENT A, 2/96, J. SZYMANSKI; ATTACHMENT B, PART I, A Conceptualization of Geologic Systems & The Nature and Determination of Stress in the Accessible Lithosphere, 5/96, T. HARPER, J. SZYMANSKI; ATTACHMENT C, Yucca Mountain High-Level Waste Site - Suitability Issues, & Geological History of Yucca Mountain and the Problem of the High-Level Nuclear Waste Repository, Y. DUBLYANSKI, J. SZYMANSKI, A. CHEPIZHKO, B. LAPIN, and V. REUTSKI; Carbonate Deposits at Yucca Mountain and the Problem of High-Level Nuclear Waste Disposal, 5/96, Y. DUBLYANSKY, JERRY SZYMANSKI

NRC QA ISSUES (ISSUES 1-10 WERE PRESENTED/DISCUSSED AT 12/5/96 QA MEETING.

- ISSUE 11- HAS BEEN ADDED SINCE THAT MEETING, THEREBY CLOSING ISSUE 10 SINCE THIS INVOLVES A LARGER PROBLEM THAN THE ORIGINAL AUDIT OBSERVER INQUIRY.

	ISSUE	REFERENCE	STATUS
1	M&O DESIGN CONTROL PROGRAM	BERNERO TO DREYFUS LTR. 10/13/94	OPEN
2	POTENTIAL OF CONSTRUCTION WORK TO IMPACT SITE CHARACTERIZATION OR THE WASTE ISOLATION CPABILITY OF THE SITE	BERNERO TO DREYFUS LTR. 10/13/94	OPEN
3	REQUEST FOR MORE DETAILS REGARDING QA CONCERNS AS WELL AS THE DESIGN OF THE ESF	BERNERO TO DREYFUS LTR. 10/13/94	OPEN
4	LICENSE APPLICATION ANNOTATED OUTLINE (LAAO) INCOMPLETE AND EDITORIALY POOR	HOLONICH TO MILNER LTR. 8/15/95	OPEN
5	LAAO CHAPTER 10 HEADINGS DO NOT REFLECT NRC GUIDANCE	HOLONICH TO MILNER LTR. 8/15/95	OPEN
6	QUALITY CONTROLS APPLIED TO THE LAAO	HOLONICH TO MILNER LTR. 8/15/95	OPEN
7	USGS TECHNICAL PROGRAM EFFECTIVENESS	HOLONICH TO MILNER LTR. 11/2/95	OPEN
8	DATA QUALIFICATION	AUSTIN TO MILNER LTR.3/18/96	OPEN
9	LEVEL OF QUALITY OF WORK PRODUCTS	AUSTIN TO MILNER LTR. 10/24/96	OPEN
10	EXEMPTION OF STATISTICAL ANALYSIS PROGRAMS FROM QA REQUIREMENTS	OBSERVER INQUIRY OF 11/12/96 - AUSTIN TO MILNER LTR. TBD	CLOSED SEE #11 BELOW
11	DOE QARD SUPPLEMENT I GUIDANCE/REQUIREMENTS UNCLEAR FOR STATISTICAL ANALYSIS PROGRAM	SECTION 4.0 OF NRC ON-SITE REP. FEB. 1997 REPORT	OPEN

COMMITTEE CORRESPONDENCE

committee: ASME/NQA-1 Committee
Program Management Processes SC

address writer
care of: Gordon M. Weaver
MACTEC-ERS
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Grand Junction, CO 81503



subject: SC MEETING
MARCH 24-26, 1997
HOUSTON, TX

date: February 24, 1997

copy to: Margie Shepherd
Chris Sanna

to: SC Members

The Spring, 1997 meeting of the ASME NQA-1 Committee, Program Management Processes Subcommittee will take place on Monday and Tuesday, March 24 & 25, 1997 at The Adam's Mark Hotel, 2900 Briarpark Dr., Houston, Texas with a phone number of (713) 978-7400. Monday's meeting will be from 8:00AM to 5:00PM with Tuesday's meeting from 8:00AM to 2:00PM (or thereabouts).

