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## GEOLOGICAL REPORT

on the

SAINT 1, SAINT 3 and FLACO CLAIM GROUP

LIARD MINING DIVISION

N.T.S. 94K/4W and 94L/1E

Latitude: 58°08'N

Longitude: 125°58'W

by

R.C. Carne

ARCHER, CATHRO & ASSOCIATES LIMITED

for

WELCOME NORTH MINES LTD. (Owner)

and

GATAGA JOINT VENTURE (Operator)

Submitted March 3, 1981

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LIST OF CLAIMS

<u>Claim</u>	<u>Record Number</u>	<u>Number of Units</u>	<u>Record Date</u>	<u>Expiry Date</u>
Saint 1	283	20	April 28, 1977	April 28, 1981
Saint 3	284	12	April 28, 1977	April 28, 1981
Flaco	1318	4	June 24, 1980	June 24, 1981

GEOLOGICAL REPORT

on the

SAINT 1, SAINT 3 and FLACO CLAIM GROUP

Introduction

The Saint 1, Saint 3 and Flaco claim group was staked by Gataga Joint Venture in the name of Welcome North Mines Ltd. to cover a northwest-trending belt of upper Devonian black shales which host lead-zinc mineralization in the nearby Driftpile Creek area on the P, D and Goof claims. The Saint 1 and Saint 3 claims were staked in 1977 while the Flaco claims were staked in 1980. Gataga Joint Venture (GJV) was formed in 1977 to explore for lead-zinc in northeast British Columbia, and is a syndicate composed of Aquitaine Company of Canada Ltd., Chevron Canada Limited, Getty Mines, Limited, Welcome North Mines Ltd. and Castlemaine Exploration Ltd. The program was managed by Archer, Cathro & Associates Limited and was directed in the field for the fourth successive season by R.C. Carne.

Geological mapping at 1:5,000 scale in the area was initiated as part of an ongoing program to provide a basis for prospecting and geochemical evaluation of the underlying rocks. Topographic control for the survey was established with aid of a contour 1:5,000 scale orthophoto map produced in 1980 from aerial photography flown by GJV in 1979. The 1980 work was carried out between August 7 and August 14, 1980.

Location and Access

The Saint 1, Saint 3 and Flaco claims are located 25 km northwest of Gataga Lakes on NTS map sheets 94K/4W and 94L/1E. The centre of the group is located at latitude 58°08'N and longitude 125°58'W. Access is by float-equipped, fixed-wing aircraft from Watson Lake, Yukon Territory, about 280 km to the northwest,

