Lawrence Livermore National Laboratory
NUCLEAR SYSTEMS SAFETY PROGRAM
L-196

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Mr. M. E. Blackford, MS-623ss
Project Officer, WMGT
Technical Review Branch
Division of High-Level Management, NMSS
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Transmittal of Letter Report on a Review of "Status Report on the Tectonic Fracture and Breccia Study in the Vantage Area," SD-BWI-ER-005, by Tolan et al. (1983).

Reference: NRC FIN A0297

Dear Mr. Blackford:

This is to transmit the subject Letter Report on our review of a DOE document related to the BWIP Site. This review was accomplished by Robert D. Bentley, a consultant member of our LLNL team.

The subject DOE document is concerned with aspects of structural geology of the Cold Creek Syncline and its comparability to the Vantage Area. This DOE document, if completed fully, can be a valuable reference as we believe that numbers of outlined technical items in the DOE document once they have been completed, could assist the NRC in estimating the hydrologic significance of tectonic fractures. Because the subject DOE document is preliminary, we feel that the document has a very limited value and useage at this time. Bentley pointed out several points of inadequacies and limitations in the DOE document.

If you have any questions, please let us know.

Sincerely yours,

Dae H. (Danny) Chung
Program Manager

DHC/ic
Encls. as stated.

cc: H. E. Lefevre, NRC/WMGT
K. McConnell, NRC/WMGT

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WM Project: WM-10, 11, 16
PDR w/encl
(Return to WM, 623-SS)

WM Record File: A0297
LPDR w/encl

LLNL Document Review Sheet

Review Document Number:SD-BWI-ER-005 (REVIEWED WITHOUT PLATE 1)

Topic: Structural Geology of the Cold Creek Syncline: The comparability to the Vantage area.

Site Applicability: B W I P

Document: Chamness, N., Tolan, T. L. (1983 Status Report on the Tectonic Fracture and Breccia Study in the Vantage Area, SD-BWI-ER-005

Reviewer: R. D. Bentley Robert D Bentley

Date Review Completed: 11/15/87

Brief Review of Document:

The authors have initiated a fracture analysis and areal study in the northern part of the Yakima Fold Belt near Vantage. This study area was selected because it may have been deformed similar to the Cold Creek syncline and because it is not possible to study tectonic features directly in the Cold Creek syncline.

This document is only a preliminary paper that does little more than outline the problem, beginning with some of the physical characteristics of breccia zones and fractures that may influence the hydrogeologic properties of basalt within a broad synclinal area.

Is the Vantage area syncline comparable the Cold Creek syncline? Both areas are located in broad synclines occuring between two narrow anticlinal ridges. However, the Vantage area is dominated by a major northeast trending transpressional cross structure (Ryegrass Mountain Structure) and the Cold Creek syncline contains no analogous structure except that it lies inline with the plunge of Yakima Ridge. Many of the fractures described here (Figures 11 - 17) are associated with this Ryegrass Mountain structure and therefore, the density of tectonic features may not be directly analogous to the Cold Creek syncline.

Significance to NRC Waste Management Program:

This document is of little value to the NRC because of its very tentative nature. If the study is completed as outlined many of the results could assist the NRC in estimating the hydrologic significance of tectonic fractures.

Problems, Deficiencies or Limitations of Report: Most of the report is preliminary and inadequate. The following items illustrate this.

1. The Grande Ronde units are poorly described in the stratigraphic section (p. 14) of the report yet many of the tectonic features mentioned in the report (Areas A, B, C? and D) occur in upper Grande Ronde units.

2. No details are presented in any of the areas of study (Figures 11 - 17). Therefore, evaluation of the suggested terminology is very tentative and of little value. Most of the fractures sited in this report are typical of mildly deformed basalt such as might be expect in the Cold Creek syncline.

3. No data of thicknesses of the Vantage Member are presented (p.14). Where is it absent? Are any of the contacts invasive? How is the average 9 meters arrived at? Hopefully, this type of data is not used to support the growth of the Hog Ranch axis in Vantage time. It is well exposed in many roadcuts along I-90 within the study area.

4. Ginkgo thickness data presented on page 16 suggests that the flow thins on the Frenchman Hills but no details are described across the structure. Is it regional thinning or is it related to growth structures? Three Ginkgo flows may be present in the area but no details are presented. This type of "documentation" is typical of the type of data presented in several recent papers (Reidel, 1983) to support the growth structures in the Yakima Fold Belt. A flow must thin on both sides of a structure to document a growth structure.

5. The stratigraphy of the Sand Hollow flow is much more complex than described on pages 16 and 17. It thins irregularly across the Ryegrass Mountain and Hog Ranch structures but much more thickness data is needed to properly evaluated whether the thinning is regional or related to growth of structures.

6. The Sentinel Gap flow as described in this report (p.17) must include a Rye (Sand Hollow) flow of Bentley and Powell (1984*) in the north and west part of the map area. This flow ends abruptly as described by Mackin (1961). An upper flow lobe is present in the southern part of the study area which was not recognized by the authors. * This report present maps and cross sections of the Vantage area at a scale of 1:12,000.

7. The channel fill of the Roza flow as described on page 18 probably does not exist but is a locally thickened area just northwest of the end of the Sentinel Gap flow.

8. Where is the locality where the Elephant Mountain flow overlies the Beverly interbed as mention on page 19? The Elephant Mountain flow is unknown west of the Columbia River. The outcrop

referred to in this report (p. 20) is Priest Rapids basalt. This illustrates the very tentative nature of this report.

9. Where in this area does the Beverly Member conglomerate underlie the Elephant Mountain flow as suggested on page 19. This is not true.

Action Taken: Submit to NRC. Suggest to NRC that they acquire copy of updated map of the area.

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'87 NOV 30 A10:18

WM Record File A0297 WM Project 10,11,16
Docket No.
PDR ✓
X LPDR ✓ (B, A, S)

Distribution:
Blackford
(WM, 623-SS)