

GEOLOGICAL AND GEOCHEMICAL REPORT

on the

CAT AND DOG CLAIM GROUP

LIARD MINING DIVISION

N.T.S. 94F/13W and 94K/4W

Latitude: 57°59'N

Longitude: 125°52'W

by

R.C. Carne

ARCHER, CATHRO & ASSOCIATES LTD.

for

WELCOME NORTH MINES LTD. (Owner)

and

GATAGA JOINT VENTURE (Operator)

Submitted December 15, 1980

MINERAL RESOURCES BRANCH ASSESSMENT REPORT <b>8623</b> NO. _____
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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>
Dog	975	16	Sept. 17, 1979	Sept. 17, 1981
Cat	978	14	Sept. 17, 1979	Sept. 17, 1982

GEOLOGICAL AND GEOCHEMICAL REPORT

on the

CAT and DOG CLAIM GROUP

Introduction

The Cat and Dog 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. These rocks host significant lead-zinc mineralization in the nearby Driftpile Creek area on the P, D and Goof claims. 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.

The Dog and Cat claims were geologically mapped at a scale of 1:20,000 to provide a basis for prospecting and geochemical evaluation of the area. Geochemical sampling was carried out over the target black shales. Topographic control for the surveys was established with aid of a contoured 1:20,000 scale orthophoto map produced from aerial photography flown by GJV in 1979. The work was carried out between May 21 and July 1, 1980.

Location and Access

The Dog and Cat claims are located 12 km northwest of Gataga Lakes on N.T.S. map sheets 94K4/W and 94F/13W. The centre of the group is located at latitude 57°59'N and longitude 125°52'W. Access is by float-equipped, fixed-wing aircraft from Watson Lake, Yukon Territory, about 290 km to the northwest, to Mayfield

