DAVIS CANYON
DATA REVIEW AND COMMENTS

APRIL 1986

STATE OF UTAH

HIGH LEVEL NUCLEAR WASTE OFFICE

INTRODUCTION

The following comments are based primarily on a review of the seismic portions of "Seismic reflection, gravity and aeromagnetic studies of geologic structure in the Davis and Lavender Canyons candidate area, Paradox Basin, Utah" by Kitcho et al. (1984). These comments were developed after analyzing portions of the data, the processing procedures, and the interpretations of the DOE and its contractors. This comment document is organized by issue. The issues are related to stratigraphy, structural geology, and dissolution, in that order. Issues are identified and discussed, and then the implications of the comments on specific guideline findings are noted. (These findings are reported in the guideline findings report distributed at the OCRWM ISCG meeting in Dallas.)

Most of this information was reviewed and discussed with DOE representatives in Denver, Colorado at the office of J.J. Richards Inc. on February 13-14, 1986. In attendance were:

Mike Ferrigan	DOE/SRPO
Jim Hileman	ONWI
Don Turner	ONWI
Ivan Wong	WCC
Jeff McCleary	WCC
Jack Richards	J.J. Richards, Inc.
Janice Perttu	State of Utah HLNWO
Cynthia Brandt	Utah Geological and Mineral Survey (UGMS)

REVIEW RESPONSIBILITIES

Review and analysis of seismic data and interpretation leading to this report was performed by UGMS personnel with assistance from HLNWO personnel. Review of well log data was performed by HLNWO personnel with assistance from UGMS personnel.

STRATIGRAPHY

Major Comments:

In the Draft Environmental Assessment for Davis Canyon (DEA), the evaluation of many of the guideline conditions relies heavily on the assumption that stratigraphic units in this area are continuous and predictable. This assumption is in large part dependent upon the data and interpretation offered in Kitcho et al. (1984) on the structure and stratigraphy of the Davis Canyon/Gibson Dome region.

The uncertainty in conclusions reached in the Draft Environmental Assessment with regard to the depth, thickness, and consistency of stratigraphic units bears heavily on findings related to site geology. The evaluations which lead to these conclusions are based on surface geology, well log data, and seismic reflection data. As discussed in the State's DEA comments (March, 1985), the limited set of available data requires interpolation over large areas. Based on the following analysis, it now appears that the available data could support alternative interpretations which appear less favorable to the site than those published by DOE contractors.

Detailed Comments:

1) The seismic reflection data were acquired, reprocessed, and interpreted under the direction of J.J. Richards, Inc. (herein referred to as JJRI), a DOE

contractor. JJRI used stratigraphic picks, which are difficult for independent reviewers to objectively assess, because there is no velocity control to establish an empirical time-depth relationship. JJRI felt that the magnitude of velocity variations across the study area precluded the usefulness of a velocity survey in GD-1. Furthermore, the nearest existing velocity survey, which was shot several miles away, was also considered by JJRI to be unusable for the Davis Canyon area. In spite of the lack of an empirical time-depth relationship, JJRI expressed confidence that the stratigraphic picks were accurate because of personal knowledge of the area held by JJRI personnel. DOE representatives stated that constructing a meaningful time-depth relationship would have been overly difficult and time-consuming.

Without the development of a time-depth relationship, the EA interpretation of the Davis Canyon stratigraphy is solely dependent upon an expert's "eye." This approach to geophysical interpretation is not acceptable within the context of repository site selection. Because of the relationships between siting decisions and health and safety and the foreclosure of siting options at each decision point, conservative and objectively assessable procedures should have been employed to render defensible interpretations of site conditions. Such procedures do not appear to have been employed by DOE subcontractors in key instances.

2) Based on discussions in Denver, the State of Utah believes that the well log data were not integrated consistently into the seismic interpretations because of the absence of an empirically defined time-depth relationship. Tying the well log information to the seismic lines is appropriate and standard procedure and could have been done at GD-1. WCC representatives

reportedly attempted to correlate well log data with the reflection data at an earlier point. In these earlier efforts, errors were often hundreds of feet in magnitude. Consequently, the interpretation of the seismic reflection data was used only to identify faults and the general structure of the Davis Canyon area but not to provide quantitative information on stratigraphy.

3) The reflector which corresponds to the top of the Paradox Formation is difficult to discern or follow, even on seismic lines judged to be of good quality. Reprocessing might improve the clarity of some of the seismic lines in the shallower horizons. Velocity control would also help define the top of the formation. If this reflector cannot be recognized and traced with reasonable assurance, constant salt thickness and lack of dissolution cannot be deduced from the seismic data.

4) The State of Utah believes that a velocity survey should have been run in GD-1 to establish a time-depth relationship in the study area. Velocity variations may exist in the study area, but we do not believe that the magnitude is such that the velocity information would not be helpful. Furthermore, some of the other wells close to the seismic lines (within 1 mile) should have been tied into the lines with synthetic seismograms. Until these procedures are completed, the seismic data provide little objective data on stratigraphic thickness or depth. Consequently, the existing well log data must provide the basis for depth and thickness interpretations of the repository horizon.

