GEOLOGICAL REPORT

on

PAY MINERAL CLAIM GROUP

FORTIN LAKE AREA

Watson Lake Mining Division
Yukon Territory

Longitude 130° 30' W.
Latitude 62° 00' N.

by

Clyde L. Smith
Atlas Explorations Limited

May 5 - September 5, 1967

TABLE OF CONTENTS

LIST OF CLAIMS

Claim Numbers	Grant Numbers	Date Recorded
Pay 87-166	Y16981 - Y17060	November 7, 1966
167-203	Y17793 - Y17829	June 23, 1967

ATLAS EXPLORATIONS LIMITED

ROSS RIVER (Y.T.)

PAY MINERAL CLAIMS

KEY MAP OF CLAIMS AND GRID

CLAIM SHEETS: 105-G-16
" " 105-G-15
" " 105-J-1
" " 105-J-2

PELLY RIVER

130° 30'

62° 00'

FORTIN LAKE

PAY

PHIL

LINE 14S W

BASELINE O

LINE O

LINE 24E

BASELINE 30S

LINE 30S

OUTLINE OF GRID

3000

3500

4500

6000

P.V.

INTRODUCTION

The Pay 1 - 16 group was optioned from R. McBean on August 16, 1966, following an examination and recommendation by A. Kulan and discussions with P. Risby, who made the initial discovery. The option agreement stated that a single row of claims would be staked around the 16 claims as well as between the 1 - 14 and 15 - 16 groups, which lie separated by two claim lengths. In order to honor this agreement, a double row of claims was staked around the 1 - 14 block and claims were staked over and to the northwest of 15 - 16 so as to leave no fractions; this staking brought the total to 86 claims as of late September.

Because of a favourable geologic environment in the Pay area as well as the occurrence of mineralization on the 1 - 16 claims, a regional geochemical soil sampling program was initiated in late September. By mid-October an extensive zinc geochemical anomaly had been outlined in an area about three miles west of the 1 - 16 group.

Claims 87 - 166 were staked to cover this anomaly; they were tied to the previous group so as to leave no intervening ground open. In order to enclose anomalies extending off the group, adjoining claims were attached to the northwest, southwest, and southeast sides of the 87 - 166 blocks in early June, 1967 (167-203) and early August, 1967 (204-221). The Pay fractions were staked to cover wedge-shaped fractions within the Pay 87 - 166 area.

In mid-August, 1967, an independent prospector, G. Lishy, discovered zinc in an exposure about one-half mile south of the margin of the Pay group. Lishy staked the Zn. 1 - 2 claims over the showing and subsequently optioned them to Atlas. In order to cover adjoining ground as well as to tie the showing to the Pay group, the Phil 1 - 42 claims were staked in early September, 1967.

LOCATION AND ACCESS

The Pay group is centered roughly at latitude 62 deg. 00' North and longitude 130 deg. 30' West and covers the adjoining corners of claim sheets 105-G-15, 105-G-16, 105-J-1, and 105-J-2. The group lies immediately east of Fortin Lake and extends about five miles east of the Lake. Two smaller groups were recently staked to the northwest and southeast by Spartan Explorations.

Access to the property is by float or ski aircraft landing on Fortin Lake or Pay Lake. A tote-trail runs through the property from north of Finlayson Lake on the Ross River - Watson Lake Road. The trail may be negotiated with difficulty by bombardier in the summer or by 4-wheel drive vehicle in the winter.

TABLE OF GEOLOGIC FORMATIONS

Cretaceous (?)	5 a	Quartz monzonite porphyry
	4 c	Black phyllite
	4 d	Chert-dolomite
Upper Devonian	4 c	Dolomite
	4 b	Dolomite-chert
	4 a	Bonded chert
Silurian-Devonian	3 a	Graphitic dolomite; 3a, host dolomite
	2 c	Sericitic phyllite
Middle-Upper Cambrian	2 b	Phyllite
	2 a	Spotted phyllite
Proterozoic (?)	1 c	Quartzite.

