JUN 21 1994

Mr. Dwight E. Shelor, Associate Director
for Systems and Compliance
Office of Civilian Radioactive Waste Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Dear Mr. Shelor:

SUBJECT: STAFF EVALUATION OF OPEN ITEM RESPONSES ON DEWATERING AND AIR MOVEMENT IN THE EXPERIMENTAL STUDIES FACILITY

Enclosed are the Nuclear Regulatory Commission staff's evaluations of U.S. Department of Energy (DOE) responses to two Open Items. For the reasons cited in the Enclosures, the staff considers Site Characterization Analysis (SCA) Comment 123 to be closed and Question 1 to Site Characterization Plan (SCP) Progress Reports 6 and 7 to be open. A summary of these Open Items and the staff's evaluation of them is below.

In the DOE response to Question 1 of Progress Reports 6 & 7, DOE states that Question 1 is associated with SCA Comment 123. Question 1 and Comment 123 contain overlapping concerns about possible Exploratory Studies Facility (ESF) ventilation impacts on the collection of water chemistry samples. In reexamining SCA Comment 123, the staff has determined that Question 1 of SCP Progress Reports 6 & 7 better expresses the staff's concerns on the potential for ESF ventilation to adversely impact collection of liquid geochemical data necessary for licensing. Therefore, the staff is closing SCA Comment 123.

Question 1 to SCP Progress Reports 6 and 7 (see Enclosure 2) asks: "What evaluation has DOE made of the potential for air movement from the ESF to adversely impact the collection of geochemical data necessary for site characterization?" To address this question, the staff needs the current description of the Accelerated Surface Based Testing Plan and an explanation of why the DOE feels that the Accelerated Surface Based Testing Plan will address the concerns raised in this question. Therefore, the staff considers this question to remain open.

These two Open Items are related to the concern on pneumatic pathways which was originally raised to the NRC staff by Robert Loux of the Nevada Nuclear Waste Projects Office in a January 25, 1994, letter to B.J. Youngblood. I am sending you a separate letter detailing the NRC staff's position on this State of Nevada concern. You may find it useful to coordinate your review and any response to these two letters.

If you have any questions regarding this letter or would like to discuss these Open Items further, please contact Mark Delligatti, of my staff. Mr. Delligatti can be reached at (301) 415-6620.

Sincerely,

/s/

Joseph Holonich, Chief
High-Level Waste and Uranium Recovery
Projects Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Enclosures: As stated

cc: See attached list

Distribution:

Central File	DWM r/f	MKnapp	MBell
JSurmeier	JHolonich	MFederline	NMSSr/f
HLURr/f	LSS	LPDR	ACNW
PDR/LPDR	CNWRA	On-Site Reps	

*See Previous Concurrence
Mark Small Boxes in Concurrence Block to Define Distribution Copy Preference.
In small Box on "OFC:" line enter: C = Cover E = Cover & Enclosure N = No Copy

OFC	HLUR	E	HLUR*		PAHB*		PAHB*		HLUR	E		
NAME	MDelligatti		RJohnson		WFord		DBrooks		JHolonich			
DATE	06/21/94		06/16/94		06/08/94		06/09/94		06/21/94			

G:\OI.MSD

cc: List

R. Loux, State of Nevada
T. J. Hickey, Nevada Legislative Committee
J. Meder, Nevada Legislative Counsel Bureau
R. Nelson, YMPO
M. Murphy, Nye County, NV
M. Baughman, Lincoln County, NV
D. Bechtel, Clark County, NV
D. Weigel, GAO
P. Niedzielski-Eichner, Nye County, NV
B. Mettam, Inyo County, CA
V. Poe, Mineral County, NV
F. Mariani, White Pine County, NV
R. Williams, Lander County, NV
L. Fiorenzi, Eureka County, NV
J. Hoffman, Esmeralda County, NV
C. Schank, Churchill County, NV
L. Bradshaw, Nye County, NV

If you have any questions regarding this letter or would like to discuss these Open Items further, please contact Mark Delligatti, of my staff. Mr. Delligatti can be reached at (301) 415-6620.