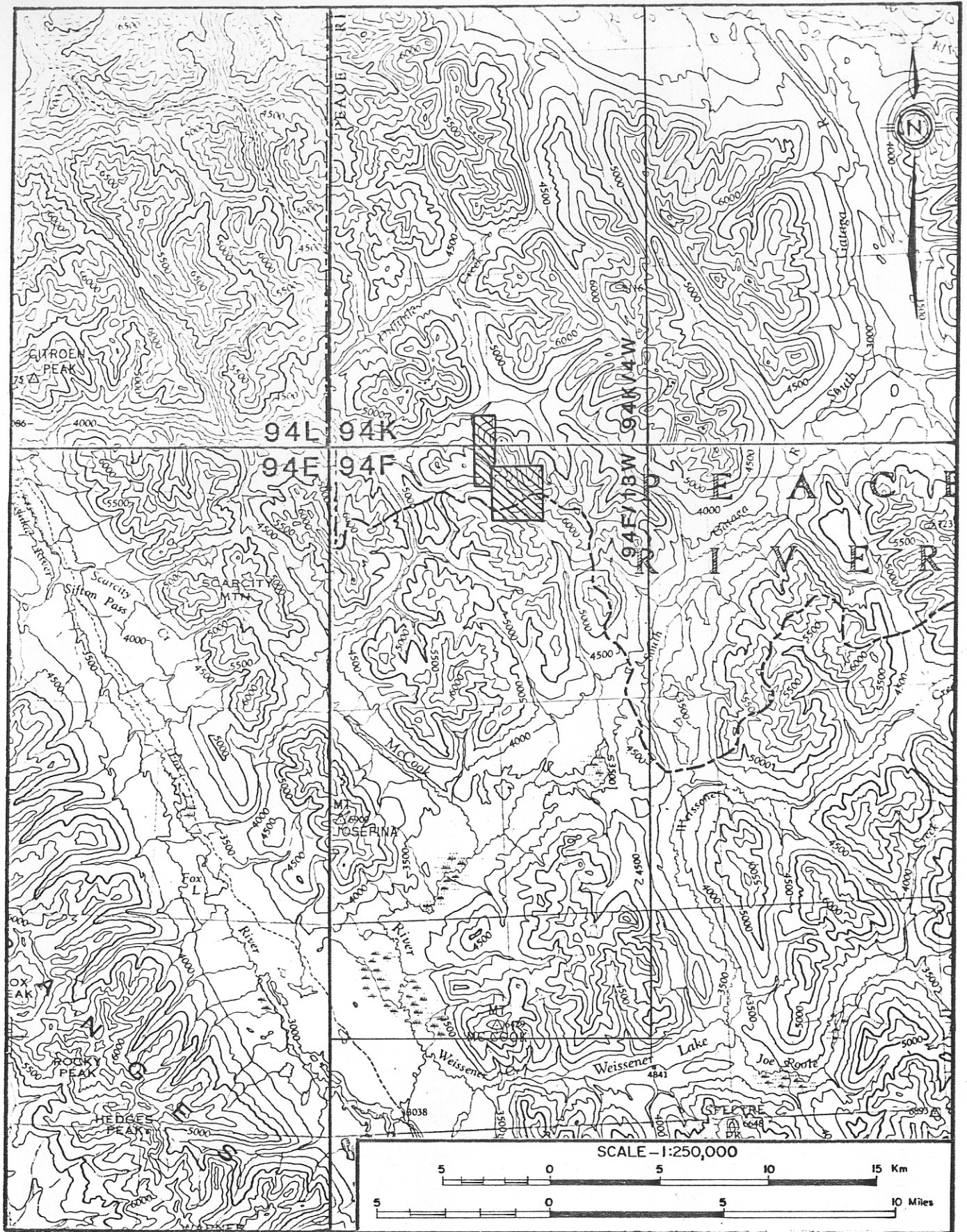


Figure 1: Location of Cat and Dog claim group (NTS 94F/13W and 94K/4W)

Lake, located about 20 km east 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 7 km to the north.

### 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 2.

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

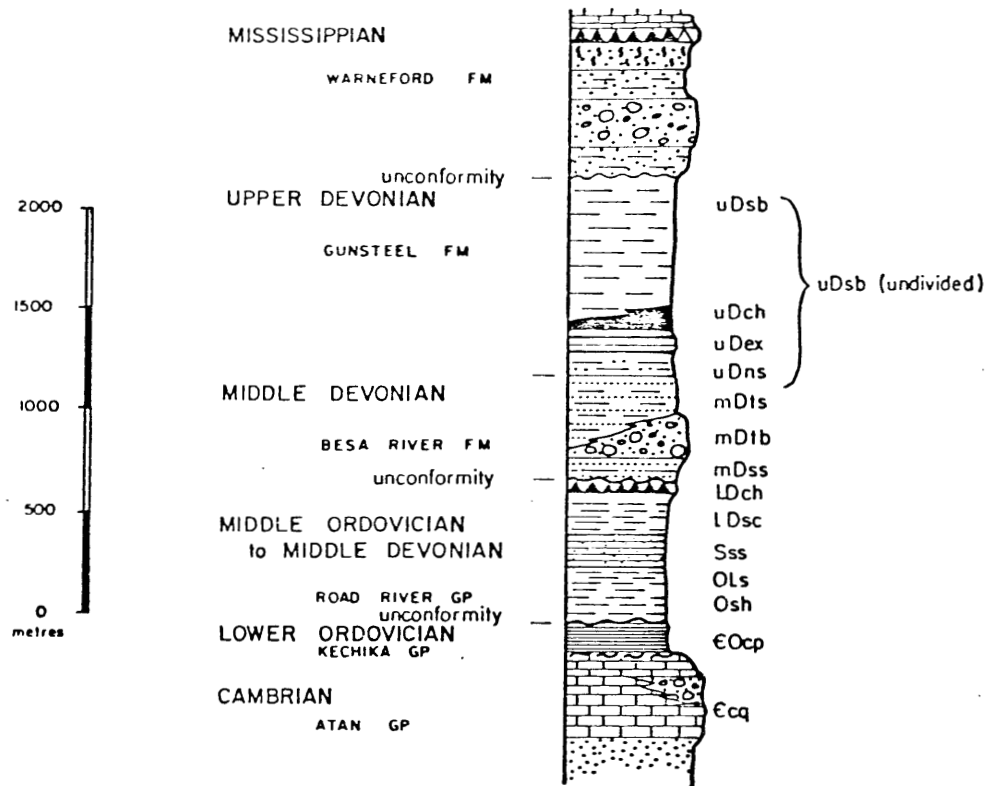


FIGURE 2

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**STRATIGRAPHY**  
**GATAGA LAKES AREA**  
**GATAGA JOINT VENTURE**

Driftpile Creek some 7 km to the northeast and at Cyprus Anvil's Cirque claims, located about 120 km southeast of the area.