5) Well log data alone are inadequate for characterizing stratigraphic changes in the area. There are few wells which intersect Salt Cycle 6 in the immediate site vicinity. Figure 1 shows the location and DEA designation of

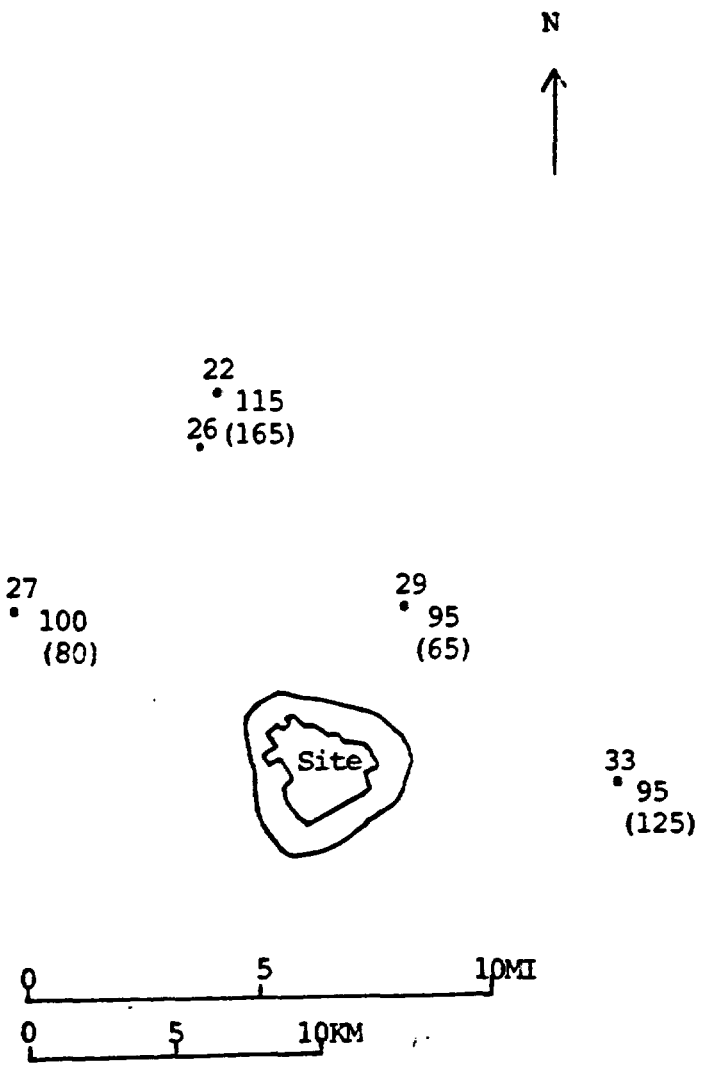

Figure 1. Well locations nearest Davis Canyon site. Modified from DEA.

these wells and the repository location. Due to the limited amount of data and the large distances between data points (about 5 miles), a large degree of uncertainty exists in the stratigraphic projections.

6) <u>There is no indication from the well log data that carnallite will not occur in the repository area</u>. <u>If the carnallite zone is not an appropriate repository host, the thickness of the repository horizon is greatly reduced</u>. Based on the well log data, Salt Cycle 6 is estimated to be about 200 feet thick in the repository area. The presence of carnallite in Salt Cycle 6 is well documented. There is also general agreement that the repository should not be located in the carnallite zone because of the zone's 1) high solubility; 2) high magnesium content (which would lead to more rapid corrosion of the waste package); and 3) high water content. The State of Utah does not feel that the well log data support the conclusions stated on page 3-109 of the draft EA:

> Potash mineralization in the Paradox Formation occurs primarily north and east of the geologic repository operations area. The estimated southern boundary of this mineralization is north of the site (Hite, 1982a, p.3) (Figure 3-25).

Discussions with DOE confirmed that the carnallite zone can be identified with radioactivity logs and can be correlated from well to well. The following is a list of carnallite thicknesses in the wells closest to the site and the thickness of the salt underlying the carnallite. These values are shown in Figure 1.

Well no.	Carnallite thickness	Salt thickness below carnallite
29	65	95
33	125	95
26	well log didn't indicate carnallite	
22	165	115
27	80	100

A conservative assessment of the data would assume that carnallite will occur in the repository area. If only the non-carnallite zone of Salt Cycle 6 below the carnallite is considered as the repository host horizon, then the repository horizon thickness would be predicted to be about 95 feet. This estimate is below the minimum adequate thickness of 100 feet stated in the Davis Canyon DEA.

GUIDELINE FINDINGS AFFECTED BY THE ABOVE INFORMATION

960.4-2-1 Geohydrology

All of the geohydrology conditions rely on a clear understanding of the stratigraphy. The uncertainty of the data has not been clearly represented. The repository site lies about 12 miles (DEA Figure 3-14) from the southwestern depositional boundary of Salt Cycle 6. The effects of facies changes towards this margin have not been addressed. If facies changes are occurring, the hydrologic properties determined in GD-1 may not be applicable at the site. The well control in this direction is minimal; consequently, the potential for rapid stratigraphic changes has not been assessed.

960.4-2-2 Geochemistry

Comments have already been made on the adverse effects of carnallite. It is hoped that potential impacts of these effects have been re-evaluated with the knowledge that carnallite will likely occur in close proximity to the proposed host horizon.

960.4-2-3 Rock Characteristics

Favorable Condition 1- A host rock that is sufficiently thick and laterally extensive to allow significant flexibility in selecting the depth,

configuration, and location of the underground facility to ensure isolation.

Analysis: The probable occurrence of carnallite in the repository area reduces the predicted thickness of the host horizon to 95 feet which is insufficient to meet the recommended minimum salt thickness of 100 feet. The finding that the favorable condition is present has not taken this information into account. This indicates that the finding was not based on the conservatism required by the implementation guidelines.

Potentially Adverse Condition 2- Potential for such phenomena as thermally induced fractures, no hydration or dehydration of mineral components, brine migration, or other physical, chemical, or radiation-related phenomena that could be expected to affect waste containment or isolation.

Analysis: The DRA evaluation states: "Potential for deleterious effects in host rock properties caused by thermal dehydration of carnallite minerals present in salt cycle 6 is not apparent, as discussed in Section 3.2.7.1." This condition was found to be present apparently due to the existence of corrosive brines. Since the presence of carnallite is highly probable, the adverse condition is also present due to the potentially deleterious effects of thermal dehydration of carnallite.

Potentially Adverse Condition 3- A combination of geologic structure, geochemical and thermal properties, and hydrologic conditions in the host rock and surrounding units such that the heat generated by the waste could significantly decrease the isolation provided by the host rock as compared with pre-waste-emplacement conditions.

Analysis: Same as PAC 2. The analysis that found the condition not present did not take into account the physical properties of carnallite.

