KZ 1-24 CLAIMS

GEOLOGY AND GEOCHEMISTRY, 1982

Dawson Mining District

NTS : 116 G/1-116 G/8

Latitude : 64°15'N

Longitude : 138°33'W

Author : B. Jago, M.Sc.

Owner : Mattagami Lake Exploration Limited

Date : October, 1982

091416

This r... has been examined by
the Ge...cal Eval... t
under Section 53 (4) ... Quartz
Minin... and is allowed as
repr... work in the amount
of $ 4,800.

P. Watson

for Regio..., Exploration and
Geolo... for Commissioner
of Yukon Territory.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE : INTRODUCTION

Location and Access

The KZ 1-24 claims are located 130 kilometers north of Dawson City, Y.T., and 4 kilometers west of kilometer 180 on the Dempster Highway (Figure 1).

The claim group is located within low rolling hills of the Ogilvie Mountains, at the head of a fairly broad creek valley. This valley is drained by a single tributary of Engineer Creek which flows northward into the Ogilvie River. Access to the area has been by helicopter from the Dempster Highway.

History of the Claims

The KZ 1-24 claims were staked in 1981 to cover a spectacular kill zone and very high stream geochemical values, which ranged up to 2,600 ppm Zn, 110 ppm Mo and 11,000 ppm Ba in silt. Water samples contained 190,000 ppb Zn, greater than 50,000 ppb F and 5,100 ppb Cu; pH levels ranged from 2 to 7 in rusty bottomed streams. Also in 1981, a soil grid (175 m X 100 m) was established over the kill zone to define the lateral extent of the metal-in-soil enrichment (Biczok, 1981).

Work Program

The 1982 work program consisted of geological mapping, geochemical grid sampling on an expanded soil grid, trench sampling (1 meter deep soil

