

CANADA  
DEPARTMENT OF ENERGY, MINES AND RESOURCES

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GEOLOGICAL SURVEY OF CANADA  
TOPICAL REPORT NO. 122

YUKON RIVER DRAINAGE BASIN  
DAM SITE INVESTIGATION

SITE No. 33

UPPER LAPIE CANYON DAM SITE  
(MAP AND NOTES)

E. B. OWEN



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OTTAWA  
1967

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## Upper Lapie Canyon Dam Site

### General Description

The examination of Upper Lapie Canyon dam site was part of an investigation by the Water Resources Branch, Department of Energy, Mines and Resources of the hydroelectric power potential in the Yukon River drainage basin. Upper Lapie Canyon dam site is situated on Lapie River in Yukon Territory about 9 and a half miles upstream from the junction of Lapie and Pelly Rivers. An alternate site (Lower Lapie Canyon), which is described in Topical Report No. 115, is located about 5 and a half miles downstream. Upper Lapie Canyon dam site is included on National Topographic Series sheet No. 105F (Quiet Lake), scale 1:250,000 and on Royal Canadian Air Force aerial photograph A12238-183. The geology is described on Geological Survey of Canada map No. 7-1960<sup>1</sup>.

The purpose of this investigation was to obtain some knowledge of geological conditions at Upper Lapie Canyon which would assist design engineers in determining the feasibility of constructing a dam at the canyon to provide storage for larger dams on Pelly River. From the viewpoint of the geology Upper Lapie Canyon is not a satisfactory site for a dam. Bedrock throughout the canyon has been greatly disturbed and considerable remedial work will be necessary to render it suitable as abutment and foundation material. Other

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<sup>1</sup>Wheeler, J.O., Green, L.H. and Roddick, J.A.: Geology, Quiet Lake, Yukon Territory, Geol. Surv. Can., Map 7-1960, 1960.