GEOLOGY

The Pay group area is underlain by a northwesterly-trending, moderately-folded sucession of low grade metasedimentary rocks ranging in age from Proterozoic (?) to Upper Devonian. The beds are cut by numerous faults and intruded by a granitic stock about $\frac{1}{2}$-mile southeast of Barry Lake.

The oldest rocks in the area are Proterozoic (?) quartzites exposed west of Little Grid Lake. The rocks are fine-grained, grey to black, massively-bedded, "clean" quartzites which may be correlated with a thick section cropping out to the east on Fleming Ridge.

South of Grid Lake a thick section of Middle-Upper Cambrian phyllites is exposed. The phyllites are characteristically grey, well-foliated and cleaved, and contain up to 50 percent quartz as distinct laminae, lenticular pods, or veinlets. The quartz has a "sweated-out" appearance but, because the rocks are of low metamorphic grade, this is probably not its origin; the quartz bodies are probably thin chert layers which have been modified in shape and crystallinity by metamorphism. The phyllites have a characteristic "Gleitbrit" structure consisting of micro-folds separated by fractures along which fold limbs are displaced. Three sub-units may be distinguished: spottled phyllite, grey phyllite, and sericitic phyllite. Spotted phyllite is distinguished by the presence of cordierite and ~~new~~ rare andalusite porphyroblasts in a grey phyllite matrix. Sericitic phyllite has a lustrous sheen apparently caused by an abundance of sericite mica.

Silurian-Devonian dolomite and graphitic dolomite occurs folded into the axis of a tight syncline south of Grid Lake and south of the Boundary fault. Stratigraphic relations on the Pay area are

not definite but the dolomites may be correlated with a thick carbonate sequence exposed on Dolomite Ridge southeast of the Pay group. In the Pay area, dolomites are dark grey-brown microcrystalline, and either "platy" - or massively-bedded. South of the Boundary fault a distinct unit of "host" dolomite is interbedded in the carbonaceous dolomites. The host dolomite is light to dark grey and is characteristically brecciated and veined with quartz and calcite as well as locally hydrothermally altered to silica and pyrite; it is this unit which contains important zinc mineralization.

A sequence of Upper Devonian cherts, dolomites, and black slates crops out between Grid Lake and Barry Lake. Although separated from older rocks by faults this unit is believed to lie with strong angular unconformity upon Silurian-Devonian and Cambrian. The older member of this sequence (4a) is a distinctive grey to green, finely-banded chert which forms the core of an open anticline east of Grid Lake. Small fracture-filling deposits of Pb-Zn and Au-arsenopyrite occur in these cherts . Overlying (4a) is a dark brown, massively bedded dolomite unit (4b) which contains interbedded chert north of Barry Lake. Younger units (4c, 4 d, 4e) consist of varying amounts of dark grey chert, massive dark brown dolomite and black carbonaceous slate. North of Barry Lake (mineral showing G) Pb-Zn mineralization of low grade occurs as chert breccia fillings scattered over a length of 4000 feet. The mineralization appears to have a general stratigraphic control within a 200-300 foot thick bed of interbedded chert and dolomite.

Cretaceous (?) biotite quartz monzonite porphyry cuts the metasediments just east of the Pay group.

The Pay region appears to have undergone at least two periods of deformation and metamorphism. An older period is reflected in the well-developed schistosity and Gleibrit structure of the Cambrian phyllites. The younger period has imposed very low-grade metamorphism on rocks of younger age and thrown the beds into moderately tight folds plunging gently (up to 20 degrees) to the northwest. In the area of important mineralization south of the Boundary fault, the structure is not well known, due to limited outcrop but the host dolomite appears to occur within the northeast limb of an anticline.

Two important directions of faulting are recognized; a northwest to east-west set and a northerly set. Major faults trend northwesterly and some display an accurate trace swinging more westerly as they are followed to the north. Displacements cannot be accurately determined but in places they must be large for major stratigraphic sections are commonly brought into just-a-position.