Sincerely,

Joseph Holonich, Chief
High-Level Waste and Uranium Recovery
Projects Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Enclosures: As stated

cc: See attached list

Distribution:

Central File	DWM r/f	MKnapp	MBell
JSurmeier	JHolonich	MFederline	NMSSr/f
HLURr/f	LSS	LPDR	ACNW
PDR/LPDR	CNWRA	On-Site Reps	

*See Previous Concurrence
Mark Small Boxes in Concurrence Block to Define Distribution Copy Preference.
In small Box on "OFC:" line enter: C = Cover E = Cover & Enclosure N = No Copy

OFC	HLUR	E	HLUR	C	PAHB*		PAHB*		HLUR			
NAME	MDelligatti		RJohnson	BY	WFord		DBrooks		JHolonich			
DATE	06/14/94		06/16/94		06/ /94		06/ /94		06/ /94			

G:\OI.MSD

If you have any questions regarding this letter or would like to discuss these Open Items further, please contact Mark Delligatti, of my staff. Mr. Delligatti can be reached at (301) 415-6620.

Sincerely,

Joseph Holonich, Chief
High-Level Waste and Uranium Recovery
Projects Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Enclosures: As stated

cc: See attached list

Distribution:

Central File	DWM r/f	MKnapp	MBell
JSurmeier	JHolonich	MFederline	NMSSr/f
HLURr/f	LSS	LPDR	ACNW
PDR/LPDR	CNWRA	On-Site Reps	

Mark Small Boxes in Concurrence Block to Define Distribution Copy Preference.
In small Box on "OFC:" line enter: C = Cover E = Cover & Enclosure N = No Copy

OFC	HLUR	E	HLUR		PAHB	E	PAHB	E	HLUR			
NAME	MDelligatti		RJohnson		WFord		DBrooks		JHolonich			
DATE	06/08/94		06/ /94		06/08/94		06/9/94		06/ /94			

G:\OI.MSD

cc: List

R. Loux, State of Nevada
T. J. Hickey, Nevada Legislative Committee
J. Meder, Nevada Legislative Counsel Bureau
R. Nelson, YMPO
M. Murphy, Nye County, NV
M. Baughman, Lincoln County, NV
D. Bechtel, Clark County, NV
D. Weigel, GAO
P. Niedzielski-Eichner, Nye County, NV
B. Mettam, Inyo County, CA
V. Poe, Mineral County, NV
F. Mariani, White Pine County, NV
R. Williams, Lander County, NV
L. Fiorenzi, Eureka County, NV
J. Hoffman, Esmeralda County, NV
C. Schank, Churchill County, NV
L. Bradshaw, Nye County, NV

SCA COMMENT 123

The effects of ventilation of the exploratory shafts and the underground testing rooms may have been underestimated in the evaluation of the potential interference with testing and the potential for irreversible changes to baseline site condition; also, there is not an adequate analysis of the effects of ventilation in the Experimental Studies Facility (ESF).

EVALUATION OF DOE RESPONSE

In the Department of Energy's (DOE) response to Question 1 of Progress Reports 6 & 7, DOE states that Question 1 is associated with Site Characterization Analysis (SCA) Comment 123. Question 1 and Comment 123 contained overlapping concerns about possible ESF ventilation impacts on the collection of water chemistry samples. As part of the NRC staff's evaluation of DOE's response to Question 1, the staff reexamined the relevance to the Yucca Mountain characterization program of SCA Comment 123. In reexamining SCA Comment 123, the staff determined that Question 1 of Progress Reports 6 & 7 (which remains open) better expresses the staff's concerns on the potential for ESF ventilation to adversely impact collection of liquid geochemical data necessary for licensing. Therefore, the staff is closing SCA Comment 123. Below, the staff discusses its position on the specific issues it raised in SCA Comment 123.

SCA Comment 123 raised a concern about the dewatering effects of ESF ventilation causing test interference. The staff notes that improved ESF matrix dewatering models, by DOE contractors, predict that dewatering effects will be local to the ESF (Peterson, 1988, and Sobolik, 1991). It is anticipated that geochemical effects due to dewatering will be limited to the areas being dewatered. In general, water movement should be toward areas experiencing drying (i.e., the ESF). However, should water that has been chemically altered by evaporation due to ESF dewatering, move away from the ESF, the rate of movement should be very slow due to the existing low permeability of the rock matrix and the lower permeabilities caused by rock dewatering. Therefore, any test interference effects due to dewatering from the ESF are felt to be minor (i.e., close to the ESF).

A second concern raised by the staff in SCA Comment 123 was the potential for ESF dewaterinng to significantly increase the rate of radionuclide gaseous transport. In its reexamination of this concern, the staff observed that most air movement is anticipated to be through open faults and fractures in welded units above, below, and in the repository horizon. Since, borehole data collected indicate that the fractures at the repository horizon are dry, dewatering should have little effect on the rate of air

movement. Therefore, ESF dewatering should not significantly increase the rate of radionuclide gaseous transport from a future repository.