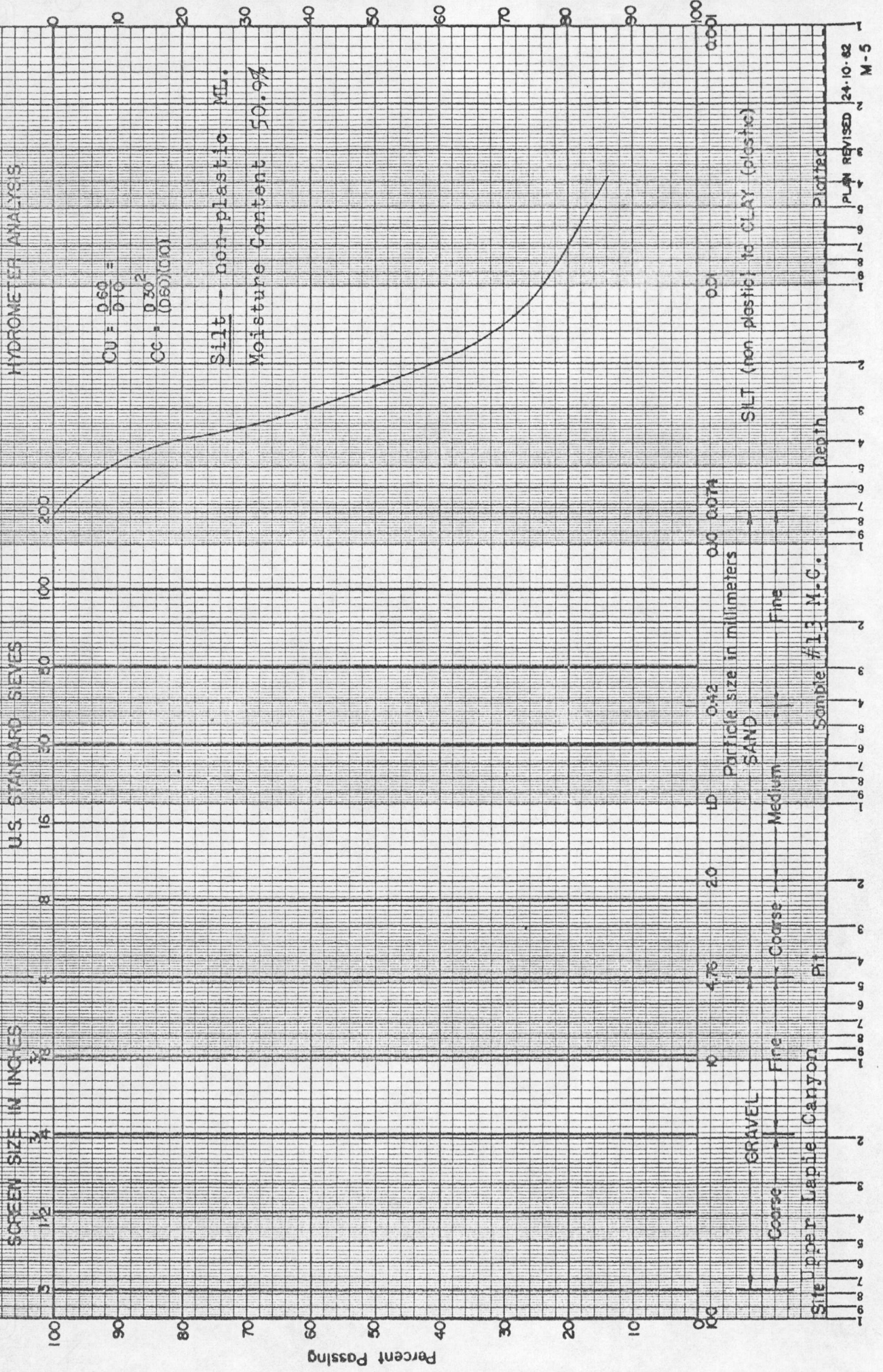
adverse features are the relatively small flow of water in Lapie River and the limited amount of storage available in the narrow valley of Lapie River upstream from the canyon. Redeeming features of the dam site are that it is readily accessible from Canol Road and the availability of most types of construction materials. Samples of the frozen soil were obtained using BX casing and a 10 pound sledge hammer.

Description of Frozen Soil for the following Grain Size Analyses Curves

Pit No.	Location	Sample No.	Depth (in inches)	Description of Material	Group* Symbol	Moisture Content	Visible Ice	Log of Test Pit (in inches)
1	Upstream part of dam site area; 350 feet east of river	13	21 - 26	Silt: grey, non-plastic	ML	50.9%	25% by volume	0-7 = Black organic material 7-10 = Volcanic ash 10-17 = Black organic material
		14	31 - 37	Sand: minor silt and fine-grained gravel	SP-SM	22.0%	None	@ 17 = Frost line 17-19 = Black organic material 19-31 = Silt; grey, non-plastic 31-37 = Sand; minor silt and fine-grained gravel

\* Unified Soil Classification System

WATER RESOURCES BRANCH  
GRAIN SIZE ANALYSIS



CU = 0.60 =  
D10 / D60

CC = 0.30<sup>2</sup>  
(D60/D10)

Silt - non-plastic  
Moisture Content 50.9%

SILT (non plastic) to CLAY (plastic)

