

GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF ENERGY, MINES AND RESOURCES

CANYON LAKE
WL. 2972-97, July 9, 1952

LEGEND

- | | | | |
|----------|---|--|---|
| CENOZOIC | } | QUATERNARY | |
| | | 3 | RECENT ALLUVIUM: sand, silt, minor gravel |
| | | 2 | GLACIO-LACUSTRINE: silt with minor clay and fine-grained sand |
| MESOZOIC | } | | GRANODIORITE |
| | | | |
| | | Jointing | |
| | | Edge of outcrop | |
| | | Geological Boundary (approximate) | |
| | | Boundary of Campground | |
| | | Swamp | |
| | | Cabin | |
| | | Archaeological Site | |
| | | Area where frozen soil encountered within 18 inches of ground surface (June, 1964) | |
| | | Magnetic Declination 31° 00' E. (approximate) | |

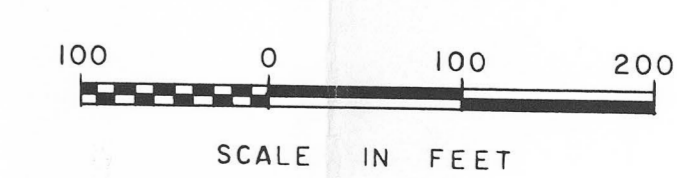
Descriptive Notes

Aishihik and Canyon Lakes occupy a broad, north-trending valley which drains south through Aishihik River. During Pleistocene time the area was glaciated by ice moving north from the St. Elias Mountains. Large quantities of glacial materials chiefly impervious, clayey, silty till (sample No. 1) were deposited on the floor and sides of the valley. Morainic ridges of till extending across the valley floor have acted as natural dams which have partially blocked the drainage and created Canyon and Aishihik Lakes. The till is not exposed at Otter Falls dam site but is visible in cuts along Aishihik Road and bluffs along Aishihik River. It was encountered in several shallow test pits put down in the dam site area. Following glaciation a glacial lake covered a large area to the south and east including much of the valleys of Dezadeash and Takhini Rivers. One arm of this lake extended north into the lower part of Aishihik River valley and as a result the area in the vicinity of Otter Falls dam site is covered with a thin layer of stratified silt and silty clay (samples Nos. 2 and 4). The thickness of these glacio-lacustrine materials in the dam site area as determined by several test pits varies between 6 and 36 inches. Invariably they overlie till or bedrock.

The till should be satisfactory as core material for a rolled earth dam. It contains few boulders sufficiently large that they would have to be removed in order that the soil could be satisfactorily compacted. Large quantities will probably be excavated during construction of the canal from Canyon Lake to Rainbow Falls. The till exposed along the sides of the canal will be relatively stable if it is not frozen. However the frost line was encountered within 18 inches of ground surface in several test pits put down in the dam site area. Considerable ice was observed in the overlying silt and clay and these materials became fluid when allowed to thaw. Test borings will be required along the centre line of the proposed canal to determine the extent of the frozen soil as well as the types of materials which would be excavated.

Bedrock exposed at Otter Falls consists of fine- to medium-grained, grey, biotite, granodiorite. It is a competent rock and should provide excellent foundation and abutment material. Many of the angular rock fragments in the till and boulders in the alluvium along Aishihik River are of this rock type. In places especially on north-facing exposures bedrock surface is highly weathered and covered with up to 24 inches of soft, sandy residual soil. However, in no place should it be necessary to remove more than 4 feet of rock to expose fresh material against which concrete could be placed. There are two sets of joints both of which are common in bedrock throughout the dam site area. The presence of these could lower the competency of the rock mass and increase its permeability. One joint set strikes in a general north-northwest direction and has a relatively steep dip. As indicated on the accompanying joint rosette this set intersects the river at a fairly acute angle and dips steeply both upstream and downstream. The spacing varies from a few inches to several feet. Open fractures up to 6 inches frequently occur along these joints. The other set is a form of sheet jointing with curved surfaces essentially parallel to the surface of the outcrop. The visible spacing varies from 8 to 24 inches with the smallest closest to surface. Openings along these fractures are seldom more than one inch in width and usually less. The presence of these fractures at depth could cause overbreak when excavating and would constitute planes of weakness causing instability in the rock abutment.

Suitable riprap and aggregate could be obtained from bedrock at the site. However cheaper aggregate could probably be obtained from beach deposits around the edge of the former glacial lake. The most likely place to prospect for these materials would be downstream from the dam site along the sides of Aishihik River valley between elevations 2,300 and 2,800.



PACIFIC COAST DRAINAGE
SITE NO. 37
OTTER FALLS DAM SITE
TO ACCOMPANY TOPICAL REPORT NO. 127
GEOLOGY BY E.B. OWEN, 1964