### Property Geology

Geology of the Dog and Cat claims and surrounding area is shown at 1:20,000 scale on Figure 3.

Oldest lithologies exposed in the area are Ordovician to lower Devonian pelitic rocks of the Road River Group (Map Units Ols, Osh, Sss, 1Dsc and 1Dch). 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. A thin limestone and chert member (Ols) occurs in the southeast part of the area mapped.

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 1Dsc occurs throughout the project 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 intervals.

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 2 mm to 1 cm 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 in the north part of the district.

Bulk 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. A narrow belt of unit uDsb crosses the central Cat claim.

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 GJV Bear claims. Map Unit uDex consists of bedded barite and interbedded chert, cherty argillite, 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 GJV 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. Neither unit uDex nor uDch was identified on the Dog and Cat claim group.

#### Geochemical Survey

During the 1980 season, seven soil and silt samples were taken on the Cat claim as part of a larger sampling traverse designed to test the potential of upper Devonian black shales in the area for lead and zinc mineralization. Soil samples were taken at 200 metre intervals from the "B" soil horizon where possible. Sample sites were located with the aid of a Hip Chain measuring device and a contoured 1:20,000 scale orthophoto. Sample locations were marked in the field with orange survey flagging. All samples were shipped air freight to Chemex Labs Ltd., North Vancouver, B.C. where they were dried, screened to a minus 80 mesh fraction and analyzed routinely for copper, lead, zinc and silver using a nitric-perchloric acid extraction and atomic absorption spectrometry. Samples which contained a high barium content required redigestion due to barium interference with lead analysis. A portion of the minus 80 mesh fraction from each sample was stored at the lab.

Background levels for the four metals have been established statistically on results of grid soil geochemical surveys carried out by GJV over known mineralization at Driftpile Creek. Results are tabulated below:

	<u>Threshold Value (ppm)</u>	<u>Moderately Anomalous (ppm)</u>	<u>Strongly Anomalous (ppm)</u>
Cu	75	150	300
Pb	175	700	3,000
Zn	700	3,000	10,000
Ag	0.6	2.5	5.0

Copper anomalies are rare in the area, only minor copper values have been recorded from known mineralization. Lead geochemistry has proven to be the most valuable tool for both regional and detailed exploration for shale hosted massive sulphide deposits. Lead distribution in both soil and silt is not as erratic as that for zinc which has a high mobility in locally acid ground waters. Exotic zinc soil geochemical anomalies resulting from dispersion in acid spring can range up to several percent. Silver distribution is very erratic in soils which overlie the upper Devonian Gunsteel Formation. Little is known about the silver content of the shales although values of greater than 30 ppm silver over several metres have been received from drill core of unit uDch on the Bear claims. Massive sulphide mineralization at Driftpile Creek contains only trace amounts of silver while similar mineralization on the Bear claims can contain as much as 35 ppm silver.

Copper, lead, zinc and silver results are summarized on Figure 3. Copper values are generally low, ranging between 16 and 88 ppm. Two samples located off the claim group, on the north side of the Dog claim, exceed the threshold value of 75 ppm established for copper. Lead values are uniformly low and represent

background concentrations. Zinc values are erratic, ranging between 56 ppm and 4700 ppm although moderately anomalous values are clustered off the claim group in an area located just north of the Dog claim. Silver values are generally low and reflect background values with the exception of three weakly anomalous samples (1.0 ppm to 1.8 ppm) which occur with the high zinc values.

### Economic Geology

Rocks of the upper Devonian Gunsteel Formation underlie a narrow belt in the central portion of the property. Although this unit hosts stratiform barite-lead-zinc deposits elsewhere in the Gataga Lakes area, no evidence for similar mineralization was detected in mapping and prospecting on the claims. Zinc and silver values from soil samples taken along the shale belt on the claims are uniformly low. The only geochemical evidence for mineralization is a clustering of weak to moderately anomalous zinc and silver values in an area located just off the claim group.