Particle size in millimeters

SAND

GRAVEL

Site Upper Laple Canyon

Depth

Plotted

PLAN REVISED

24-10-82

M-5

WATER RESOURCES BRANCH  
GRAIN SIZE ANALYSIS

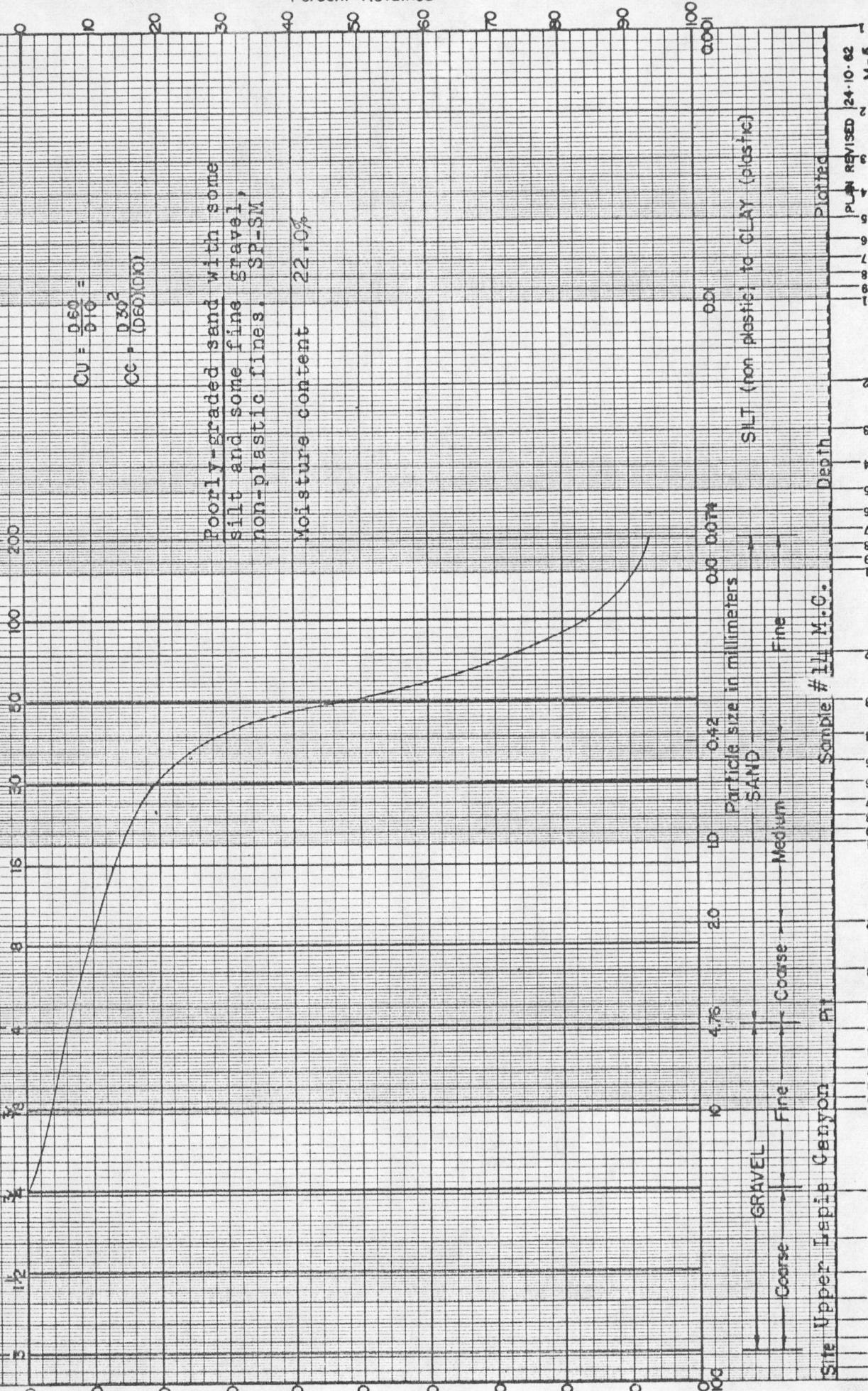
HYDROMETER ANALYSIS

U.S. STANDARD SIEVES

SCREEN SIZE IN INCHES

Percent Passing

Percent Retained



$CU = \frac{D_{60}}{D_{10}} =$   
 $CC = \frac{D_{30}^2}{(D_{60} \times D_{10})}$

Poorly-graded sand with some silt and some fine gravel, non-plastic fines. SP-SM

Moisture content 22.0%

ODY  
SILT (non-plastic) to CLAY (plastic)