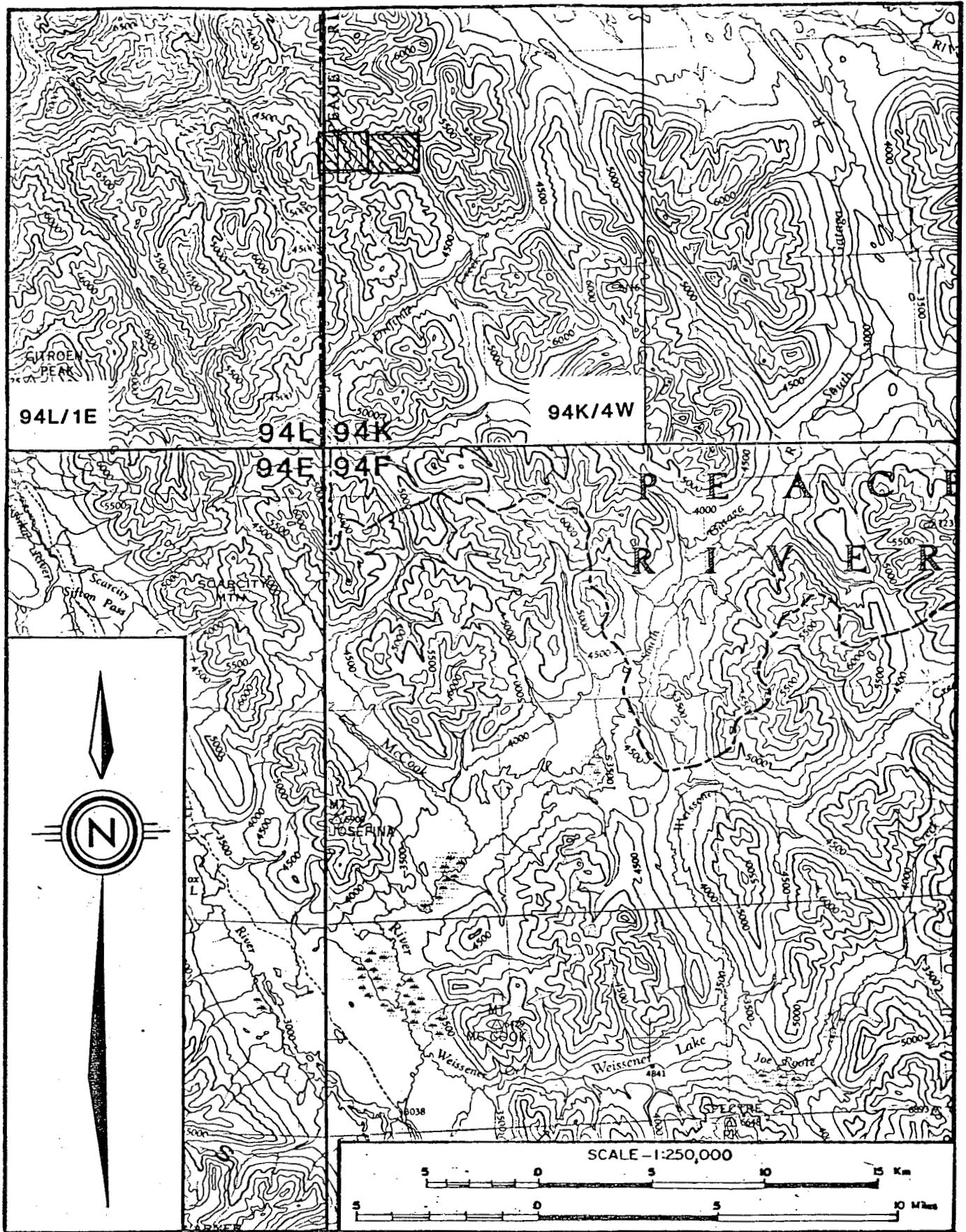


Figure 1: Location of Saint 1, Saint 3 and Flaco claim group.

to Mayfield Lake, located about 15 km northeast of the property. Access to the claims from the lake is by helicopter. The nearest large town, 210 km to the east, is Fort Nelson which does not have a float plane base. Fuel and camp supplies used for the 1980 program were trucked 300 km from Watson Lake to Muncho Lake (Km 747 on the Alaska Highway) and ferried 100 km during mid-April, 1980 by ski-equipped, single Otter aircraft to Mayfield Lake. Field work was conducted with a helicopter supported program based from a permanent field camp located on Driftpile Creek, about 10 km to the southeast (Figure 2).

### Regional Geology

The Gataga Lakes area lies within Kechika Trough, a southeasterly extension of the much larger Selwyn Basin. Sedimentary rocks range in age from Cambrian to lower Mississippian. Prior to upper Devonian, easterly derived clastic sedimentary assemblages reflect normal sedimentation patterns while the westerly derivation of upper Devonian to Mississippian sedimentary rocks resulted from block faulting and uplift along the continental margin. Regional stratigraphic relationships are summarized on Figure 3.

Structural geology of the area is dominated by northwesterly trending, easterly directed thrust faults. Pelitic sedimentary rocks within thrust sheets are complexly deformed into upright to slightly overturned isoclinal folds cut by numerous near-vertical shear zones. A penetrative axial plane foliation is commonly well developed. Structural geology is complicated by deformation initiated prior to deposition of middle Devonian clastic rocks above a pronounced unconformity.

Upper Devonian siliceous and pyritic black shales are host to numerous stratiform barite and barite-lead-zinc deposits in the area, notably those at Driftpile Creek some 10 km to the southeast and at Cyprus Anvil's Cirque claims, located about 135 km southeast of the area.

