The Portland Hills fault forms a strong northwest trending lineament along the east side of the Tualatin Mountains. An 'en echelon lineament follows North Scappoose Creek, Alder Creek, and the Clatskanie River along the same trend, through Columbia County, Oregon. The possibility that this lineament follows a fault or fault zone was investigated in this study. Geophysical methods were used, with seismic
refraction, magnetic and gravity lines run perpendicular to the lineament. The seismic refraction models indicate the near surface basalt is broken in many places, with 15 - 30 meters (50 - 100 feet) vertical displacement, down to the west, at Bunker Hill along the Alder Creek fault. Gravity models required a faulted zone approximately two kilometers wide across the lineament. The proposed fault zone is more clearly defined in the south, becoming more diffuse and branching in the northern part of the study area. The Bouguer gravity values from this study distort the -40 milligal contour farther to the northwest than is shown on the Complete Bouguer Gravity Anomaly Map of Oregon (Berg and Thiruvathukal, 1967b). The existence of sharp topographic features and the geophysical evidence indicate fault activity along the zone.