



UNITED STATES
NUCLEAR WASTE TECHNICAL REVIEW BOARD
1100 Wilson Boulevard, Suite 910
Arlington, VA 22209

Agenda

Full Board Meeting

Thermal Loading: The Integration of Science and Engineering

July 13-14, 1993

Stouffer Concourse Hotel
3801 Quebec Street
Denver, CO 80207
(303) 399-7500

Tuesday, July 13, 1993

- 8:00 A.M.** **Welcome and Opening Remarks**
John Cantlon, Chairman
Nuclear Waste Technical Review Board (NWTRB)
- 8:05 A.M.** **Yucca Mountain Site Characterization Project Office (YMPO)
Update**
[Carl Gertz](#)
- 8:15 A.M.* *Background and Position Explanation* *(NOTE: Added by DOE at
Linda Smith, Acting Associate Director* *the last minute.)*
Mined Geologic Disposal System
- 8:20 A.M.** **Introduction to Thermal-Loading Issues**
[Don Langmuir](#), NWTRB Chair of July 13 Sessions
- DOE PLANS AND PROGRESS
TOWARD EVALUATING A THERMAL-LOADING STRATEGY
- 8:40 A.M.** **DOE Decision Strategy for Thermal Loading**
[William Simecka](#), YMPO
- 9:05 A.M.** **Mined Geologic Disposal System (MGDS) Thermal-Loading Study**
[Steven Saterlie](#)
Management and Operating Contractor (M&O)
TRW Environmental Systems (TRW)

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9:35 A.M. **Thermal-Loading Testing Needs and Test Plans**
[David Stahl](#)
Babcock & Wilcox Fuel Company (B&WFC) - M&O

10:00 A.M. **BREAK (15 minutes)**

INSIGHTS FROM UNSATURATED ZONE GEOTHERMAL ANALOGUES

10:15 A.M. **Geothermal Systems as Analogues to Yucca Mountain with
Emphasis on Hydrologic Aspects**
[Gudmundur Bodvarsson](#)
Lawrence Berkeley Laboratory (LBL)

10:45 A.M. **Rock/Water Interactions in Geothermal Systems**
[Joseph Moore](#)
University of Utah Research Institute

11:15 A.M. **Thermal Effects on Fracture and Rock Matrix Properties**
[Larry Myer](#), LBL

11:45 A.M. **Alteration History of Yucca Mountain Due to Thermal Effects:
Analogue for a Hot Repository?**
[David Bish](#)
Los Alamos National Laboratory (LANL)

12:25 P.M. **LUNCH (1 hour and 10 minutes)**

MODELING OF YUCCA MOUNTAIN UNDER THERMAL LOADS

1:35 P.M. **Gas-Water-Rock Geochemistry at Proposed Yucca Mountain
Repository Under Various Thermal Loads: Relations to Fluid Flow**
[William Murphy](#)
Southwest Research Institute
Center for Nuclear Waste Regulatory Analyses

1:55 P.M. **Numerical Modeling of Proposed Yucca Mountain Repository
Under Various Thermal Loads**
[Karsten Pruess](#), LBL

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2:50 P.M. **Numerical Modeling of Proposed Yucca Mountain Repository Under Various Thermal Loads**
[Thomas Buscheck](#)
Lawrence Livermore National Laboratory (LLNL)

3:30 P.M. **Numerical Modeling of Proposed Yucca Mountain Repository Under Various Thermal Loads**
[Eric Ryder](#)
Sandia National Laboratories (SNL)

3:45 P.M. **Experience of Numerical Modeling of Geothermal Systems**
[Gudmundur Bodvarsson](#), LBL

4:10 P.M. **BREAK (15 minutes)**

ROUND-TABLE DISCUSSION OF GEOTHERMAL ANALOGUES AND MODELING ISSUES

4:30 P.M. **Introduction of Discussion Questions**
Don Langmuir, NWTRB, Round-table Moderator

The round-table discussion will include the following questions:

- Based on today's presentations, what is the apparent status of thermal-loading modeling?
- What have we learned from geothermal analogues that assists us in making a defensible choice of a thermal-loading strategy for Yucca Mountain?
- What additional decision information can be obtained through further study of geothermal analogues?
- How, and how quickly, could such studies be performed?
- Are there other critical repository performance issues that must be better projected to defend a thermal-loading strategy?
- How should these other issues be addressed, and how soon can this type of information and assessment be acquired?

4:35 P.M. **Round-Table Discussion on Geothermal Analogues and Modeling Issues**
John Bredehoeft, U.S. Geological Survey (USGS); Sabodh Garg, Maxwell S-Cubed Div.; William Glassley, LLNL; William Herkelrath, USGS; Carl Johnson, state of Nevada; William Melson, Smithsonian Institute; Benjamin Ross, Disposal Safety, Inc.; Jean Younker, TRW (M&O); Ben Ross, Disposal Safety, Inc.

