

Active Faults In or Near the Proposed Trans-Alaska Gas Pipeline Corridor, east-central Alaska

Gary Carver, Carver Geologic Inc. Kodiak AK (cgeol@acsalaska.net),
Sean Bemis, Dept. of Geological Sciences, University of Oregon, Eugene OR
(sbemis@darkwing.uoregon.edu; ray@uoregon.edu),
Diana Solie, DGGs, Fairbanks, AK (diana.solie@alaska.gov),
Kyle Obermiller DGGs, Fairbanks, AK, and Department of Geological Engineering,
University of Alaska, Fairbanks (kyle.obermiller@alaska.gov),
and
Ray Weldon Department of Geological Engineering, University of Alaska, Fairbanks

During the 2006-07 field seasons we documented four Holocene faults in or near the proposed Trans-Alaska Gas Pipeline corridor between Delta Junction and Dot Lake, Alaska. The Panoramic fault northwest of Granite Mountain trends northeast into the Tanana River valley. It has a 4-m-high west-side-up scarp in Holocene alluvium. Its linear trace and northeast orientation suggest it is mostly strike-slip.

The left-lateral Canteen fault trends northeast along the Little Gerstle River. The fault horizontally offsets Donnelly age moraines 32 m and a Delta moraine 230 m. Assuming OIS stage 2 (~20 ka) and stage 6 (~180 ka) for the ages of the moraines, the fault's horizontal slip rate is 1.3 to 1.6 mm/yr. Trenches and pond sediment cores revealed at least three episodes of faulting. Two sigma 14C ages of 4800-4627, 3206-2897, and 1370-1177 cal BP constrain the maximum ages of these faulting events.

The Dot "T" Johnson fault borders the south side of the Tanana River valley east of the Johnson River. West of Dot Lake the fault forms a mole track scarp on a deformed fluvial terrace. Trenches exposed a 20°-south-dipping thrust and evidence of two faulting events, each with more than 3 m of dip-slip displacement. Maximum 2-sigma limiting 14C ages for the events are 12,089-11,655 and 9287-9015 cal BP. The direction of tilting and sense of terrace offset suggest the fault is a back-thrust of a thrust wedge on a major south-dipping range-front fault, and an eastern extension of the Northern Foothills Fold and Thrust belt.

The Billy Creek fault is north of the Tanana River along a northeast trending topographic lineament. A trench across a southeast-facing scarp shows at least three faulting events represented by vertically offset colluvial wedges on a high-angle fault. The colluvial wedges lack evidence of periglacial reworking and thus presumably are Holocene.