Department of Energy
Washington, DC 20585

January 31, 1994

Mr. Kenneth R. Hooks, Acting 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

References: (1) Ltr, Shelor to Linehan, dtd 12/14/90
(2) Ltr, Bernero to Bartlett, dtd 7/31/91

Dear Mr. Hooks:

On December 14, 1990, the U.S. Department of Energy (DOE) transmitted its responses to objections, comments, and questions presented in the U.S. Nuclear Regulatory Commission's (NRC) Site Characterization Analysis (SCA) (Reference 1). The NRC staff evaluated these responses, closing some of the items and creating open items of the remainder (Reference 2). One of the open items, identified above, has been addressed through actions and progress in the program.

The enclosure summarizes the administrative record with respect to SCA Question 58.

DOE believes that the response provided is sufficient to close Question 58 and awaits NRC confirmation.

If you have any questions, please contact Chris Einberg of my staff at (202) 586-8869.

Sincerely,

Dwight E. Shelor
Associate Director for
Systems and Compliance
Office of Civilian Radioactive
Waste Management

Enclosure

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ADDITIONAL INFORMATION ON QUESTION 58

The current Exploratory Studies Facility (ESF) design differs markedly from the two-shaft configuration described in the Site Characterization Plan (SCP). This response includes a brief description of the current ESF concept and a discussion of the concept's ability to adapt to potentially changing testing requirements.

Description of the ESF

The current ESF concept was generated by a rigorous and systematic evaluation of 34 different possible ESF configurations. This process is documented in the "Exploratory Studies Facility Alternatives Study (ESFAS): Final Report" SAND91-0025, which was sent to the NRC on March 3, 1992 (letter from Roberts to Holonich). The preferred alternative, Option 30 in the study, formed the basis for Title I design. Title I was completed in September 1991, and Title II began in October 1991. The NRC has been apprised of the changes in ESF design in all Site Characterization Progress Reports since No. 4 (see letter from Shelor to Holonich dated September 17, 1993). The NRC also received "DOE's Plan for the Phased Approach to ESF Design Development and Implementation" in a letter dated December 19, 1991, (letter from Roberts to Holonich).

The configuration involves access by inclined ramps as opposed to vertical shafts, and includes tunneling on two different levels. Two inclined ramps from the surface provide access to the potential repository horizon, the Topopah Spring Level (TSL). The ramps will intersect the potential repository block at its north and south ends. Drifting in the TSL will include a main exploratory drift connecting the lower ends of the two ramps, a Main Test Area (MTA) which will house a large part of the in situ testing program, and three lateral drifts to explore faulting within and immediately adjacent to the block. A lower level, the Calico Hills Formation (CH), will be accessed via two CH ramps. As in the upper TSL, the ramps will enter the CH at the north and south ends, directly beneath the entry points of the ramps in the overlying TSL. The CH ramps will start in the TSL ramps, approximately 1,000 feet from the TSL ramps' entry point into the potential repository block. Drifting in the CH will include a main tunnel connecting the two ramps and three fault exploratory drifts. An optional vertical shaft is incorporated into the planning. The shaft would be constructed if deemed necessary by operational or testing concerns. The shaft would penetrate to the TSL only and would enter the TSL near the MTA. The attached sketch shows an oblique view of the completed facility.

Flexibility of the Facility

The current ESF subsurface configuration is a much more extensive facility than the SCP's configuration and provides access to a much larger area underground. The equipment used to excavate the ESF, including tunnel-boring machines, roadheaders, mobile miner, and drill and blast machinery, as well as the supporting systems such as ventilation and mined rock conveyors, will be available after completion of the initial excavation of the 14-mile portal-to-portal loop. If a decision is made to incorporate a new test or

cc: w/enclosure

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suite of tests into the facility, the following sequence of events would occur:

- The proposed test(s) would be evaluated to decide if additional underground drifting is needed.
- If needed, the design of the new drifting would be conducted in parallel with the detailed development of the new testing program.
- On completion of the design, the new area would be excavated by the existing equipment.

The ability to handle events such as this is designed into the current facility. Flexibility features include:

- The ramps from the surface to the TSL are to be 7.6 meters in diameter. Even using a conservative maximum airflow velocity in the ramps of 3 meters/sec, a total of 227 cubic meters/second of airflow can be made available in the subsurface. This is roughly twice what is required by the current plans, and does not include the additional air that could be supplied if the optional shaft were constructed.
- The mined rock storage area is designed to accommodate 100 percent more tonnage than is currently planned to be excavated. This allows an increase of 1.5 million metric tons of excavation over that currently planned. This would translate into approximately 14,700 meters of additional 7.6 meter diameter tunnel.

There are no current plans to utilize radioactive materials to simulate the effects of waste packages in the ESF (small amounts of radioactive materials are integral to various types of scientific instruments which will be used). If the DOE decides to include onsite testing with radioactive materials in the ESF, it would request the Director of the NRC's Office of Nuclear Material Safety and Safeguards for concurrence prior to initiating work in this area (10CFR60.18(e)).

A change in program direction requiring the receiving and handling of radioactive sources large enough to simulate waste packages would require a significant effort to design and construct surface facilities and transport systems. This work could be performed in parallel with the design/construction of the underground space needed to carry out the testing. Ample space is available on the surface near the two portals to site the required facilities. There are also existing surface facilities in Area 25 that could be used.

The DOE recognizes the fact that the ESF must have "designed in" flexibility in order to meet its goal of providing the data required to adequately characterize the site. The flexibility exists in the current design to handle major amounts of additional subsurface excavation without having to resort to underground openings. Based on this inherent flexibility, this question should be resolved.

Reference:

Dennis, A. W., (ed.), 1991, Exploratory Studies Facility Alternatives Study: Final Report, SAND-0025, 2 Volumes, Sandia National Laboratories, Albuquerque, NM.