

JUN 26 1972

W. Gammill, Chief, Site Analysis Branch, L

GEOLOGICAL RECONNAISSANCES TO HANFORD 2 AND GRAND COULEE DAM, WASHINGTON, 6-12-72 THRU 6-15-72

Introduction

The purposes of the trip were to review the results of the latest investigations at the Hanford 2 site, examine the 15 foot deep trench recently excavated across the proposed site of the reactor building, and to conduct a geological reconnaissance of the region around Grand Coulee Dam.

Hanford 2

On 13 June the USGS representatives and I were accompanied by representatives from WPPSS, Burns and Roe, and Shannon and Wilson to the Hanford 2 site. The trench across the reactor site is 15 feet deep by about 200 feet long. The sides of the trench had raveled so badly that it was impossible to see the stratigraphy. We were able to clean off the sides at several locations and thus spot-check exposures. The upper two feet of soil (a sandy silt), which is probably of about the same geologic age as the Touchet beds in the PPTF area, was exposed and showed no indications of being displaced. Beneath the silt was a two to five foot thick layer of gravel which did not appear to be displaced. At one end of the trench there were several filled-in cavities extending several feet into the gravel layer. These features were attributed to animal burrowings which were obviously older than the overlying silt bed.

There were no offsets on either side of these features. Below the gravel layer was a coarse to medium grained sand which extended at least to the base of the trench. The sand was very loose and caved immediately after digging into it. It was impossible to determine orientations of bedding or whether or not this material had been displaced by faulting. The Shannon and Wilson representative stated that detailed photographs had been taken immediately after each section of wall was exposed, and that detailed mapping was accomplished. These documents will be provided as soon as available. Relative density tests made within the upper 15 feet of soil, which we had requested earlier in order to confirm the results of standard penetration tests, indicated that the parameters based on

OFFICE ▶					
SURNAME ▶					
DATE ▶					

B605220260 720626  
PDR ADOCK 05000397  
A PDR

the standard penetration tests taken during subsurface investigations were completely inaccurate (actually 40 to 50% average relative density instead of the computed 75% minimum). WPPSS and consultants had not yet decided what course of action to take, but were considering excavating to the top of the Ringold formation (about 40' depth) and backfilling and compacting up to the foundation grades. They were told that they must assure us that the material below 40 foot depth met the criteria of 75% minimum relative density. The same method of determining relative densities above 40' depth was employed to compute relative densities of the material below this level; therefore, the competency of the deeper soil is questionable. However, seismic refraction data indicate that there are sharp increases in compression wave velocities below this level, indicating a more dense material. I told them that they must substantiate the relative density values derived from the standard penetration blow counts below a depth of 40 feet by some means other than the seismic refraction data.

I again explained our reasons for requiring the boring into bedrock as follows:

1. to confirm the results of the geophysical surveys which, when used alone, can be misleading;
2. to aid in defining the structural geology beneath the site and its relationship to the regional geology to confirm along with the other data that there is no geologic structure that could be of greater significance to the site as an earthquake generator than the Rattlesnake Wallula structure.

Grand Coulee

On the afternoon of June 13 we traveled to Grand Coulee. A list of attendees for the geologic reconnaissance is attached.

Messrs. Viers and Neff of the Bureau of Reclamation took us to the terrace exposures along the Columbia River north of Grand Coulee and pointed out the location at which the dated sample mentioned in the Blume report was taken. It had been reasoned that since material similar to this overlay the Colville Fault in an undisturbed state, the last movement along the fault was at least older than this material. The test indicated that the soil, which belonged to the Nespellum formation, was at least 27,400 years old. Our criteria for determining that a fault is inactive require that it be demonstrated that movement along that fault has not occurred in less than 35,000 years. Additionally, the Nespellum formation is apparently a "catchall" formation which contains a conglomeration of material deposited between the beginning of Pleistocene (one million years ago) and Recent

time.				
OFFICE ▶	CRM			
SURNAME ▶	G. Z. Z.			
DATE ▶				

We next traveled up to the south "end" of the westernmost fault of the Colville fault zone (Republic Graben). On reconnoitering this area, we used the USGS geology quadrangle map based on the work of M. Staatz. The map shows that this portion of the fault transects the Nespellum formation. It could possibly be a printing error as the fault line coincides with a contour line and may have been mistakenly blacked in instead of dashed. The dashed line would indicate that the fault lay under the soil but did not displace it, thus providing proof that movement had not taken place since deposition. Bob Morris of the USGS will contact Staatz to determine whether or not the fault does in fact displace the Nespellum formation. We located in the field, with some difficulty, the exposures shown on the map, but were unable to determine the location of the fault trace.

The geological reconnaissance to Grand Coulee did not alter the conclusions stated in our preliminary report dated 9 June 1972. In this report it was stated that the applicant had not adequately demonstrated the conservatism of its proposed SSE and OBE acceleration values of .16 and .08, respectively. The age of last movements along the Colville faults must be determined, and the limits of the southern extension of the fault must be established, particularly if the age of last movement is indeterminate or is marginal by AEC criteria.

DISTRIBUTION:

1 - Suppl  
 L - Rdg  
 AD/SS - Rdg  
 SAB - Rdg

R. B. McMullen, Geologist  
 Site Analysis Branch  
 Directorate of Licensing

cc: S. Miner, L  
 J. Shea, L

Note: On 21 June, Mr. Morris, USGS, called and stated that the solid line denoting surface faulting was a printing error. Mr. Staatz had confirmed that the fault did not offset the Nespellum formation. Mr. Staatz had also expressed his belief that the graben is continuous across the Columbia River, downstream from Grand Coulee Dam, and that the faults were formed concurrently with the resurgent phase of intrusive igneous activity within the Colville Batholith. This event occurred in Late Miocene, or more than 25 million years ago. It is still up to the applicant to demonstrate that the Colville Fault Zone is inactive by AEC criteria.

OFFICE ▶	L:SA				
SURNAME ▶	RBMCMULLEN:pad	CRISS			
DATE ▶	6/26/72				

ATTENDEES AT GRAND COULÉE MEETING  
June 14, 1972

Bureau of Reclamation

G. Neff  
R. Viers

WPPSS

R. Chitwood

J. A. Blume & Associates

F. Conwell

USGS

F. Houser  
R. Morris

AEC-L

R. McMullen

OFFICE ▶					
SURNAME ▶					
DATE ▶					