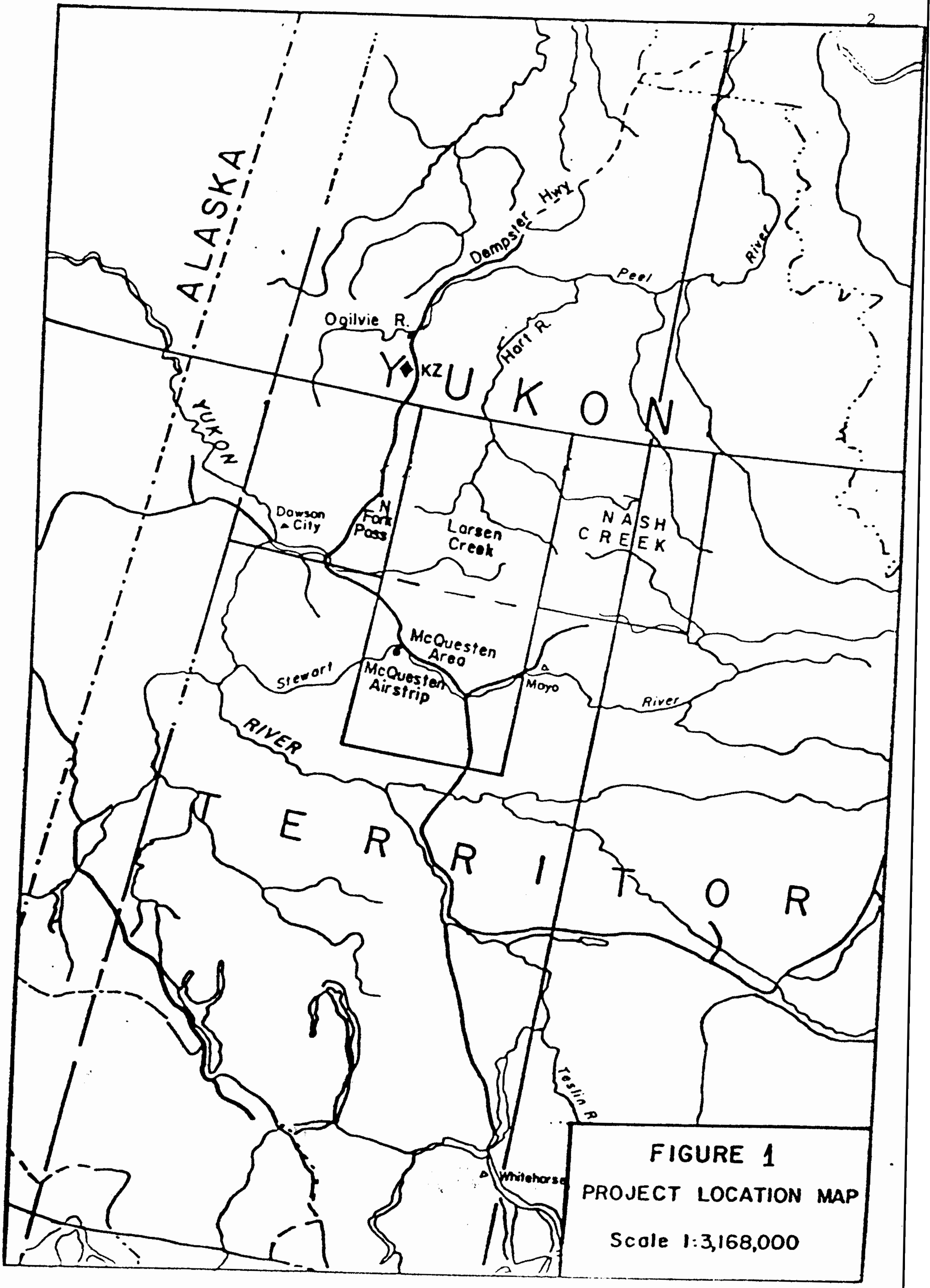


FIGURE 1
PROJECT LOCATION MAP
Scale 1:3,168,000

pits) over the kill zone to obtain geochemical soil profiles and detailed stream sampling. Shallow permafrost made trench and grid sampling difficult and the paucity of outcrop precluded the construction of a detailed geology map. Zinc zap solution was used to locate zinc-hydroxide concentrations on weathered shale surfaces. Helicopter support was provided by a Hiller 12E helicopter on charter from Buffalo Airways, Fort Smith, N.W.T.

CHAPTER TWO : GEOLOGY

General Geology

According to Norris (1974) the area of interest is underlain by a broadly folded (E-W axes) sequence of Ordovician to Devonian clastic and chemical sedimentary rocks (Figure 2). Ordovician to Silurian and Devonian fossiliferous limestones form prominent ridges to the north and south of the claims while recessive organic-rich, shales and more resistant cherty shales of similar age occur in river valleys or form low rolling hills. A roughly east striking thrust fault which passes through the centre of the claims group, truncates the regional stratigraphy. No igneous intrusions occur within the vicinity of the claims.

Detailed Geology and Description of Rock Units

The results of detailed mapping are presented in Figure 3. The list of formations is given in Table 1.

