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Fm P. PRESTWOLT/20

J. Jones

16-Jun-1989 14:22

### Location of the Exploratory Shaft Facility

The location of the Exploratory Shaft for site characterization was developed in a screening analysis done by the Project Office in 1982 and published at a later date (Bertram, 1984). The Bertram Report examined multiple criteria to arrive at a preferred area for the single exploratory shaft location. The Bertram analyses focused on the science and data quality aspects of the exploratory shaft. One of the recommendations of the Bertram Report was that additional detailed mapping be performed in the area of the 5 alternate shaft locations proposed in the Report. That mapping was performed by the USGS and documented in a July 16, 1982 letter (Dixon to Vieth) transmitting the results of the requested mapping. The requested mapping was intended to cover only the immediate area of the proposed shaft locations; geologic information for the regions including and surrounding the proposed locations is also available in a later USGS geologic map (Scott and Bonk, 1984). The field information supporting both the detailed maps and the subsequent USGS (Scott and Bonk) map were actually plotted in the field on the same air photo. Map coverage of the areas is thus complete. The mapping was, in fact, performed by the same individual.

Subsequent to the Exploratory Shaft site location selection, a decision was made by the DOE in 1984 to incorporate a second shaft at the Yucca Mountain site. This decision was made at the time of preparation of the EAs. The second shaft was specifically added for a secondary egress owing to safety considerations. The emergency egress shaft location was outside of the preferred area of the Bertram Report for the science/testing shaft. A study was performed by the ESF A/E to analyze the location for the emergency egress shaft. That study noted that there were no geological features identified that would influence the location of the second shaft within a 500 ft. radius of the first shaft. The letter transmitting the results of that study (Cross to Dryden, Aug 9, 1984) noted that the conclusions and the recommended location for the second shaft were reviewed by the USGS. As the ESF design and site characterization concepts matured following the issuance of the EA, it became clear to the DOE that it would be necessary to make changes to the ESF concepts presented in the EA; one of these changes was to move the exploratory shaft locations in response to an expressed NRC concern about flooding. The proposed changes were discussed with the NRC and an agreement signed in April, 1987. The shafts have remained at those locations since that time. The science/testing shaft has remained inside the area identified in the Bertram screening study and the egress shaft has remained just outside the boundary, allowing a 300 ft separation between the shafts.

The preferred area in the Bertram Report was developed for a single science shaft, small facility. The physical size of the area would constrain any flexibility for layout of a two shaft facility. A greater separation of the shafts results in a lower likelihood that both shafts could be within the area recommended by the Bertram study. Incidentally, in their comments on the SCP/CD, the NRC has said that they wanted the separation of the shafts to be much greater than the 300 ft. selected by the DOE. A greater separation would, of course, place the egress shaft farther outside of the screening area in the Bertram Report.

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United States Department of the Interior

GEOLOGICAL SURVEY  
BOX 25046 M.S.  
DENVER FEDERAL CENTER  
DENVER, COLORADO 80225



IN REPLY REFER TO:

June 1, 1989

WBS: 1.2.9.1  
QA: QA

Carl P. Gertz  
Yucca Mountain Project Office  
U.S. Department of Energy  
P.O. Box 98518  
Las Vegas, NV 89193-8518

Dear Carl:

An eastward-dipping normal fault has been interpreted to occur in Coyote Wash on the basis of electrical resistivity contrasts modeled in two sections parallel to the wash (Smith and Ross, 1982, plates II and V). On the map of plate V, the fault is shown as a solid line across the wash, and it is dashed at both ends and queried at the northern end (dashes indicate considerable uncertainty). On the sections of plate II, the fault is shown as a dashed line.