AGENDA

1. Call to Order
• Roll call and determination of quorum
• Introductions
Dan Jennings
Dan Jennings
Dan Jennings
2. Review/Finalize Agenda
Dan Jennings
3. Approval of Past Minutes
Dan Jennings
4. Announcements
Dan Jennings
5. Membership Actions
• Margie Shepherd
(New Membership application previously submitted to C. Sanna)
Dan Jennings
6. Reports
• NRC - Update on General NRC Activities
• NRC - Update on NRC High-Level Waste Activities
• DOE
• NIRMA
Bill Belke
Bill Belke
TBD
TBD
7. Inquiries
Dan Jennings
8. Letter Ballot 276, QAD 96-14, Results and Comments
• Ward 4 of 5 - Research previous responses to inquiries
Dan Jennings
Bill Belke
9. A-94-35 - TPN Draft - Graded Approach for systems, structures, and components important to safety and safety-related.
Bill Belke
 - Presentation on current regulatory guidance used by the Nuclear Industry for grading and planning for the future
Bill Belke
 - Samples of documents and past efforts attempting to provide Guidance for a graded approach
Bill Belke



The American Society of
Mechanical Engineers

345 East 47th Street,
New York, NY 10017

Keep ASME Codes and Standards Department Informed

ENCLOSURE 2

- Overview of NRR Pilot Program and draft Evaluation Guide For Development of Graded QA Programs sent out to three Nuclear power plants
- Bill Belke
10. SPIN 2.22.1 – Data vs. Records
 - Ed Netzel’s white paper
 - Various Electronic Document & Approval information

Harley Kirschenmann/Ed Netzel
Ed Netzel
Gordon Weaver
 11. Draft TPN for training quality personnel beyond QA inspection personnel

Doug Reinhart
 12. QA Records Flow Chart status and “where do we go from here?”

Jerry Heaney/Dan Jennings
 13. A-95-22 – Need to find out what this is

Harley Kirschenmann
 14. QAD-96-20 – Establish interface with SC-Applications

Bill Belke
 15. Matrices
 - Gather/Maintain Existing Matrices

Doug Reinhart
 16. New Business

Dan Jennings
 17. Future meeting

October 13-15, 1997	April 1998
The Sands Regency Hotel	Charlotte, NC
Reno, NV	

Dan Jennings
 18. Adjournment

ESF TUNNEL STRATIGRAPHY*

STATION

0+00 to 0+99.5m

Tiva Canyon crystal poor upper lithophysal zone.

Alcove #1 (centerline station intersection):0+42.5

0+99.5 to 1+90m

Tiva Canyon crystal poor middle nonlithophysal zone

Alcove #2 (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+63.5m

Pre-Ranier Mesa bedded tuffs

2+20

Fault (4.3m offset)***

2+63.5 to 3+33m

Tuff "X"

3+33to 3+49.5m

Pre-Tuff "X"

3+49.5 to 3+59.5m

Tiva Canyon crystal rich vitric zone

3+59.5 to 4+34m

Tiva Canyon crystal rich nonlithophysal zone

4+30m

Fault (~10m offset)***

4+34 to 4+39m

Tiva Canyon crystal rich lithophysal zone

4+39 to 5+53m

Tiva Canyon crystal poor upper lithophysal zone

5+50m

Fault (~5m offset)***

5+53to 5+87m

Tiva Canyon crystal poor middle nonlithophysal zone

ESE TUNNEL STRATIGRAPHY CONTINUED*

STATION

5+87 to 6+17m Tiva Canyon crystal poor lower lithophysal zone

6+17 to 7+77m Tiva Canyon crystal poor lower nonlithophysal zone

7+00m Fault (~20m? offset)***

Alcove #3 (centerline station intersection):7+54.

7+77 to 8+69m Tiva Canyon crystal poor vitric zone

8+69 to 8+72.5m Pre-Tiva Canyon bedded tuffs

8+72.5 to 8+73.5m Yucca Mountain Tuff

8+73.5 to 9+12m Pre-Yucca Mountain bedded tuffs

9+12 to 10+20m Pah Canyon Tuff

10+20 to 10+51.5m Pre-Pah Canyon bedded tuffs

Alcove #4 (centerline station intersection):10+27.8

10+51.5 to 12+00m Topopah Spring crystal rich vitric zone

12+00 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 63+08m Topopah Spring crystal poor middle nonlithophysal zone