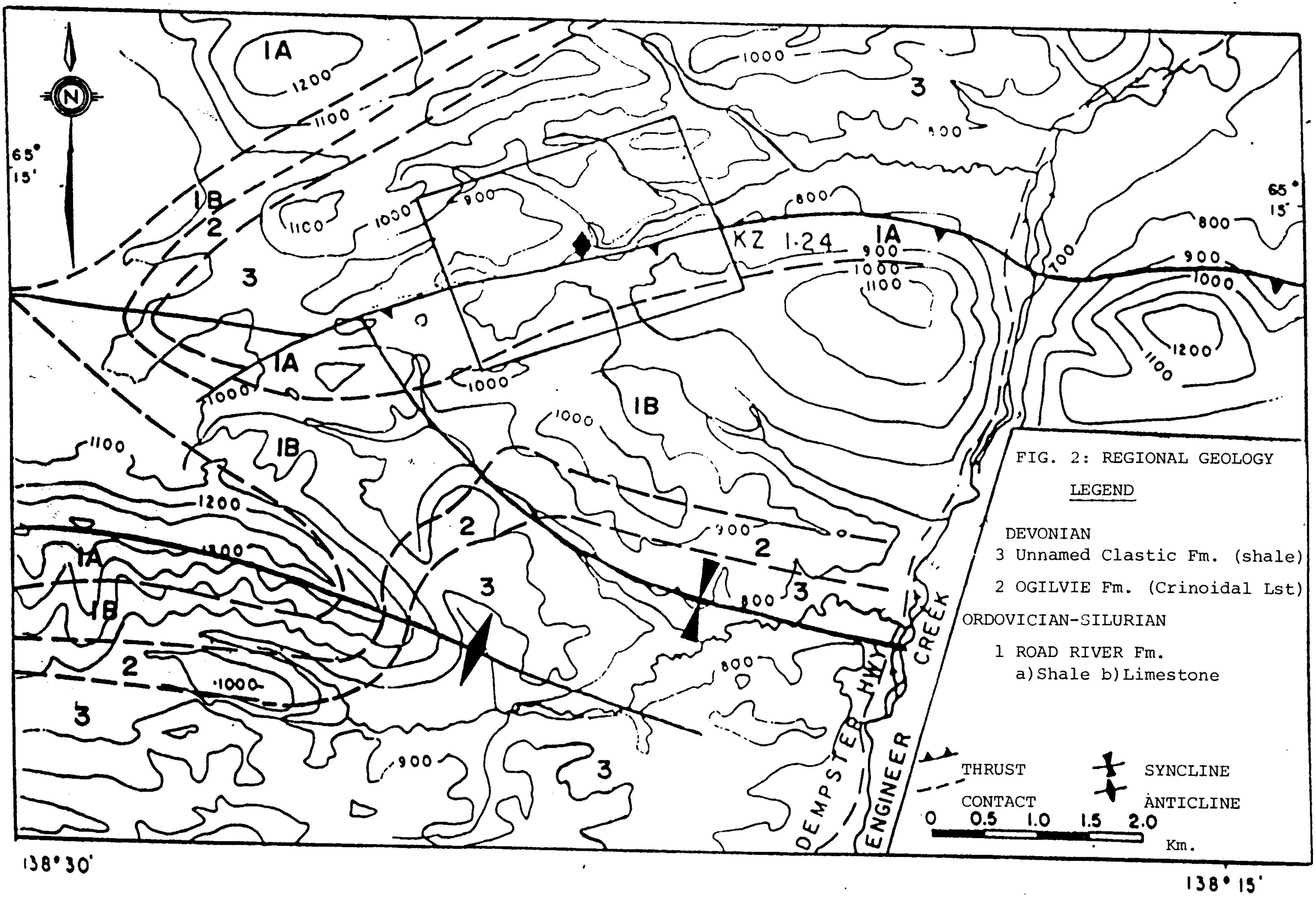


FIG. 2: REGIONAL GEOLOGY

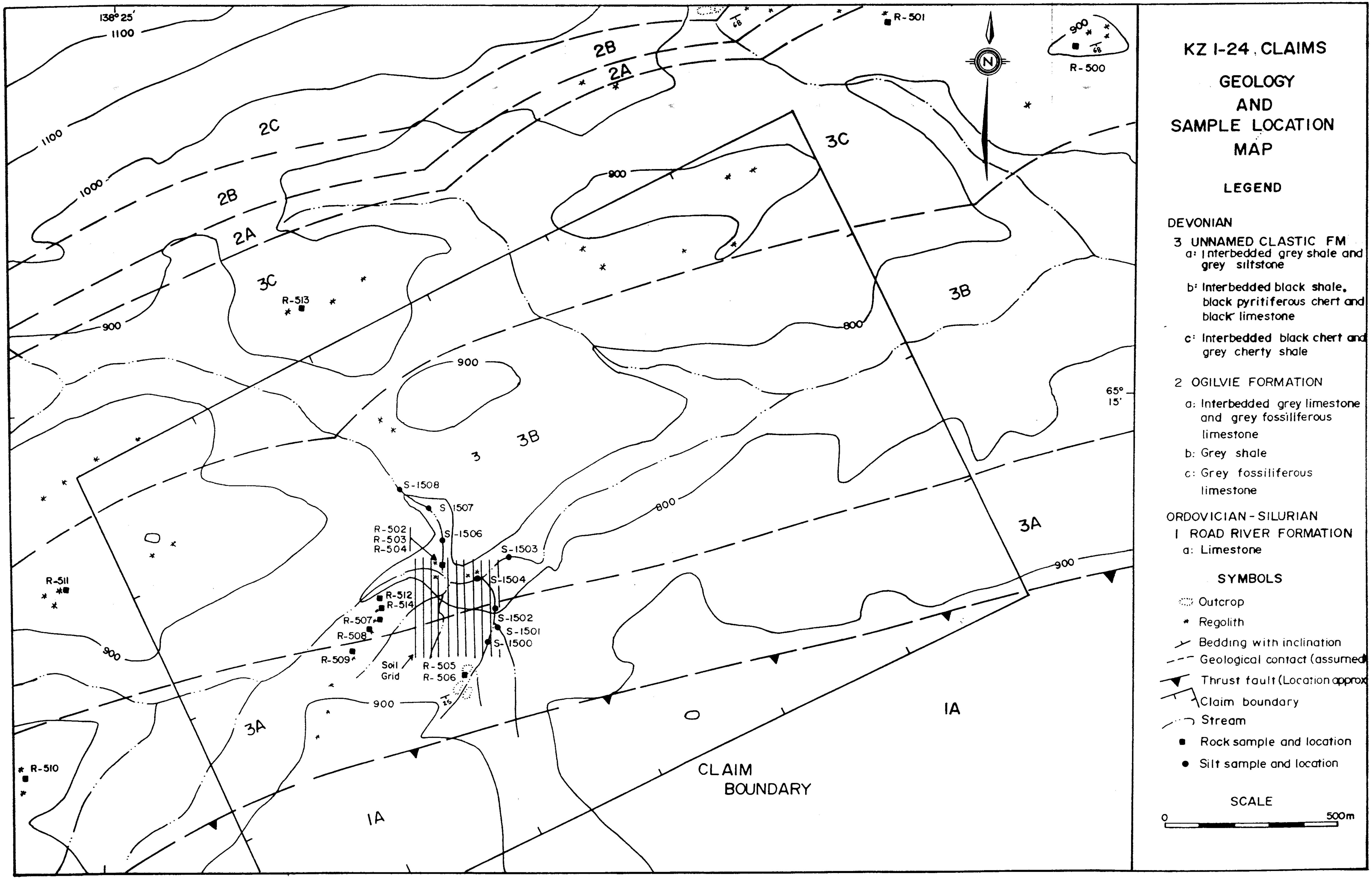

KZ 1-24 CLAIMS
GEOLOGY AND SAMPLE LOCATION MAP
LEGEND
DEVONIAN
3 UNNAMED CLASTIC FM
a: Interbedded grey shale and grey siltstone
b: Interbedded black shale, black pyritiferous chert and black limestone
c: Interbedded black chert and grey cherty shale
2 OGILVIE FORMATION
a: Interbedded grey limestone and grey fossiliferous limestone
b: Grey shale
c: Grey fossiliferous limestone
ORDOVICIAN - SILURIAN
1 ROAD RIVER FORMATION
a: Limestone
SYMBOLS
Outcrop
Regolith
Bedding with inclination
Geological contact (assumed)
Thrust fault (Location approx)
Claim boundary
Stream
Rock sample and location
Silt sample and location
SCALE
0
500m
138° 25'
65° 15'
CLAIM BOUNDARY
Soil Grid
R-500
R-501
R-502
R-503
R-504
R-505
R-506
R-507
R-508
R-509
R-510
R-511
R-512
R-513
R-514
S-1500
S-1501
S-1502
S-1503
S-1504
S-1506
S 1507
S-1508
1100
1000
900
800
2A
2B
2C
3
3A
3B
3C
1A
68
25

TABLE ONE

LIST OF FORMATIONS

PERIOD	FORMATION	DESCRIPTION
Devonian -3-	Unnamed Clastic Formation	
	(a) Grey shale/grey siltstone	-Interbedded, fine-grained very fissile grey shales and rusty weathering grey, siliceous siltstone. Palm sized chert concretions are common in the grey shales.
	(b) Black shale/pyritiferous chert/black limestone	-Interbedded, organic-rich black shales, thinly bedded (6 cm thick), black, organic-rich pyritiferous chert and thinly bedded (6 cm thick), black, fetid limestone.
	(c) Black chert/cherty shale	-Interbedded, black, thinly bedded (2-3 cm thick) chert and grey highly fissile laminated cherty shales.
-2-	Ogilvie Formation	
	(a) Grey limestone/fossiliferous limestone	-Interbedded thick bedded (thickness?) massive grey limestone and massive, grey crinoidal limestone.
	(b) Grey shale	-Fissile, lamination, grey shale.
	(c) Grey fossiliferous limestone.	-Thick bedded (0.5 m), massive, fossiliferous (brachipods) limestone.
Ordovician-Silurian -1-	Road River Formation	-not visited