In SCA Comment 123, the staff anticipated that impacts on future repository performance by ESF dewatering could be significant. Upon reexamination, the staff now considers that the heat generated by the radioactive waste packages and ventilation drying by the more numerous tunnels of a future repository will cause much more dewatering of the rock than the ESF. Therefore, any impacts on future repository performance due to ESF dewatering would be small compared to the dewatering impacts caused by the repository.

The NRC staff considers this comment closed.

REFERENCES

Peterson, A. C., *et al.*, Technical Correspondence in Support of an Evaluation of the Hydrologic Effects of Exploratory Shaft Facility Construction at Yucca Mountain, Sandia National Laboratories, SAND88-2936.

Sobolik, S.R., *et al.*, 1991, Movement of Shaft and Drift Construction Water in Yucca Mountain, Nevada - An Extended Study, Sandia National Laboratories, SAND91-0791.

QUESTION 1, PROGRESS REPORTS 6 AND 7

What evaluation has the U.S. Department of Energy (DOE) made of the potential for air movement from the Exploartory Studies Facility (ESF) to adversely impact the collection of geochemical data necessary for site characterization?

EVALUATION OF DOE RESPONSE

The DOE response to this question is contained in two letters from DOE to Joseph Holonich (NRC); one dated September 17, 1993, and another dated August 20, 1993. In its response, DOE states that: "...although data are not yet available to show definitely how ESF construction will affect existing pneumatic or geochemical conditions, DOE has committed to monitor the effects of ESF excavation on this data-gathering program as construction proceeds." Furthermore, DOE has developed a plan to address the State of Nevada's concerns which were expressed in a May 13, 1993, letter from Carl Johnson (Nevada) to B.J. Youngblood (Nuclear Regulatory Commission). In the May 13, 1993, letter, the State of Nevada advocates the collection of data on ambient conditions of gaseous circulation prior to ESF excavation. DOE has stated that the plan to address the State of Nevada's concern will also address this Open Item.

This Open Item expresses the concern that both liquid and gas chemistry data collected from surface based tests might be compromised by the ESF. However, the geochemical aspects of the State of Nevada's concern and DOE's plan focuses only on gas sampling.

The plan proposed by DOE in the August 20, 1993, letter identifies drill holes that will be tested and monitored for gas chemistry data. Six holes are identified; UZ16, UZ14, UZ6, UZ6s, UZ7, and SRG5/SD11 along with possible sampling of 3 more holes; UZ4, UZ5, and UZ13. However, the plan offers no explanation of how the collection of this data will address this Open Item.

Representatives of DOE presented an Accelerated Surface Based Testing Plan on three occasion: at an NRC/DOE Technical Exchange, from October 4-5, 1993; at a meeting of the Nuclear Waste Technical Review Board, from October 19-20, 1993; and at a Scientific Roundtable Interaction on Yucca Mountain Pneumatic Continuity, from January 26-27, 1994. Addressing this Open Item was identified as one of the objectives of the Accelerated Surface Based Testing Plan. From these meetings, it appears the plan to address this Open Item has been expanded from the plan described in the August 20, 1993, letter. The Accelerated Surface Based Testing Plan contains different drill hole locations and identifies geophysical, air permeability, and gas phase tests. The Accelerated Surface Based Testing Plan also lists gas flow surveys,

ENCLOSURE 2

water potential and gas pressure monitoring, and gas and water chemistry sampling activities. However, again at these presentations an explanation was not provided on how the accelerated surface based testing plan would address the concerns of this Open Item.

To address this Open Item the staff needs the current description of the Accelerated Surface Based Testing Plan and an explanation of why DOE feels that the Accelerated Surface Based Testing Plan will address the concerns of this Open Item. The explanation should describe the logic and reasoning that support how the Accelerated Surface Based Plan will address this Open Item. If possible, the explanation should include a description of the potential interference (if any) expected from the ESF, explaining the degree of interference or why the interference is or is not expected. In addition, the staff would like information included on the schedule of hole drilling, the planned frequency of gas and water sampling, and the schedule of data analysis relative to ESF construction. As part of the description, the staff would like information included on drill hole locations (map), geohydrologic units sampled, along with the type of sample (water or air) for each drill hole, and the type of gases to be sampled.

The NRC staff considers this question open.