

TAK 1-48 CLAIMS

GEOLOGY AND GEOCHEMISTRY, 1982

DAWSON MINING DISTRICT

NTS : 116 B/9 and B/10

LATITUDE : $64^{\circ}33'N$

LONGITUDE : $138^{\circ}32'W$

AUTHOR : B. Jago, M.Sc.

OWNER : MATTAGAMI LAKE EXPLORATION LIMITED

DATE : NOVEMBER, 1982

091417

This report has been examined by
the Regional Geology Unit
under the supervision of Mr. J. H. Quartz
Mining Engineer and is
represented as correct to the amount
of \$ 4,800 -

P. Watson

for Regional Manager, Exploration and
Geological Services for Commissioner
of Yukon Territory.

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ABSTRACT

The TAK 1-48 claims, wholly owned by Mattagami Lake Exploration Ltd., are located 69 km northeast of Dawson City, Yukon. The claims are underlain by an east-trending belt of largely clastic metasedimentary rocks ranging from late-Precambrian to Cretaceous in age. These are intruded by a Cretaceous syenite-monzonite suite with associated lamprophyre dykes.

Detailed geological mapping has been completed over the claims as has a detailed stream sampling program. The results of these detailed programs indicates that additional prospecting should be carried out to further localize the source of metal-in-silt stream anomalies.

