Department of Energy
Washington, DC 20585

DEC 13 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

Reference: (1) Ltr, Desell to Linehan, dtd 12/19/90
(2) Ltr, Holonich to Shelor, dtd 6/24/93

Dear Mr. Holonich:

Enclosed are the U.S. Department of Energy's (DOE) responses to comments 2 and 3 and Question 6 from the U.S. Nuclear Regulatory Commission's (NRC) Phase II review of Study Plan 8.3.1.5.2.1, Revision 2. The other comments and questions from the NRC's review were addressed in Reference 1. Reference 2 evaluated the responses in Reference 1 and identified the comments and question that still remained as open items after the NRC's review of Revision 2 of the study plan.

One NRC comment related to the collection of data using a thermal scanner. Further review has led to the determination that this technique would not be effective and, consequently, collection of this data is not now planned. The study plan states that the technique was to be evaluated for possible use. The other NRC comment related to age determinations based on the uranium-series disequilibrium method. It should be emphasized that age determinations will be based almost exclusively on carbonate deposits and not the opaline deposits that form the basis for the comment. The NRC question related to the determination of isotopic compositions for "analog deposits" to Trench 14. Strontium isotopes are being used to study calcite deposits in the vicinity of Yucca Mountain, Nevada.

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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:
Responses to NRC Comments

cc:
R. Nelson, YMPO w/o enclosures
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
W. Offutt, Nye County, NV
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

U.S. DEPARTMENT OF ENERGY (DOE) RESPONSES
TO U.S. NUCLEAR REGULATORY COMMISSION (NRC) COMMENTS
ON STUDY PLAN 8.3.1.5.2.1, REVISION 2
(CHARACTERIZATION OF THE QUATERNARY REGIONAL HYDROLOGY)

NRC Comment 2

Planned thermal scanner flight data may not provide sufficient areal coverage for the characterization of regional properties.

DOE Response to Comment 2

DOE has determined from extensive literature review that the use of this technique for the purpose of determining site-scale hydraulic properties of soils would not prove effective. As a result thermal flight scanner data will not be used for determining these properties and the use of this technique will not be pursued.

NRC Comment 3

Spring and other water-precipitated deposits are not being analyzed for organic materials.

DOE Response to Comment 3

Age determinations for Study 8.3.1.5.2.1 are based almost exclusively on carbonate deposits. Carbonates have a crystal lattice that better retains the decay products of uranium. Once deposited, carbonates are a closed system and organic materials do not affect the decay of uranium and its daughter products. Dates based on carbonate materials have proven to be reliable.

Opal, on the other hand, an amorphous substance, is an open system, and has no crystal lattice sites for retention of uranium decay products. Opal also tends to adsorb secondary uranium and thorium subsequent to its deposition, which also adversely affects its use in age determinations. Opal is not used in uranium dating techniques, and is not an influence except in those rare cases where the opal cannot be totally separated from the carbonate materials.

NRC Question 6

Will tracer isotopic compositions be determined for analog deposits and compared to those in Trench 14?

DOE Response to Question 6

It is assumed that the reference to "analog deposits" refers to other calcite deposits in the vicinity of Yucca Mountain that might have the same origin as those in Trench 14. If this assumption is correct, then strontium isotopes are being used to study these types of deposits (see reference to Marshall et al, 1991) in the work being conducted in Study 8.3.1.5.2.1.