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MEMORANDUM FOR: John J. Linehan, Section Leader  
 Repository Projects Branch, DWM

FROM: Mysore S. Nataraja, Section Leader  
 Engineering Branch, DWM

SUBJECT: NNWSI DRAFT EXPLORATORY SHAFT TEST PLAN

On September 16 through 19, 1985, Dinesh Gupta and David Tiktinsky, WMEG, and our consultants made an Appendix 7 visit to the Office of NNWSI On-Site Representative, Paul Prestholt. During this visit, they examined the draft of the NNWSI Exploratory Shaft Test Plan (ESTP) document available at Paul Prestholt's office. A trip report on this visit is enclosed (Attachment 1).

During the visit, it was brought to my staff's attention that the NNWSI had previously intended to release this document in its present form for comments by NRC and others. The document would have been revised to incorporate appropriate comments, before being released as an SCP document. However, it appears that the DOE now intends to change the format of the document to conform with the SCP (Chapter 8) format before releasing it as an SCP document. In other words, we may not get an opportunity in the near future to comment on the DOE's draft ESTP document, and the document is likely to be released as an SCP document or as part of the SCP without having the benefit of outside review comments.

Based on my staff's examination of the draft NNWSI ESTP document, it is their impression that the document has been sufficiently developed at this time so that the DOE may benefit by having an early NRC staff review of the document. I strongly recommend that we pursue this matter with the DOE Headquarters and suggest to them that the DOE should release the draft document in its present form for an early NRC review. We need to impress upon the DOE that the NNWSI project is likely to benefit by seeking NRC staff comments on the draft ESTP document as soon as possible. It is my judgment that use of this approach by the DOE is not likely to significantly affect their schedule in any way.

I will be pleased to further discuss this matter with you, if you so desire.

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Mysore S. Nataraja, Section Leader  
 Engineering Branch, WM

Attachment: As stated

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TRIP REPORT - APPENDIX 7 VISIT TO NNWSI  
September 16-19, 1985

On September 16 through 18, 1985, Dinesh Gupta, David Tiktinsky, and consultants (Jaak Daemen, University of Arizona; Swapan Bhattacharya, EI; and Kanaan Hanna, U.S. Bureau of Mines) visited the office of NNWSI On-Site Representative (Paul Prestholt) in Las Vegas, Nevada. The primary purpose of this visit was to become familiar with the draft of the NNWSI Exploratory Shaft Test Plan available at Paul Prestholt's office.

On September 19th, David Tiktinsky, Swapan Bhattacharya and Kanaan Hanna visited the G-Tunnel and the Yucca Mountain Site.

The draft ESTP document consists of two parts and two appendices. Part I describes the purpose of the test program and background information about NNWSI, the site and the testing approach. Part II of the ESTP describes test plans for a suite of 30 tests under consideration for conducting in-situ test measurements. Appendix A consists of a Glossary of terms. Appendix B was not available at the time of our visit; it is expected to contain description of costs and schedules. A copy of the Table of Contents of the draft ESTP document is attached (Attachment 1).

Because of time constraints, we concentrated our effort on reviewing Chapter 5 (Part I), "Rationale for Exploratory Shaft Facility Tests" and Chapter 3 (Part II), "Geomechanics Testing for Performance and Design Data." However, we scanned through the entire document (about 1000-1500 pages) to become familiar with the overall contents of the draft ESTP.

In describing the rationale for the proposed test plan (Chapter 5, Part I), the DOE has stated that the purpose of the planned ES tests is to:

1. Validate models
2. Reduce uncertainty
3. Provide information for NRC Siting Criteria
4. Simulate processes of components of the repository system

In addition, the DOE has stated in the ESTP that the in-situ test results would provide information to design engineered components (drifts, emplacement holes,

canisters etc.) and to address DOE's issues hierarchy (four key issues, 44 issues and 171 information needs related to performance and siting criteria).

The DOE has also identified the priority data needed to meet the 10 CFR 60 performance objectives. These data needs are shown on Attachment 2. In this context, we identified two new reference documents: a) Hayden N. 1985, "Priority of Data Needs by Performance Assessment," letter of March 7, 1985 to W. Myers, Sandia National Laboratories, Albuquerque, N.M. and b) Ticeney, et.al., Sandia National Laboratory, "Priority of Data Needs by Performance Assessment, FY85." We requested Paul Prestholt to approach DOE to find out if these documents can be made available to us at this time.

In Chapter 3 (Part II) of the ESTP, DOE has provided a description of planned Geomechanical Tests to be conducted in the exploratory shaft. These tests include Shaft convergence, Overcore Stress, Demonstration Breakout Room, Sequential Drift-Mining Evaluations, Plate-Load Testing, Slot-Strength Testing, Geomechanical Laboratory Testing, and Demonstration of a Prototype Boring Machine.

Overall, our visit to Paul Prestholt's office was useful to us in getting an early insight into DOE's draft ESTP document.

Attachments:

1. Table of Contents - NNWSI Exploratory Shaft Test Plan
2. Priority data identified in the ESTP as needed to meet 10 CFR 60 Performance Objectives

TABLE OF CONTENTS

NNWSI EXPLORATORY SHAFT TEST PLAN  
REVISION 1  
AUGUST 1985

PART I

1. Introduction
2. General Concept of a Geologic Repository in the Unsaturated Zone at Yucca Mountain
3. Regional Geologic and Hydrologic Setting of Yucca Mountain
4. Evolution and Summary of Siting Requirements and Information Needs
5. Rationale for Exploratory Shaft Facility Tests
6. Construction and Testing Operations of the Exploratory Shaft Facility
7. Integrated Data System
8. Management of the Exploratory Shaft Facilities Operations
9. Safety and Environmental Impacts
10. QA Requirements

PART II

1. Introduction
2. Basic Geologic Data Tests
3. Geomechanics Testing for Performance and Design Data
4. Hydrologic and Transport Phenomena Tests
5. Near-Field and Thermally Perturbed Tests

Appendix A      Glossary of Terms  
Appendix B      ESTP Cost and Schedule Estimates

PRIORITY DATA IDENTIFIED IN THE DRAFT ESTP AS NEEDED  
TO MEET 10 CFR 60 PERFORMANCE OBJECTIVES

POST CLOSURE

Hydrology Data

q - Percolation Flux - Infiltration at Surface in Upper Bound

$\bar{n}_{eff}$  - Spatial Average of Effective Matrix Porosity

$k_s$  - Spatial Average of Saturated Hydraulic Conductivity

Geochemistry Data

$r_f$  - Effective retardation factor

D - Diffusion Coefficient

Waste Package Data

s - Solubility Limit

A - Effective Water intercept area of waste package

Geology Data

d - Thickness of each unit

b - Mean aperture of fractures

PRE-CLOSURE

Geomechanical Data for Ambient and Post-Emplacement Conditions