ECONOMIC GEOLOGY

Three basic types of mineralization occur in the Pay area; small Pb-Zn vein and breccia-filling bodies in banded chert, quartzite, and chert-dolomite (showings A, B, E), Au-arsenopyrite veins (showings C, D), and Zn-Pb replacement and breccia filling deposits in host dolomite (showing F). The first two types were shown to be of little economic importance (see assays on geologic map).

The main targets of the Pay area are low grade Zn deposits in host dolomite south of the Boundary fault. The host dolomite

was exposed by two bulldozer trenches, one long hand trench and several small pits and trenches near showing F (between L40W and 45W, just south of B150S). Exposures in this area coincide with an intense, linear, northwesterly-trending Zn geochemical anomaly which may be traced for about 2 miles to the northwest and about 1 mile to the southeast of the exposure area. The host unit also strikes northwest-southeast and it appears that high Zn geochemical values are reflecting mineralization along strike within this bed.

In the exposure area, the host is a 90+ feet thick bed of light grey, microcrystalline, massively bedded dolomite. Mineralization is irregularly distributed, consisting of light purplish-brown fine-to medium-grained sphalerite, galena in quartz veins, pyrite and rare chalcopyrite in a gangue of quartz, calcite, gypsum, siderite, and rare barite (?). Hydrothermal alteration is erratic and not pervasive, consisting of silicification and minor pyritization. Textures are characteristic of open space filling in quartz-carbonate veins in brecciated dolomite and of true disseminated replacement by sphalerite and pyrite. Genetically the deposits appear to be of the telethermal class (Mississippi Valley Pb-Zn, Tenessee Zn, and Polish Pb-Zn types).

Three chip samples taken across significant lengths ran 3.8% Zn over 25 feet, 1.9% Zn over 90 feet, and 1.42% Zn over 95 feet. Numerous erratics in ground moraine exposed by pits and trenches, mainly northwest of the exposure area, are of a higher grade, well disseminated type; visual estimates running as high as 20% Zn. Due to the limited amount of exposure on an intense geochemical anomaly of such magnitude, it is difficult to estimate whether or not economic grade can be located and if so what tonnages will be found. The great length of the anomaly and its definite relation to a 90+ foot thick host unit suggest

however, that should economic grade be located, tonnages could be large.

RECOMMENDATIONS

Because geochemical anomalies are somewhat transported and because geophysical methods have not been successful in tracing the host unit, it is recommended that diamond drilling be undertaken first of all in zones of most intense geochemical values. The host unit dips moderately to steeply to the northeast in the anomaly area; it would perhaps be best located by exploratory drilling from set ups located northeast of anomalies and by drilling shallow angle holes in a southwesterly direction.

Respectfully submitted
Clyde L Smith
Chief Geologist

A P P E N D I X I

SUMMARY OF COSTS

		Costs - $
1.	Wages, Salaries, Bonuses	13,645.57
2.	Repairs and Maintenance	64.64
3.	Freight	9.10
4.	Supplies and Miscellaneous Equipment	997.37
5.	Travel and Accommodation	788.25
6.	Fixed wing support	68.65
7.	Helicopter support	2,764.39
8.	Fuel Costs	169.50
9.	Ross River Base	2,858.51
10.	Whitehorse Office	2,575.31
11.	Camp Support	7,192.64
	TOTAL	$ 31,133.93

TELEPHONE 685-4331

ATLAS EXPLORATIONS LIMITED
(N.P.L.)
330 MARINE BUILDING
355 BURRARD STREET
VANCOUVER 1, B.C.

APPENDIX II

AFFIDAVIT

Supporting Summary of Costs

I, Clyde L. Smith, Chief Geologist, Atlas Explorations Limited, of Vancouver, B.C., do hereby state that to the best of my knowledge and belief the statement of costs as presented in Appendix I of this report "Geological Report on Pay Mineral Claim Group" is both true and correct.

DATED AT Vancouver, British Columbia, this fourteenth day of November, A.D. 1967.

SWORN BEFORE ME at Vancouver, British Columbia, this 14th day of November, A.D. 1967

A Commissioner for taking Affidavits in the Yukon Territory

Clyde L. Smith

APPENDIX III

PERSONNEL

Name	Position	Address
Clye L. Smith	Chief Geologist	West Vancouver, B.C.
Robert Darney	Geologist	Vancouver, B.C.
Wayne Roberts	Geologist	Vancouver, B.C.