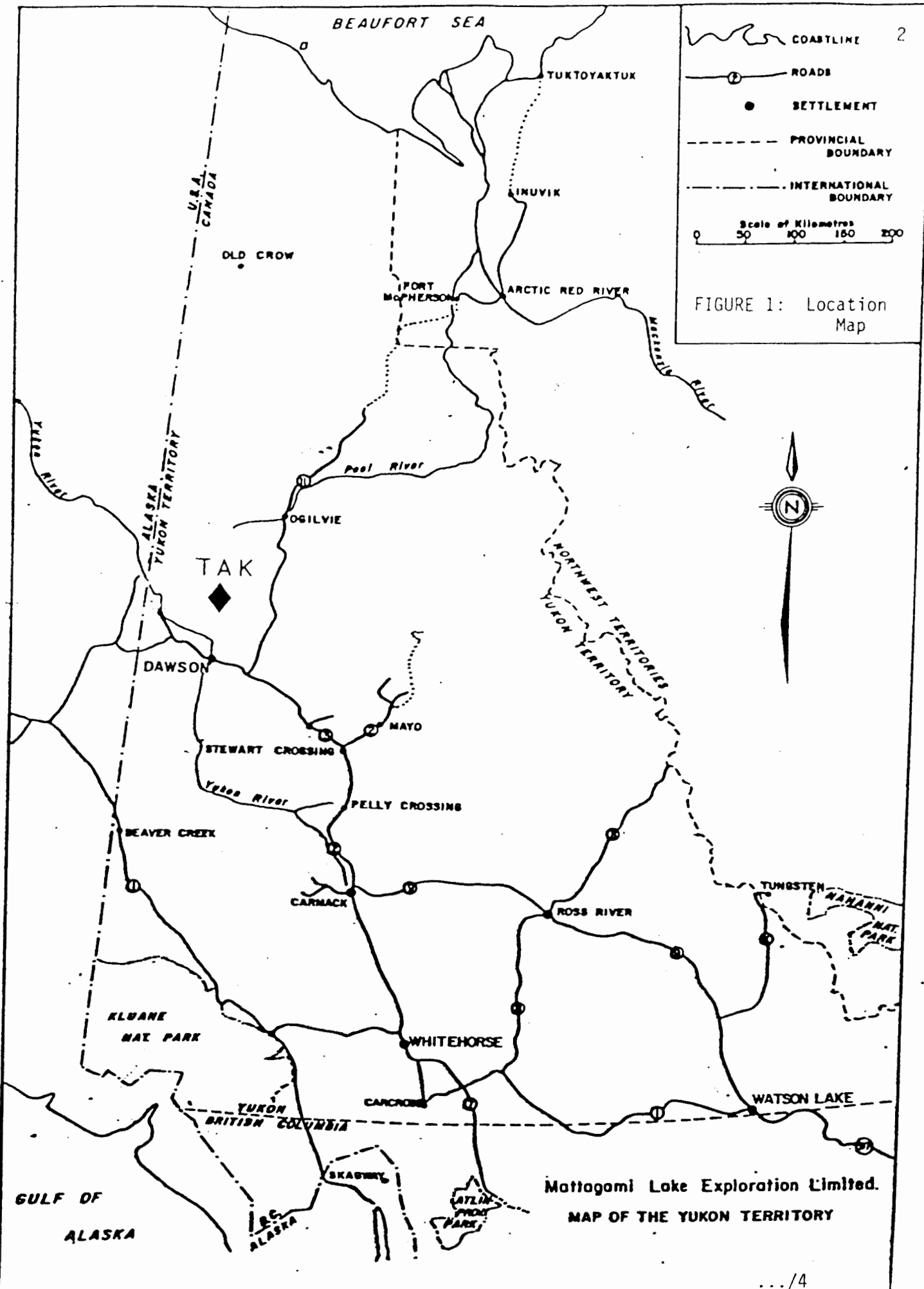
CHAPTER ONE : INTRODUCTION

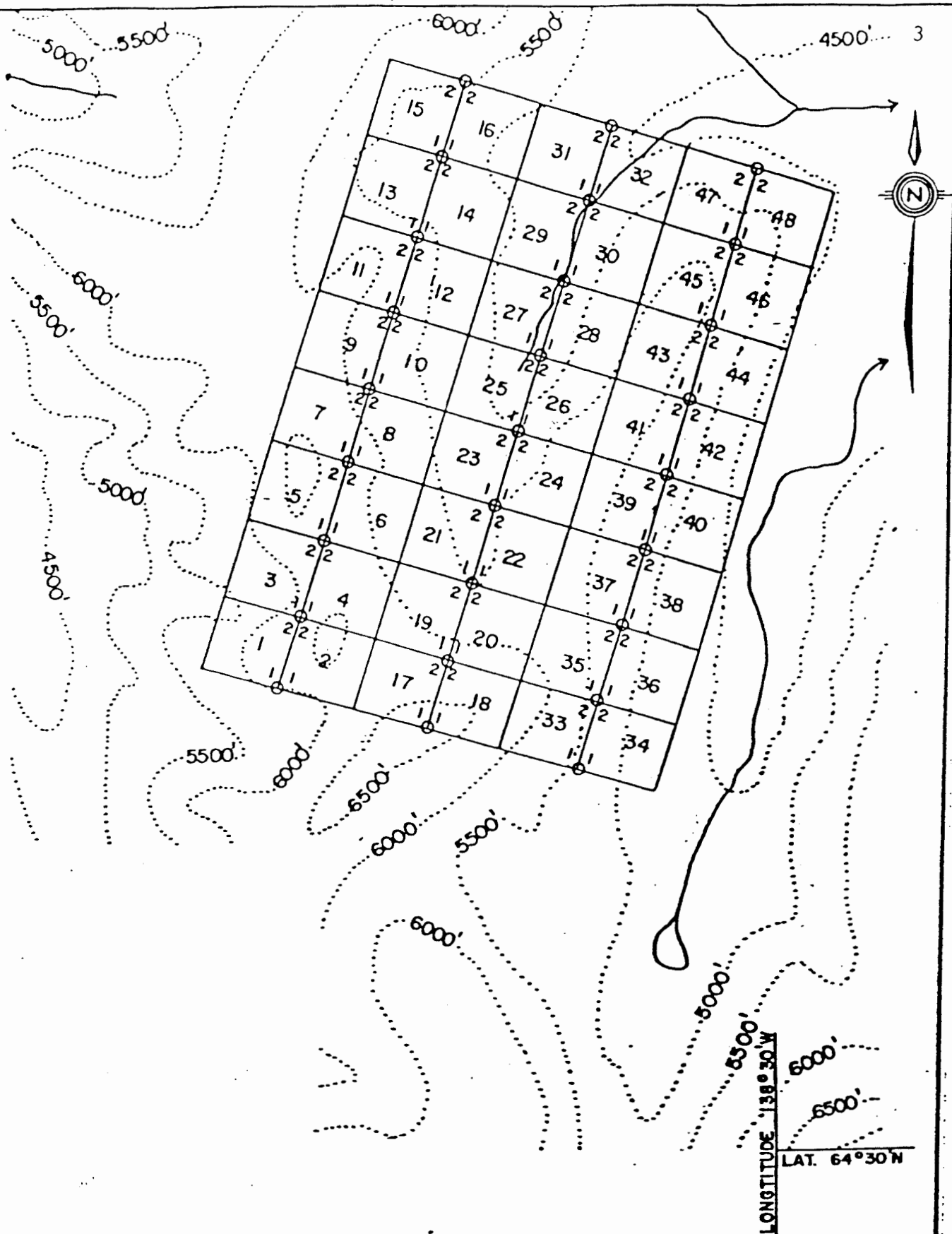
Location and Access :

The TAK 1-48 claims (Figure 1) are located 69 km NE of Dawson City, Yukon at $64^{\circ}33'N$ and $138^{\circ}32'W$ (NTS 116 B/9 and 116 B/10), within the Tombstone Mountains, Ogilvie Range. Access to date has been by helicopter from a debarkation point located 13 km to east, at North Fork Pass, km 76 on the Dempster Highway. In future, if the property warrants development, a road could easily be constructed to the property along a wide, flat-bottomed valley which connects the claim group with the highway.

History of the Claims :

The TAK claims were staked on July 16, 1980, by company personnel and recorded on August 4, 1980 (Figure 2). Grant numbers YA52870 to YA52917 inclusive were assigned to the claims. This staking program followed a moderately successful, stream geochemical survey which located anomalous lead-in-silt levels (180 ppm) with associated zinc, silver and copper anomalies. These were initially detected by the G.S.C. during a regional geochemical survey. In 1981, detailed geological mapping (see TAK 1-48, Geology and Geochemistry, Biczok, 1980) was conducted within the southern portion of the claim group and adjacent lands to locate the presumed source of these metal-in-silt anomalies. Originally the source rocks were thought to be a Devonian clastic unit exposed in the southern portion of the claim group. Rocks of similar age host important lead-zinc deposits elsewhere in the Selwyn Basin. However, detailed mapping in 1981 and 1982 was not able to confirm this hypothesis.





Mattagami Lake Exploration Limited

FIGURE 2.

Tak 1 - 48 Claims
Staked 16th July 1980

1982 Work Program :

During 1982, a two stage exploration program was conducted. During the initial stage (July 15-July 19, 5 man crew) detailed stream sampling was conducted on streams draining the TAK claims and adjacent lands. During the latter stage (September 14 to September 18), the author and Neil Ball completed the detailed mapping program on the northern half of the claims and recovered additional silt samples from the anomalous creek and its tributaries. Mapping was conducted on a 1:10,000 scale enlargement of NTS maps 116 8/9 and 116 B/10.