STRUCTURE

The structural geology of the site was defined primarily by seismic reflection data and was also described in Kitcho et al. (1984). In Kitcho et al. (1984) faults on the Mississippian reflector and on the top of salt reflector are shown in Figures 5-3 and 5-4 respectively. A detailed interpretation by the State of Utah of all of the seismic data at the Denver meeting would have required more time than was available. In the interest of a timely review the following observations were based on a general overview of the seismic data and a detailed evaluation of seismic lines 33 and 37.

Detailed Comments:

1) The number of faults in an area is directly proportional to the seismic coverage. Figure 5-3 in Kitcho et al. (1984) shows faults on the Mississippian reflector and seismic line locations. The area of the proposed repository site has few faults mapped, but it is important to note that there is minimal seismic coverage as well. In contrast, the area north of the site has dense seismic coverage and numerous mapped faults. There is no indication that there should be a drastic change in geologic character between the site and the area north of the site. Consequently, the State questions whether the lack of faulting in the repository area is an accurate reflection of the geology or, rather, a reflection of the data concentration. A conservative evaluation would anticipate the high probability of additional fault identification in the site area as additional seismic data are gathered.

2) Faults are preferentially oriented perpendicular to the seismic lines. Review of maps in the Kitcho et al. (1984) and reference material indicates that the majority of the seismic lines runs northeast and that the majority of the faults trends northwest. The northwest trend is consistent with the regional structural trend. Orientation of the seismic lines and knowledge of regional trends may have biased the way faults were mapped. The bias towards northwest and subordinate northeast trends was evident in our summary discussion in Denver. In the February 13-14 meeting, Utah questioned whether offsets on two different seismic lines might not have been generated by the same fault. This interpretation would have oriented the fault north-south. The DOE representatives responded that north-south faults could not exist in the area. Preconceptions of this sort can obscure legitimate alternate conclusions supported by the data. It was also unclear to the State of Utah whether lateral movement on faults was considered in the seismic reflection analysis (or data collection).

3) The State of Utah's detailed examination of aspects of seismic lines 33 and 37 indicated that the vertical extent of several faults could be interpreted to be higher than that indicated by DOE contractors. The proposed theory that faulting in the area of the proposed site ceased during early Paradox time has not been conclusively demonstrated and has not been uniformly applied in other DOE interpretations. Younger faults have been interpreted by the DOE to be the result of collapse caused by dissolution. Contradicting this view is the Lockhart Basin area interpretation in Figure 5-3 of McCleary (1983). This figure shows possible faults cutting the Paradox Formation-Honaker Trail Formation contact.

4) The data permit the interpretation of faults in places where DOE contractors interpreted marked stratigraphic changes. On line 37, reflectors were noted to be offset from below the top of the Mississippian reflector to the near surface. Offset reflectors are generally an indication of a fault. If this is a fault, then it is within the repository area at about the same location as DOE Fault EEE, which is shown to intersect only the Precambrian reflector. The orientation of the newly identified possible fault is unknown but it appears to intersect seismic line 37 at an oblique angle. The offset is down to the northeast. Information in Figure 6-1 and Table 6-1 in Kitcho et al. (1984) confirms the existence of structural changes at the top of the Paradox Salt in this area. Figure 2 shows the elevation of the top of salt in Davis Canyon using the information from Table 6-1. An increase is noted in steepness of the dip in the area between shot points C and D. The fault which the State of Utah believes may be inferred is in this same location and has the same sense of offset.

5) Aeromagnetic surveys indicated that faults are located in Davis Canyon. Utah personnel learned in Denver that interpretations of proprietary aeromagnetic surveys included in Kitcho et al. (1984) will be deleted in future editions. The interpretive maps by Geoterrex, which accompanied the contoured magnetic anomaly maps, showed faults and magnetic anomaly trends. Several faults were shown on this map, many of them lateral faults. One north-northeast trending left-lateral fault is located in Davis Canyon. The significance of these faults cannot be readily evaluated because the rationale for their locations, as well as their absence from subsequent geologic reports, has not been explained.