### Conclusions and Recommendations

Geological mapping on the Dog and Cat claims has confirmed the existence of a narrow belt of upper Devonian Gunsteel Formation black shale. This unit hosts potentially economic barite-lead-zinc deposits at the nearby Driftpile Creek property (D, P and Goof claims) and elsewhere in the district. Prospecting, geological mapping and geochemical sampling undertaken on the claim group failed to locate any potentially economic mineralization, however. It is recommended that no further work be carried out on the claims.

Respectfully submitted,

ARCHER, CATHRO & ASSOCIATES LIMITED

A handwritten signature in black ink, consisting of a stylized, cursive 'R' followed by a horizontal line that extends to the right.

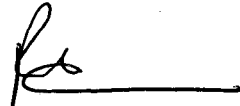
R.C. Carne.

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

CAT and DOG CLAIM GROUP

between May 21 and July 1, 1980

Salaries and Wages

R. Carne (geologist)	June 21, 22 and July 1	3 days @ \$177/day	\$531.00	
R. Gish (assistant)	May 21	1 day @ \$77/day	77.00	
T. Paulson (draftsman)		1 day @ \$62/day	<u>62.00</u>	\$670.00

Camp Maintenance (includes fixed-wing aircraft support)

5 mandays @ \$35/day				175.00
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Geochemical Analyses

Analysis of 8 samples for Cu, Pb, Zn & Ag @ \$3.40				27.20
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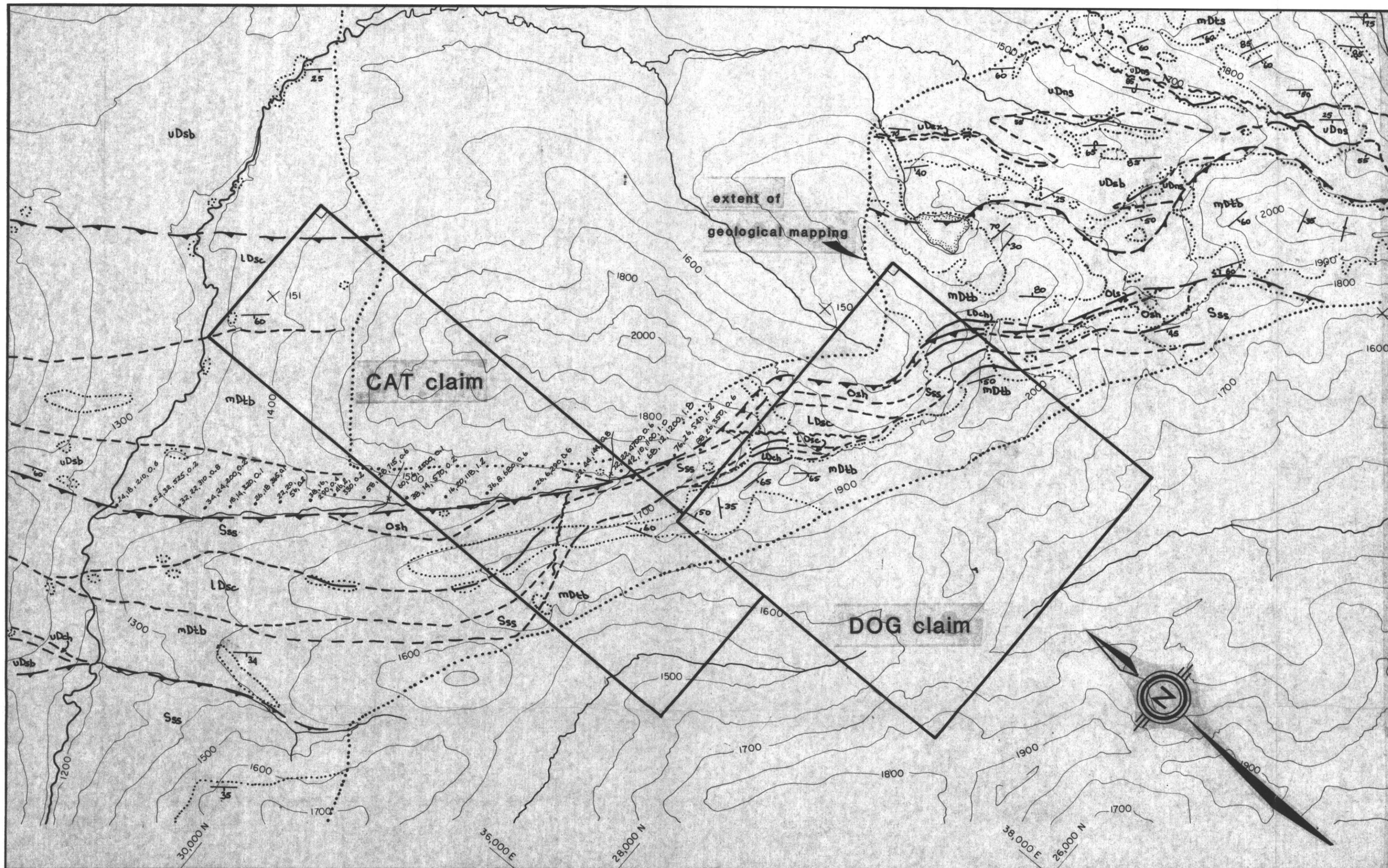
Helicopter (includes fuel costs on site)

