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NORCEN ENERGY RESOURCES LIMITED

ASSESSMENT REPORT  
GEOLOGICAL MAPPING, GEOCHEMICAL SAMPLING AND  
DIAMOND DRILLING PROGRAM  
GROUP IX (COG 7 - COG 15)

GOLDEN MINING DIVISION,  
BRITISH COLUMBIA

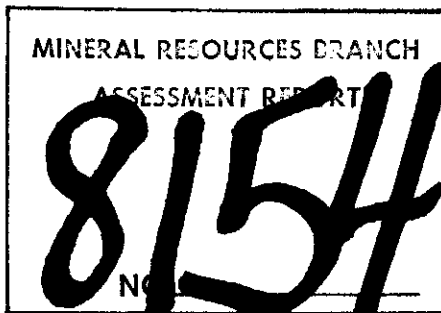
Claims: COG 7 (326)  
COG 15 (334)

Location: 42 km South of Golden, British Columbia

Latitude: 50°53'N

Longitude: 116°57'W

Owner and Operator: Norcen Energy Resources Limited  
July 9-23, August 1-3, 6, 7,  
October 6-15, 1979



*L. Smith*

June 11, 1980

L. Smith, P.Geol.

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### MAPS

1. Land Holdings Map; Crystal Creek Project, British Columbia, (Two Copies).
2. Ag in Soil Geochemical Survey.
3. Cu in Soil Geochemical Survey.
4. Pb in Soil Geochemical Survey.
5. Zn in Soil Geochemical Survey.
6. Detailed Geology.
7. Diamond Drill Hole Location Map.
8. Trench Map 77-3.

## SUMMARY

Detailed geological mapping, soil geochemical sampling, and diamond drilling was performed within the boundaries of Group IX (COG 7 - COG 15) on July 9-23, August 1-3, 6, 7, October 6-15, 1979. A total of fifty-six (56) B horizon soil samples were collected along grid lines spaced 50 metres apart with sample locations every 25 metres. These were geochemically analysed in parts per million for copper, lead, zinc, and silver.

A detailed geological mapping program was completed over the grid area. Three diamond drill hole was completed totalling 204.85 metres.

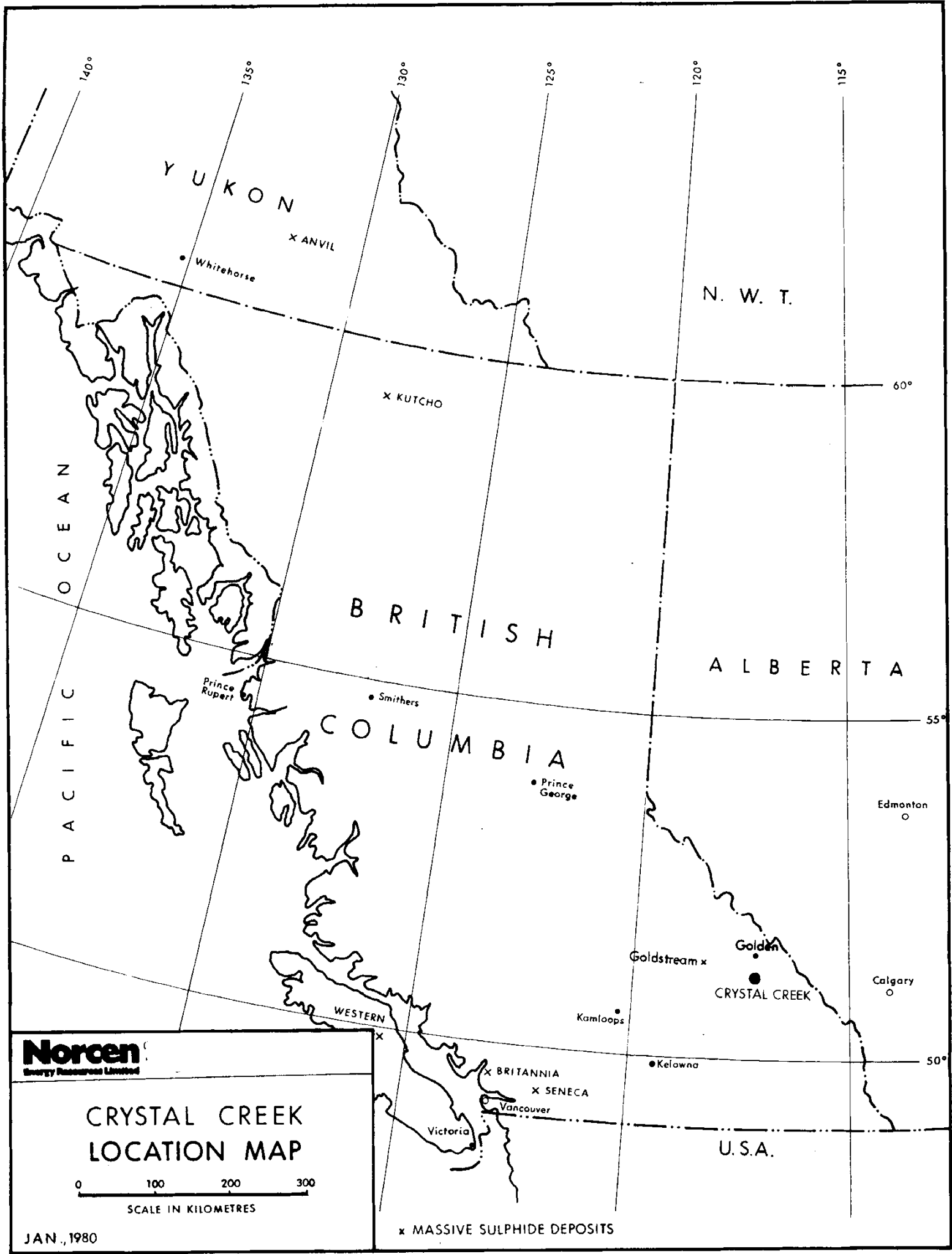
LOCATION AND ACCESS (See Land Holdings Maps, Crystal Creek Project, British Columbia)

The claims are located in the Purcell Mountains approximately 42 kilometres south of Golden, British Columbia. Access is provided by Provincial Highway 95 south from Golden to Parson, followed by 51 kilometres along a gravelled logging road along Vowell Creek.