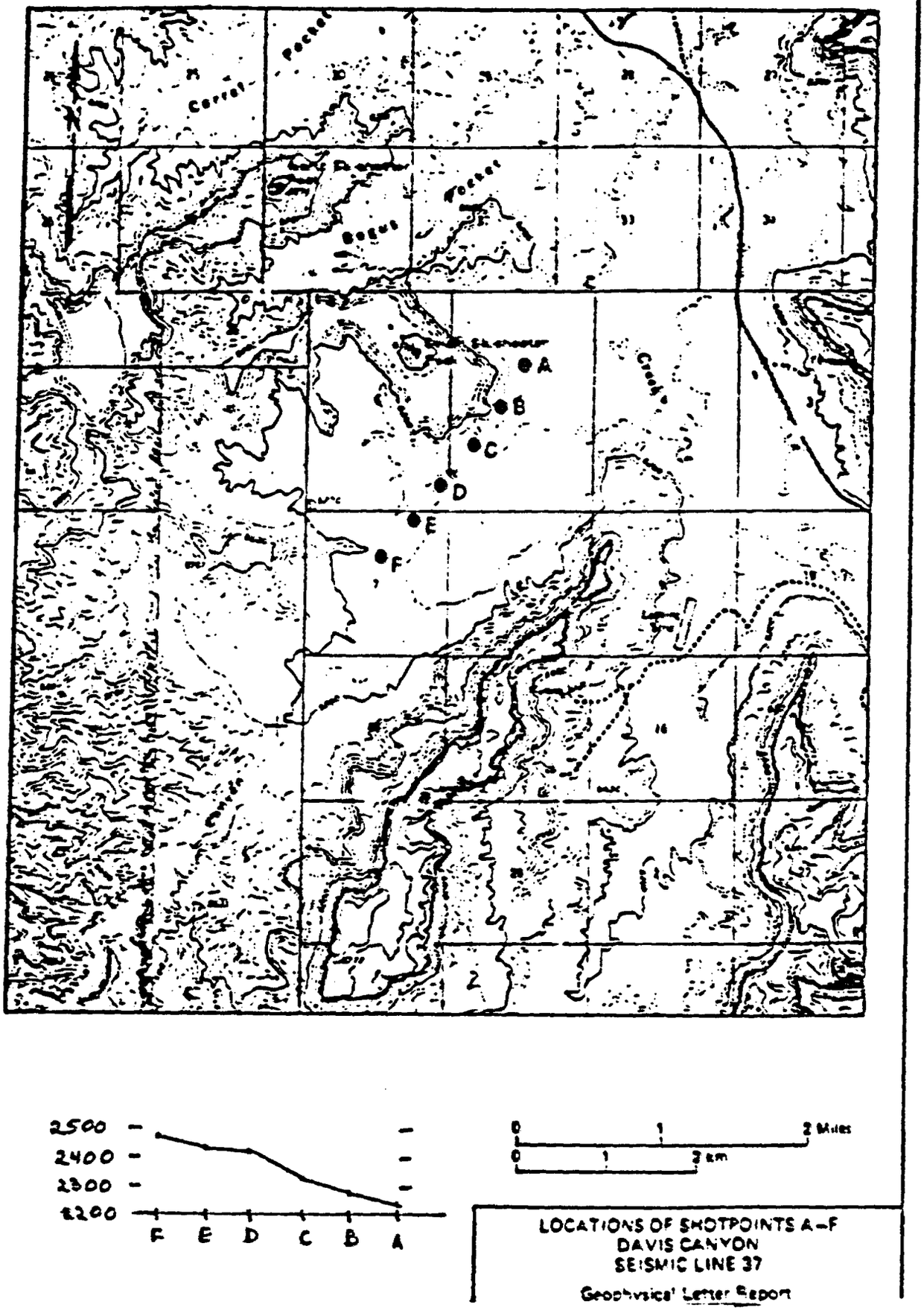

Figure 2. Elevation of top of salt. From Kitcho et al., 1984.

This evidence strongly suggests that faulting occurs in the repository area. The propagation of faults through salt is very poorly understood and widely debated. However, if a fault can be traced on a seismic line through the salt, the physical properties of the fault may differ from the surrounding rock and should be investigated.

KITCHO REPORT COMMENTS

Utah comments concerning Kitcho et al. (1984) which were developed prior to the seismic data review were also addressed by the DOE and its contractors at the Denver meeting. Some of the items discussed at that time were drafting and editing errors in Kitcho et al. (1984), which had not been corrected at the time of the meeting. These will not be discussed at this time, although they raise concerns with the thoroughness of the review of contractor reports which served as the basis for DEA findings.

On Figure 5-3 of Kitcho et al. (1984), the contouring around the central part of Fault D is not supported by the seismic data (see Figure 3.). It indicates a greater amount of offset in the central area of the fault, where there are no data, than in the areas where there are data. The contouring also juxtaposes a closed structural low and a closed structural high across a fault. Standard contouring procedures take into consideration the relationship between features on opposite sides of faults.

After some discussion at the Denver meeting about whether the existing contouring was merely a different but justifiable interpretation of the data, it was recognized that the interpretation was more complicated than indicated by the data. DOE contractors stated that this type of "optimistic" contouring is the norm in the petroleum industry: If the data do not disallow it, an