ATLAS EXPLORATIONS LIMITED

ROSS RIVER (Y.T)

PAY MINERAL CLAIMS

GEOLOGY

SCALE 1 : 1000'

GEOLOGY : R. DARNEY
C.I. SMITH
W. ROBERTS

DATE : AUGUST 1967

LITTLE GRID LAKE

GRID LAKE

PAY LAKE

BARRY LAKE

BOUNDARY OF PAY MINERAL CLAIM GROUP

BOUNDARY OF PHIL MINERAL CLAIM GROUP

BOUNDARY FAULT

BL 100 S

BL 50 S

LEGEND :

CRETACEOUS (?)	5a	QUARTZ MONZONITE PORPHYRY : QUARTZ AND ORTHOCLASE PHENOCRYSTS IN A GREY, MILDLY-ALTERED FINE- TO MEDIUM GRAINED MATRIX.
UPPER DEVONIAN	4e	BLACK PHYLLITE : EXTREMELY FINE-GRAINED WITH WELL DEVELOPED FOLIATION, CARBONACEOUS, LACKS SEGREGATED QUARTZ.
	4d	CHERT-DOLOMITE : DARK GREY-BLACK, MASSIVELY-BEDDED. LOCALLY INTERBEDDED WITH GREY DOLOMITE UP TO 40 %. UNIT IS QUITE EXTENSIVELY BRECCIATED AND CONTAINS ORIGINAL PAY-SHOWINGS ON 1-16 GROUP.
	4c	DOLOMITE : DARK GREY, FINE GRAINED, MASSIVE TO WELL BEDDED. MINOR THINLY INTERBEDDED LIMESTONE.
	4b	DOLOMITE - CHERT : CRYPTOCRYSTALLINE, DARK BROWN, THINLY-BEDDED WITH WELL DEVELOPED FOLIATION. LOCALITY N.E. OF GRID LAKE IS ESSENTIALLY DOLOMITE WITH MINOR INTERBEDS OF PHYLLITE AND CHERT WHILE AREA NORTH OF BARRY LAKE CONTAINED A MUCH HIGHER PERCENTAGE OF INTERBEDDED CHERT.
	4a	BANDED CHERT : FINELY-BEDDED GREY GREEN CHERT. BANDING IS FINE, (1-2 M.M.) AND IN SOME LOCALITIES VERY REGULAR. IN AREA S.E. OF PAY LAKE THE BANDING CONSISTS OF ALTERNATE LAYERS OF GREY, GREENISH-GREY, AND PURPLISH BLACK COLOURED CHERT. BANDING IS REGULAR BUT CRENULATED.
SILURIAN - DEVONIAN	3a	GRAPHITIC DOLOMITE : MEDIUM - DARK GREY, FINE GRAINED, CRYSTALLINE AND LOCALLY PLATY.
	3a	HOST DOLOMITE : LIGHT TO DARK GREY, FINE - TO MEDIUM - GRAINED LOCALLY BRECCIATED, SPORATICALLY HYDROTHERMALLY ALTERED BY SILICA AND PYRITE.
	3a	DOLOMITE : CRYPTOXLINE, DARK BROWN, THINLY BEDDED AND FOLIATED. VERY SIMILAR TO UNIT 4b, BUT LACKS INTERBEDDED CHERT AND PHYLLITE.
MIDDLE-UPPER CAMBRIAN	2c	SERICITIE PHYLLITE : LIGHT-MEDIUM GREY, FINE GRAINED WITH WELL DEVELOPED FOLIATION UP TO 15% INTERBEDDED AND CROSS-CUTTING SEGREGATED QUARTZ.
	2b	PHYLLITE : DARK GREY, FINE GRAINED, FOLIATED, AND CONTAINS UP TO 50 % SEGREGATED QUARTZ, BOTH INTERBEDDED AND CROSS CUTTING. FOLIATION NOT AS WELL DEVELOPED AS IN UNIT #3.
	2a	SPOTTED PHYLLITE : PHYLLITE SPOTTED WITH FINE-GRAINED CRYSTALS OF CORDIERITE AND ANDALUSITE.
PROTEROZOIC (?)	1c	QUARTZITE : FINE GRAINED, GREY TO BLACK, MASSIVE-BEDDED