The possible occurrence of the fault has been inferred solely on the basis of modeling of contrasts in electrical resistivity. However, these contrasts could equally be caused by other contrasts in material properties not related to faultings such as differences in the degree of fracturing, moisture content, and mineralogy. Furthermore, two published geologic maps that are based on detailed field mapping show no surficial evidence of faulting at this location (Lipman and McKay, 1965, and Scott and Bonk, 1984)

The Yucca Mountain Project currently is conducting a Technical Assessment Review on geological and geophysical evidence pertaining to the structure geology of the exploratory shaft location. The purposes of this review (which is being conducted under quality assurance procedures) are to (1) review the data and interpretations on which the Smith and Ross (1982) report is based; (2) review the results of other geologic and geophysical interpretations that relate to the possibility of faulting in the vicinity of the exploratory shafts; and (3) determine what interpretations are allowed by the evidence. Presently, no definitive statement can be made on the occurrence of a fault at Coyote Wash. However, once the review is completed, on the basis of the weight of evidence, a collective judgment will be made regarding the structural geology in this area.

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The Exploratory Shaft Location Documentation Report (Gnirk, et al.) contains, on p. 66, the sentence: "The new locations are within the Coyote Wash ES site area identified and recommended on the basis of the results of the ES site screening activity in 1982 (Bertram, 1984)." The Gnirk, et al. Report was intended to be solely a compilation of existing historical documentation with sufficient commentary to relate the historical documentation to current questions about the ESF. The authors of that Report did not specifically identify or reference any documents containing analyses indicating that the new shaft locations were, in fact, clearly within the area identified by Bertram. The sentence in question reflects a general impression of the authors that the shaft locations were inside of the area. On the scale of the maps in the Bertram Report, the egress shaft plots so near the boundary of the area that it is not clear whether the location is inside or outside of the area. It is important to bear in mind that the Bertram Study was a screening exercise and the criteria of that study are neither absolute, nor, as has been pointed out by the NRC staff, did they clearly relate to waste isolation. The questions of impact to isolation capabilities was subsequently the subject of SCP section 8.4 and the DAA Comparative Evaluation. That evaluation concluded that consideration of waste isolation potential in the shaft location selection process would not have changed the choice of the current location and may have strengthened the the scientific basis for choosing the current location. It also concluded that the presence of a shaft at any of the locations considered would not be expected to significantly affect the waste isolation capability of an associated repository. Those conclusions are not sensitive to the absolute boundaries of the areas of the Bertram Report; they are valid for limited regions surrounding the areas.

#### Undetected Faulting in the Area of the ESF

Questions have been raised about the extent of the mapping done in the area of the ESF. The USGS has formally published two detailed geologic maps that encompass the area of the exploratory shafts. The later of these two maps (Scott and Bonk) was prepared by the USGS as part of their responsibilities in the characterization of the Yucca Mountain Site. The decision to publish the Scott and Bonk map reflects a thorough review of all available geologic data. In particular, the proposed occurrence of the "resistivity" fault was known to both the authors of the map and those that reviewed it prior to publication. The possible occurrence of the fault has been inferred solely on the basis of modeling of contrasts in electrical resistivity. However, these contrasts could equally be caused by other contrasts in material properties not related to faulting such as differences in the degree of fracturing, moisture content, and mineralogy. The two published geologic maps are based on detailed field mapping, and show no surficial evidence of faulting at the ESF locations. It is also important to note that the detailed mapping of the ESF location referenced in the Dixon letter was also done by Scott using the same techniques and scales as the later published Scott and Bonk Report.

The DAA presents a recommendation to evaluate the consequences of an exploratory shaft intersecting a fault and possibly creating a preferential pathway to the accessible environment. Although there is not, in that recommendation, explicit recognition of the fault suggested by the resistivity profiling, the impact of such a fault would be covered by the proposed analysis. The Project Office is currently conducting a Technical Assessment Review, under Quality Level I procedures, of the available evidence pertaining

to the structural geology of the exploratory shaft location. Once that review is complete, a collective judgment can be made regarding the structural geology, including the possibility of the presence of the "resistivity" fault, in that area. The review is anticipated to be completed by the end of July.

The concerns expressed above are partially symptomatic of the fact that information from different time periods in the rapidly changing environment that has characterized the HLW program for the past several years is being compared and contrasted. This is perhaps occurring without sufficient time being devoted to examining both the reasons why certain positions are no longer considered valid and the manner in which they have been incorporated and tracked into newer program positions. The DOE may need to assess the benefits to the program of undertaking an evaluation of the types of information addressed in this note to more fully analyze and explain the current program positions and how all of the older information is treated in these positions. As the concerns are clearly related to the ESF (owing to the incorporation of the shafts into the repository), the DOE may want to consider focusing efforts on the surface based program while undertaking a study, related to ESF activities, that addresses concerns such as those described. As a benefit, new information from the surface based studies would provide information to confirm the adequacy of the current project positions on the ESF and the correctness of treatment of the older data.