During the first work program, the exploration crew was camped at km 68 on the Dempster Highway. A Hiller 12E helicopter chartered from Buffalo Airways (Fort Smith, N.W.T.) transported the work crews to the claims. During the second stage the two man crew established a fly camp on the claim block. This was serviced by a Hughes 500D helicopter chartered from Trans North Turbo Air, Dawson City, Y.T. The chart below summarizes the number of man days per activity expended on the property, and the personnel utilized in the 1982 work program.

<u>Personnel</u>		<u>Activity</u>	<u>Man Days</u>
John Biczok	Project Geologist	Geological Mapping	8
Bruce Jago	Party Chief	Geochemical Sampling	2
Lori Walton	Senior Assistant	Reports	1
Yuko Tainaka	Junior Assistant	General	4
Tim Hensch	Junior Assistant	Mob/Demob	1
Paul Duquette	Junior Assistant		
Marlene Watson	Junior Assistant		
		TOTAL	16 man days

The general category includes only cook days by junior personnel.

CHAPTER TWO : GEOLOGY

Introduction :

The regional geology of the TAK claims (Map 1, back pocket) has been summarized by Biczok (1982). Briefly, the TAK claims are situated near the western end of a greater than 350 km long, east trending belt of Ordovician to Cretaceous, clastic and chemical, metasedimentary rocks. This belt (Dawson City - Keno Hill) and the flanking Precambrian rocks were mapped by L.H. Green, of the G.S.C. (1972). He delineated five formations in the western part of the belt and two in the eastern part (Table 1). From oldest to youngest, these formations are :

- 1) The Ordovician-Silurian Road River Formation, predominantly chert, cherty shale and argillite.
- 2) The Permian Tahkandit Limestone, a bioclastic formation up to 30 m thick and 16 km long.
- 3) The Jurassic "Lower Schist" division, a mixture of phyllite, quartzite, argillite, slate, etc.
- 4) The Cretaceous Keno Hill Quartzite, a very thick, massive quartzite formation.
- 5) A Cretaceous maroon and green shale and brown siltstone sequence.

In addition to these sedimentary formations, a northwest trending belt of Cretaceous intrusions, ranging from dyke to batholithic proportions, intersects this clastic belt within the Tombstone Range. Several of these dykes are found on the TAK property and are the focus of the company's exploration efforts on the MARN claims located 16 km to the west.

TABLE 1: Table of Formations

Period	Formation	Description
CRETACEOUS	7. Syenitic Intrusions	Sills and dykes of Hbl-Kfd (7a) and Musc. Porphyritic (7b) Syenite and Biotite Lamprophyre (7c).
	6. Diabase	Medium-grained Diabase dyke.
	5. KENO HILL QUARTZITE	Thick sequence of massive orthoquartzite with shale and phyllite partings (5a) and minor sandy limestone (5b).
JURASSIC	4. LOWER SCHIST	Mainly phyllitic to graphitic slate and shale, minor quartzite (4a) with minor green phyllite (4b).
DEVONIAN	3. BLACK CLASTIC UNIT	Basal chert pebble conglomerate and grey quartzite (3a) overlain by a thick sequence of grey-black shale.
ORDOVICIAN-SILURIAN	2. ROAD RIVER FORMATION	Largely a cherty sequence with green-grey to black cherty shale and argillite (2a) and grey-black to green chert, cherty shale (2b), slate; minor quartzite.
PRECAMBRIAN OR LATER	1. "GRIT UNIT"	Mainly clastic sequence of maroon and green slates with minor quartzite (1a), green phyllite (1b) and olive-green to grey phyllite and mudstone (1c).

(Biczok, 1982)

Recent mapping by Bob Thompson of the G.S.C. (1982), D. Tempelman-Kluit and the company's geologists (1982) has indicated that a Devonian "Black Clastic" sequence lies between the Road River Formation and overlying strata. This formation, which may be correlated with the Canol Formation, in the eastern Yukon Territory, is the focus of the company's exploration efforts. The latter hosts important Pb-Zn-Ag-Ba deposits with the Selwyn Basin.

Description of Rock Formations :

Biczok (1982) has described in detail the strata exposed on the southern portion of the TAK claims and adjacent lands (Table 1 and TAK Claims, Geology and Geochemistry, Biczok, 1982). The 1982 mapping program focused upon Ordovician to Silurian and Precambrian strata exposed in the northernmost claims. The following account will summarize previous descriptions and add, in detail, descriptions of strata mapped this season.

The Precambrian "Grit Unit" (Green and Roddick, 1962) exposed in the northernmost TAK claims consists of south dipping maroon and green slates and phyllites (1a), grey limestone with intercalated sandstone and light grey chert (1d), a thick white sandstone unit (1c) and a thin, discontinuous unit of chert/quartz pebble conglomerate (1e). The vary-coloured slate and phyllite unit is locally cherty, especially the olive green (1c) variety. These fine grained sediments are very fissile reflecting their thinly bedded nature. The grey limestone unit is locally metamorphosed to marble and is thickly bedded (<50 cm thick) except where intercalated with medium grained white sandstone (2-3 cm thick) and grey to white chert beds (10-15 cm thick). In this association, the limestone beds seldom exceed 25 cm in thickness. The thin sandstone beds which are intercalated with the limestone, grade upsection into thicker (15-20 cm thick) bedded deposits at the expense of the limestone, and appear to grade eastward into a considerably thicker section of similar material. The constituent beds are massive, pyritiferous (2-3% pyrite) and locally

metamorphosed to quartzite. The discontinuous chert and quartz pebble conglomerate member contains angular white chert and translucent white quartz fragments up to several centimeters in width.