Detailed mapping revealed a sequence of roughly east striking, south dipping clastic and chemical sedimentary rocks. The southern portion of the claims is underlain by a thrust slice of Ordovician-Silurian, Road River Formation limestone (Norris, 1974). These thick bedded sediments override a sequence of Devonian grey shales and grey, siliceous siltstones which grade downsection (north) in to interbedded black shales, black, organic-rich, pyritiferous (1-3% pyrite) cherts, black, fetid limestones, and interbedded laminated to thinly bedded (2 cm thick), black chert and fissile, grey, cherty shales. These sediments are underlain by grey, Ogilvie Formation, thick bedded, crinoidal limestone, laminated, grey shale and grey thin bedded (15 cm thick), fossiliferous limestone.

CHAPTER THREE

Geochemistry

Sample location sites for the 1982 silt sampling programs are illustrated on Figure 3; values are reported in Table 2. Sample location sites and the contoured results (Cu, Pb, Zn, Ag) of the 1981 and 1982 soil sampling programs are illustrated on Figures 4 and 5, respectively; values are given in Table 3. Table 4 presents the results of the rock geochemistry program.

Discussion : Silt Sampling Program

Examination of Table 2 and Figure 3 shows that no very high metal-in-silt values were found in streams draining the kill zone, although all streams were rusty bottomed. The most northern creek (red bottomed) represented by samples S-1506, S-1507 and S-1508 are not anomalous in any elements except for moderate enrichment in Mo, and may be accepted as background values. Samples S-1500 to S-1505 are moderately elevated in Cu, Zn and Ag compared to the background values but are not strongly anomalous for streams in the Selwyn Basin. The moderately enriched nature of zinc and silver may be due to the acid groundwater leaching of zinc-silver bearing shales in rock units 3A and 3B.

Silt samples obtained in 1981 were highly anomalous in zinc, molybdenum and barium (see History of Claims, this report). The difference between high values obtained in 1981 and low values obtained in 1982 may be due to the sampling of different types of stream silt. During the 1982 program, the rusty gel-like material found in the creek bottoms was excluded from the