## CLAIM STATUS

The COG 7 and COG 15 claims form part of the Crystal Creek Property. The COG 7 and COG 15 claims have been grouped into Group IX (COG 7 and COG 15).

<u>Claim Name</u>	<u>Record Number</u>	<u>Recorded Date</u>	<u>Unit Dimensions</u>	<u>No. of Units</u>
COG 7	326	June 18, 1979	5S X 4W	20
COG 15	334	June 18, 1979	4N X 4E	16



**Norcen**  
Energy Resources Limited


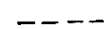
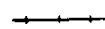


# CRYSTAL CREEK LOCATION MAP

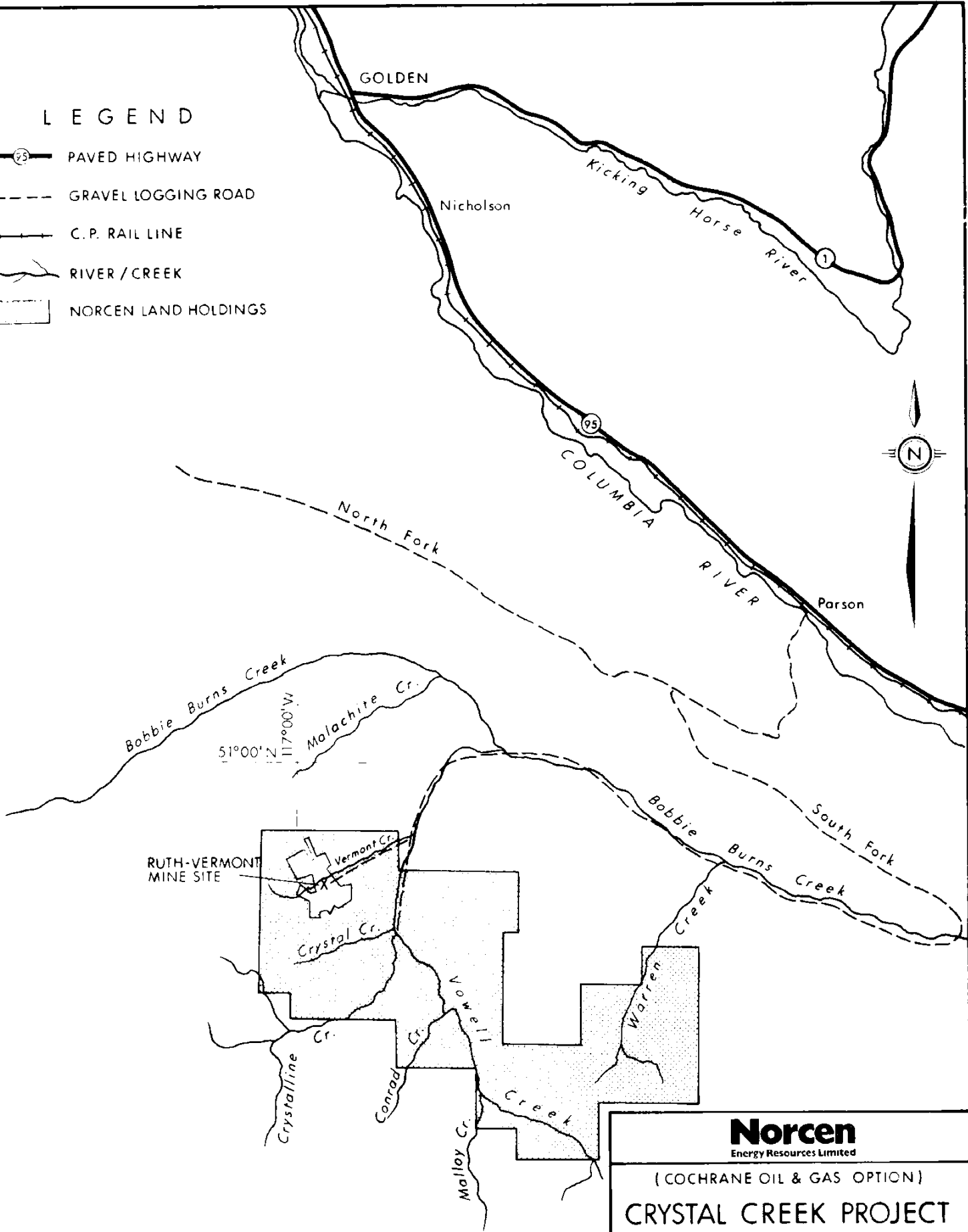


JAN., 1980

x MASSIVE SULPHIDE DEPOSITS

L E G E N D

-  PAVED HIGHWAY
-  GRAVEL LOGGING ROAD
-  C. P. RAIL LINE
-  RIVER / CREEK
-  NORCEN LAND HOLDINGS



**Norcen**  
Energy Resources Limited

(COCHRANE OIL & GAS OPTION)

**CRYSTAL CREEK PROJECT**  
BRITISH COLUMBIA  
LOCATION MAP

0 5 10 Km.  
SCALE 1:250,000

NTS 82-K-14E, 82-K-15W, 82-K-15E Nov. 1979

## GEOLOGICAL MAPPING

A detailed geological mapping program was carried out between July 9, 10, 14-23, and August 1-3, 6, 7, 1979. An existing grid was utilized for control in plotting the data. Outcrop exposures are somewhat confined to the roads made during previous drilling programs.

As a generalization the rock types identified on the grid would represent the middle portion of the Horsethief Creek Group as described by Ressor (G.S.C. Memoir 369, Geology of the Lardeau Map Area, East Half, B.C., 1973). Several rock types were identified including a variety of argillites, phyllites, limestone, arkose, quartzite, grits, and quartz pebble conglomerates. A brief description of each is given below.

### 1. Argillite and Phyllite

Argillite (and its foliated equivalent phyllite) is the predominant rock type located on the grid. Several variations are present ranging from light grey to near black in color, and from massive and structureless to thinly laminated, bedded, and sometimes varved varieties. The darker colored argillites frequently contain pyrite or marcasite crystals. The numerous varieties are commonly interbedded and may or may not be calcareous. Soft sediment and structural deformation is often visible in the laminated and bedded varieties.

### 2. Limestone

Limestone is not abundant on the grid. Typically the limestone is dark colored, fine grained, impure and interbedded with thin beds of argillite. In several areas, calcareous arkosic or sandy layers were identified and they may represent an impure coarse variety of the limestone.