Detailed mapping in the southcentral portion of the claims during 1982 confirmed the presence of a thrust slice of fine-grained Precambrian sediments mapped by R. Thompson of the G.S.C. in 1981. Previous mapping by company geologists failed to locate this fault although its presence was inferred by a thick unit of structurally discordant green phyllite and olive green to grey phyllite and mudstone. These units have been described by Biczok (1982).

Three additional members have been added to Biczok's (1982) description of the "Road River Formation". These consist of thinly bedded, black, organic-rich shales (2c), black, chert pebble conglomerate with intercalated black, laminated chert (2d) and interbedded grey chert and quartzite (2e). These three members are characteristically discontinuous and may demonstrate considerable structural deformation. The former and latter two units are non-pyritiferous while the black chert pebble conglomerate contains very minor pyrite (1-2%). During 1981, two members were distinguished in this formation; a lower green-grey to black argillite/shale member (2a) and an upper, grey-black to green chert member.

The "Black Clastic" Formation encountered during the 1981 mapping season contains a thin, lower unit of chert pebble conglomerate (3a) and a thick upper sequence of monotonous grey-black shale (3b)(Biczok, 1982).

The Jurassic "Lower Schist" unit (Biczok 1982) exposed in the southern portion of the claims and lands beyond contains an upper green phyllite member (4b) and a lower, more diverse member of slate, shale and quartzite (4a).

The Cretaceous "Keno Hill Quartzite" is the youngest sedimentary unit. A 540 meter thick sequence which outcrops south of the claims contains thick massive beds of orthoquartzite with lesser intercalated slate and phyllite (5a). Thin, brown weathering, sandy limestone is scarce (5b).

Three rock types form sills on the property. These are dominantly hornblende $\pm$ K-feldspar $\pm$ biotite-porphyritic and muscovite-syenite (7) with considerably lesser biotite-"lamprophyre" and diabase (6) (one outcrop; Biczok, 1982). Only two outcrops of syenite were encountered during this seasons program.

CHAPTER THREE : GEOCHEMISTRY

Stream Samples

Introduction :

The TAK stream sampling program was conducted as part of a detailed follow-up inspired by anomalous base-metal and silver values obtained during Mattagami's 1980 and 1981 sampling programs, and the G.S.C.'s regional program in 1977.

G.S.C. sample 1078 (Map 2) obtained south of a forked tributary (Winisk Creek) to the TAK claims was anomalous in both base metals and silver (99 ppm Cu, 108 ppm Pb, 360 ppm Zn and 1.0 ppm Ag, normal pH) and led the Company to extend its program in this area. As a result, Mattagami (1981) obtained an anomalous lead-in-silt (180 ppm Pb, normal pH) value on the southern tributary to this anomalous fork. This led to a detailed follow-up in 1982.

Sample sites for the two stage 1982 program are illustrated on Map 2. Both silt and water samples were obtained during the initial program; only silts were recovered in the latter program. The results of these two surveys are tabulated in Appendices A and B.

Examination of Map 2 and Appendix A shows that both basemetal and silver values are elevated in samples taken from streams in the northern portion of the claim group (Winisk Creek) and from streams which drain the western claim boundary. These streams all have normal pH. Samples from streams flowing to the west (Sample sites 40300/40301, 40302/40303 and 40298/40299) are elevated in basemetal values but are not as anomalous as the samples from Winisk Creek. Samples obtained in creeks draining the southeast and northwest corner of the claims are not lead anomalous.

Discussion :

Sample sites for the two stage 1982 program are illustrated on Map 2. Both silt and water samples were obtained during the initial program; only silts were recovered in the latter program. The results of these two surveys are tabulated in Appendices A and B.

Examination of Map 2 and Appendix A shows that both basemetal and silver values are elevated in samples taken from streams in the northern portion of the claim group (Winisk Creek) and from streams which drain the western claim boundary. These streams all have normal pH. Samples from streams flowing to the west (sample sites 40300/40301, 40302/40303 and 40298/40299) are elevated in basemetal values but are not as anomalous as the samples from Winisk Creek. Samples obtained in creeks draining the southeast and northwest corner of the claims are not lead anomalous. The company utilized this criteria (high Pb-in-silt) to distinguish between zinc and lead-zinc anomalous shale terrains. The latter are obviously more likely to host stratiform lead-zinc mineralization than the former.

The sampling program during July of 1982 was limited in that it did not sample the entire length of Winisk Creek. The sampling results (App. A, Map 2) spuriously show that the lead-anomalous samples might only be obtained on a single creek (sample 40272/40273), however, the September program (App. B, Map 2) which obtained silt from the entire length of the creek localized the anomalous silt values to the upper reaches of the fifth tributary (samples 39536/39537) to Winisk Creek and to the entire length of the fourth tributary (samples 39532 and 39533) (prospecting of all creeks in this area has shown that strongly anomalous results would also have been obtained from the third tributary, immediately south of sample site 40268/40269, however, this creek was dry at the time of sampling).

Rock Geochemistry :

Twenty rock samples were recovered from shale horizons upstream from high metal-in-silt stream anomalies and from creek bottoms in the same vicinity. The results of this sampling program are given in Appendix C.