Figure 4

KZ 1-48 CLAIMS SOIL GRID SAMPLE LOCATION MAP

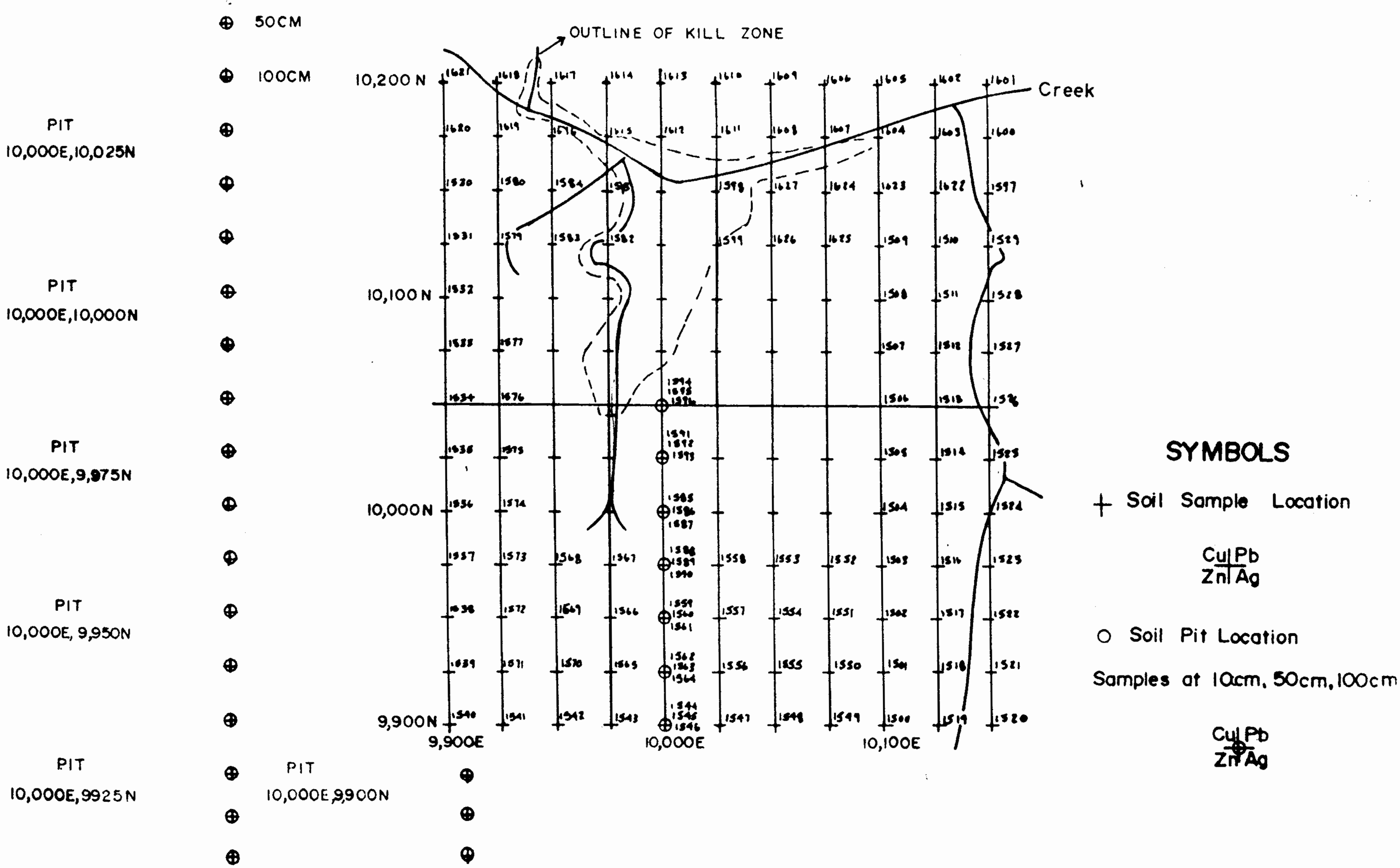
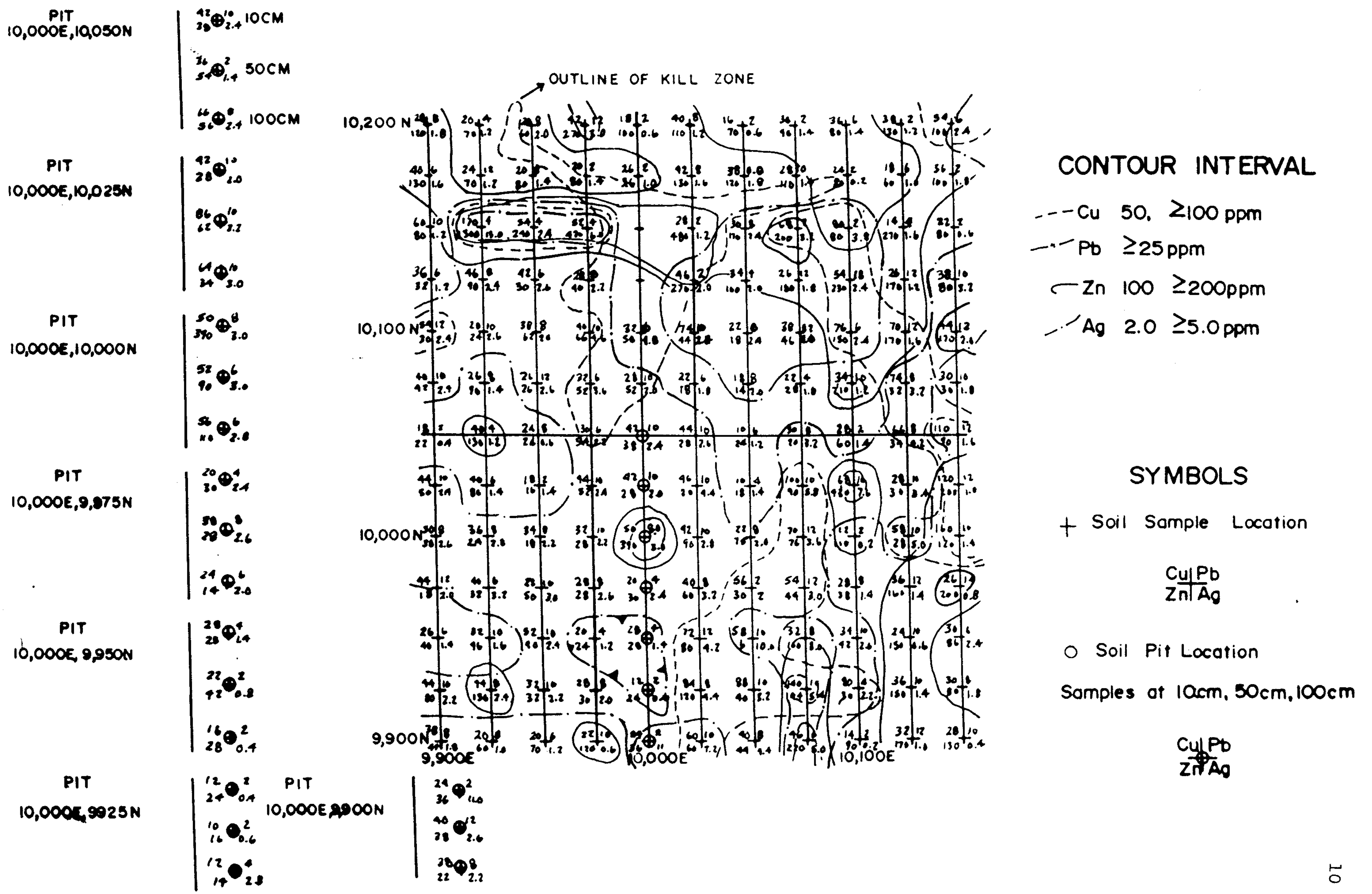


