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Mr. Stephen Bradhurst, President
Allen Bradhurst Corporation
P. O. Box 1510
4720 Canyon Drive
Reno, NV 89505

JAN 02 1991

Dear Mr. Bradhurst:

SUBJECT: UPCOMING WORKSHOP COORDINATED BY THE UNIVERSITY OF ARIZONA (AZ), TUCSON, AZ

The purpose of this letter is to inform you of a technical research workshop, "Workshop V-Flow and Transport Through Unsaturated Fractured Rock -- Related to High-Level Radioactive Waste Disposal." This workshop is being jointly sponsored by the U.S. Nuclear Regulatory Commission (NRC), the Center for Nuclear Waste Regulatory Analyses, and the University of Arizona. It will be held from January 7-10, 1991 at:

The Radisson Suite Hotel
6555 E. Speedway
Tucson, AZ 85710
(602) 721-7100
(800) 333-3333

Although U.S. Department of Energy (DOE) contractors are planning on making presentations, this workshop is not a formal licensing meeting or technical exchange between NRC and the DOE dealing with the Yucca Mountain site. However, you are welcome to send an observer. Yucca Mountain licensing items will not be discussed at this workshop.

If you intend to send an observer, please provide the observer's name to Thomas Nicholson of NRC's Office of Nuclear Regulatory Research at 301 492-3856. Please contact Mr. Nicholson if you need further information on this workshop.

Sincerely,

ORIGINAL SIGNED BY

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

Enclosure: Workshop Agenda
cc: D. Evans, UAZ
J. Russell, CNWRA

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NAME:MDelligatti:DChery :JHolonich:JLinehan :RBallard:TNicholson*:JRandall*:MSilberberg*

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*Telephone concurrence

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WORKSHOP V
ORGANIZATION AND PROGRAM

Workshop V -- Flow and Transport Through Unsaturated Fractured Rock --
Related to High-Level Radioactive Waste Disposal

Sponsored by -- Nuclear Regulatory Commission
Center for Nuclear Waste Regulatory Analyses
University of Arizona

Date and Place -- January 7-10, 1991; Radisson Suite Hotel
6555 E. Speedway,
Tucson, AZ 85710
(602) 721-7100
(800) 333-3333

Organizing Committee -- Thomas J. Nicholson, NRC-RES/WMB
Donald L. Chery, NRC-NMSS/TR
John L. Russell, CNWRA
Al Yang, USGS/Denver
Daniel D. Evans, Coordinator
Dept. of Hydrology and Water Resources
University of Arizona, Tucson, AZ 85721
(602) 621-7118

General Scope -- Physical, chemical and coupled processes and relevant
parameters, experimental methods and results,
modeling -- as related to water flow and transport of
contaminants through unsaturated fractured rock

Schedule -- Jan. 7 Monday a.m. Open house, Dept. of Hydrology and
Water Resources, University of Arizona
Monday p.m. Technical session
Jan. 8 Tuesday a.m. & p.m. Field trip
Jan. 9 Wednesday a.m. & p.m. Technical sessions
Jan. 10 Thursday a.m. Technical session
Thursday p.m. Research needs session

Registration Fee -- \$125

Tentative Program, 12/01/90
Workshop V
(Some Titles are Tentative)

Mon. am 01/07/91

8:30 to noon Open House at the Department of Hydrology and Water Resources, University of Arizona. See enclosed map for directions.

Mon. pm 01/07/91

12:30 Registration

General Chairperson: Tom Nicholson, RES/NRC

- 1:00 Introductory remarks -- Dan Evans, UAZ
- 1:15 Performance assessment/hydrogeologic research -- Sudni Saqar, CNWRA
- 1:45 Hydrogeologic issues at Yucca Mountain: Findings of a DOE peer review team -- Alan Freeze, UBC
- 2:15 On the relationship between information content and model structure: Advective travel (time) versus dispersion -- Shlomo Neuman, UAZ
- 2:45 Break
- 3:00 Tracer transport in fracture systems -- Yvonne Tsang, LBL
- 3:30 How does equilibrium continuum compare with fracture/matrix interactions -- Tom Buscheck and John Nitao, LLNL
- 4:00 Update on INTRAVAL/Phase II Cases -- Thomas Nicholson, NRC and Charlie Voss, Golder and Associates
- 4:30 Does the wind blow through Yucca Mountain? -- Ed Weeks, USGS Denver
- 4:40 Discussion
- 5:00 Adjourn
- 5:30 Reception