A unique calcareous unit was located in the eastern portion of the grid. The rock appears to contain oolites or pisolites as well as angular clasts of a variety of rock types common to the local area. The current interpretation is that this represents slump brecciation within a shallow water environment. This carbonate breccia has a thickness of 3 to 5 metres (perhaps locally up to 10 metres) and represents a marker horizon that will assist in the unravelling of the stratigraphy on the Crystal Creek property.

# TABLE OF FORMATIONS

ERA	PERIOD OR EPOCH	GROUP OR FORMATION	LITHOLOGY	THICKNESS (feet)	
P R O T E R O Z O I C	W I N D E R M E R E  ( H A D R Y N I A N )	H O R S E T H I E F  C R E E K G R O U P	Varicoloured slate argillite and phyllite; quartzite, grit and quartz-pebble conglomerate; minor limestone	3,000 to 8,000	
		T O B Y  F O R M A T I O N	Polymictic conglomerate with pebbles, cobbles, and boulders of varied composition; matrix of impure limestone, shale and quartzite.	0-1,500	
	U N C O N F O R M I T Y				
	P U R C E L L  ( H E L I K I A N )	M O Y I E  I N T R U S I O N S		Metadiorite and meta-quartz diorite sills	
		I N T R U S I V E			
		M O U N T N E L S O N  F O R M A T I O N	Buff and grey dolomite and dolomitic limestone, slate, argillite, quartzite	~ 4,000	
		D U T C H C R E E K  F O R M A T I O N	Varicoloured argillite and slate, quartzite, and some carbonate rocks	± 4,000	
		K I T C H E N E R - S I Y E H  F O R M A T I O N	Very thinly bedded quartzite, black argillite and some dolomite, sandy dolomite and limy argillite	6,500	
		C R E S T O N  F O R M A T I O N	Green chloritic quartzite, grey quartzite with purple laminae, green and grey phyllite and and argillite	8,000	
		A L D R I D G E  F O R M A T I O N	Upper division: Sericitic quartzite, argillite, thin-laminated argillite and quartzite		~ 9,500
			Lower division: Fine-grained quartzite		unknown
	B a s e n o t e x p o s e d				

From Ressor 1973, G.S.C. Memoir 369, Geology of the Lardeau Map area, East Half, British Columbia.

### 3. Quartzite, Arkose, Grits, and Pebble Conglomerates

Rocks of varying clastic composition ranging in grain size up to 10mm are found on the Crystal Creek grid area. For the most part the clastic rocks are light grey and green colored although dark brown and dark grey varieties are present. The coarser varieties are dotted with white and blue quartz clasts. Several arkosic and gritty sections are calcareous. The clastic section would appear to be several tens perhaps hundreds of metres thick with interbeds of argillite (phyllite).

Most of the particles consist of quartz which may occur as aggregates of grains as in the quartz pebble conglomerates. The pebbles in the conglomerates are predominantly of quartz, although feldspar, chert, quartzite, dolomite, and argillite pebbles are recognizable. The coarse (up to 50 mm) pebble conglomerates were not seen on the grid area; however, several outcrops are visible along the main access logging roads to the east.

Two sulphide occurrences (Trench 77-3 and Lower Showing) were located within the boundaries of the Group IX (COG 7 - COG 15) claims. Trench 77-3 was mapped and sampled in detail (map enclosed).

### GEOCHEMICAL SOIL SAMPLING

A total of 300 soil geochemical samples were collected at 25 metre intervals along the grid. Fifty-six (56) of these soil samples were collected within the boundaries of Group IX (COG 7 - COG 15) claims. The samples were collected below the leached horizon from a brown rusty soil zone that is thought to represent the B horizon. These samples were geochemically analysed by Loring Laboratories Ltd. of 629 Beaverdam Road, N.E. Calgary, Alberta, by atomic adsorption for the elements of lead, zinc, copper, and silver.

The purpose of the geochemical sampling survey over the grid was the two fold; (i) to locate and define specific targets within the known area of zinc-lead-silver mineralization (ii) to outline a set of anomalous values for several elements that could in turn be utilized to define anomalous geochemical areas within the surrounding claim blocks.

A total of 205 B horizon soil samples were collected from adjacent Norcen claim blocks.

A number of characteristics can be tabulated from the soil geochemical surveying for the gridded area:



- 1) The base metal elements of Pb, Zn, Cu, and Ag all outlined areas of known mineralization on the gridded areas.
- 2) Pb and Zn tended to give broad linear anomalies with several values in excess of 0.5% (5 000 ppm).
- 3) Ag and to a lesser degree Cu defined much narrower geochemically anomalous zones. However Cu in particular did not locate at least one area of known mineralization.
- 4) From the statistical analysis there are two distinct populations evident for Pb, Zn, and Ag. This is likely due to the collection of samples directly over mineralization.
- 5) From the statistical analysis, the anomalous values for Pb, Zn, and Ag are extremely high.

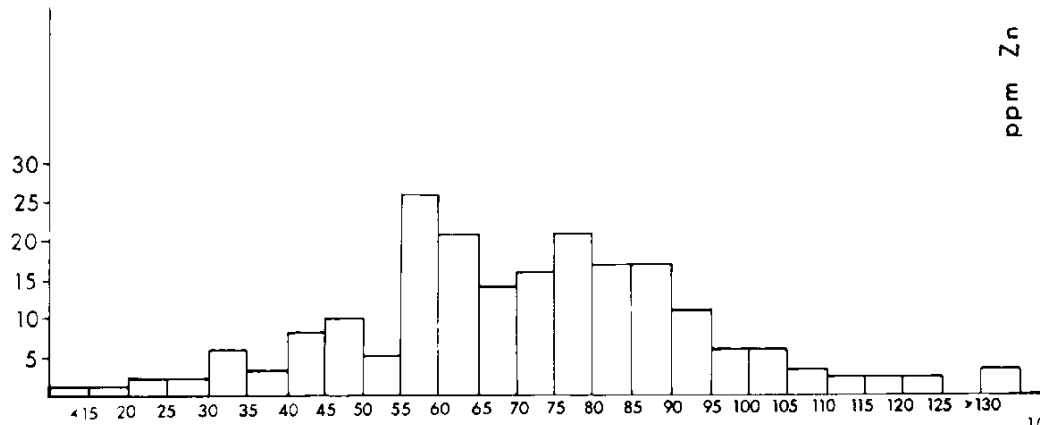
Due to probable biased anomalous values for each element (perhaps with the exception of Cu) a separate statistical analysis was done for the regionally collected samples.

