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Mr. Carl P. Gertz, Project Manager
Yucca Mountain Project Office
U.S. Department of Energy
Nevada Operations Office
Phase 2, Suite 200
101 Convention Center Drive
Las Vegas, NV 89109

SUBJECT: ESF Locations

Dear Mr. Gertz:

During the past 5 years this office has observed with keen interest as the conceptual and preliminary designs for the Exploratory Shaft Facility evolved. While a few of our concerns regarding the planning, as expressed in my letter of 5/31/88, have been alleviated, most are still in limbo awaiting resolution in subsequent design processes or at some future discussion or review. This letter will discuss our continuing concern involving the location of the exploratory shafts and their related surface facilities.

In the early conceptual plans, the exploratory shaft collars were located close to midstream in Coyote Wash. At a DOE/ NRC/ State meeting held April 14 and 15, 1987 to discuss proposed changes to the ESF, DOE announced that the conceptual plans were being revised to relocate the shaft collars 440 feet to the northeast. The stated motivation for the relocation was NRC Staff concerns that the original locations were sited in the alluvial fill of Coyote Wash. The new location was said to minimize the likelihood of collar erosion because the shafts would now be collared in hard rock outside the flow channel of Coyote Wash.

At the ESF Title I 50 Percent Design Review meeting held in May of this year, the NRC Staff continued to express concerns related to collar erosion and possible shaft flooding resulting from flood flows in the adjacent Coyote Wash. It appeared that the shift to hardrock and retreat from the center of the wash did not entirely allay the NRC concerns.

The ESF Title One Design Review is currently nearing completion. Reviewing the latest release of Title I plans relating to the surface facilities in the subject area, we note minor revisions in the drainage plans for the Coyote Wash channels that are culverted under the road connecting the ESF pad and drill hole G-4 pad. This situation is in the State's view a bottleneck and will be addressed in future correspondence.

Of major concern with the ESF Design is the analyses and references used to develop the Probable Maximum Flood (PMF) levels. We note that the prime reference for the PMF predictions is a USGS Water-Resources Investigations report, #83-4001, Flood Potential of Fortymile Wash and Its Principal Southwestern Tributaries, Nevada Test Site, Southern Nevada. This report was prepared by Squires and Young. However, in reviewing the Consultation Draft of the Site Characterization Plan, Chapter 3, we get the impression that the DOE has little confidence in the flood prediction studies done to date.

Note the following excerpts from your Draft SCP:

Page 3-8. Regarding runoff:"--scanty data available for the region---". Later: "Quantitative data on rainfall, runoff, and evaporation for the area are not yet adequate to determine rainfall-runoff-recharge relations for individual storms, seasons, or years. Therefore, only general knowledge of runoff parameters is available.----- models can't be calibrated until more field data become available."

Page 3-12. Regarding streamflow at Yucca Mountain: "--- almost no streamflow data have been collected."

Regarding floods: "Flood analyses at Yucca Mountain are needed to provide flood data for design and performance considerations."

Page 3-13. Regarding future flooding: "Confidence in predictions of future flooding is lessened because of the sparse historical data, quantitative or qualitative, on streamflow or flooding throughout the region surrounding Yucca Mountain."

Page 3-14. Regarding long term flood predictions: "Predictions are especially difficult for drainages with minimal stream-flow records, such as those in the hydrologic study area."

Page 3-16. Regarding calculating probable maximum flood: "The sparse streamflow records, the availability of only minimal precipitation and storm data, and the absence of data on infiltration-runoff

characteristics for the drainage basins in the Yucca Mountain area requires that many speculations and assumptions would be needed to calculate the magnitude of probable maximum floods in complex drainages the size of Forty mile and Topopah washes. Also, the lack of storm and runoff data throughout the hydrologic study area prevents checking the validity of the various assumptions used."

Page 3-17. Regarding the drainage basins of Busted Butte Wash and Drill Hole Wash: " The regional maximum flood would inundate all central flat-fan areas in these two watersheds."

Page 3-19. Regarding erosion: "The extent of erosion and sediment movement caused by flood flow in Fortymile Wash and its tributaries that drain Yucca Mountain is not known quantitatively."

Regarding flood and debris hazard: "The sparseness of the historic data base on surface water hydrology, including the movement of both water and debris inhibits accurate prediction of flood and debris hazards for the immediate future. Likewise, a deficient understanding of the paleoclimates and the past geomorphic processes limits the ability to predict climatic changes and their probable effects on flood-and-debris-hazards potential over the next several thousands of years."

Page 3-20. Regarding hazard potential: "The minimal data on stream flow and insufficient knowledge of geomorphic parameters make predictions of flood and debris hazards very speculative."

In looking at the overall Yucca Mountain Project, we view the determination of the PMF or other major hydrologic event as major design uncertainties. Without substantiated hydrologic data on a given site, it is impossible to obtain a PMF at that particular site. Since it is clearly acknowledged in both the CD-SCP and the CDR that no site specific data exist for the Coyote Wash area, it becomes a question of conservatism as to the determination of the PMF.

The problem is that the design depends on the PMF determination and the PMF determination is likewise dependent upon the design. PMF is determined by considering hydrologic data, which is sparse, and the planned structures in the wash that will cause backwater effects, damming, etc. In a relatively narrow wash, such as Coyote Wash, the peak level of the PMF is

highly dependent on the existence of such obstructions.

In order to insure that the ESF shafts will be safe and free from the damage due to major hydrologic events, it is critical to place the shafts in a position and at an elevation that the engineering and scientific community as a whole agree as safe from the PMF. At their current locations, the shafts certainly do not meet this standard.

We certainly concur with the discussion contained in the Draft SCP: flood prediction at Yucca Mountain is indeed very speculative. Our obvious question is, therefore, how can you confidently site the ESF shafts that will technically be an integral part of the licensed repository in Coyote Wash considering the unfounded, admittedly deficient condition of the potential flood data? We might further point out that the other proposed shafts, the ramps and the surface facilities described in the CDR all may have a similar problem.

This office is prepared to discuss our concerns regarding the ESF location with your staff at any time.

Sincerely,

Robert R. Loux
Executive Director

RRL/jrg

cc: Robert Browning, NRC