MINERAL SHOWINGS :

A — SHEAR ZONE 12-18' WIDE IN BANDED GREEN-GREY CHERT. Pb-Zn OCCURS AS BRECCIA MATRIX. ASSAYS : Y1554

B — ARSENOPYRITE, PYRITE, PYRRHOTITE, AND MINOR Pb-Zn-Cu IN A SERIES OF 4 CROSS-CUTTING VEINS IN BANDED CHERT. VEINS WIDTHS VARY FROM 6" TO 12". ASSAYS : Y1555

C — ARSENOPYRITE, PYRRHOTITE, PYRITE IN CROSS-CUTTING QUARTZ VEIN (12" WIDE) IN BANDED CHERT. ASSAYS : 4856

D — Pb-Zn, ARSENOPYRITE AND PYRITE AS BRECCIA MATRIX IN NARROW SHEAR ZONE IN BANDED CHERT. ASSAYS : Y1601-1602, Y1556

E — IRREGULAR Pb AND MINOR Zn REPLACEMENT WITH QUARTZ, BARITE GANGUE APPROXIMATELY 3 FEET WIDE IN MEDIUM TO DARK GREY QUARTZITE. SOME DISSEMINATION OCCURS ERRATICALLY OUTWARDS FOR 3-4 FEET FROM THE MAIN MINERALIZED AREA ASSAY : Y1603, Y1553.

F — MAIN SHOWING : VEINED AND TRUE DISSEMINATED LIGHT PURPLISH-BROWN Zn IN BRECCIATED SILICIFIED DOLOMITE. SOME PYRITE ALTERATION AND VEINED Pb IS ALSO PRESENT. GANGUE CONSIST OF QUARTZ, CALCITE, MINOR SIDERITE AND BARITE. ASSAYS Y1674, 1675, 1676, 1677, Y1557, 1551-1552
HANDTRENCH # 1 1.9 % Zn/30'
CAT TRENCH # 2 1.6 % Zn/ 70'
FOR DETAIL ASSAYS SEE TRENCH ASSAY MAP.
HAND TRENCH #2 1.6 % Zn/70'

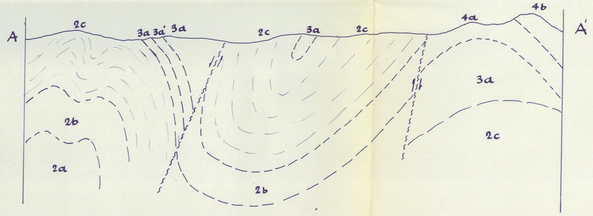
G — REPLACEMENT Pb-Zn-Cu IN CHERT BRECCIA AND LOCALLY IN DOLOMITE ASSAYS : Y1604-Y1616.

SYMBOLS :

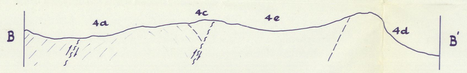
- OUTLINE OF GRID
- OUTLINE OF CLAIMS
- GEOLOGICAL CONTACT (DEFINED, APPROXIMATELY, ASSUMED)
- BEDDING (HORIZONTAL, INCLINED, VERTICAL)
- FAULT (ASSUMED)
- FAULT (APPROXIMATELY)
- ISOCLINAL SYNCLINAL AXIS
- ANTICLINAL AXIS
- OUTLINE OF OUTCROP AREA
- OUTCROPS
- TOPOGRAPHIC CONTOURS