Anomalous Values are Defined by the

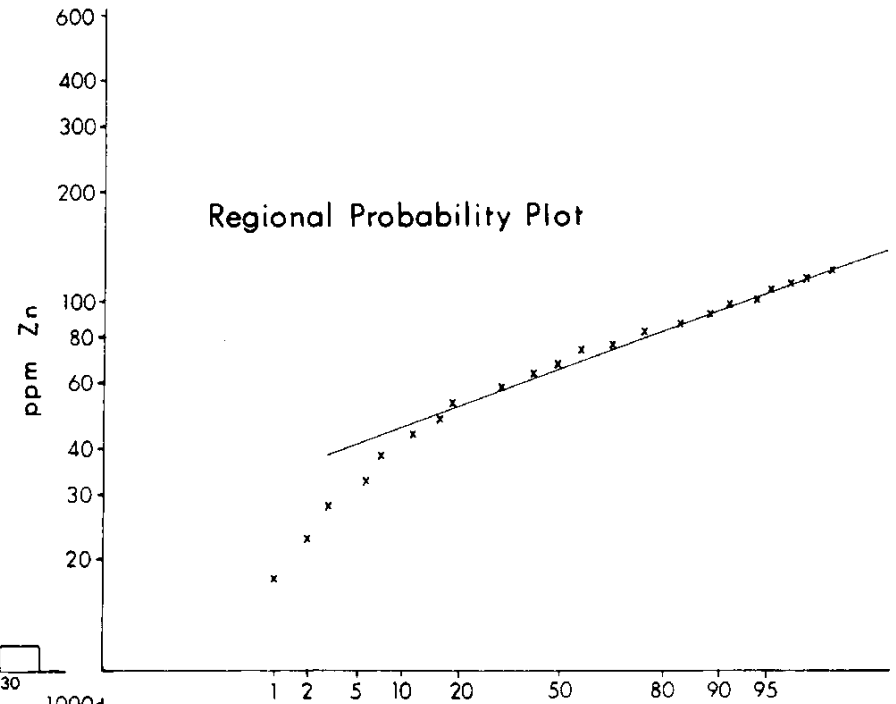
	<u>Upper 5% of the values in ppm</u>	<u>Median plus 2 Standard Deviations in ppm</u>
<u>Gridded Area</u>		
Pb	400	117
Zn	775	544
Ag	2.7	1.9
Cu	47	45
<u>Regional</u>		
Pb	33	32
Zn	108	108
Ag	0.9	0.9
Cu	38	38

