

SCP MTG TRANSMITTAL LETTER

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Mr. Ralph Stein, Associate Director
Office of Systems Integration and Regulations
Office of Civilian Radioactive Waste Management
U. S. Department of Energy, RW-24
Washington, D. C. 20545

Dear Mr. Stein:

The purpose of this letter is to transmit the meeting summary for the May 9-10, 1989 NRC-DOE meeting at which preliminary NRC concerns regarding DOE's Site Characterization Plan (SCP) for the Yucca Mountain, Nevada site and the Exploratory Shaft Facility (ESF) Design Acceptability Analysis (DAA) were presented to DOE. Representatives of the State of Nevada, Nye County, and the Utility Nuclear Waste Management Group also attended this meeting.

Should you have any questions on the enclosure, please contact King Stablein (FTS 492-0446) of my staff.

Sincerely,

ORIGINAL SIGNED BY

John J. Linehan, Director
Repository Licensing and Quality
Assurance Project Directorate
Division of High-Level Waste Management

Enclosure: As stated

- cc: R. Loux, State of Nevada
- M. Baughman, Lincoln County, NV
- S. Bradhurst, Nye County, NV
- D. Bechtel, Clark County, NV
- C. Gertz, DOE/Nevada
- K. Turner, GAO

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NAME: <i>WKS</i> Stablein/mc: <i>JL</i> Linehan	:	:	:	:	:	:
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SUMMARY OF NRC-DOE MEETING ON
SCA/DAA PRELIMINARY CONCERNS
May 9-10, 1989
Rockville, Maryland

Agenda: See Attachment 1.

List of Attendees: See Attachment 2.

Summary:

The objectives of the meeting were (1) for NRC to present its preliminary concerns with respect to DOE's Yucca Mountain, Nevada Site Characterization Plan (SCP) and DOE's Exploratory Shaft Facility Design Acceptability Analysis (DAA); and (2) for DOE to have the opportunity to clarify information in the SCP and DAA related to the NRC concerns.

After short opening statements by NRC, DOE, and the State of Nevada, NRC made presentations of preliminary concerns with respect to the SCP and DAA in the following areas: Performance Assessment (Attachment 3); Quality Assurance (Attachment 4); Geotechnical Engineering (Attachment 5); Waste Package Program (Attachment 6); Geology/Geophysics (Attachment 7); Hydrology and Geochemistry (Attachment 8). After each NRC presentation, DOE caucused, then asked questions related to the preceding presentation and made some clarifying remarks concerning the material in the SCP relevant to the preceding NRC presentation.

At the conclusion of the meeting, both NRC and DOE considered that the objectives of the meeting had been accomplished and agreed that future interactions in a number of technical areas discussed would be appropriate.

The State of Nevada representatives were present throughout the meeting, and a representative from Nye County was in attendance part of the second day. The State of Nevada was asked whether it had comments or questions after each NRC presentation but indicated it had none.

King Stablein 5/19/89

King Stablein, Senior Project Manager
Repository Licensing and Quality Assurance
Project Directorate
Division of High-Level Waste Management
Office of Nuclear Material Safety
and Safeguards
U.S. Nuclear Regulatory Commission

Edward P. Regnier 5/19/89

Edward Regnier
Licensing Branch
Office of Systems Integration
and Regulations
Office of Civilian Radioactive
Waste Management
U.S. Department of Energy

AGENDA

NRC/DOE MEETING
ON SCP/DAA PRELIMINARY CONCERNSMay 9-10, 1989
Rockville, MDMay 9, 1989 (Tuesday)

8:30 a.m.	Opening Remarks U.S. Nuclear Regulatory Commission (NRC) U.S. Department of Energy (DOE) State of Nevada Affected Units of Local Governments
8:45 a.m.	NRC Presentation of Preliminary Concerns in the Area of Systems Performance
10:00 a.m.	Caucus
10:30 a.m.	DOE Clarifications Relative to NRC Concerns in the Area of Systems Performance
11:00 a.m.	NRC Presentation of Preliminary Concerns in the Area of Quality Assurance
11:30 a.m.	Lunch and Caucus
1:00 p.m.	DOE Clarifications Relative to NRC Concerns in the Area of Quality Assurance
1:30 p.m.	NRC Presentation of Preliminary Concerns in the Area of Geotechnical Engineering
2:30 p.m.	NRC Presentation of Preliminary Concerns in the Area of Materials Engineering
3:30 p.m.	Caucus
4:00 p.m.	DOE Clarifications Relative to NRC Concerns in the Areas of Geotechnical Engineering and Materials Engineering
4:30 p.m.	Adjourn