Depth  
Sample # 114 M.C.  
Plotted  
PLAN REVISED 24-10-62  
M-5

GRAVEL  
Coarse  
Fine  
Site Upper Isipie Canyon Pt

SAND  
Coarse  
Medium  
Fine

Description of Potential Impervious Material for the following Grain Size Analysis Curve

Sample Number	Location	Field Description of Material	Group* Symbol	Field Description of Overburden	Thickness of Deposit	Areal Extent (Estimated)	Remarks
1	Bluff along left side of Lapie River; 250 feet downstream from Canol Road bridge; 20 feet above river; 12 inches beneath ground surface	Till: clayey, sandy, dense, brown-grey; boulders of grey quartzite and grey granite to 8 inches; numerous black chert pebbles from 1-2 inches	SC	6-10 feet of coarse-grained gravel	30 feet	Not large but unlimited throughout area near site	L.L. - 25.0 P.L. - 15.1 P.I. - 9.9

\* Unified Soil Classification System





Description of Potential Fine-grained Aggregate for the following Grain Size Analysis Curve

Sample Number	Location	Field Description of Material	Group* Symbol	Field Description of Overburden	Thickness of Deposit	Areal Extent (Estimated)	Remarks
2	Top of road cut along east side of Canol Road; one-half mile north of dam site; 4 feet below top of bluff; 12 inches below ground surface	Sand: fine-grained, silty, brown, dry, indistinct stratification	SM	None	Variable	Extensive but not unlimited	Possibly aeolian; readily available by scraper

\* Unified Soil Classification System

WATER RESOURCES BRANCH

GRAIN SIZE ANALYSIS

U.S. STANDARD SIEVES

HYDROMETER ANALYSIS

$$CU = \frac{D_{60}}{D_{10}} = \frac{0.6}{0.075} = 8$$

$$CC = \frac{D_{20}^2}{(D_{10})^2} = \frac{0.3^2}{(0.075)^2} = 16$$

Silty Fine Sand - Non Plastic SM

Percent Passing

Percent Retained

SCREEN SIZE IN INCHES

Particle size in millimeters

SAND

SILT (non plastic) to CLAY (plastic)