# Zinc content of soil samples

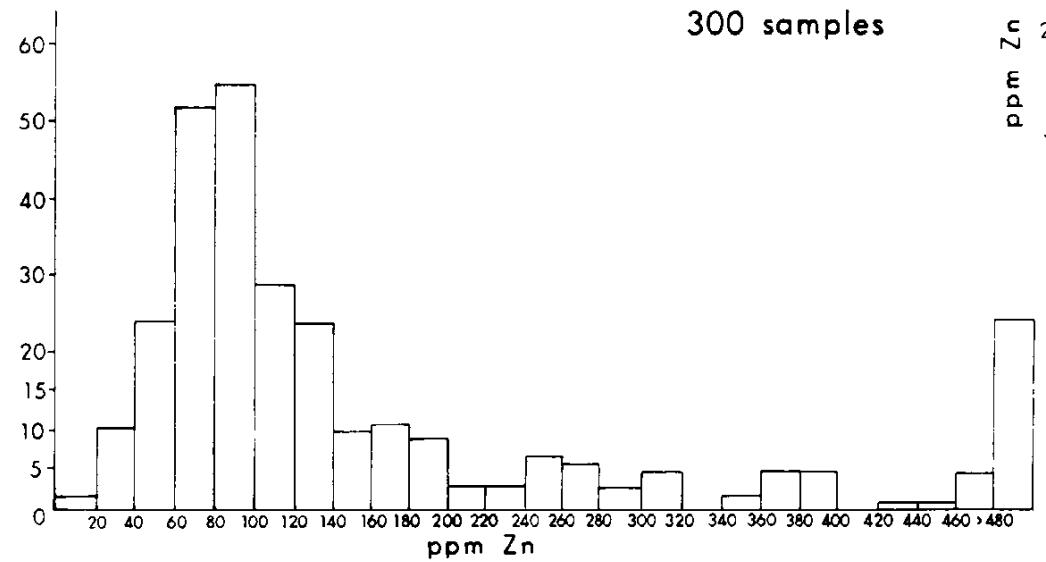
Regional Histogram  
205 samples



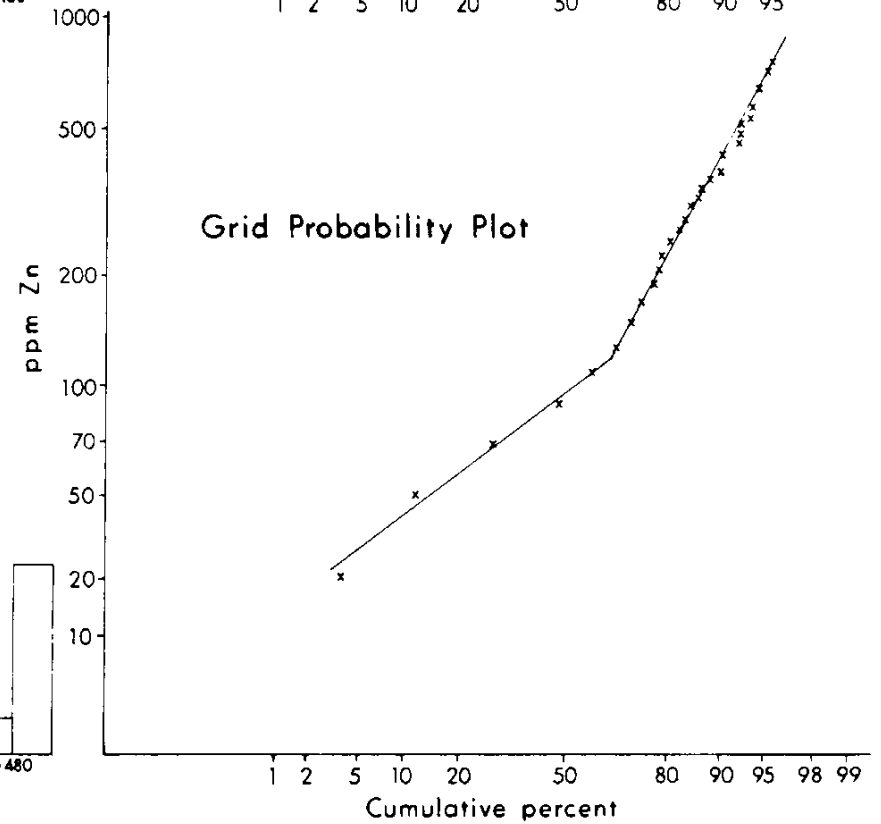
Regional Probability Plot



Grid Histogram  
300 samples

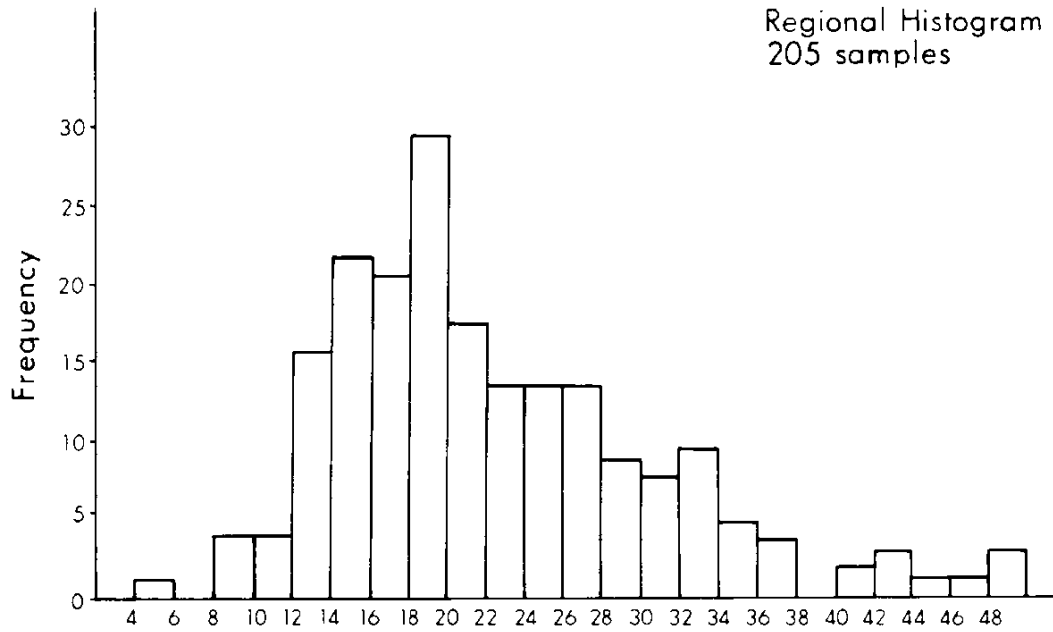