May 10, 1989 (Wednesday)

8:30 a.m.	NRC Presentation of Preliminary Concerns in the Area of Geology/Geophysics
9:30 a.m.	Caucus
10:00 a.m.	DOE Clarifications Relative to NRC Concerns in the Area of Geology/Geophysics
10:30 a.m.	NRC Presentation of Preliminary Concerns in the Areas of Hydrology and Geochemistry
11:30 a.m.	Caucus
12 noon	DOE Clarifications Relative to NRC Concerns in the Areas of Hydrology and Geochemistry
12:30 p.m.	Closing Statements NRC DOE State of Nevada Affected Units of Local Government
1:00 p.m.	Adjourn
Afternoon	Preparation of Meeting Summary

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Attendees - NRC/DOE SCP/DAA MEETING MAY 9-10, 1989

<u>Name</u>	<u>Organization</u>	<u>Telephone</u>
JOHN LINAHAN	HLW-NRC	301-492-3387
MAXWELL BLANCHARD	DOE-YMP	702-794-7939
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Edward Regan	DOE/HQ	202-586-4590
Gordon Appel	DOE/OCRWM/Licensing	(202) 586-1462
Steve Frishman	State of NV	702/885-3744
CARL JOHNSON	STATE OF NEVADA	(702) 885-3744
Scott Dam	WESTON/DOE/HQ	202-646-6660
MIKE BAUSER	UWASTE	(202) 955-6669
JERRY KING	SAIC	(702) 794-7648
PHILIP JUSTUS	NRC HLW GEOL-GEOPHYS	301-492-3460
Ron Ballard	NRC/NMSS/HLGP	301-492-3462
Ram Lahoti	DOE/OCRWM/OFS	202-586-4099
Donald Alexander	DOE/OCRWM/OSIR	202-586-4889
JOE TILLESAN	SANDIA NATIONAL LABS	505-844-5575
Michael Voegelé	SAIC / NNWSI	702-794-7638
Melissa Hankins	ICF Technology	703-934-3166
John Robson	DOE/YMP	702-794-7933
Scott Sinnock	SNL/LV	702-794-7200
Felton Bingham	SNL	505-844-8816
Larry Ricketson	WESTON/DOE/HQ	(202) 646-6860
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Ralph Stern	DOE/HQ	202-586-6026

DAVID SIEFREN	WESTON / DOE / HQ	202-646-6610
Bob Gamble	Weston / DOE / HQ	202-646-6656
Bob CLARK	Weston / DOE / HQ	202 646-6636
David Dobson	DOE / YMR	702 794-7940
Jeff Kimball	DOE / HQ	202 586 1063
Bob Jackson	Weston-DOE / HQ	
John TRAPP	NRC / HLG P	301-492-0809
NORMAN EISENBERG	NRC / HLG I	492-0324
Pauline Brooks	NRC / HLG P	492-0404
Seth M Copley	NRC / HLG P	492-0410
King Stubblein	NRC / HLG W	492-0446
Rag Wallace	USGS-HQ / DOE-HQ	586-1244
JAMES MONTGOMERY	WESTON / DOE-HQ	202 646-6731
Stan Echok	DOE-GO	582-6947
Ruth Weiner	CNWRA	703 979-9129

Attendees NRC/DOE Meeting SCP Comments 5/10/89

<u>NAME</u>	<u>Organization</u>	<u>Phone</u>
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Jerry King	SAIC/YMP	(702) 794-7648
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Ron Ballard	NRC/HLGP	301-492-3462
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Philip Berger	Energetics/DOE/EH	(301) 992-4000
Ray Wallace	USGS-HQ/DOE-HQ	(202) 586-1244
R. B. Raup	USGS - Geologic Dist'n	FTS 776-1272
Julie A. Canepa	Los Alamos	FTS 843-4109
HAROLD E. LETEVRE	NRC/HLW GEOLGY/GEOPHYSICS	FTS 492-3464
Melissa Hankins	ICF Technology	(703) 934-3166
Bob CLARK	WESTON - DOE/HQ	(202) 646-6636