5:40 P.M. **Recess Until Wednesday, July 14, 1993**

Wednesday, July 14, 1993

WASTE PACKAGE THERMAL-LOADING ISSUES

- 8:00 A.M.** **Session Introduction**
Ellis Verink, NWTRB, Session Chair
- 8:05 A.M.** ***Site Characterization Plan (SCP) Thermal Goals Reevaluation***
[Steven Saterlie](#), TRW (M&O)
- 8:35 A.M.** **Corrosion Aspects Under Various Thermal Scenarios**
[Daniel McCright](#), LLNL
- 9:05 A.M.** **Compatibility of MPC/MPU with Thermal Scenarios**
[Thomas Doering](#), B&WFC (M&O)
- 9:35 A.M.** **BREAK (10 minutes)**

REPOSITORY CONCEPTUAL DESIGN:
INTERACTION OF THERMAL LOADING AND TESTING

- 9:45 A.M.** **Session Introduction**
Ed Cording, NWTRB Session Chair
- 9:50 A.M.** **Designing a Mined Geologic Disposal System: When is a Thermal-Loading Decision Necessary?**
[Lawrence Ramspott](#)
- 10:10 A.M.** **Repository Advanced Conceptual Design (ACD): Underground**
[K. Bhattacharyya](#)
Morrison-Knudsen (M&O)
- 10:45 A.M.** **Waste Package Environment Thermal Tests**
[Dale Wilder](#), LLNL
- 11:20 A.M.** **ESF Thermomechanical Tests**
[J. Pott](#), SNL
- 11:40 A.M.** **Integration of Waste Package, ESF, & Repository Designs
and
Proposed Enhancements to the Current ESF Configuration**
[Robert Sandifer](#), TRW (M&O)
- 12:10 P.M.** **LUNCH (1 hour)**

Wednesday, July 14, 1993 — cont.

THE BIG PICTURE

- 1:10 P.M.** **Session Introduction**
Garry Brewer, NWTRB Session Chair
- 1:15 P.M.** **Extended Retrievability**
Eugene Roseboom, USGS
- 1:45 P.M.** **Desert Ecosystem Water Dynamics Under Varied Thermal Scenarios**
Kent Ostler
EG&G, Inc.
- 2:15 P.M.** **Total Systems Performance Assessment (TSPA)-II Overview**
Jeremy Boak, YMPO
- 2:35 P.M.** **TSPA-II SNL Perspective**
Holly Dockery, SNL
- 3:00 P.M.** **TSPA-II M&O Perspective**
Robert Andrews, INTERA (M&O)
- 3:25 P.M.** **Performance Assessment Studies in Support of the National
Academy of Sciences Committee on Technical Bases for Yucca
Mountain Standards**
James Duguid, INTERA (M&O)
- 3:45 P.M.** **BREAK (15 minutes)**

WRAP-UP AND ROUND-TABLE DISCUSSION ON THERMAL ISSUES

- 4:00 P.M.** **Statements from the Public**
Participants from the audience
- 4:20 P.M.** **Introduction of Discussion Topics**
Garry Brewer, NWTRB, Round-Table Moderator

The round-table discussion will include discussion of the following:

- The DOE's timing and decision framework for deciding on thermal loading.
- The level of the DOE's consideration during repository advanced conceptual design of concepts such as extended retrievability, rail versus rubber-tired vehicles, diesel versus electric vehicles, extended heat transfer surface/heat pipes, operability considerations, and robotics (self-shielding, emplacement method, etc.).

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- Any deliberate or inadvertent DOE assumptions that may preclude better repository design options.
- The DOE's ESF test area plans and designs (particularly for heater tests) for their adequacy to obtain licensing information for whatever thermal-loading choice is made.
- The degree of integration between the DOE's ESF design and their advanced conceptual designs for the waste package and the repository.
- The presence or absence in the DOE's presentations of limits on waste package capacities, weights, dimensions, configurations, or shapes and whether limits presented are justified.
- Performance assessment assistance in reaching a thermal-loading decision.

4:30 P.M.

Round-Table Discussion: Thermal Issues

Paul Gnirk, Table Top Consultants; William Halsey, LLNL; Carl Johnson, state of Nevada; Lawrence Ramspott; *Thomas Cotton, J.K. Research Associates, Inc. (M&O) [added from audience at last minute]*; Rosa Yang, EPRI; Tom Cotton, M&O.

5:30 P.M.

Final Comments and Adjournment

John Cantlon, Chairman, NWTRB