On the other hand, there may be significant benefits to aggressively pursuing early ESF field activities. Site preparation, for example, would provide an early opportunity for direct, three dimensional information about the rock structure. This could provide confirmatory information as well as early indication of potential problems. As a next step, construction of the first 100 ft or so of shaft could provide another opportunity to examine the rock and structure in detail.

The Yucca Mountain Project considers it important to initiate new site characterization activities so that these technical issues, some of which are quite old, can be resolved. This cannot be done until we move forward with new site characterization activities.

BOB MILLER, Acting Governor

STATE OF NEVADA

Administration 782/888-4670  
Air Quality 888-3468  
Construction Grants 888-4670

Groundwater 782/888-4670  
Waste Management 888-3472  
Water Pollution 888-4670



DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**  
801 South Fall Street  
Carson City, Nevada 89710

June 5, 1989

ACTION E 20  
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Frank E. Bingham, Director  
Environmental Protection Division  
Department of Energy  
Nevada Operations Office  
P.O. Box 98518  
Las Vegas, Nevada 89193-8518

Re: Modification, Nevada Test Site Air Quality Operating Permit No. 1591

Dear Mr. Bingham:

The Division of Environmental Protection has reviewed the application in accordance with NAC 446.707 and determined that additional information is needed as detailed in the attached staff memo.

Sincerely,

*L. M. Dodgson*  
L. M. Dodgson, P.E.  
Administrator

LHD:mlw  
Attachment  
cc: Lowell Shifley

JUN 8 1989

L. H. Dodgion  
June 2, 1989  
Page 2

3. Number of acres which will be disturbed for each activity

Mr. Bingham's May 15 letter does state that the drilling activities will be less than two acres of disturbance. The mapping program will use existing test pits, pads, and roads. However, the exact disturbances should be indicated on the topographic map.

4. Method of controlling TSP emissions and post activity area stabilization

Mr. Bingham addresses dust control adequately in his May 23, 1989, letter. The proposed dust control is a standard method.

5. Associated activities which will generate TSP, such as increased traffic to the sites.

No mention is made of secondary particulate emissions in either of Mr. Bingham's letters. The increased vehicle traffic and quantified emissions should be detailed.

The fee of \$200.00 has been received.

From the above, it can be determined that the application for amendment to Operating Permit 1591 is incomplete.

BOB MILLER, Acting Governor

STATE OF NEVADA

Administration 702/688-4670  
Air Quality 688-5045  
Construction Grants 688-6870

Groundwater 702/688-46  
Waste Management 688-50  
Water Pollution 688-46



DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
DIVISION OF ENVIRONMENTAL PROTECTION  
201 South Fall Street  
Carson City, Nevada 89710

June 2, 1989

MEMORANDUM

TO: L. H. Dodgion, Administrator

FROM: Lowell H. Shifley, Jr., P.E. *LHS*  
Air Quality Officer

SUBJECT: DOE Request for Modification to Operating Permit 1591

The additional information required in your letter of May 15, 1989, to Frank Bingham, has been partially addressed, as follows:

1. Detailed description of "prototype testing activities"

Mr. Bingham's letter of May 15, 1989 does include a descriptive statement on these activities. However, no mention is made of how many boreholes will be drilled, depth and diameter.

2. Location of each such proposed activity

The two specified locations for the activities (south of the Yucca Mountain area and the east side of Fran Ridge on the NTS) is too general. Section, township and range or UTM coordinates are required. Also, a topographic map indicating the exact location of the disturbances is required.

10122 P. 3

Sincerely,

*Larry R. Hayes*

Larry R. Hayes  
Technical Project Officer  
Yucca Mountain Project  
U.S. Geological Survey

cc: W. Wilson, USGS/Denver  
R. Raup, USGS/Denver  
D. Jorgensen, USGS/Denver  
YMP-USGS Local Records Center

LRH/WW/klh  
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