Attendees NRC/DOE Meeting SEP Comments 5/10/89

<u>Name</u>	<u>Organization</u>	<u>Phone</u>
Maxwell Blanchard	DOE-YMPO	702-794-7939
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John Redson	DOE/YMPO	702-794-7933
Ken Beall	SAIC	702-794-7829
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Jim Davenport	Nevada.	206-352-4000
JOHN LINAHAN	NRC	301-492-3289
CHED BRADLEY	DOE/EH-25	586-4610
Felton Bingham	SNL	(505) 844-8816
JEFFREY POOLE	NRC	FTS 492-0545
Fred Ross	NRC	FTS 492-0527
King Stubblein	NRC	FTS 492-0446
John Bradbury	NRE	FTS 492-0535
Neil Coleman	NRC	492-0530
Tin Mo	NRC	FTS-492-0541
William Gail	NRC	492-0506

SCP/DAA PRELIMINARY CONCERNS

PERFORMANCE ASSESSMENT SECTIONSCP REVIEW

The SCP commits to a systematic, integrated approach to site characterization (i.e., the Issue Resolution Strategy). However, the SCP does not appear to demonstrate that such an approach has been implemented. Some specific areas of concern are

- Performance allocation has gaps in its execution
- The treatment of alternative conceptual models has some inconsistencies and gaps
- Plans for the use of performance assessment during site characterization are not adequate to integrate data gathering activities
- The validation program is inadequate
- Scenario analyses in support of performance allocation is flawed
- Planned reliance on formal use of expert judgement could result in an unconvincing license application

Table 8.3.1.2-2a. Current representation and alternative hypotheses for unsaturated-zone hydrologic system conceptual models for the geohydrology program (page 1 of 16)

Current representation		Uncertainty and rationale	Alternative hypothesis	Significance of alternative hypothesis			Studies or activities to reduce uncertainty	
Model element	Current representation			Performance measure, design or performance parameter	Needed confidence in parameter or performance measure	Sensitivity of parameter or performance measure to hypothesis	Need to reduce uncertainty	
Unsaturated zone (UZ) underlying Yucca Mountain	The UZ is defined as a distinct hydrogeologic regime	Low-dominant processes defining UZ occur over geologic time scales	UZ is undefinable because of strong short-term coupling with saturated-zone, tectonic, and thermal regimes	DOMAIN				
				GWT; water inflow to the underground facility ^a	High	High-UZ is presumed to be principal natural barrier to water-borne radionuclide migration	High-integrity of UZ needs to be preserved for 10,000 yr	8.3.1.2.2.10.1, 8.3.1.2.2.10.5
Stratigraphy	The unsaturated zone comprises a finite number of discrete, statistically homogeneous hydrogeologic units	Low-layered tuffs and zones of alteration lead themselves to characterization as hydrogeologic units	Hydrologic properties are graded over space; discrete hydrogeologic units cannot be distinguished Lateral and vertical heterogeneities preclude defining hydrogeologic unit	INTERNAL GEOMETRY				
				GWT; radionuclide releases to the accessible environment	High	High-hypothesis defines approach to calculate GWT and radionuclide releases to the accessible environment	Low-statistical methods could be used to calculate GWT for completely random systems	8.3.1.2.2.3.1, 8.3.1.4.3, 8.3.1.3
Structural features Fractures Faults	Fractures and fracture systems are barriers to or conduits for liquid-water flow, depending on ambient matrix saturation	Medium-current evidence indicates that spontaneous longitudinal water flow in fractures is not initiated until matrix is at or near complete saturation	Water may move longitudinally within fractures even at low values of matrix saturation	GWT; water inflow to the underground facility	High	High-hydrologic interaction between matrix and fractures will affect possible magnitudes of both parameters	High-hydrologic interaction between partially saturated fractures and matrix may have profound effect on conditions within UZ	8.3.1.2.2.4.1, 8.3.1.2.2.4.2, 8.3.1.2.2.9.1, 8.3.1.2.2.9.2