Tues. am & pm

Discussions in the field -- Leaders: Todd Rasmussen and Mike Sully

- 8:00 Leave hotel with box lunch
- 10:30 Arrive at field stations -- subgroups rotate among sites
 1. Cross borehole testing/geophysics site -- Mike Sully, UAZ
 2. Geochemical site -- Randy Bassett, UAZ
 3. Watershed site -- Todd Rasmussen, UAZ
 4. Heater experiment site -- Dan Evans, UAZ
 5. Gas sampling site -- Al Yang, USGS
 6. Prototype drilling at Apache leap -- Roy C. Long, DOE
- 3:00 Leave field sites
- 5:15 Arrive at hotel

Tues. eve

7:00 Group Dinner, Hidden Vally Inn

Wed. am

Flow and transport Chairperson: John Russell, CNWRA

- 8:00 Physical-chemical properties of thin water films-- John Cushman, Purdue U.
- 8:30 Characterization of hydraulic rock properties and verification through modeling -- Alan Flint, USGS/Las Vegas
- 9:00 Geophysical methods for hydrogeologic characterizations -- Gary Olhoeft, USGS Denver
- 9:30 Unsaturated flow: Laboratory studies using welded and nonwelded tuff -- Falah Thamir, USGS Denver
- 10:00 Break
- 10:20 Issues related to modeling -- Bill Ford, NRC/NMSS
- 10:50 Unsaturated flow and transport modeling -- Rachid Ababou, CNWRA
- 11:20 Hysteresis Measurement -- Lorraine Flint, Discussion and short volunteer presentations
- 12:00 Group Lunch

Wed. pm

Nonisothermal multiphase flow and transport Chairperson: Karsten Pruess, LBL

- 1:15 Coupled processes -- Chin Fu Tsang, LBL
- 1:45 Field heater test, G-tunnel -- Abe Ramirez, LLNL
Tom Buscheck, LLNL
- 2:45 Break
- 3:00 Status of nonisothermal modeling at Yucca Mountain -- Rex Wescott, NRC/NMSS
- 3:30 Nonisothermal laboratory experimental results -- Ron Green, CNWRA
- 4:00 Modeling 2-phase nonisothermal flow -- Karsten Pruess, LBL
- 4:30 Material heterogeneities and flow -- Roger Eaton, Sandia
- 4:40 Discussion
- 5:00 Adjourn

Wed. eve

- 7:30 Proposed field heater experiment: Discussion -- Dan Evans, UAZ, Discussion Leader

Thur. am

Gas and aqueous tracers Chairperson: Al Yang, USGS/Denver

- 8:00 Evaluation of tracers for hydrologic studies at Yucca Mountain -- Robert S. Bowman, New Mex. Tech.
- 8:30 The carbon dioxide and carbon isotopes of gases from borehole UZ-6 at Yucca Mountain -- Donald C. Thorstenson USGS/Reston
- 9:00 Flow and transport through unsaturated rock at Yucca

Mountain: Preliminary stable- and radioactive-isotope analyses -- Al Yang, USGS/Denver

9:30 Stable and tracer isotopic studies of hydrogenic deposits exposed at Trench 14, Nevada Test Site, Nevada -- John S. Stuckless, USGS/Denver

10:00 Break

10:20 Isotopic traces for water and solute movements in desert soils -- Fred Phillips, New Mex. Tech.

10:50 Discussion

12:00 Group Lunch

Thur. pm

Research Questions and Priorities Co-chairpersons: Don Chery, Jr., NRC
Dan Evans, UAZ

Objective: To arrive at lists of prioritized research questions which could be answered in 4 to 5 years through research at a reasonable level of funding to yield improved estimates of travel times and radionuclide releases for a high-level nuclear waste repository in unsaturated fractured rock.

Procedure:

1. Participants are divided into subgroups with a designated group leader and reporter for each subgroup
2. Each participant independently prepares a list of 10 research questions considered of highest priority (Should be completed prior to the session)
3. Questions are presented to the subgroup, one list at a time with no discussion or elaboration
4. The lists of 10 questions are combined and edited for duplications to form a single list
5. Each participant selects the 20 most important questions and ranks them from 1 to 20, with 1 being of highest priority
6. The rankings are tallied and the 20 with the lowest scores are arranged in ascending order
7. Each of the 20 questions is written at the top of a separate pad of paper. Participants write brief statements of justification and research approaches on pad for each question in turn.
8. Group leader leads discussion of products generated. The group summarizes its efforts for reporting to the complete group.
9. Each subgroup gives a brief presentation to the entire group and each reporter prepares a written report for inclusion in the final workshop report.

Thur. eve

7:30 INTRAVAL Working Group I meeting. (All participants are invited) Group Chairman: Tom Nicholson, NRC/RES

