
Title: Geophysical and Geological Analysis of a Fault-like Linearity in the Lower Clackamas River Area, Clackamas County, Oregon.

APPROVED BY MEMBERS OF THE THESIS COMMITTEE:

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A fault-like linearity along the lower Clackamas River is evaluated by analysis of physiographic and structural alignments, geological relationships, and by gravity and magnetic data. The study has resulted in the verification of a structural feature extending along the Clackamas River and the eastern front of the Portland Hills.
Physiographic alignments were examined in twelve 15 minute and two 7-1/2 minute quadrangle maps. A significant northeasterly morphologic trend, N. 20° W. and N. 40° W., and other secondary trends, namely, the N-S, E-W, and N. 50-60° E., has developed in the Portland area. The consistent northwest trend is observed throughout the entire area studied which strongly suggests that the alignments are very good indicators of underlying structural features.

Structural alignments show that approximately 60% of the known mapped faults and fold axes concur with the dominant northwest physiographic trend. Seismic first motion analysis supports the established morphologic trend.

A series of regionally co-aligned morphologic and structural features striking S. 40-50° E. across the state of Oregon suggest the presence of a major structural fault system aligned with the Portland Hills-Clackamas River structural alignment.

The geologic cross sections developed from map and well data generally lack any tangible evidence as to the nature of the physiographic alignment. An apparent offset of the lower Pliocene Sandy River mudstone suggests movement as recent as middle Pliocene.

Geophysical information was obtained from six gravity traverses and three magnetic traverses. The consistency of the size and shape of the gravity anomaly, 2.18 milligals/0.2 mile, downdropped to the east, across the physiographic alignment.
defines the zone of a fault or a steep fold developed in the Columbia River basalt. The magnetic anomalies show a consistent change in the magnetic gradient corresponding to the structural zone.