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BWIP Bulletin

SEISMIC DATA REPROCESSING RESULTS

NONTECHNICAL SUMMARY

In an effort to obtain more accurate, detailed information regarding the feasibility of basalt as a potential waste repository site, seismic reflection data were recently reprocessed using more detailed analytical techniques. The seismic reflection method uses energy waves in a manner similar to sonar to visualize the top portion of the basalt rock through the several hundred feet of sediments which cover it. These data have indicated several seismic features. The cause and geologic significance of these features are not currently known. They could be due to such things as changes in the properties of the overlying sediments, bedrock erosion prior to sediment deposition, poor data quality, or structural deformation. The seismic reflection technique appears to be a good screening method for allowing the project to quickly and relatively cost effectively focus on important areas. Project emphasis will be placed on collecting additional data to more accurately characterize this area and will review the data and plans with the Nuclear Regulatory Commission and consultants. These data, along with the results from many other types of tests, will be utilized to make a careful future determination of whether or not the site can meet the stringent criteria established by the Environmental Protection Agency and the Nuclear Regulatory Commission.

TECHNICAL SUMMARY

As a part of studies under way by the Basalt Waste Isolation Project (BWIP), approximately 14 line-miles of seismic reflection data were recently reprocessed and interpreted in an effort to more fully characterize the geologic setting of the reference repository location (RRL). As a result of this recent work, one seismic feature was identified on each of the two seismic reflection lines near the proposed exploratory shaft (ES) site. Based on the locations of these seismic features, they may be interpreted to represent a northeast-southwest linear through the ES site.

Interpretation of the seismic reflection data placed strong reliance upon synthetic seismograms and models based upon the known physical parameters of the sediments overlying the basalt. Seismic refraction, gravity and magnetic data, as well as borehole data, were also used to aid in the interpretation of the seismic reflection data. The recent reprocessing resulted in significant improvement in the seismic reflection data quality over previous processing and indicated that this technique provides good potential for identifying features in the sediments and uppermost basalt flows which could be of geologic significance.

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 Docket No. _____
 PDR _____
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Distribution:
RWRIGHT
 (Return to WM. 623-SS) 15

82
679

BWIP Bulletin

BB-84-001

Page 2

Although the two seismic features within the vicinity of the proposed ES site appear to be related to good seismic data, the existing geophysical and other data are insufficient to adequately characterize their geologic significance. The features could be related to one or more factors, including (1) bedrock structure, (fault, monocline, syncline/anticline limb), (2) erosional feature (channel), (3) lateral variation in sediments overlying basalt bedrock, (4) data processing limitations, and/or (5) data quality. Additional proposed investigations to help determine their geologic significance include a gridded seismic reflection survey to more fully characterize the top of basalt and overlying sediment stratigraphy and structure within the RRL. Emphasis will be placed on the area near the current ES site and two identified features. The BWIP Overview Committee and their consultants, as well as the Nuclear Regulatory Commission, will be requested to review the existing data and proposed plan.

For further information, contact B.C.K. Moravek of Rockwell Hanford Operations' Basalt Waste Isolation Project's Communications and Public Affairs Department on (509) 376-7551.

82