



Department of Energy

Washington, DC 20585

SEP 17 1993

Mr. Joseph J. Holonich, Director
Repository Licensing & Quality Assurance
Project Directorate
Division of High-Level Waste Management
Office of Nuclear Material Safety
and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Holonich:

Enclosed with this letter is a controlled copy of Study Plan 8.3.1.2.2.7, Revision 1, "Hydrochemical Characterization of the Unsaturated-Zone," at enclosure 1, prepared by the U. S. Department of Energy (DOE) for the Yucca Mountain site. The study plan numbers correspond to the same numbers used in the Site Characterization Plan (SCP) for the Yucca Mountain site.

Study plans are prepared, reviewed, and approved under Yucca Mountain Site Characterization Project Office (YMPO) quality assurance procedures.

This study plan was submitted to YMPO for review before the 1993 DOE/U.S. Nuclear Regulatory Commission (NRC) study plan agreement became effective. Therefore, DOE has reviewed the study plan for consistency with the content requirements for study plans, as given in Attachment B to the Summary of the DOE/NRC meeting on the Level-of-Detail for the SCP (May 7-8, 1986). A list of technical procedures to be used in conjunction with this study plan is at enclosure 2.

It should be noted that there may be some inconsistencies in the milestone report titles and schedules given in this study plan and those in the SCP. Study plans, in general, represent a further evolution of the study in the areas related to schedules and milestones relative to the SCP, and as such, represent DOE's current plans.

DOE did not identify any Site Characterization Analysis open items related to this study plan.

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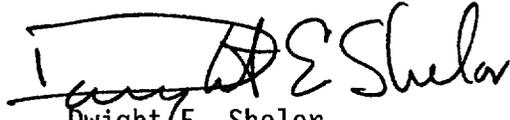
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PDR

The Document Transmittal/Acknowledgement Record for your controlled copy of the study plan should be signed and dated and returned to the Document Control Center in Las Vegas, Nevada.

If you have any questions, please contact Ms. Sheila Long at 202-586-1447.

Sincerely,



Dwight E. Shelor
Associate Director for
Systems and Compliance
Office of Civilian Radioactive
Waste Management

Enclosures

- on the Sheryl M. Lander*
1. Study Plan 8.3.1.2.2.7,
Revision 1
 2. List of Technical Procedures

cc: w\enclosures
Alice Cortinas, CNWRA, San Antonio, TX

cc: w/enclosure 2
C. Gertz, YMPO
T. J. Hickey, Nevada Legislative Committee
R. Loux, State of Nevada
D. Bechtel, Las Vegas, NV
Eureka County, NV
Lander County, Battle Mountain, NV
P. Niedzielski-Eichner, Nye County, NV
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L. Bradshaw, Nye County, NV
C. Schank, Churchill County, NV
F. Mariani, White Pine County, NV
V. Poe, Mineral County, NV
J. Pitts, Lincoln County, NV
J. Hayes, Esmeralda County, NV
B. Mettam, Inyo County, CA
C. Abrams, NRC

CURRENT LIST OF APPROVED TECHNICAL PROCEDURES FOR STUDY PLAN 8.3.1.2.2.7

Technical Procedure Number

Technical Procedure

Collection and transportation of gas samples

| | |
|---------|---|
| HP-176 | Field procedure for gas and water vapor sampling from open borehole |
| HP-07 | Use of a trace gas for determining atmospheric contamination in a dry-drilled borehole |
| HP-56 | Gas and water vapor sampling from unsaturated-zone test holes (stemmed) |
| HP-176 | Procedure to collect gas-composition samples at selected depth intervals in open unsaturated-zone boreholes |
| HP-195 | Method for heat evacuating gas storage and collection cylinders |
| HP-236T | Installation and operation of PVC straddle packer string in UZ boreholes for gas and water vapor sampling |
| HP-239T | Method for removing traced drilling air from unsaturated-zone boreholes |

Preparation of gas samples for analysis

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|---------|--|
| HP-86 | Method for degassing carbon dioxide and water (vapor) samples from unsaturated-zone test holes |
| HP-190T | Scientific notebook plan: silica gel dewatering |

Analysis of gas samples

| | |
|--------|--|
| HP-160 | Methods for analysis of samples for gas composition by gas chromatography |
| HP-194 | Approximation of relative humidity using a silica-gel tower, cold trap, and molecular-sieve within unsaturated-zone test holes as an aid in determining pumping efficiency |
| HP-204 | Liquid scintillation spectrometry method for tritium measurement of water samples |
| HP-240 | Method for analysis of CO ₂ and/or CH ₄ gas sample concentrations by gas chromatography using Summit Interests SIP 1000 |

Collection and transportation of water samples

- HP-131 Methods for handling and transporting unsaturated-core and rubble samples for hydrochemical analysis
- HP-237T Methods for sealing unsaturated zone borehole core samples to preserve moisture content

Extraction of water from core samples

- HP-125 Methods for extraction of pore water from tuff cores by triaxial compression
- HP-126 Extraction of residual water from tuff samples by vacuum distillation
- HP-223 Method for pore-water extraction using one-dimensional compression
- HP-110 Extraction of pore waters by centrifuge methods

Analyses of water samples

- HP-202 Analysis of water samples for anion and cation concentrations by ion chromatography
- HP-204 Liquid scintillation spectrometry method for tritium measurement of water samples