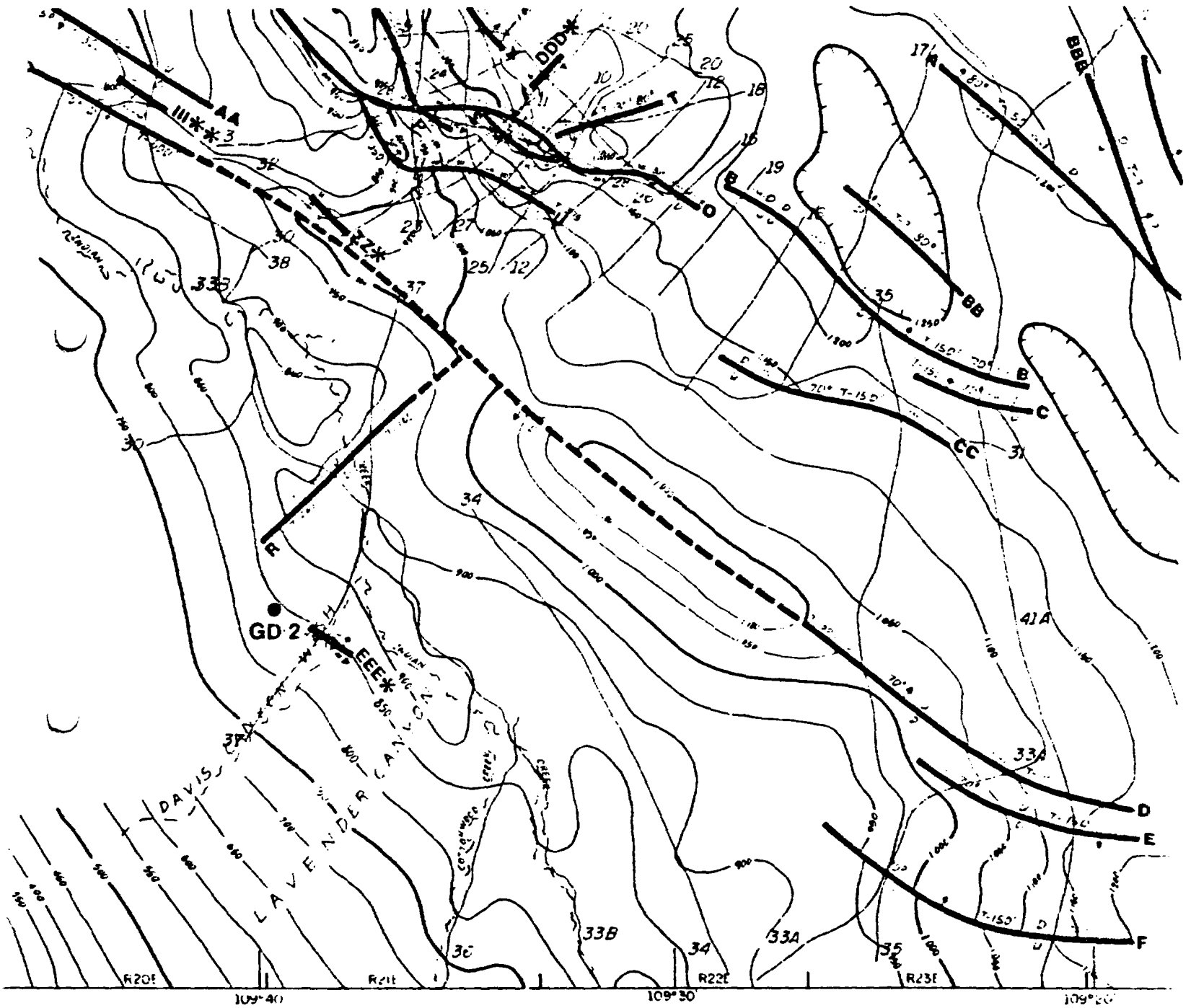

Figure 3. Reflection times on top of Mississippian reflector. From Kitcho et al., 1984.

interpretation which suggests potential drilling targets is used. DOE contractors agreed that this area should be recontoured to better represent the data.

A possible alternate contouring approach is shown in Figure 4. This approach reduces the offset across fault D. It also eliminates the appearance that the north end of Fault R has a different sense of offset (south side up) than the south end of Fault R. This is a better approach because the data do not indicate such an offset change.

The contouring at the south end of Fault R reflects unwarranted certainty about existing conditions (refer to Figure 3). The reflection time contours south and west of Fault R are drawn continuously. The contours are not dashed or question marked as is standard practice when no data exists. Drawing the contours continuously conveys to the reader a certainty that Fault R does not continue to the southwest. In fact, reflection data indicate that the offset on Fault R, is increasing to the south, so it is probable that Fault R does continue to the southwest. With the knowledge that the offset is increasing southwestward, a more accurate map would show a dashed continuation of the fault and dashed reflection time contours south of the fault.

In the Lockhart Basin area, Faults KKK and O show offsets that would produce a horst in the Paradox Formation (Figure 5). McCleary (1984) shows cross-sections showing a graben in the Paradox consistent with dissolution and collapse. Seismic line 39, which crosses Fault O, was reviewed and found to be of very poor quality; it could not, therefore, support the indicated interpretation. Consequently, it was agreed to dash the faults and change the sense of offset on both Faults O and KKK.

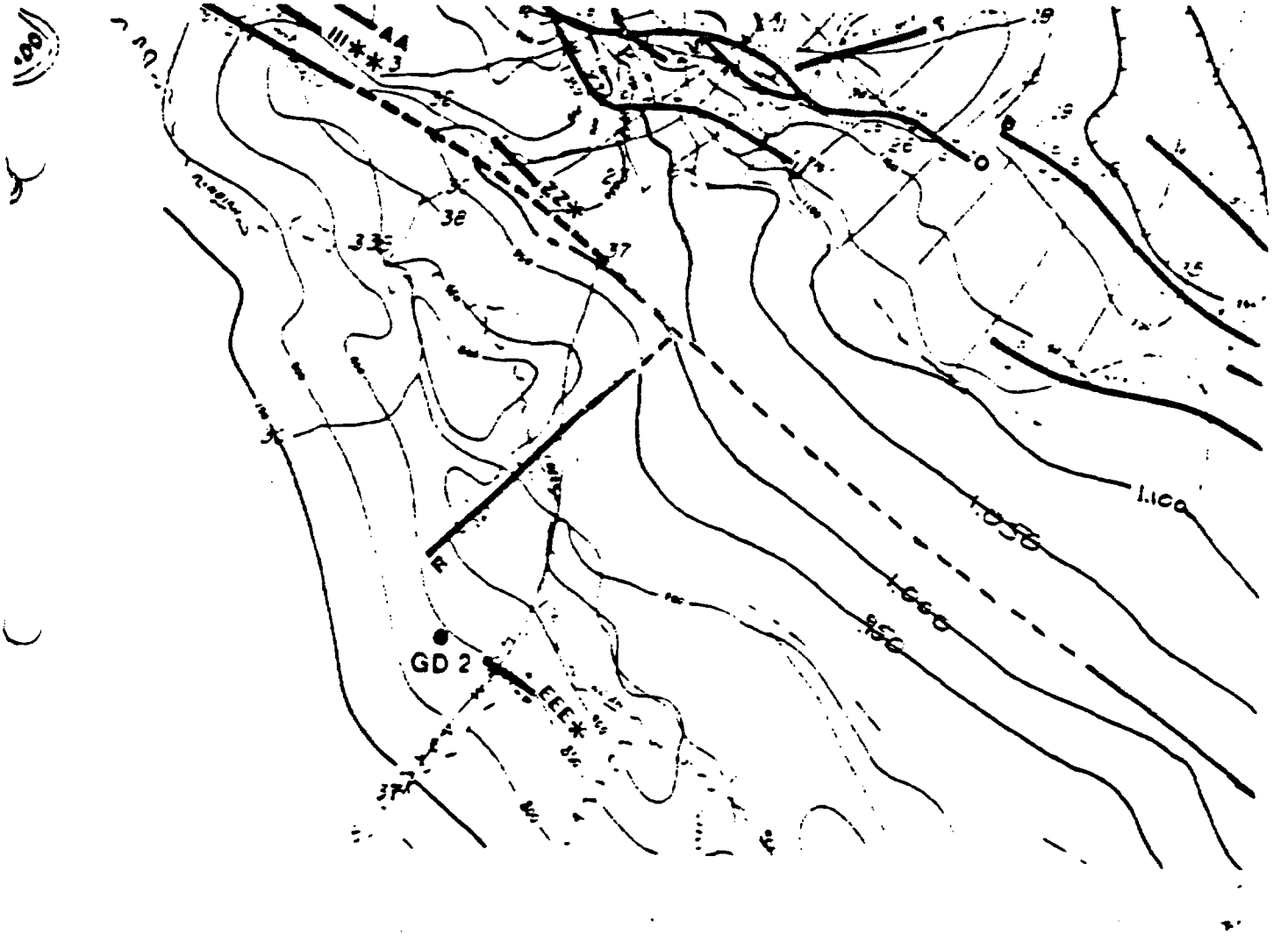

Figure 4. Possible revised contouring of reflection times on top of Mississippian reflector. Modified from Kitcho et al., 1984.