Examination of Appendix C shows that all shale and argillite samples (sample #'s 39538 to 39544, 39546, 39547 and 39551) are essentially barren of base and precious metals and are not likely host rocks for stratiform lead-zinc mineralization.

Sample 39545 is a quartz/siderite vein from a small shear zone. This sample shows slight zinc enrichment but is otherwise barren.

Sample 39548 is a sample of brecciated (quartz veins) white, laminated chert with minor yellow staining. Geochemical analysis shows that this sample is barren of base and precious metals and that the yellow staining is probably not a weathering product of arsenopyrite.

CHAPTER FOUR :
CONCLUSIONS AND RECOMMENDATIONS

The TAK 1-48 claims are underlain by a south dipping sequence of Precambrian to Cretaceous clastic and chemical metasedimentary rocks. These predominantly fine grained sediments are intruded by several syenite sills and a single diabase dyke. An easterly striking thrust fault has disturbed this rock sequence and emplaced a thick wedge of Precambrian metasediments within the west-central portion of the claim group.

To date, detailed mapping has failed to locate the source horizon for anomalous metal-in-silt values. These were originally thought to have originated from a Devonian "Black Clastic" unit exposed toward the south end of the property, however, it appears that a different geological approach may be warranted to determine the source.

It is recommended that more detailed stream sampling be conducted in this area prior to additional geological studies. Upon receipt and review of these analyses, a detailed mapping and prospecting program should be considered to enhance further the Company's knowledge of the regional stratigraphy and potentially mineralized strata.

REFERENCES

Biczok, J., 1982. Tak 1-48 Claim, Geology and Geochemistry, Internal Company Report.

Green, L.H. and Roddick, J.A., 1962. Dawson, Larsen Creek and Nash Creek Map Areas, Yukon Territory; Geological Survey of Canada, Paper 62-7.

Thompson, R.I. and Roots, C.F. Ogilvie Mountains Project, Yukon; Part A : A New Regional Mapping Program in Geological Survey of Canada Paper 82-1A Current Research Pages 403-411.

Tempelman-Kluit, D., 1970. Stratigraphy and Structure of the "Keno Hill" Quartzite in Tombstone River - Upper Klondike River Map Areas, Yukon Territory. Geological Survey of Canada, Bulletin 180.

STATEMENT OF COSTS

TAK 1-48

HELICOPTER CHARTERS	\$5,613.
WAGES:	
GEOCHEMICAL	2,229.
GEOLOGICAL	2,941
REPORT WRITING	478.
DRAFTING	527.
CONTRACTOR FEES	505.
CAMP COSTS	500.
ASSAYS	650.
TOTAL:	\$13,443.

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.)

APPENDICES

APPENDIX A

Stream Sediment Values Obtained for Samples
Recovered During Stage One Exploration

SAMPLE NUMBER	SILT										WATER							PAN						
	Cu	Pb	Zn	Ag	Mo	U	Ba	As			Cu	Pb	Zn	F	U	pH	K							
GSC 1078 173-82	99	108	360	1.0	8	5.9	2000				N/A	N/A	N/A	54	0.2	7.5								
S-40272 W-40273	300	240	740	1.2							10	20	L10	80	L0.1	6.7	165							
S-40270 W-40271	16	68	500	1.6							10	20	20	50	L0.1	6.4	120							
S-40268 W-40269	150	160	550	1.6							10	20	10	60	L0.1	6.5	150							
S-40266 W-40267	140	130	550	1.4							10	20	20	60	L0.1	6.4	165							
S-40260 W-40261	140	200	550	1.2							10	20	L10	60	L0.1	6.6	170							
S-40258 W-40259	50	74	180	0.2							L10	L20	L10	40	L0.1	6.7	110							
S-40264 W-40265	54	80	190	0.2				42			L10	L20	L10	40	L0.1	6.7	95							
S-40262 W-40263	58	64	160	0.2				8			L10	L20	L10	40	L0.1	6.6	100							
Streams West S-40298 W-40299	92	76	320	0.6							L10	L20	L10	120	L0.1	6.6	250							
S-40300 W-40301	80	90	250	0.2				30			L10	L20	L10	80	0.1	6.6	170							
S-40302 W-40303	62	66	180	0.2				22			L10	L20	L10	60	L0.1	6.7	100							
Streams East S-40276 W-40277	76	6	840	0.8				0.7			L10	L20	40	90	L0.1	9.4	300							
S-40280 W-40281	84	18	420	0.8				2.7			L10	L20	L10	120	L0.1	6.5	160							

NOTE : "L" designates less than
All silt values reported in ppm
All water values reported in ppb
(except pH and conductivity)

APPENDIX B

Stream Sediments Values Obtained for Samples
Recovered During Stage Two Exploration

SAMPLE NUMBER	SILT										WATER						PAN							
	Cu	Pb	Zn	Ag	As																			
173-82-S																								
39528	230	70	470	1.2	38																			
39529	210	74	650	1.2	32																			
39530	120	42	210	0.4	20																			
39531	200	64	520	1.0	30																			
39532	290	260	800	1.0	100																			
39533	150	180	460	0.8	58																			
39534	250	82	440	1.2	46																			
39535	100	46	180	0.4	40																			
39536	110	72	250	0.4	84	}	Same Location	}	Wet Sample	Dry Sample														
39537	120	42	200	0.6	30																			