FIGURE 5:

KZ 1-48 CLAIMS SOIL GRID



samples. In 1981, this metal-rich substance may have been included in the samples.

Soil Sampling Program

Examination of Figure 5 shows that several geochemical enrichment patterns emerge.

(1) Silver shows modest (> 2 ppm) enrichment throughout the entire soil grid. The highest anomalies (A, 13.0 ppm Ag; D, 5.0 ppm Ag; and E, 11.0 ppm Ag) are relatively isolated although both A and D have a multielement association. These will be discussed below. The broadly anomalous nature of the soil enrichment is thought to be a product of localized acid groundwater leaching of the weakly silver-rich shaley substratum and is of no economic significance.

(2) The northern and eastern portions of the soil grid show fairly widespread weak copper and zinc enrichment in soils. The zinc enrichment near the northern boundary (Anomaly A and C) is thought to reflect the weakly enriched nature of zinc in the black, organic-rich, sometimes pyritiferous (1-3% pyrite) shaley substratum, although this is not evident in rock samples R-504, R-512 or R-514. In addition, the zinc enrichment is coincident with the northwestern corner of the kill zone which adjoins the main creek. The rusty nature of the creek (metal-rich gel in creek bottom) and surrounding kill zone is probably due to redox reactions between acidic metalliferous groundwater and oxygenated stream waters. The upward percolation of these metal enriched groundwaters has no doubt contributed to the magnitude of this zinc-enriched soil horizon.

Multi-element anomaly A (1300 ppm Zn, 170 ppm Cu and 13.0 ppm Ag) is flanked by two rusty bottomed streams (see Figure 2) and is underlain by black, organic-rich sediments. Acidic groundwaters percolating upward through these sediments have probably contributed to the magnitude of this anomaly although this may not completely explain the very high zinc enrichment. The very low lead values (4 ppm Pb) associated with this anomaly suggest that it is of no economic significance.

The broad multi-element soil anomaly (Anomaly D) flanking the eastern soil grid boundary lies along a small tributary showing moderately high (305 ppm Zn) zinc-in-silt values. This area is underlain by grey shales and siltstones which grade into black, organic-rich sediments downslope to the north. A rock sample recovered from this area (R-506) is not enriched in base metals and shows only weak silver enrichment (1-6 ppm Ag). Because stream waters flowing beside this anomaly appear to carry above background concentrations of base metals and silver, it is thought that this broad, perhaps linear anomaly may be due to the upward percolation of these stream waters and subsequent concentration of metals in the soil profile. The economic potential of this area is nil.

Soil Pits : Soil Profiles

Six one meter deep soil pits were excavated upslope from the kill zone (Figure 3) to determine the source of the potentially metal-rich groundwaters which contributed to the devastation in the vegetation kill zone. However, no buried, rusty talus slopes or soil horizons were encountered in any of the soil pits. The results of this investigation are shown in Figure 5. A comparison of base metal and silver values encountered in samples chosen from 10,50 and 100 cm depth show either diminishment in metal values or a rough constancy. Although one pit showed weak zinc-enrichment (350 ppm Zn), in the 10 cm deep soil sample, and all but two pits showed weak silver enrichment, these values were not repeated at depth, indicating that the enrichment is surficial and does not overlay an economic sulphide deposit.