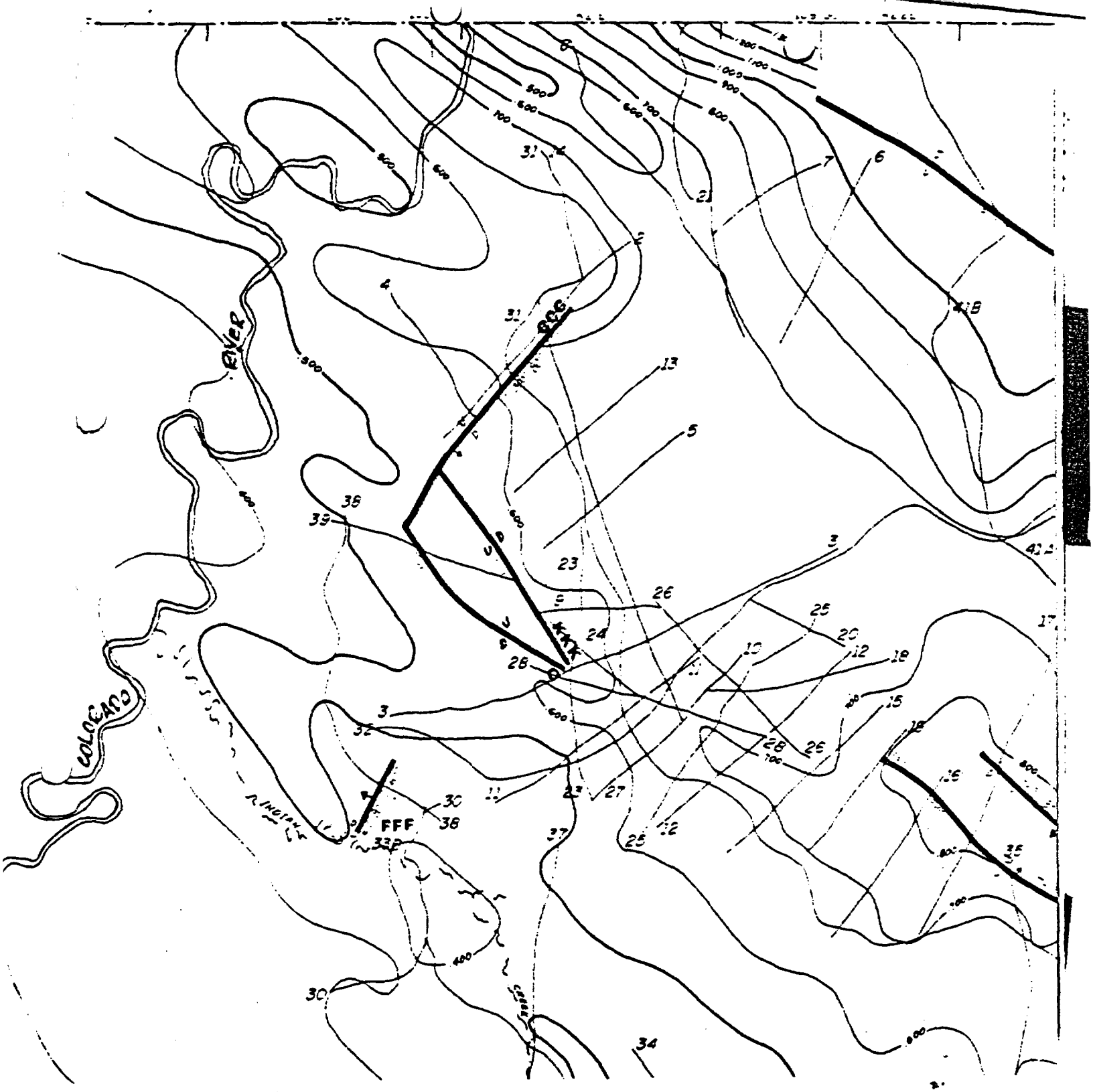

Figure 5. Lockhart Basin faulting. From Kitcho et al., 1984.

GUIDELINE FINDINGS AFFECTED BY THE ABOVE INFORMATION

960.3-2-1 Geohydrology

Qualifying Condition - The present and expected geohydrologic setting of a site shall be compatible with waste containment and isolation. The geohydrologic setting, considering the characteristics of and the processes operating within the geologic setting shall permit compliance with (1) the requirements specified in Section 960.4-1 for radionuclide releases to the accessible environmental and (2) the requirements specified in 10 CFR 60.113 for radionuclide releases from the engineered-barrier system using reasonably available technology.

Analysis: Evaluation of the seismic data indicates a possible fault in the site. Kitcho et al. (1984) also indicates a possible fault in the top of salt in the same area. If this fault does exist in the site area and links the repository horizon with the upper and lower hydrostratigraphic units, considerably shorter radionuclide travel times to the accessible environment could result. The large amount of faulting shown in areas where sufficient data exist suggests that the site may be underlain by similar faults. A conservative analysis would assume a similar structural style in the site area. This guideline condition evaluation should have considered the potential for flow through secondary porosity in light of the preceding discussion.

Favorable Condition 1 - Site conditions such that the pre-waste-emplacement ground-water travel time along any path of likely radionuclide travel from the disturbed zone to the accessible environment would be more than 10,000 years.

