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TITLE: Recent Geologic Studies for the Bradley Lake Hydroelectric Project Alaska

ABSTRACT

The Bradley Lake Hydroelectric Project, the State of Alaska's largest construction project, is located in the rugged Kenai Mountains about 105 miles south of Anchorage and 27 miles northeast of Homer, Alaska. Primary project facilities, will consist of a 605 foot long concrete faced rockfill dam raising present lake level by about 100 feet to elevation 1190 feet and a 19,000-foot long, 11-foot diameter power tunnel connecting Bradley Lake with the powerhouse located at tide level on Kachemak Bay. To design and construct these facilities, a wide range of geologic hazards and potential construction problems have been addressed by 207 test borings, 72 test pits, several miles of seismic refraction and reflection lines and extensive geologic mapping studies. This presentation will summarize the recent Bradley Lake geologic investigations describing selected hazards, construction problems, and the design alternatives. An element in the documentation of the site geology is a consistent method of classifying, logging and mapping the lithologies

Rocks in the Bradley Lake area are part of the McHugh Complex composed primarily of graywacke, argillite, metatuff, greenstone, and chert. These lithologies constitute a greatly deformed and complexly intermixed melange, accreted onto the North American Plate. The overall engineering rock character correlates to the proportions in which constituent lithologies are present. To relate geologic data from the mapping and test borings to engineering properties, rock units have been identified on the basis of relative percentages of each basic rock lithology. This system allows the range of complex structural and lithologic mixtures to be described and correlated to the specific tests that have been performed.

The McHugh Complex is bounded by the Border Ranges Fault and Eagle River Thrust. These two faults, the Aleutian Trench-Arc Megathrust and the locally significant Bradley River and Bull Moose Faults trend NE-SW and are the dominant structural features of the area.

Site preparation work for the Bradley Lake Hydroelectric Project commenced in 1986, general civil construction is expected to start in 1987 and commercial power is scheduled to be online in 1990.