Northern Mountain Helicopters Ltd.

Bell Jet Ranger 206B @ \$406/hr. x 0.7 hrs.				<u>287.70</u>
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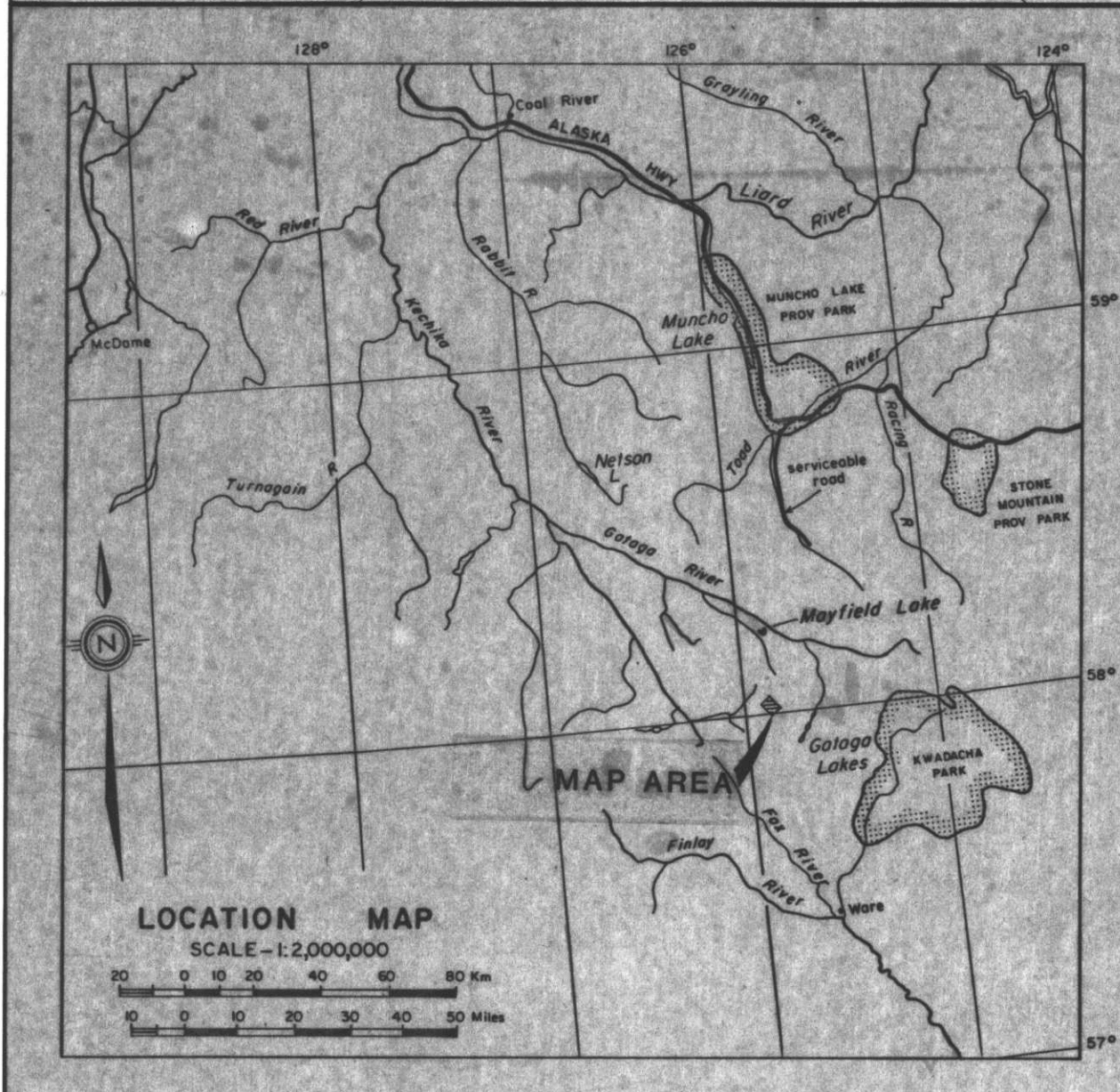
Total Expenditures				<u>\$1,159.90</u>
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### LEGEND