Analysis: As discussed above faulting would greatly reduce groundwater travel times. DOE changed its original finding to not present in their revised findings because of the difficulty in modeling the hydrologic system using the existing data set. The possible existence of faults in the site would reduce the travel times and complicate modeling further.

Favorable Condition 3- Sites that have stratigraphic, structural, and hydrologic features such that the geohydrologic system can be readily characterized and modeled with reasonable certainty.

Analysis: The DEA recognized that this favorable condition was not present; however, this decision was based on a lack of data. The State of Utah concurs with this finding. In addition to the general lack of data with which to identify hydrologic parameters and boundary conditions, the data that is present suggests the presence of faults in the site area. Since the extent, location, and conductivity characteristics of these faults are not known, the geohydrologic system cannot readily be characterized or modeled.

Favorable Condition 4 d(i)- A host rock and immediately surrounding geohydrologic units with low hydraulic conductivities.

Analysis: Faults extending through the salt section could have very high hydraulic conductivities. The evaluation that the favorable condition is present did not consider this factor.

Potentially Adverse Condition 3- The presence in the geologic setting of stratigraphic or structural features-such as dikes, sills, faults, shear zones, folds, dissolution effects, or brine pockets- if their presence could

significantly contribute to the difficulty of characterizing or modeling the geohydrologic system.

Analysis: The DEA found that this adverse condition was present because of adverse geologic conditions in the site vicinity. The draft continues: "However, because of the distance of known features such as these from the site and their generally widely dispersed occurrence within the geologic setting, it is not certain to what degree they will add to the difficulty of characterizing and/or modeling the geohydrologic system." The faulting north of the site, where there is a significant amount of geophysical data, is not widely dispersed; rather, it is closely spaced. The possibility suggested by existing data that this type of faulting may underlie the site was not considered in the evaluation of this finding. In conclusion, we feel that the finding is correctly analyzed as present but that there are substantial reasons for this evaluation which have not been addressed in the DEA.

Disqualifying Condition- A site shall be disqualified if the pre-waste-emplacement ground-water travel time from the disturbed zone to the accessible environment is expected to be less than 1,000 years, along any pathway of likely and significant radionuclide travel.

Analysis: Potential faulting within the site could connect the repository horizon and the upper and/or lower hydrostratigraphic units. Depending on the permeability of the fracture, the travel time to the accessible environment could be greatly reduced.

960.4-2-3 Rock Characteristics

Qualifying Condition - The present and expected characteristics of the host rock and surrounding units shall be capable of accommodating the thermal, chemical, mechanical, and radiation stresses expected to be induced by repository construction, operation, and closure and by expected interactions among the waste, host rock, ground water, and engineered components. The characteristics of and the processes operating within the geologic setting shall permit compliance with (1) the requirements specified in Section 960.4-1 for radionuclide releases to the accessible environment and (2) the requirements set forth in 10 CFR 60.113 for radionuclide release from the engineered-barrier system using reasonably available technology.

Analysis: If faults are identified in the site, they must be taken into account when estimating thermally and mechanically induced stresses in the repository. Even if they are shown to have healed and are not permeable, faults may still be zones of weakness or as discussed in Chaturvedi, 1984, may contain pressurized gas pockets.

DISSOLUTION

General Comments:

The identification of dissolution features is extremely important in this geologic setting particularly because of the differences they could make in modeling the performance of the total containment system. Very little information has been gathered on known dissolution features in the study area. Furthermore, there is a limited degree of understanding on the mechanisms of their formation, particularly their development over time and their relationships to other geologic features. The level of uncertainty at this time must play a significant role in absolute and comparative site evaluation.

One section in Kitcho et al. (1984) purports to have the ability to identify dissolution features using geophysical means:

> Geophysical studies in the Lockhart area aided in characterizing the signature of a known dissolution area on gravity and seismic data. Knowledge of these signatures helps verify that no other such areas are present in the Davis Canyon area. Geophysical surveys detected no Mississippian faults that could potentially cause similar dissolution conditions in Davis Canyon (Kitcho et al., 1984, p. 26).

Our analysis of these geophysical interpretations in the Lockhart Basin area has identified many inconsistencies. Gravity anomaly A (discussed on page 19 and shown on Figure 5-5) is a gravity high over Lockhart Basin reflecting dissolution. The authors state on page 26 that "Fault O bounds the collapsed area in the subsurface" and that "the gravity high over Lockhart basin is attributed to the absence of salt." The gravity anomaly crosses south of Fault O, extends across seismic line 38, and is <u>not</u> centered over Lockhart basin. Kitcho et al. (1984) also states: "Seismic line 38 shows salt present along its entire length, yet the gravity anomaly which is supposed to indicate dissolution overlaps this line. <u>These inconsistencies shown in Figure 6 indicate that the ability to identify dissolution features using geophysical means is limited by the resolving power of the seismic tools</u>.

<u>Favorable Condition</u> - No evidence that the host rock within the site was subject to significant dissolution during the Quaternary Period.

> The DEA evaluation states that there are no indications of Quaternary or earlier dissolution within the site." The discussion above establishes that the available data are not sufficient to make that determination. In addition, the interpretation that Mississippian faults do not exist in the site may be in error as discussed in the structure section of this report. These faults may cause salt dissolution.