APPENDIX C

Rock Geochemical Results

SAMPLE NUMBER	ELEMENTS												SAMPLE DESCRIPTION
	Cu	Pb	Zn	Ag	Au *	As	Hg	Sb	SO ₄	W			
39538	16	16	200	1.2									-very fissile, black organic-rich shale
39539	48	12	40	0.3									-grey, filiated calcareous argillite
39540	106	14	85	1.0									-very fissile, black, organic-rich shale
39541	128	16	185	0.1									-very fissile, black, organic-rich shale
39542	160	10	115	0.4									-grey-black, filiated argillite
39543	42	34	205	0.3									-brown weathering, massive quartzite with specular hematite filled fractures
39544	28	8	30	0.5									-rusty weathering laminated, black, pyritiferous (1-2% py) chert
39545	2	44	960	0.4	5	36							-coarse, white quartz vein with very minor siderite
39546	188	20	165	0.9									-very black, organic-rich fissile shale
39547	68	8	60	0.6									-laminated, black, organic-rich shale
39548	2	2	4	0.4	20	3							-banded white chert with yellow arsenic (?) stain, brecciated

APPENDIX D

Sample No. 39828

<u>Mode</u> :	siderite	35-40%
	limonite	25-30%
	quartz	2-3 %
	tetrahedrite	30-35%
	pyrite	1-2 %

The rock is a coarse-grained assemblage consisting mainly of altered siderite and tetrahedrite. Grain size in the siderite ranges up to 1 cm. Abundant limonite occurs as an alteration product along grain boundaries and cleavage planes. Minor amounts of quartz occur as isolated anhedral grains to 2 mm in diameter, and are usually enclosed by sulfide grains.

The only opaque minerals present are tetrahedrite and pyrite. The tetrahedrite is unusually soft (Vickers microhardness of 100-150), but the petrographic identification was confirmed by XRD analysis. The tetrahedrite occurs as irregular, coarsely crystalline masses to 1 cm in diameter. Pyrite forms rare sub-rounded grains to 0.5 mm in diameter within the tetrahedrite, but more commonly occurs as very fine grains distributed just outside the boundaries of the larger tetrahedrite grains.

A zone of limonite 0.1 - 0.2 mm wide is present along all grain boundaries, precluding study of detailed mineral paragenesis.

*Vancouver Petrographics Ltd.*

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Invoice 3606

November 16, 1982

Sample: One unnumbered rock slab with thin section outlined.

R-34954

This sample is a rubbley rock with a brain-like texture. Minerals are:

galena	7%	
quartz	6	
limonite	1	
arsenates	4	
stolzite	82	PbO.WO_3 isomorphous with scheelite

In the section there are two grains of galena about 4mm in size. These are surrounded by stolzite which forms the brain-like structure. Arsenates and limonite (with traces of clay) occur in the gaps between the stolzite grains. Rounded to ovoid patches of quartz occur within the stolzite.

The quartz forms highly strained and crushed grains from 0.05 to 1.2mm in size which occur in aggregates of several grains. Smaller grains occur between the strained grains. Thin fractures cut through the quartz aggregates. The quartz has been replaced by the stolzite; a few isolated grains occur within or between stolzite grains.

Galena is unaltered and also occurs in wispy patches about 0.05mm in size in the core of some of the stolzite grains as well as forming the two large grains.

Grain size of the stolzite is very variable, ranging from 0.02 to 1.5mm. It occurs in spherulitic aggregates around the galena. Thin zones of approximately uniform grain size have grown around the galena. These zones vary in width from 0.1 to 1.0mm. Grains are rounded to shapeless in form. A few subprismatic grains also occur; these have a poorly developed cleavage parallel to the crystal outline; extinction is straight against the cleavage. Some zones are clear but others, especially the thinner ones, are cloudy with extremely fine grained limonite or arsenates. The stolzite was identified on the basis of optic sign (uniaxial negative), very high relief, high birefringence (third order) and its association with galena. A tungsten assay would confirm this identification.

The arsenates are unidentified specifically since they are too fine grained to obtain useful optical data. Two varieties are present - one is bright green, the other is yellow. They are often mixed with limonite. They occur as masses of very fine grains between the stolzite grains and are concentrated around the quartz patches and in the fractures.

A.L. Littlejohn
A.L. Littlejohn, M.Sc.