GRAVEL

Coarse

Medium

Fine

Depth

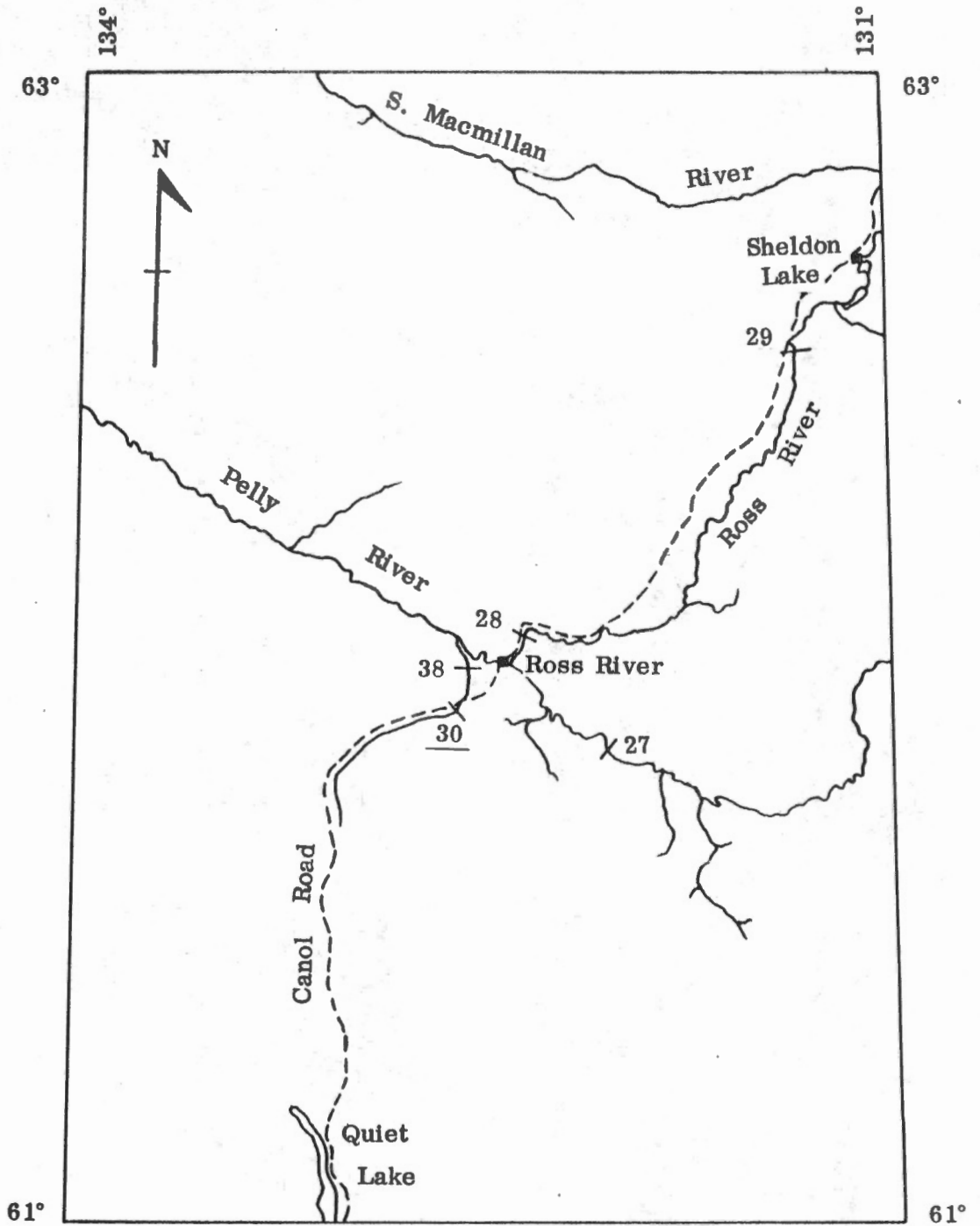
NO. 2

Plotted

PLAN REVISED 24-10-62  
M-5

Chemical Analyses of Lapie River Water at Upper Lapie Canyon dam site  
(parts per million)

Location	Date	Discharge	pH	SiO <sub>2</sub>	Ca	Mg	Na	K	Fe	CO <sub>3</sub>	HCO <sub>3</sub>	SO <sub>4</sub>	Cl	F	NO <sub>3</sub>	Turbidity	Hardness as CaCO <sub>3</sub>
Left side of river; 100 feet down-stream from Canol Road bridge; 12 inches below water sur-face	Aug. 7, <u>1963</u> Temp. 56°F	med.	8.1	4.9	45.9	18.8	1.1	0.6	Tr.	0.0	175	47.9	0.2	0.1	0.4	0	192
	Aug. 18, <u>1964</u> Temp. 46°F	low	8.3	5.8	52.1	20.4	1.6	0.7	0.23	0.0	189	58	0.1	0.12	0.2	0.8	214
	June 23, <u>1966</u> Temp. 47°F	med.	7.6	4.4	31.6	12.2	1.1	0.7	0.42	0.0	124	24.4	0.7	0.05	0.3	1.	129



**LOCATION OF PROPOSED DAM SITES  
YUKON RIVER DRAINAGE BASIN**

Scale: 1 inch = 20 miles

<u>Site No.</u>	<u>Name</u>	<u>River</u>
27	Hoole Canyon	Pelly
28	Ross Canyon	Ross
29	Prevost Canyon	Ross
30	<u>Upper Lapie Canyon</u>	Lapie
38	<u>Lower Lapie Canyon</u>	Lapie