Grid Probability Plot

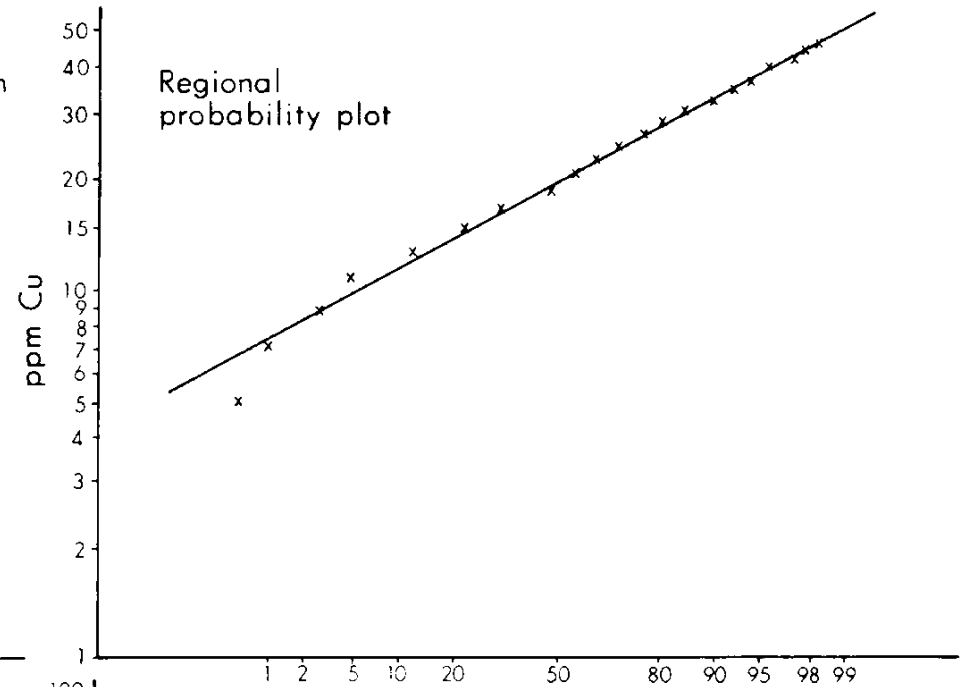


# Copper content of soil samples

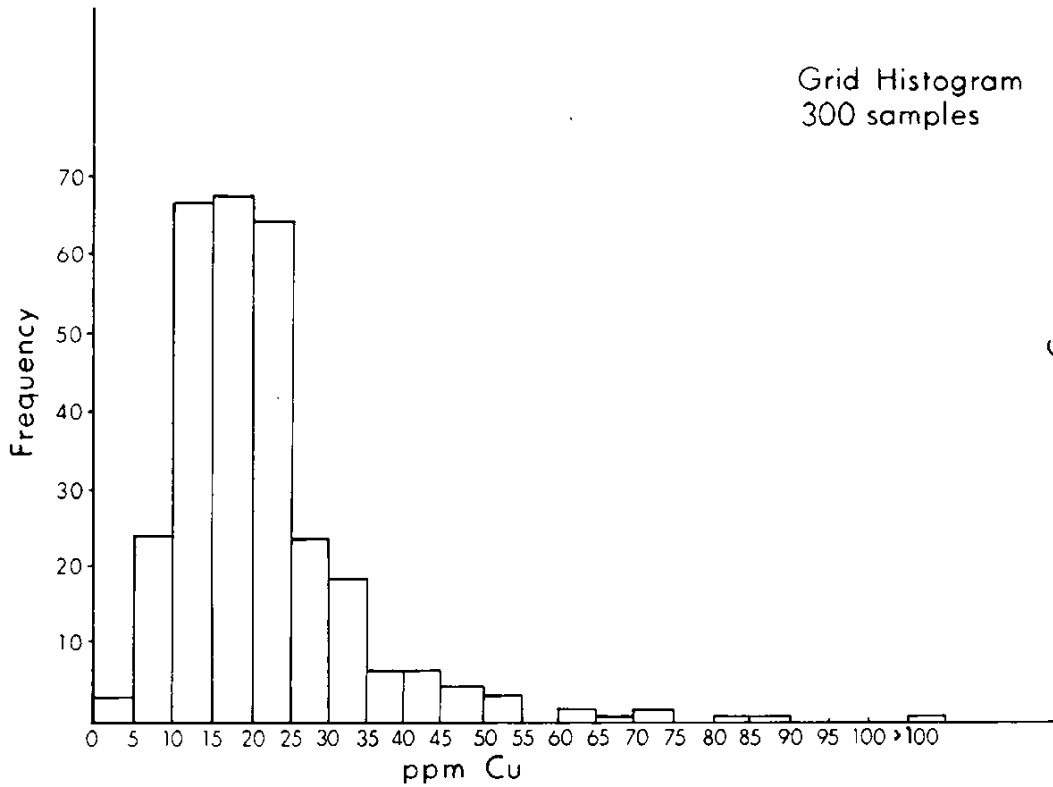
Regional Histogram  
205 samples



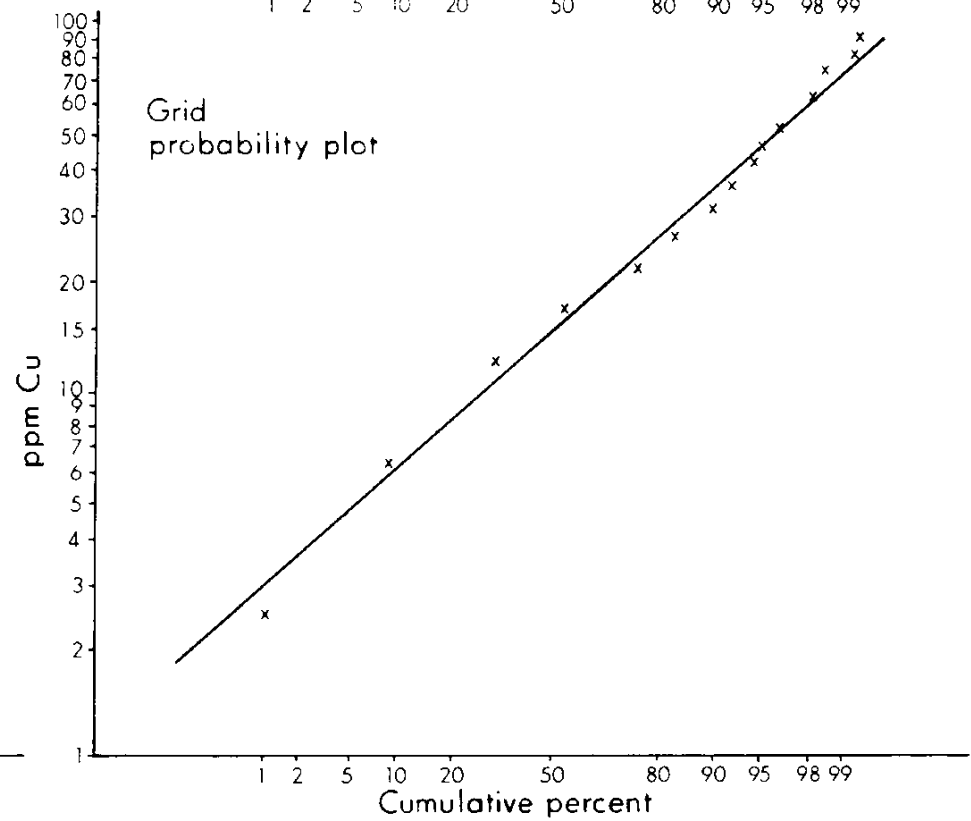