APPENDIX IV

Property		TAK	Started June 19, 1984		FIELD CO-ORDINATES		SURVEYED CO-ORDINATES		DIP TESTS						NTS no. 116 B/10	
Hole no.		T-H4-4 ₂	Finished June 20, 1984		Lat. 20+14N		Lat.		Depth	Bearing	Dip	Depth	Bearing	Dip	Project no. 92	
Bearing		345°	Length 58.2 m		Dep. 17+15E		Dep.								Logged by W. Reid	
Dip - Collar		-45°	Core size NQ		Elev. 1494 m		Elev.								Sheet 1 of 2	
METRES		% Recovery	Graphic Log	DESCRIPTION OF UNITS	% Mineralization	Sample no.	METRES			ASSAYS						
From	To						From	To	Length	Cu	Pb	Zn	Ag	Au		
0	26.5	N/A		OVERBURDEN: Mainly chert Tallus 15.5 - 18.3: Coarse sand seam 24.7: Change NQ bit												
26.5	32.46	60%		GREY ARGILLITE: Very fine grained light grey mudstone with a moderate cleavage parallel to bedding. Bedding where seen is often discontinuous and wispy. 26.5 - 26.7: Light brown "oxidized" argillite (top of bedrock) 27.3: C.A. bedding - 65° 29.3: C.A. bedding - 60° 31.9: 5 cm of dark grey fault gouge?												
32.46	32.50	100%		SIDERITE-ARSENOPYRITE VEIN: Vein is banded with 1 cm wide arsenopyrite in centre and siderite with minor qtz on either side. Total: 25% arspy 65% siderite 10% auartz Arspy band has some microfaults crosscutting the band with 1 cm displacement. Thin line of yellow arsenic oxide on boundaries. C.A. banding @ 85° Layer of graphitic phyllite on vein boundaries and change in lithologies on either side indicate the vein occupies a fault.	25% arspy 65% sid. 10% qtz.	37351	32.46	32.51	.05 m						As & Sb	
32.50	45.7	95%		GRAPHITIC ARGILLITE: Very fine grained black to dark grey mudstone. Similar to first unit only graphitic. Cove is often broken but recoveries good. Minor thin fine grained sandstone interbeds Minor thin bands (1 to 2 cm) with 2% f.g. disseminated py. Also pyrite mud occurs as small blebs and discontinuous bands. 32.9: C.A. bedding - 65% 34.1: C.A. bedding - 50% 36.3: C.A. bedding - 80% 37.3: 5 cm wide c.g. immature sandstone with 15% py frags. 37.8: 12 cm wide pebble congl. with 30% semi massive pyrite frags (replacement)	<1% py	37352 37353	32.51 37.0	34.51 38.50	2.0 m 1.5 m							

APPENDIX IV

METRES		% Recovery	Graphic Log	DESCRIPTION OF UNITS	% Mineralization	Sample no.	METRES			ASSAYS					
From	To						From	To	Length	Cu	Pb	Zn	Ag	Au	
0	26.5	N/A		OVERBURDEN: Mainly chert Tallus 15.5 - 18.3: Coarse sand seam 24.7: Change NO bit											
26.5	32.46	60%		GREY ARGILLITE: Very fine grained light grey mudstone with a moderate cleavage parallel to bedding. Bedding where seen is often discontinuous and wispy. 26.5 - 26.7: Light brown "oxidized" argillite (top of bedrock) 27.3: C.A. bedding - 65° 29.3: C.A. bedding - 60° 31.9: 5 cm of dark grey fault gouge?											
32.46	32.50	100%		SIDERITE-ARSENOPYRITE VEIN: Vein is banded with 1 cm wide arsenopyrite in centre and siderite with minor qtz on either side. Total: 25% arspy 65% siderite 10% quartz Arspy band has some microfaults crosscutting the band with 1 cm displacement. Thin line of yellow arsenic oxide on boundaries. C.A. banding @ 85° Layer of graphitic phyllite on vein boundaries and change in lithologies on either side indicate the vein occupies a fault.	25% arspy 65% sid. 10% qtz.	37351	32.46	32.51	.05 m					As &	Sh
32.50	45.7	95%		GRAPHITIC ARGILLITE: Very fine grained black to dark grey mudstone. Similar to first unit only graphitic. Cove is often broken but recoveries good. Minor thin fine grained sandstone interbeds Minor thin bands (1 to 2 cm) with 2% f.g. disseminated py. Also pyrite mud occurs as small blebs and discontinuous bands. 32.9: C.A. bedding - 65° 34.1: C.A. bedding - 50° 36.3: C.A. bedding - 80° 37.3: 5 cm wide c.g. immature sandstone with 15% py frags. 37.8: 12 cm wide pebble congl. with 30% semi massive pyrite frags (replacement)	<1% py	37352 37353	32.51 37.0	34.51 38.50	2.0 m 1.5 m						

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NORANDA EXPLORATION COMPANY LTD.

[illegible]

[illegible]

NORANDA EXPLORATION COMPANY LTD.

Property		TAK	Started		June 25, 1984		FIELD CO-ORDINATES		SURVEYED CO-ORDINATES		DIP TESTS						NTS no.		116 B/10																
Hole no.		T-84-G ₆		Finished		Lat. 19+65N		Lat.		Depth		Bearing		Dip		Depth		Bearing		Dip		Project no.		92											
Bearing		165°		Length		73.5 m		Dep. 13+60E		Dep.												Logged by		W. Reid											
Dip - Collar		-50°		Core size		NQ		Elev. 1650 m		Elev.												Sheet		1 of 2											
METRES		% Recovery		Graphic Log		DESCRIPTION OF UNITS		% Mineralization		Sample no.		METRES			ASSAYS																				
From		To										From			To			Length			Pb			Zn			As			Ag			Au		
0		5.5		N/A		OVERBURDEN: Talus and Broken bedrock																													
5.5		21.7				PHYLLITIC GRN. ARGILLITE: Light green, very fine grained, mudstone, moderately bedded with 20% light brown hematite & Mn. on fractures. Beds are lensoid, discontinuous and streaky. Minor thin black lenses. There is a non-penetrative cleavage at 35 to 40° to C.A. which is often coated with red hematite and disseminated manganese dendroids, and spots. Fractures are also lined with this material. C.A. bedding avg - 15 - 20° Hematite gives rock a red color when broken and is more common on the brown beds. Gradational contact.																													
21.7		27.1		95°		GREY ARGILLITE Bedding is very disrupted and in part brecciated. Rock is well fractured and altered by clay, hematite and limonite. Bedding and cleavage irregular. Minor thin veinlets and knots of white and brown material (qtz + siderite) however no mineral is seen and the veinlets are quite thin (mm)		rusty weathering (limonite)		37356 37357		23.6 25.1			25.1 26.9			1.5 1.8																	
27.1		53.9		60°		GRAPHITIC ARGILLITE: Unit as a whole is extensively broken, fractured and sheared with only 60% core recovery. The graphitic unit is interbedded with altered lt. brn. to grey argillite and sandy breccia. These non graphitic units are Fe oxidized with 1% very thin qtz siderite veins and knots. It is extensively clay altered and some shearing and crushing is seen in the coarser beds. Graphitic units have a yellow to orange coating on cleavage planes and fractures. Hematite alteration still moderate, however Mn not seen. C.A. cleavage @ 40-50° 30.9 - 33.7: best section of minor veining in a grey sheared argillite and silt 32.4 - 33.0: medium to coarse grained tectonic breccia (crushed) frags up to 1 cm Hematite & limonite altered 31.2: 1 cm vein of qtz x ls (largest seen) 40.0 - 41.3: med. gray to brn sheared argillite and graphitic schist. Limonite, altered and minor		limonite alteration minor qtz-sid veinlets up to 1 cm		37358 37359 37360 37361 37362 37363		26.9 28.9 30.9 40.0 49.1 50.6			28.9 30.9 41.3 50.6 52.1			2.0 2.0 2.1 1.3 1.5 1.5																	