- UPPER DEVONIAN:**  
**Gunsteel Formation**
- uDsb medium to thick bedded, siliceous and non-siliceous, carbonaceous black shale
  - uDrs medium bedded, non-siliceous, slightly gritty, nodular black shale (may be locally absent)
  - uDex bedded barite, interbedded chert, pyrite and bluish barite, massive pyrite, galena, sphalerite and barite deposits
  - uDch cherty argillite and black chert, minor silver-bearing galena, sphalerite beds on Barstow (may be locally absent)
  - uDsh undivided Gunsteel Formation
- MIDDLE DEVONIAN**  
**Besa River Formation**
- mDts thick bedded distal turbidites (dominantly black shale with minor siltstone intervals)
  - mDss medium to thick bedded intermediate turbidites (silty black shale with conglomerate and siltstone intervals)
  - mDlb thick bedded to massive proximal turbidites and debris flows (chert pebble conglomerate and chert granule grit)
  - mDex thin bedded and nodular grey to black barite and siliceous shale, very minor pyrite
- MIDDLE ORDOVICIAN TO LOWER DEVONIAN**  
**Road River Group**
- LOWER DEVONIAN**
- LDk black and bluish black, thin to medium bedded chert with minor carbonaceous shale intervals
  - LDc interbedded carbonaceous black shale and cherty black argillite, minor black chert successions
- SILURIAN**
- Sss orange weathering dolomitic and ankeritic siltstone, minor silty dolomite and cryptalgal laminated grey limestone
- ORDOVICIAN**
- Osh medium to thick bedded calcareous black shale and mudstone
  - Ols grey and white limestone with black and green chert lenses
- UPPER CAMBRIAN TO LOWER ORDOVICIAN**  
**Kechika Group**
- COk brown weathering calcareous phyllite and "wavy-banded" silty limestone
- MIDDLE CAMBRIAN**  
**Atan Group**
- Ecq massive to thick bedded grey limestone and calcareous quartzite, minor green calcareous phyllite



### SYMBOLS

- extent of outcrop
- geologic contact (known, assumed)
- bedding (inclined, vertical, overturned)
- cleavage (inclined, vertical)
- normal or strike slip fault
- thrust fault (known, assumed)
- anticline (upright, overturned)
- syncline upright, overturned)
- plunge of fold axis
- paleocurrent direction
- fossil locality (graptolite)
- quartz vein stockwork
- ferricrete deposit
- kill zone or gossan
- x silt sample
- soil sample
- ▲ gossan sample
- Cu, Pb, Zn, Ag (values in ppm)
- legal corner post

N.B. claims and geologic information were located in the field with the aid of a 1:20,000 scale orthophoto

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FIGURE 3  
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## GEOLOGY AND GEOCHEMISTRY

### DOG AND CAT CLAIMS

GATAGA JOINT VENTURE