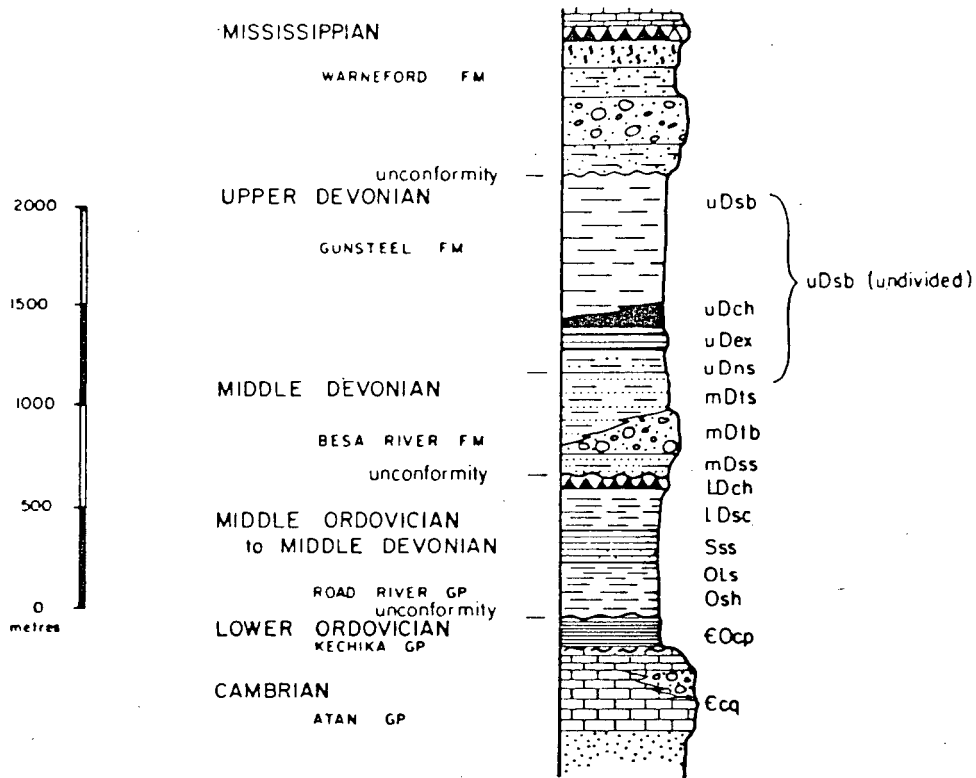


FIGURE 3

ARCHER, CATHRO & ASSOCIATES LTD

**STRATIGRAPHY**  
GATAGA LAKES AREA  
GATAGA JOINT VENTURE

### Property Geology

Geology of the Saint 1, Saint 3 and Flaco claims and surrounding area is shown at 1:5,000 scale on Figure 4.

Oldest lithologies exposed in the area are Cambro-Ordovician calcareous phyllites and "wavy-banded" silty limestones of the Kechika Group (map unit 60cp). Thickness of this unit in the Gataga Lakes area is uncertain since it is apparently in fault contact with older rocks.

Ordovician to middle Devonian rocks of Road River Group (map units Osh, Sss, LDsc and LDch) unconformably overlie Kechika Group lithologies. Medium to thick bedded calcareous black shale and mudstone of map unit Osh forms the basal part of the Road River section. An Ordovician age is assigned on the basis of poorly defined graptolite assemblages. Orange-brown weathering, relatively resistant lithologies of map unit Sss form a distinctive marker horizon in the area. The Silurian age stratigraphic package is dominantly composed of dolomitic and ankeritic siltstone and silty mudstone with minor silty dolomite and cryptalgal laminated grey silty limestone. Lower Devonian map unit LDsc occurs throughout the Gataga Lakes area although its thickness is extremely variable. The unit is primarily composed of carbonaceous, calcareous and non-siliceous black shale with lesser intervals of cherty black argillite with minor black chert successions. Road River Group is intermittently capped by a thin siliceous unit consisting of black and bluish black, thin to medium bedded chert with minor carbonaceous shale intervals (unit 1Dch).

Middle Devonian lithologies of Besa River Formation (units mDtb and mDss) unconformably overlie older rocks. Unit mDtb consists primarily of massive to thick bedded, very resistant chert pebble conglomerate and chert granule grit deposited as debris flows and proximal turbidites. Morphologies of channel



deposits and paleocurrent indicators define an easterly direction of transport for the sediment. Coarse-grained proximal turbidites grade laterally very rapidly to thick bedded, gritty black mudstone and muddy siltstone (map unit mDss) probably deposited as terrace or levee deposits. Distal equivalents of proximal and lateral facies are represented by Map Unit mDts. Brown weathering, thick bedded, gritty and fine grained mudstone and shale with thin interbeds of pyritic siltstone characterize the unit. Coarse, medium bedded intervals are scattered throughout the section.

Generally pyritic and fine grained, siliceous black shale of upper Devonian Gunsteel Formation conformably overlies coarser grained lithologies of Besa River Formation. Unlike older sedimentary units, facies changes within the formation are abrupt and bear no apparent relationship to regional trends. In simplest terms, the formation can be broken down into two members, Map Units uDns and uDsb, whose distribution is probably related to their physical environment of deposition. Discontinuous and irregular distribution of units uDch and uDex probably reflects their deposition as chemical sediments.