Alcove #5 (centerline station intersection):28+27

35+93m Sundance fault (most prominent fault plane, minor fracturing reported between Stations 35+85 and 36+40)

Alcove #6 (centerline intersection): 37+37

Alcove #7 (centerline intersection): 50+64

ESF TUNNEL STRATIGRAPHY CONTINUED*

STATION

57+30	Splay of the Ghost Dance Fault - Offset is approximately 2 meters
63+08 to 64+53	Topopah Spring crystal poor upper lithophysal zone
63+25	Fault with the offset estimated as 3.8 meters
64+53 to 65+13	Topopah Spring crystal rich lithophysal zone
65+13 to 65+23	Topopah Spring crystal rich nonlithophysal zone
65+23	Fault
65+23 to 65+35	Topopah Spring crystal rich lithophysal zone
65+35 to 66+35	Topopah crystal rich nonlithophysal zone
66+35 to 66+40	Topopah Spring vitric zone
66+40 to 66+98	Pre-Pah Canyon bedded tuffs
66+98 to 67+26	Tiva Canyon crystal poor vitric zone
67+26 to 67+62	Tiva Canyon crystal poor lower nonlithophysal zone
67+62 to 67+70	Tiva Canyon crystal poor vitric zone
67+70 to 67+88	Tiva Canyon crystal poor lower nonlithophysal zone
67+88 to 67+91	Dune Wash fault (offset is greater than 10m)
67+91 to 68+47	Topopah Spring crystal poor upper lithophysal zone
68+47 to 68+85	Topopah Spring crystal rich lithophysal zone
68+85 to 69+84	Topopah Spring crystal rich nonlithophysal zone
69+84 to 69+96	Topopah Spring crystal rich vitric zone
69+96 to 70+58	Bedded tuffs

ESE TUNNEL STRATOGRAHY CONTINUED*

STATION

70+58	Fault (Offset greater than 10 meters)
70+58 to 71+68?	Topopah Spring crystal poor middle nonlithophysal zone
71+31?	Fault
71+68 to 73+46?	Topopah Spring crystal poor upper lithophysal zone
73+46 to ?	Topopah Spring crystal rich lithophysal zone
? to ?	Topopah spring crystal rich nonlithophysal zone
? to 74+30?	Topopah Spring vitric zone
74+30 to ?	pre -Pah Canyon bedded tuffs
?	Pah Canyon Tuff
?	pre-Yucca mountain bedded tuffs
?	Yucca Mountain Tuff
?	pre-Tiva Canyon bedded tuffs
?	Tiva Canyon crystal poor vitric zone
? to ?	Tiva Canyon crystal poor lower nonlithophysal zone
? to ?	Tiva Canyon crystal poor lower lithophysal zone
? to face	Tiva Canyon crystal poor middle nonlithophysal zone