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NORANDA EXPLORATION COMPANY LTD.

Date Collared August 5, 1983		Date Completed Aug. 8, 1983		Core Size BQ		DIP TESTS				PROPERTY TAK		PROJECT No. 916		N.T.S. No. 116 B/10			
FIELD CO-ORDINATES						DEPTH		BEARING		ANGLE		SURVEYED CO-ORDINATES				Sheet 1 of 1	
Lat. 20+15N		Elev. 1494 m		Dip -50°				RECORDED	CORRECTED	RECORDED	CORRECTED						
Dep. 17+15E		Length 25.3 m		Bearing 340°								Lat.		Elev.		Dip	
												Dep.		Length		Bearing	
From		Recovery	Graphic Log	UNIT NAME		MINERALIZATION		Structure	% Sulph.	Est. Grade	SAMPLE No.	Width	ASSAYS				
To				Description & Alteration													
0				TALUS													
1.52																	
1.52		14%		ROAD RIVER FM													
25.30				Grey-black chert, heavily fractured. Numerous quartz veinlets and some chert breccia fragments. Core is very badly broken. Frequent caving in hole.													
				16.16 m: Quartz-carbonate vein fragment 1 cm long					30%								
				25.30 m: 3 cm long siderite vein with arsenopyrite stringers. Probable top of vein system.													
				Hole redrilled after cementing and terminated at 22.56 m.													

NORANDA EXPLORATION COMPANY LTD.

Date Collared Aug. 9, 1983		Date Completed Aug. 10, 1983		Core Size BQ		DIP TESTS				PROPERTY TAK		PROJECT No. 916		N.T.S. No. 116B/10		
FIELD CO-ORDINATES						DEPTH		BEARING		ANGLE		SURVEYED CO-ORDINATES				
Lat. 20+30N		Elev. 1440 m		Dip -60°								Lat.		Elev.		
Dep. 19+30E		Length 14.63 m		Bearing 340°								Dep.		Length		
												Dip		HOLE No. T-83-2		
From To		Recovery	Graphic Log	UNIT NAME		MINERALIZATION		Structure	% Sulph.	Est. Grade	SAMPLE No.	Width	ASSAYS			
				Description & Alteration												
0 2.43				TALUS												
2.43 14.63		27%		SILTSTONE Grey, thinly laminated siltstone with iron stained fractures. 60% of core is very badly broken.		Thinly bedded at about 60° to core axis.										
				11.58-14.63 m: Grey-black shale fragments												

NORANDA EXPLORATION COMPANY LTD.

Date Colliard Aug. 11, 1983		Date Completed Aug. 11, 1983		Core Size BQ		DIP TESTS				PROPERTY TAK		PROJECT No. 916		N.T.S. No. 116B/10			
FIELD CO-ORDINATES						DEPTH		BEARING		ANGLE		SURVEYED CO-ORDINATES					
								RECORDED	CORRECTED	RECORDED	CORRECTED						
Lat. 20+35N		Elev. 1500 m		Dip -85°								Lat.		Elev.			
Dep. 16+85E		Length 10.06 m		Bearing 340°								Dep.		Bearing			
From	Recovery	Graphic Log	UNIT NAME			MINERALIZATION			Structure	% Sulph.	Est. Grade	SAMPLE No.	Width	ASSAYS			
To			Description & Alteration														
0			TALUS														
3.05																	
3.05	12%		SIDERITE VEIN							20%							
5.49		Siderite with 20% arsenopyrite stringers and disseminated grains. Minor quartz and galena, strong Fe and Mn staining															
5.49	60%		BLACK SHALE														
7.01		Very fine grained shale fragments in a matrix of ice. Some fragments of quartz-carbonate vein material.															
7.01	5%		BLACK CHERT			QUARTZ-CARBONATE											
10.06		Fragments of quartz-carbonate vein material in black chert. Strong Fe and Mn staining.															



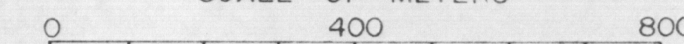


- R-39528 - Rock sample and location
- S-39502 - Silt sample and location
- ▲ S/W-40123 - Silt/water sample and location

YUKON TAK PROJECT

DATE: OCTOBER 1982

SCALE OF METERS



138° 30'