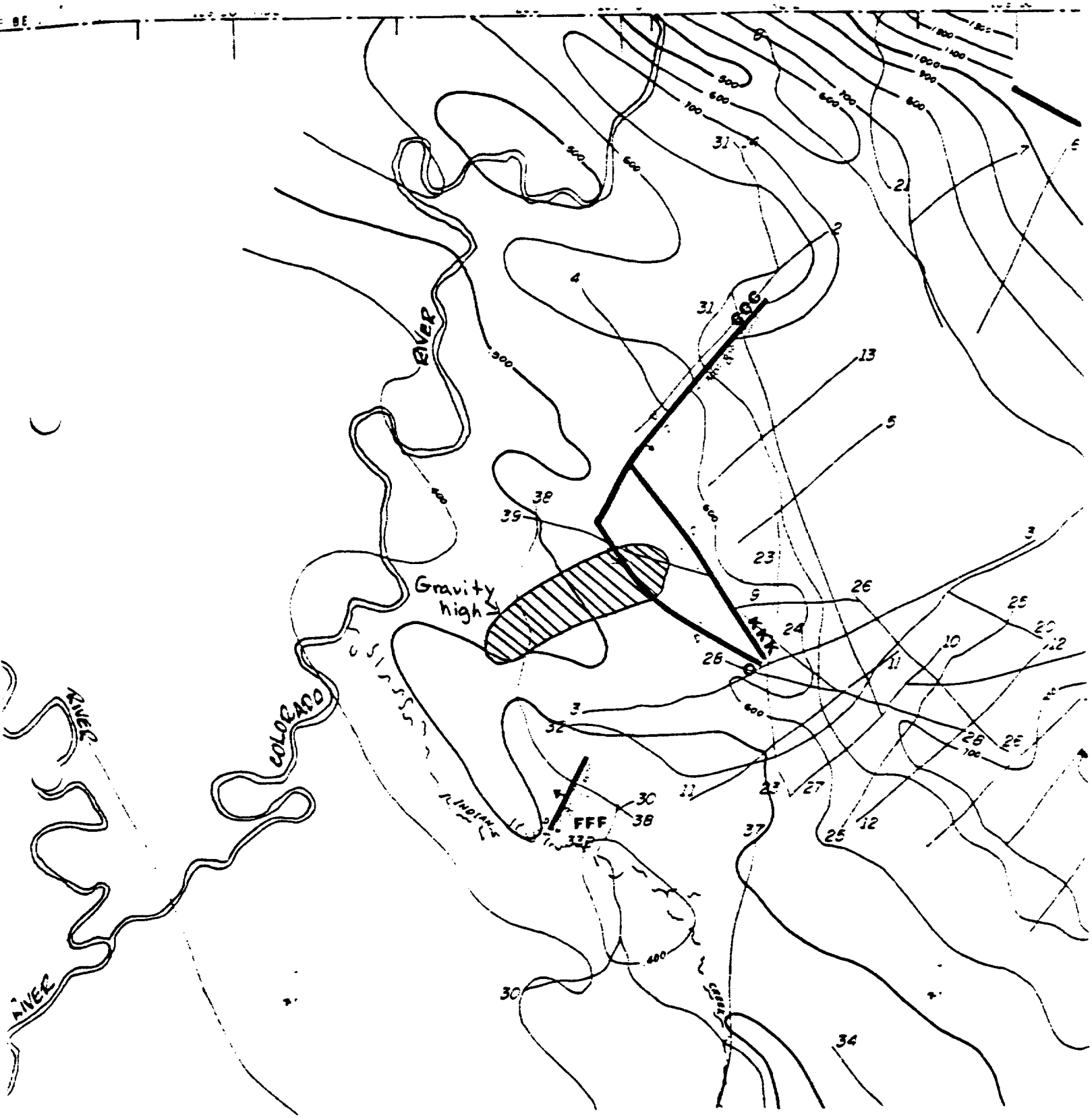

Figure 6. Relationship between Lockhart basin, a gravity high, and seismic line locations. Modified from Kitcho et al., 1984.

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McCleary, J., 1984. Stratigraphic and Structural Configuration of the Navajo (Jurassic) Through Ouray (Mississippian-Devonian) Formations in the Vicinity of Davis and Lavender Canyons, Southeastern Utah, draft perpared by Woodward-Clyde Cosultants for Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus, OH.

KM

M1

DEA Well designation

Salt thickness below carnallite (ft.)

Carnallite thickness

Figure 1. Well locations nearest Davis Canyon site. Modified from DEA.

Figure 2. Elevation of top of salt. From Kitcho et al., 1984.

Figure 3. Reflection times on top of Mississippian reflector. From Kitcho et al., 1984.

Figure 4. Possible revised contouring of reflection times on top of Mississippian reflector. Modified from Kitcho et al., 1984.

Figure 5. Lockhart Basin faulting. From Kitcho et al., 1984.

Figure 6. Relationship between Lockhart basin, a gravity high, and seismic line locations. Modified from Kitcho et al., 1984.

Department of Energy
Washington, DC 20585

MAY 12 1986

Mr. Patrick D. Spurgin, Director
High Level Nuclear Waste Office
355 West North Temple
3 Triad Center, Suite 330
Salt Lake City, UT 84180-1203

Dear Mr. Spurgin:

This letter is in response to your recent letters about an analysis of geological and geophysical data by your office relative to the Davis Canyon site. In those letters you urged that in light of the analysis certain guideline findings be reevaluated.

As you know, the Department's draft environmental assessments were issued for public comment in December 1984. The public comment period officially closed in March 1985. During that time we received thousands of comments, including many from the State of Utah. After the end of the comment period, we continued to receive additional comments with the understanding they would be considered as time permitted. The final environmental assessments had originally been scheduled for release in December 1985. That release was postponed to allow the National Academy of Sciences to review our decision-aiding methodology. The Academy's review was completed in late March 1986, and we currently plan to issue final environmental assessments by mid-May.

Given the time required to prepare the final environmental assessments, your analysis arrived too late to be considered part of the comment process. However, the analysis was reviewed by geoscientists from this office. The data on which the analysis is based are equivocal and subject to a wide range of interpretation. Our interpretation benefited from the numerous public comments we received on geoscience issues at the Davis Canyon site. That interpretation, as presented in the final assessment, is prudent and well within accepted professional standards. Furthermore, analysis you provided would not change the findings in the environmental assessments.

cc Jim.
Jack
Response?

I understand your concern over the application of geotechnical data at the Davis Canyon site. Indeed, this concern is common to all the sites. In addressing the issue prior to site characterization, we have applied best professional judgement given the available data and its inherent uncertainties. With the continued efforts of your State and others in monitoring and reviewing our future technical studies, that judgement can only improve.

Sincerely,

Ben C. Rusche

Ben C. Rusche, Director
Office of Civilian Radioactive
Waste Management