8.3.1.2-52

SCP/DAA PRELIMINARY CONCERNS

SCP CONCERNS--QUALITY ASSURANCE

- o QA PROGRAM FOR SITE CHARACTERIZATION
- o QUALIFICATION OF EXISTING DATA
- o Q-LIST

J. CONWAY
MAY 9, 1989

SCP/DAA PRELIMINARY CONCERNS

**SELECTED NRC STAFF CONCERNS ON
DOE'S
SITE CHARACTERIZATION PLAN
IN ENGINEERING AREA**

I. ACCEPTABILITY OF THE ESF TITLE I DESIGN HAS NOT BEEN DEMONSTRATED.

II. SCP HAS NOT DEMONSTRATED THAT THE PROPOSED SITE CHARACTERIZATION TESTING PROGRAM WILL YIELD NECESSARY INFORMATION FOR LICENSE APPLICATION.

III. INTEGRATION OF REPOSITORY DESIGN WITH SITE CHARACTERIZATION TEST PLAN AND ESF DESIGN IS INADEQUATE.

IV. DETAILS OF THE PERFORMANCE CONFIRMATION TESTING PROGRAM ARE INSUFFICIENT FOR NRC EVALUATION.

ITEMS OF CONCERN IN WASTE PACKAGE PROGRAM

- * Regulatory
 1. Inconsistencies
 2. Basis for numerical values

- * Testing
 1. Standardized tests
 2. In situ tests

- * Performance confirmation program
 1. Long term prediction
 2. Tests

SCP/DAA PRELIMINARY CONCERNS

GEOLOGY/GEOPHYSICS SECTION OVERVIEW OF SELECTED CONCERNS

GEOLOGY/GEOPHYSICS SECTION
OVERVIEW OF SELECTED SCP CONCERNS

Central Themes of Point Papers

- 1) Integration Among Investigations
- 2) Nonconservative Numerical Criteria

ESF Concerns

Integration of available technical data into decisions regarding shaft location

Technical Areas Addressed

1) Tectonics

a) Faulting

Alternative conceptual models
Post-closure program not integrated with waste package performance issues
Slip rates
Characterization, design, and performance parameters

b) Volcanism

Alternative conceptual models
Natural analogs
Tentative performance goals and parameter values
Integration

c) Seismicity

10,000 year cumulative slip earthquake

2) Natural Resources

Alternative conceptual models
Integration

3) Methods of Exploration

a) Geophysics

Integration

b) Surface-based and in situ testing

Integration
Representativeness of data

SCP/DAA PRELIMINARY CONCERNS
HYDROLOGIC TRANSPORT SECTION

May, 1989

SCP REVIEW

Selected SCP Concerns

- Disturbed zone boundary is not delineated by considering the effects of waste heat on all physical or chemical properties that contribute significantly to repository performance.
- The strategy for resolving the regulatory requirement for pre-waste-emplacment groundwater travel time does not include consideration of "anticipated processes and events".
- The proposed method for constructing cumulative distribution curves for groundwater travel time by weighting "alternative conceptual models" is theoretically inappropriate.
- All assumptions about features, events and processes, related to the hydrologic system for the initial modeling strategy to predict groundwater travel time, are not completely identified.
- The technical basis for initial assessments of the significance of individual features, events and processes of the hydrogeologic system to performance measures or design or performance parameters is not discussed.
- The SCP does not contain a plan to adequately characterize the hydrologic properties of the Calico Hills unit (designated primary barrier to groundwater flow and radionuclide transport).
- Activities presented for the study of the saturated zone flow system are not adequate to characterize saturated zone hydrologic boundaries, flow directions and magnitudes and flow paths.
- The geochemistry program does not study the potential process of concentrating radionuclides on fracture surfaces and subsequent episodic transport.
- Investigations of radionuclide retardation focus on the determination of a K_d for use in matrix and fracture retardation equations. This transport modeling approach has not been substantiated for all expected states of Yucca Mountain flow system (full range of unsaturated and saturated).
- Existing sorption characterization data for alkali and alkaline earth elements are insufficient for performance assessment analyses, and consequently sorption data collection plans are incomplete.