Rock Geochemistry

Four rock samples from the vicinity of the kill zone were analyzed for base metals and silver. Table 4 summarizes the results of this investigation and shows that all values are low.

Conclusions and Recommendations

Geological mapping of the KZ claims revealed a sequence of broadly folded Ordovician to Devonian clastic and chemical sedimentary rocks. Within these strata, a vegetation kill zone and associated rusty bottomed stream appears to emmanate from an organic-rich shale horizon. Detailed mapping in this area, although inhibited by the lack of outcrop, failed to locate the source horizon of the kill zone. However, soil samples collected from a detailed grid covering the kill zone and possible on-strike extensions, showed that metal-in-soil enrichments were neither consistant, high or laterally extensive and that all samples were very low in lead. Also, one meter deep soil pits did not confirm the metal-in-soil enrichments at depth. The latter suggests that the soil anomalies were all surficial and do not indicate economic mineralization of depth. Rusty stream bottoms are thought to represent redox precipitates from metalliferous (Fe-rich) acid groundwaters and do not reflect the presence of economic mineralization.

The results of detailed mapping and geochemical surveys show that the potential for base metal (Zn-Pb) mineralization on the KZ claims is nil and that the vegetation kill zone and rusty stream bottoms are probably due to extreme iron enrichment rather than to base metal enrichment. In light of this, no further work is recommended for this property.

REFERENCES

Biczok, J., 1982. Yukon Uranium Project 1981 : Report on Exploration in the Hart River (116 H) and Ogilvie River (116 G) Areas. Internal Company Report.

Norris, D.K., 1974. Ogilvie River, Yukon Territory, Geological Survey Canada, Geology Map, 116 H.

STATEMENT OF COSTS

WAGES:	
14 Mandays X $150/day=	$2100.
Helicopter Charter:	
8 hrs. X $300/hr=	$2400.
Truck Rental:	
3 Trucks for 4 days @ $25/day=	$300.
Pjonjar Drill Rental From C. Ashley Ent.=	$400
Blasting Supplies=	$200
Report Writing, Drafting, Typing:	
4 days X $150/day=	$600.
	TOTAL:$6,000.

STATEMENT OF QUALIFICATIONS

I, John Biczok, of the City of Whitehorse, in the Yukon Territory, do hereby certify :

THAT I have been employed as a Geologist by Noranda Exploration Company, Limited (No Personal Liability) since October 1, 1982, and by Mattagami Lake Exploration Limited (No Personal Liability) (a Noranda subsidiary) for three years previous to that date;

THAT I am a graduate of Lakehead University in Thunder Bay, Ontario, with an Honours Bachelor of Science Degree in Geology;

THAT I am currently completing a Master of Science Degree in Geology with the University of Manitoba;

THAT I am a member of the Geological Association of Canada, and the Canadian Institute of Mining and Metallurgy;

THAT I supervised the work described in this report.

John L. Biczok
District Geologist
Noranda Exploration Co. Ltd. (N.P.L.)

APPENDIX A

TABLES 2-4

TABLE 2: STREAM SAMPLE RESULTS

Sample Number	Silt									Water								Pans							
	Cu	Pb	Zn	Ag	Ba	Mo	Au	Hg		Cu	Pb	Zn	Ag	F	U	Ph	K	Cu	Pb	Zn	Ag	Ba	As	Au	Hg
1500	56	16	350	1.4		4																			
1501	38	12	270	1.0		4																			
1502	96	14	340	1.6		4																			
1503	60	2	440	2.2		10																			
1504	44	2	290	2.2		12																			
1505	48	10	280	2.0		12																			
1506	24	4	120	0.6		22																			
1507	26	4	110	0.6		24																			
1508	26	6	270	0.4		34																			

TABLE 3: SOIL SAMPLE RESULTS

(all values in ppm)

Sample Number (Location)	Soil								
	Cu	Pb	Zn	Ag	Ba	Mo	Hg		
1500	14	2	90	0.2					
1501	80	4	30	2.2					
1502	34	10	42	2.0					
1503	28	8	38	1.4					
1504	12	2	110	0.2					
1505	68	10	430	7.6		12			
1506	28	2	60	1.4					
1507	34	10	210	1.2					
1508	76	6	150	2.4					
1509	54	18	230	2.4					
1510	26	12	170	1.2					
1511	70	12	170	1.6					
1512	74	8	32	3.2					
1513	66	8	34	4.2		6			
1514	28	10	30	3.4					
1515	58	10	28	5.0		6			
1516	36	12	160	1.4					
1517	24	10	150	0.6					
1518	36	10	150	1.4		<2			