Regional  
probability plot



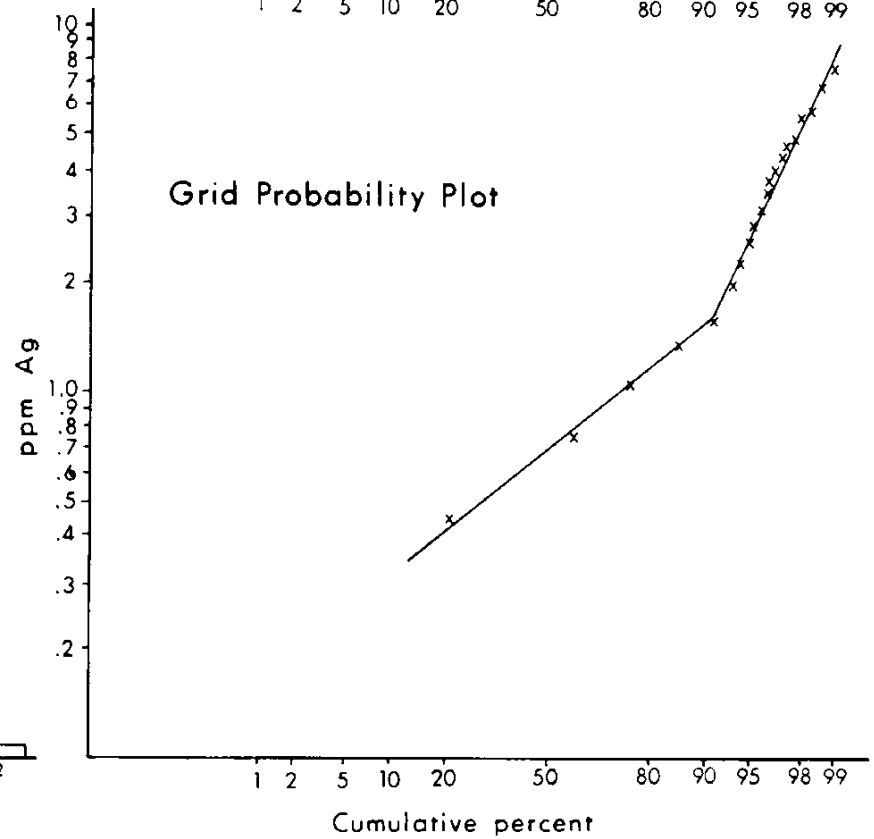
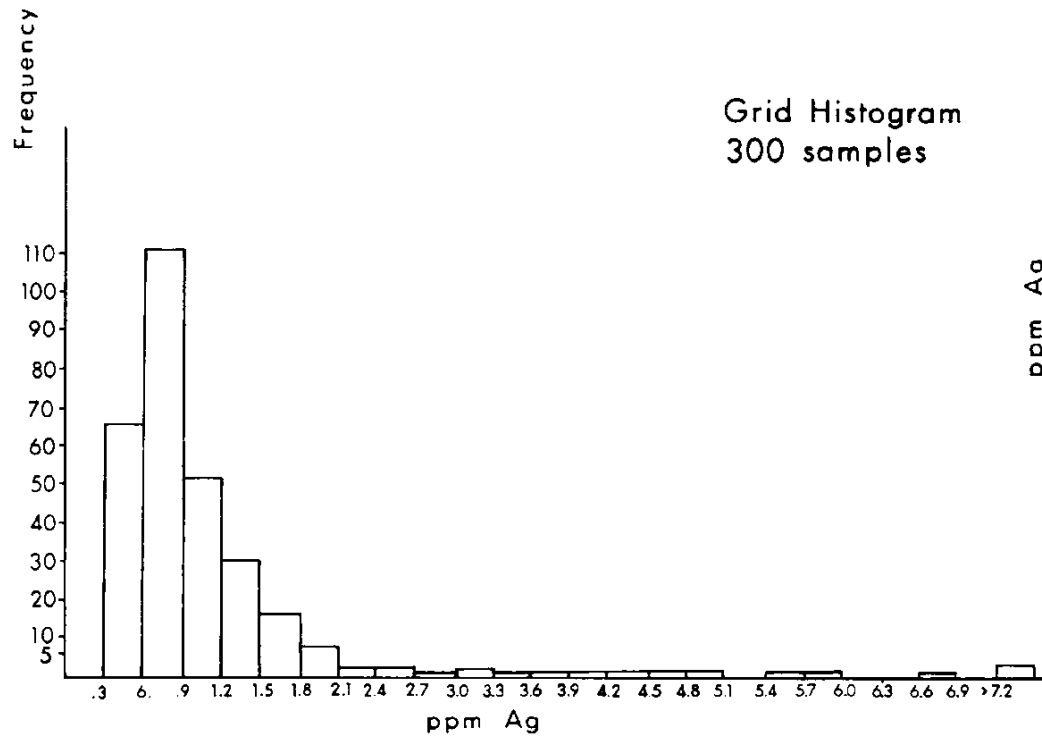
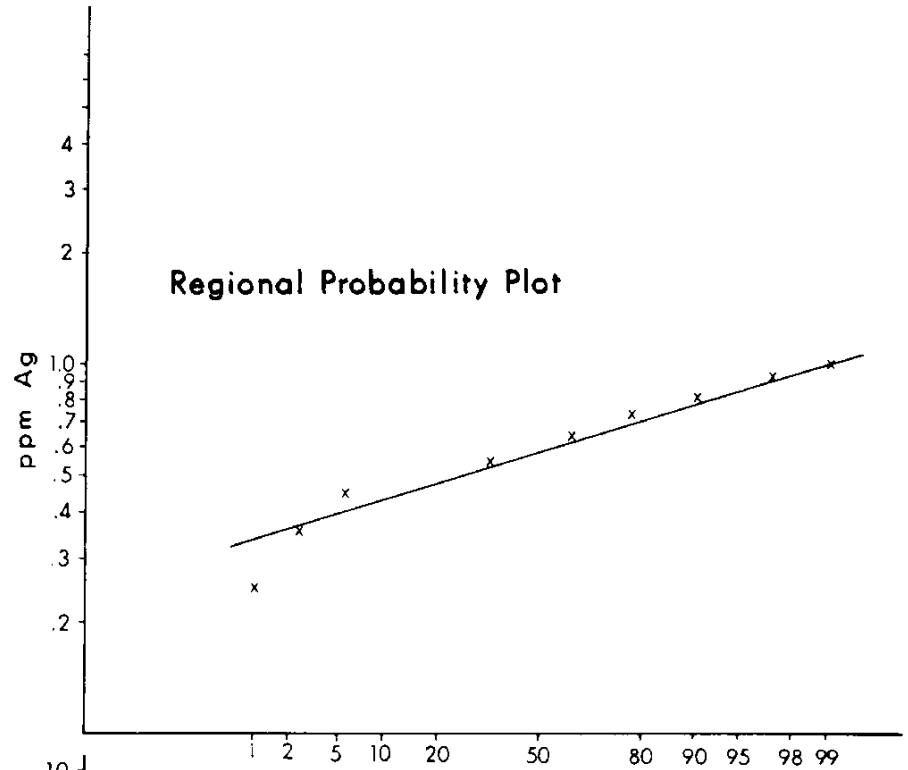
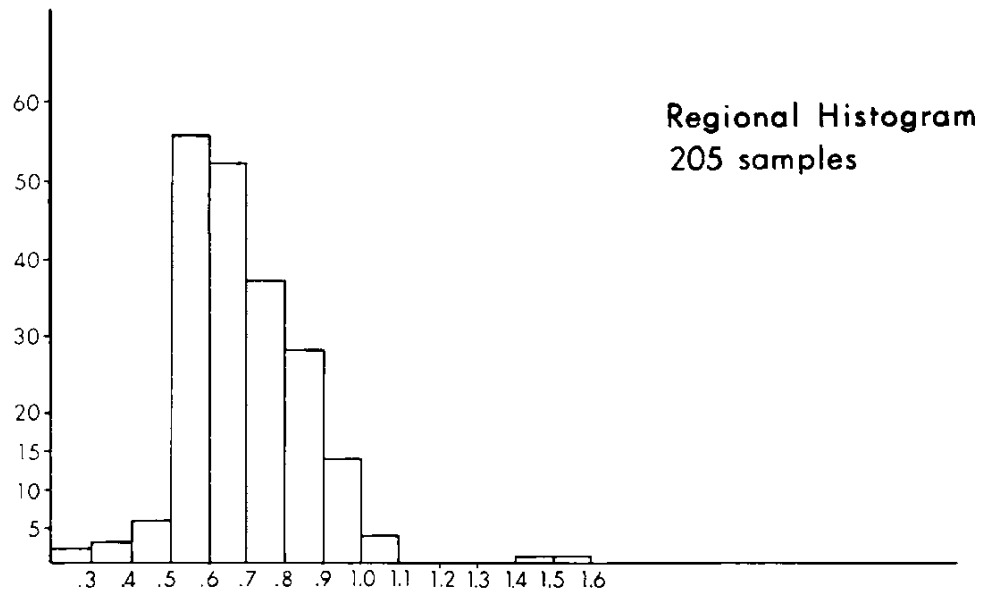
Grid Histogram  
300 samples