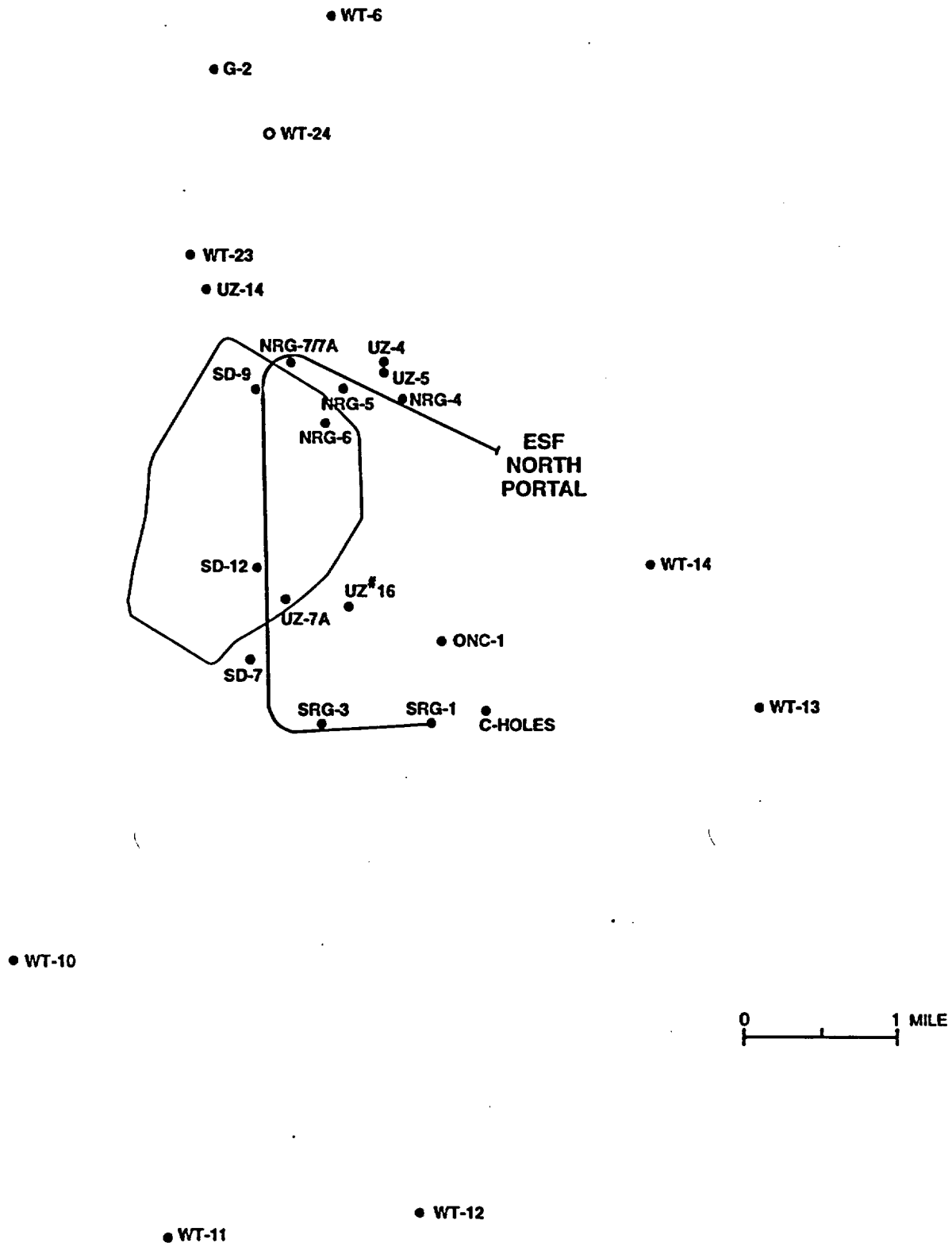
Note: Starting at station 57+02 and ending at 59+80, the crystal poor lower lithophysal zone is exposed in the lower portion of the tunnel (below springline).

* 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 by USGS geologists.

*** Only significant faults are noted on the table.

Selected Borehole Locations



SELHOLES.CDR.123/9-7-95

The next NRC OR and DOE meeting is scheduled for Tuesday, March 18, 1997 at 8:30 a.m. in the Atrium Room, Hillshire Building, Summerlin.

The agenda provided by the NRC ORs is as follows:

- 1. Need for 10 CFR 960 Rule vs 10 CFR 60 requirements - DOE**
- 2. Software QA issue open item - NRC**
- 3. NRC responses to State of Nevada letters to NRC - NRC**
- 4. DOE evaluation of 3 USGS reports - NRC**
- 5. Feedback from February 1997 Employee Concerns Program meeting - DOE**
- 6. Employee Concerns Program reporting to QA? - NRC**
- 7. Feedback on meeting with NRC on Igneous Activity on 2/25-26/97 and Seismic TR II on 2/27/97 - DOE**
- 8. Status of Change Requests for new work in FY 97 - DOE**
- 9. NRC status of upcoming site visits: - NRC**
 - NRC IG visit on April 10, 1997**
 - Commissioner Rogers visit on April 30th**
- 10. Upcoming NRC sponsored field activities in vicinity of Yucca Mountain - NRC**
- 11. Strategy for addressing large hydraulic gradient north of proposed repository - DOE**

AGENDA
Director's Program Review
Thursday, March 6, 1997
Videoconference Rooms: M&O Contractor (Dunn Loring),
DOE/Forrestal, Room GF-277, and YMSCO Blue Room