ASSAY RESULTS

	Au	Ag	Cu	Pb	Zn
Y1554	TR	.6	.15	.95	1.10
Y1555	.92	.5	.02	.25	ND
4856	.44	.15	—	ND	.02
Y1601	—	.77	—	3.0	4.0
Y1602	—	.91	—	2.0	0.65
Y1556	—	1.6	.07	3.15	1.95
Y1603	—	1.3	.005	11.5	.005
Y1553		.6	.01	1.75	.3
Y1674	TR	.16	—	TR	1.8
Y1675	—	TR	—	TR	1.6
Y1676	—	8.80	—	66.7	—
Y1677	—	—	—	—	1.2
Y1557		ND	.005	.03	1.00
Y1551		—	.02	ND	6.00
Y1552		.2	.02	ND	1.9
Y1604		1.7	.76	.09	.41
Y1605		1.2	.15	.06	.25
Y1606		2.1	.03	2.0	.005
Y1607		2.2	.03	2.5	.005
Y1608		0.5	.02	.25	.006
Y1609		0.2	.02	.03	.006
Y1610		.5	.01	.1	.007
Y1611		1.1	.06	.5	.008
Y1612		.4	.03	.02	.002
Y1613		5.4	.18	2.9	.01
Y1614		0.6	.04	3.0	1.07
Y1615		0.6	.1	4.2	.005
Y1616		6.5	.36	5.0	.004



GEOLOGIC CROSS-SECTION



GEOLOGIC CROSS-SECTION

ATLAS EXPLORATIONS LIMITED

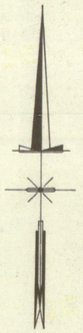
ROSS RIVER (Y.T.)

BILL GROUP GEOLOGY

(PHOTO OVERLAY OF # A-12189-357)
1000' : 1"

GEOLOGY : C.L. SMITH & R. DUNSMORE
DATE : JULY 1967
SCALE 1"=1000'

PELLY LAKE



SYMBOLS :

- OUTCROP OUTLINE
- UNIT CONTACTS
- MEMBER CONTACT
- APPROXIMATE MEMBER CONTACT
- INFERRED MEMBER CONTACT
- FAULTS
- BEDDING

LEGEND :

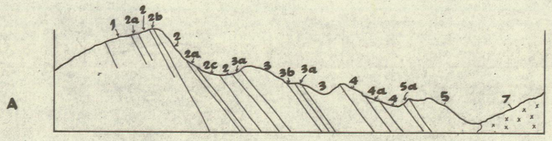
7	GRANODIORITE
6	GRAY LIMESTONE ; 6a BLACK LIMESTONE BRECCIA AND QUARTZ-MICA SCHIST.
5	GRAY CHERT ; 5a GRAY LIMESTONE
4	BLACK CHERT- BLACK PHYLLITE ; 4a BLACK PHYLLITE
3	GRAY DOLOMITE ; 3a WHITE QUARZITE ; 3b BLACK PHYLLITE
2	BLACK CHERT ; 2a GRAY DOLOMITE ; 2b GRAY QUARTZITE ; BLACK PHYLLITE
1	GRAY PHYLLITE ; 1a GRAY QUARTZITE

MAIN SHOWINGS

A — SMALL Pb-Zn MATRIX FILLING IN LIMESTONE BRECCIA

B — SMALL Pb-Zn REPLACEMENT ZONE IN DOLOMITE

OUTLINE OF BILL GROUP !



ASSAYS :

	RESULTS AU	AG	CU	PB	ZN
# Y 1901		.25	.01	.01	.01
Y 1902		.25	.02	.05	.19
Y 1903		ND	.03	.02	.10
Y 1904	TR	.11	.008	.02	.02
Y 1905	TR	.25	.004	WD	.004
Y 1906		WD	.008	.007	.01
Y 1907	TR	ND	.006	.012	.02

	RESULTS AU	AG	CU	PB	ZN
Y 1908		.14	.07	.013	.006
Y 1909	TR	.27	.003	.008	.002
Y 1910		.36	.095	1.05	2.00
Y 1912		.12	.004	.13	.007
Y 1913		ND	.004	.009	.012
Y 1923		.12	.016	1.15	1.20
Y 1924	TRW	.13	.018	1.60	2.05

DRAWN : P.K.