Medium bedded, non-siliceous, slightly gritty black shale of Map Unit uDns forms the basal part of Gunsteel Formation throughout the Gataga District. A diagnostic feature of the member is the presence of 2mm to 1cm diameter, spheroidal nodules composed of silica, calcite and clay minerals. Cross-bedded laminae or thin beds of a similar composition are sometimes associated with the nodules. Origin of these features is, at present, unknown but their mineralogy suggests possible derivation from water-lain tuffs on the Saint 1, Saint 3 and Flaco claims.

Upper part of the Gunsteel Formation consists of medium to thick bedded, siliceous and non-siliceous, carbonaceous black shale (unit uDsb). Stratigraphy within this member is very poorly defined because of the absence of identifiable marker horizons coupled with its generally recessive nature.

Distinctive lithologies of map units uDch and uDex always appear in close proximity to each other but relative ages of the two appear to vary within the district. Unit uDch consists of cherty argillite and black chert with siliceous shale partings. Thin beds of galena and sphalerite were also observed in drill core from this unit on the Bear claims, located about 25 km southwest of the area. Map unit uDex consists of bedded barite and interbedded chert, cherty argillites, pyrite and nodular or blebby barite. Massive, pyritic sulphide deposits occur within this unit on the nearby D, P and Goof claims and on the Bear claims. Silica, iron and barium content of uDex and uDch is thought to be derived from submarine hot-spring or exhalite activity during early deposition of the upper Devonian Gunsteel Formation.

#### Economic Geology

Both map units uDch and uDex are chemical sediments and, as such, hold the potential for base metal mineralization. Lead and zinc mineralization in the area commonly occurs in two forms - baritic and pyritic, although appreciable amounts of pyrite occur with both types. Large limonite gossans associated with map units uDex and uDch on the central part of the Saint 1 claim suggest the presence of significant amounts of pyrite. Preliminary prospecting of exposures of both uDex and uDch during the course of geological mapping failed to discover any lead or zinc mineralization.

Conclusions and Recommendations

The upper Devonian Gunsteel Formation which hosts potentially economic stratiform barite-lead-zinc occurrences on the nearby D, P and Goof claims is exposed across the central part of the Saint 1, Saint 3 and Flaco claim group in an area of complex structural geology. Numerous limonitic gossans are located along the mapped extent of baritic, pyritic and cherty sedimentary rocks which occur within the belt. Further geological mapping followed with detailed prospecting and geochemical sampling is recommended to fully assess the potential for stratiform zinc-lead deposits.

Respectfully submitted,

ARCHER, CATHRO & ASSOCIATES LIMITED



R.C. Carne.

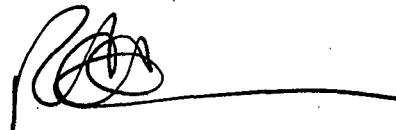
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APPENDIX I

STATEMENT OF QUALIFICATIONS

I, Robert C. Carne, geologist, with business and residential addresses in Vancouver, British Columbia, hereby certify that:

- 1) I graduated from the University of British Columbia in 1974 with a B.Sc. and in 1979 with an M.Sc. majoring in Geological Sciences.
- 2) I am a member of the Geological Association of Canada.
- 3) From 1974 to the present, I have been actively engaged as a geologist in mineral exploration in British Columbia and Yukon Territory.
- 4) I have personally participated in or supervised the field work reported herein and have interpreted all data resulting from this work.



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Robert C. Carne

APPENDIX II

SUMMARY OF COSTS

on work performed on the  
SAINT 1, SAINT 1, and FLACO CLAIMS  
 between August 7 and August 14, 1980

Salaries and Wages

R. Carne (Geologist)	August 7	1 day @ \$177/day - \$177.00	
T. Bremner (Geologist)	August 7,8,9,10 11, 14	6 days @ \$165/day- 660.00	
T. Paulson (Draftsman)		2 days @ \$62/day - <u>124.00</u>	
			\$ 961.00

Camp Maintenance (includes fixed-wing aircraft costs)

9 mandays @ \$35/day 315.00

Helicopter (includes fuel costs on site)