<u>Time (PST)</u>	<u>Subject</u>	<u>Presenter</u>
7:00 AM - 7:10 AM	Opening Remarks	Barrett
7:10 AM - 7:15 AM	Recognition of Visitors	Conner
7:15 AM - 7:30 AM	Program Status Overview Program Performance Status	Rouso
7:30 AM - 8:15 AM	YMSCO Overview ESF Status Viability Assessment YMP Performance Measurement	Barnes Fraun Fraun Kozai
8:15 AM - 8:45 AM	WAST Project Overview Waste Acceptance & Transportation Interim Storage WAST Performance Measurement	Milner Carlson Carlson Bokhari
8:45 AM - 9:00 AM	Quality Assurance	Clark
9:00 AM - 9:15 AM	Lunch at Seats	
9:15 AM - 9:35 AM	Program Management and Administration Overview PM&A Performance Measurement	Rouso Trebules
9:35 AM - 9:45 AM	Review of the Day's Action Items	Conner
9:45 AM - 9:55 AM	Questions from Visitors	All
9:55 AM - 10:00 AM	Break	
10:00 AM - 11:00 AM	Executive Session	

QA: N/A

**AGENDA
DOE-NRC TECHNICAL MEETING
EXPLORATORY STUDIES FACILITY
VIDEO CONFERENCE**

**Summerlin, 1551 Hillshire Drive, Blue Room, Las Vegas, Nevada and
NRC Rockville, MD - Room T2B5
March 13, 1997**

9:30 PST (12:30 EST)	Opening Remarks	DOE, NRC, NV, AUG
9:40 PST (12:40 EST)	ESF Construction Update - Status of Tunnel and Alcove Construction - South Portal Construction	DOE
10:30 PST (1:30 EST)	Scientific Studies Update - Status of Tunnel mapping - Update on Single Heater Test Results - Large Block Test	DOE
11:30 PST (2:30 EST)	Break	ALL
11:45 PST (2:45 EST)	Scientific Studies Update (continued)	DOE
12:45 PST (3:45 EST)	Engineering Design Program - Feedback on Level of Design Detail Appendix 7 Mtg. - Plans for Retrievability	DOE NRC, DOE
1:15 PST (4:15 EST)	Future Focus of This Quarterly Meeting - Topics Related to the Current Project's Activities - Ideas for Improving Utility of This Interaction	DOE, NRC
1:45 PST (4:45 EST)	Closing Remarks and Discussion	DOE, NRC, NV, AUG
2:00 PST (5:00 EST)	Adjourn	

**PRELIMINARY AGENDA
7TH ANNUAL DEVILS HOLE WORKSHOP
AMARGOSA VALLEY**

8:30-8:45 a.m.	WELCOME & OPENING REMARKS	Gary Russell USGS-WRD
8:45-9:15	Spring Discharge and Water-Level Monitoring at Ash Meadows NWR	Tim Mayer USFWS
9:15-9:45	Evapotranspiration at Ash Meadows, Death Valley, and Oasis Valley	Randy Laczniak USGS-WRD
9:45-10	National Park Service Activities in Ash Meadows Area	Mel Essington NPS
10-10:15	BREAK	
10:15-10:45	Cenozoic Basins of the Death Valley Extended Terrain as Reflected in Regional Scale Gravity Anomalies	Richard Blakely USGS-GD
10:45-11:15	Environmental Isotope Characterization of Regional Groundwater Flow in Southern Nevada	Tim Rose LLNL
11:15-11:45	Carbon-14 Dating of Groundwater in Southern Nevada--Three Decades of Surprises	Jim Thomas USGS-WRD
11:45-1 p.m.	LUNCH	
1-1:30	Plans for Tracer Experiment on Pahute Mesa	Rick Waddell HSI Geotrans
1:30-2	Wetlands on the Nevada Test Site	Dennis Hansen Bechtel Nevada
2-2:15	Water Use at Nevada Test Site	Doug Duncan DOE
2:15-2:30	BREAK	
2:30-2:45	Hydrologic Resources Management Program Activities	Bonnie Thompson DOE
2:45-3:00	Multi-agency Support of Regional Ground-Water Flow Model For Resource Management of the Death Valley Ground-Water Flow System	Doug Trudeau USGS
3-3:30	DISCUSSION--Water Use & Water Rights in Amargosa Valley—Past, Present, and Future	Michael DeLee Amargosa Water Com.
3:30-4	Final discussions and wrap-up; selection of next year's host	Gary Russell USGS-WRD