Sample Number (Location)	Soil								
	Cu	Pb	Zn	Ag	Ba	Mo	Hg		
1519	32	12	170	1.0					
1520	28	10	130	0.4					
1521	30	8	80	1.8					
1522	30	6	86	2.4		<2			
1523	26	14	200	0.8					
1524	160	10	120	1.4					
1525	120	12	200	1.0					
1526	110	12	90	1.6					
1527	30	10	30	1.8					
1528	44	12	170	2.0					
1529	38	10	80	3.2					
1530	60	10	80	2.2					
1531	36	6	32	1.2					
1532	54	12	30	2.4					
1533	40	10	42	2.4					
1534	18	2	22	0.4					
1535	44	10	50	2.4					
1536	30	8	38	2.6					
1537	44	12	18	2.0					

Sample Number (Location)	Soil								
	Cu	Pb	Zn	Ag	Ba	Mo	Hg		
1538	26	6	40	1.4					
1539	44	10	80	2.2					
1540	38	8	44	1.8		<2			
1541	20	8	60	1.0					
1542	20	6	70	1.2					
1543	22	10	120	0.6					
1544	24	2	36	11.0		8			
1545	40	12	38	2.6					
1546	38	8	22	2.2					
1547	60	10	60	7.2					
1548	40	8	44	4.4		2			
1549	46	6	220	5.0		4			
1550	140	10	190	5.4					
1551	32	8	100	8					
1552	54	12	44	3.0		6			
1553	56	2	30	2					
1554	58	10	6	10					
1555	88	10	40	3.2					
1556	84	8	120	4.4					

Sample Number (Location)	Soil								
	Cu	Pb	Zn	Ag	Ba	Mo	Hg		
1557	72	12	80	4.2					
1558	40	8	60	3.2					
1559	28	4	28	1.4					
1560	22	2	42	0.8					
1561	16	2	28	0.4		6			
1562	12	2	24	0.4					
1563	10	2	16	0.6		<2			
1564	12	4	14	2.8		<2			
1565	28	8	30	2.0		<2			
1566	20	4	24	1.2					
1567	28	8	28	2.6					
1568	28	10	50	3.0					
1569	52	10	90	2.4					
1570	32	10	32	2.2					
1571	44	8	130	2.4					
1572	32	10	46	1.6					
1573	40	6	32	3.2					
1574	36	8	24	2.8					
1575	40	6	80	1.4					

TABLE 3 cont.

TABLE 3 cont.

Sample Number (Location)	Soil Cu	Pb	Zn	Ag	Ba	Mo	Hg		
1576	40	4	130	1.2					
1577	26	8	90	1.4					
1578	34	6	50	1.6					
1579	46	8	90	2.4					
1580	170	4	1300	13.0					
1581	52	4	420	6.0					
1582	28	8	40	2.2					
1583	42	6	30	2.6					
1584	54	4	240	2.4					
1585	50	8	390	3.0					
1586	52	6	90	3.0					
1587	56	6	110	2.8					
1588	20	4	36	2.4					
1589	38	8	28	2.6					
1590	24	6	14	2.0		2			
1591	42	10	28	2.0		8			
1592	86	10	62	3.2		8			
1593	64	10	34	3.0		6			
1594	42	10	38	2.4		6			

Sample Number (Location)	Soil Cu	Pb	Zn	Ag	Ba	Mo	Hg		
1595	36	2	54	1.4		2			
1596	66	8	56	2.4		8			
1597	22	2	80	0.6		2			
1598	28	2	480	1.4		18			
1599	46	2	270	2.0		12			
1600	36	2	100	1.8		16			
1601	54	6	100	2.4		6			
1602	38	8	130	1.2		10			
1603	18	6	60	1.0		4			
1604	24	2	80	0.8		6			
1605	36	6	80	1.4		8			
1606	30	2	90	1.4		4			
1607	28	16	110	1.4		8			
1608	38	10	120	1.8		4			
1609	16	2	70	0.6		<2			
1610	40	8	110	1.2		6			
1611	42	8	130	1.6		6			
1612	26	2	26	1.0		<2			
1613	18	2	100	0.6		4			

Sample Number (Location)	Soil								
	Cu	Pb	Zn	Ag	Ba	Mo	Hg		
.14	42	12	270	3.0		12			
.15	20	2	80	1.4		20			
.16	20	8	80	1.4		4			
.17	28	8	60	2.0		6			
.18	20	4	70	1.2		6			
.19	24	12	70	1.0		4			
.20	40	6	130	1.6		4			
.21	28	8	120	1.8		6			
.22	42	4	270	1.6		12			
.23	80	2	80	3.8		14			
.24	68	2	200	3.2		12			
.25	26	12	180	1.8		8			
.26	34	4	100	2.0		18			
.27	30	8	170	2.4		12			

Sample Number (Location)	Soil								
	Cu	Pb	Zn	Ag	Ba	Mo	Hg		

TABLE 3 cont.

TABLE 4: ROCK SAMPLE RESULTS

SAMPLE No.	ELEMENT (ppm)			
	Cu	Pb	Zn	Ag
106-82-R				
504	46	4	55	0.9
506	8	4	50	1.6
512	76	8	106	0.7
514	6	12	20	0.3