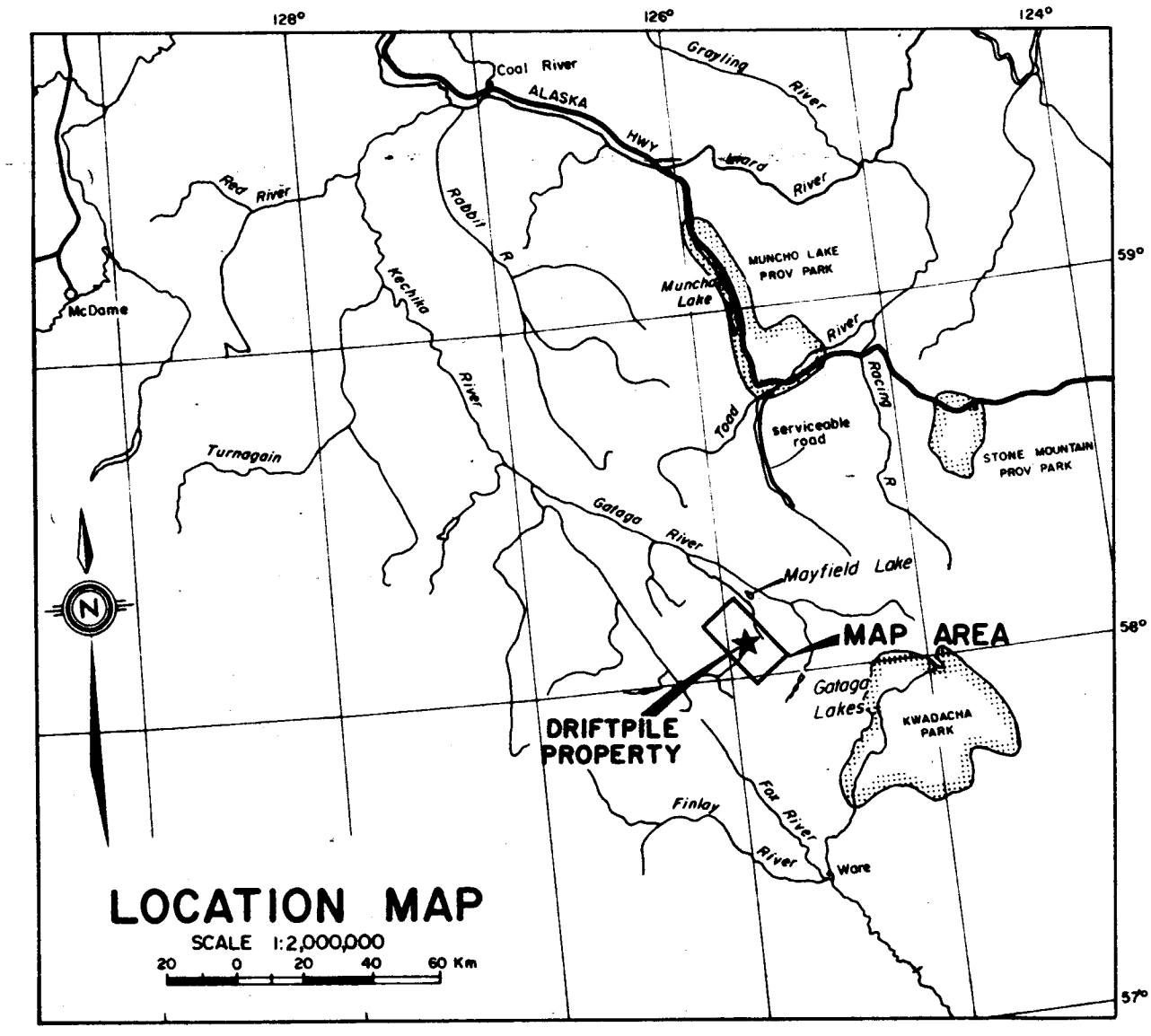
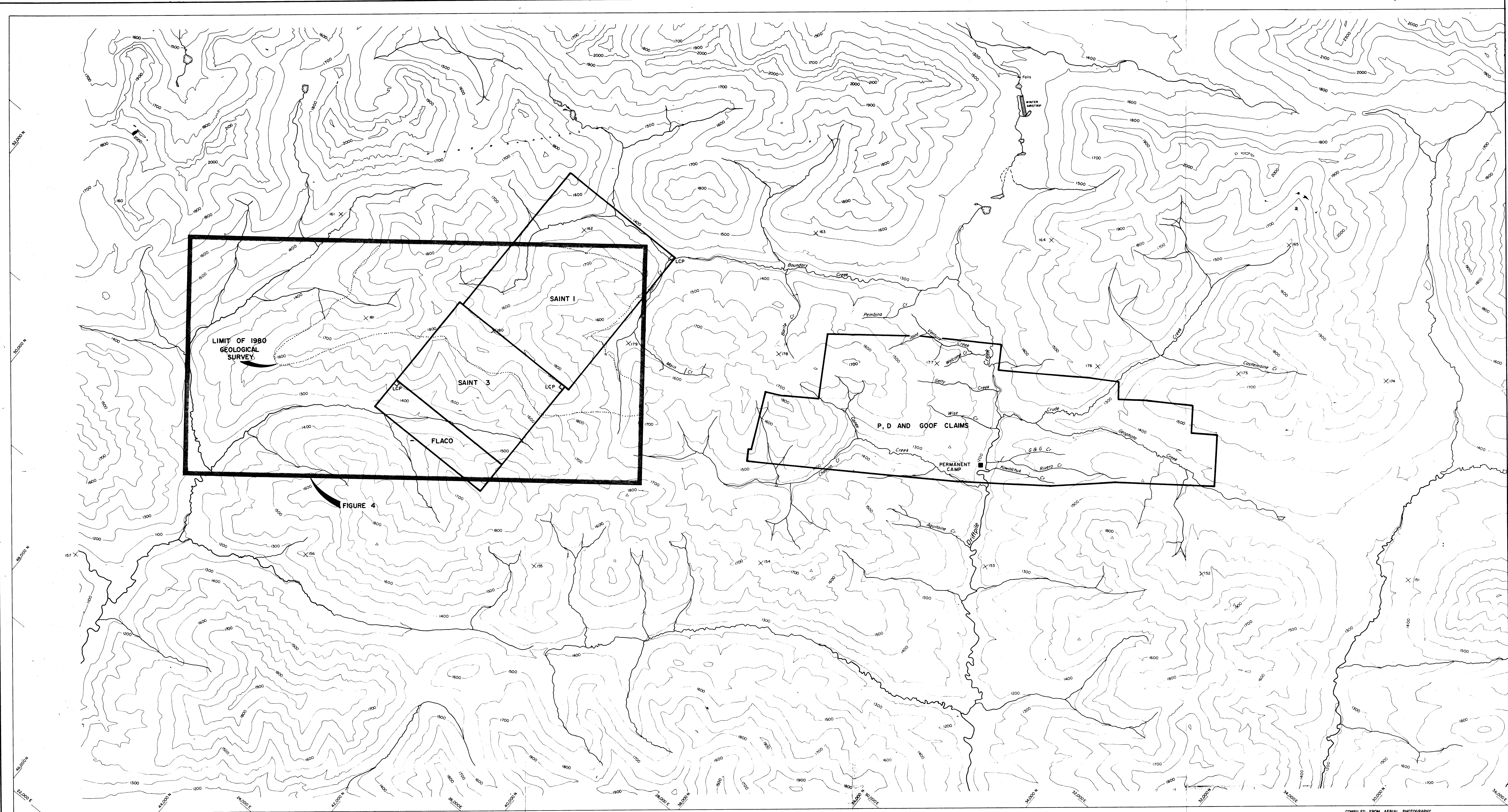
5.4 hours @ \$406/hour 2,192.40  
 \$3,468.40

Report Preparation

@ 10% of program costs 346.84

TOTAL EXPENDITURES \$3,815.24

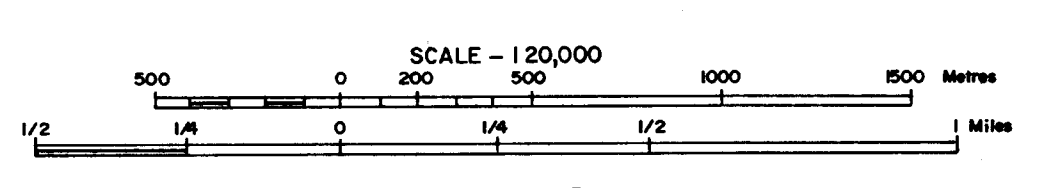




COMPILED FROM AERIAL PHOTOGRAPHY  
TAKEN AUGUST 15, 1979 AT A SCALE OF 1:24,000

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FIGURE 2  
ARCHER, CATHRO & ASSOCIATES LTD  
**LOCATION MAP**  
SAINT 1, SAINT 3 AND FLACO CLAIMS  
GATAGA JOINT VENTURE



*RCO*  
To accompany report dated March 5, 1981