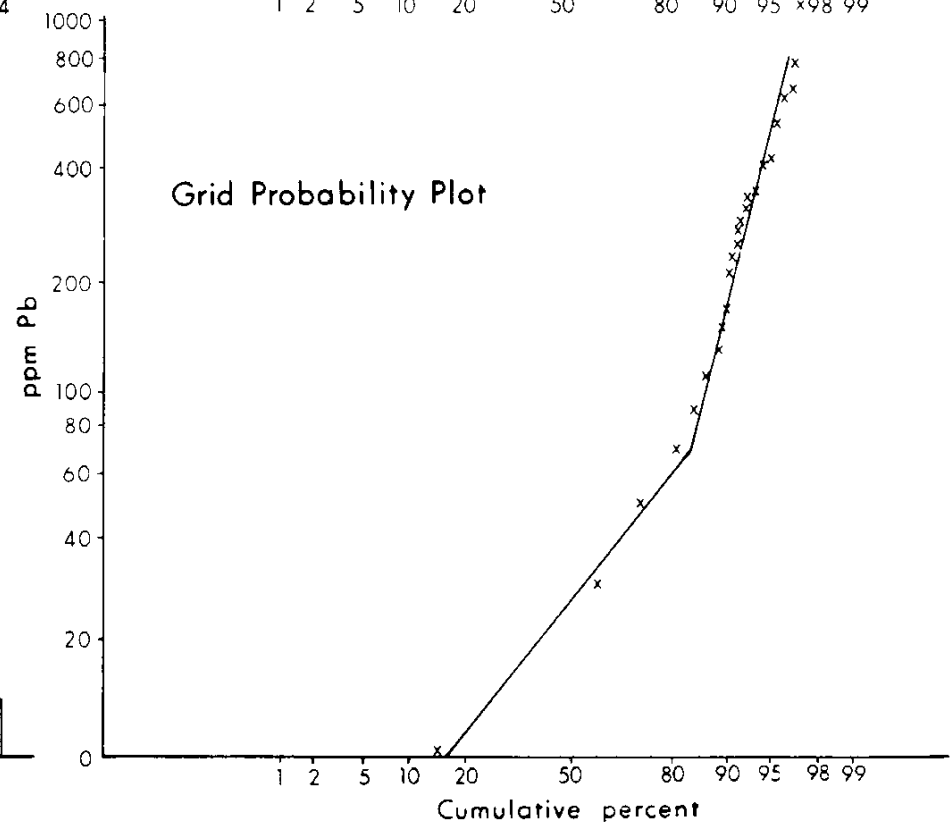
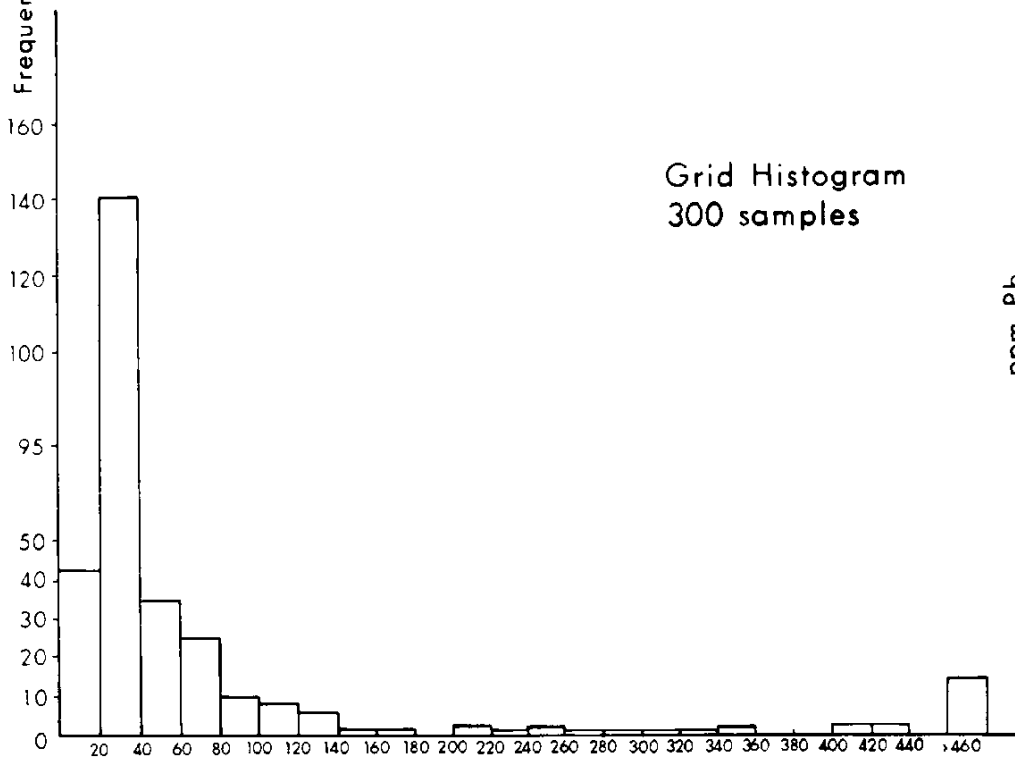
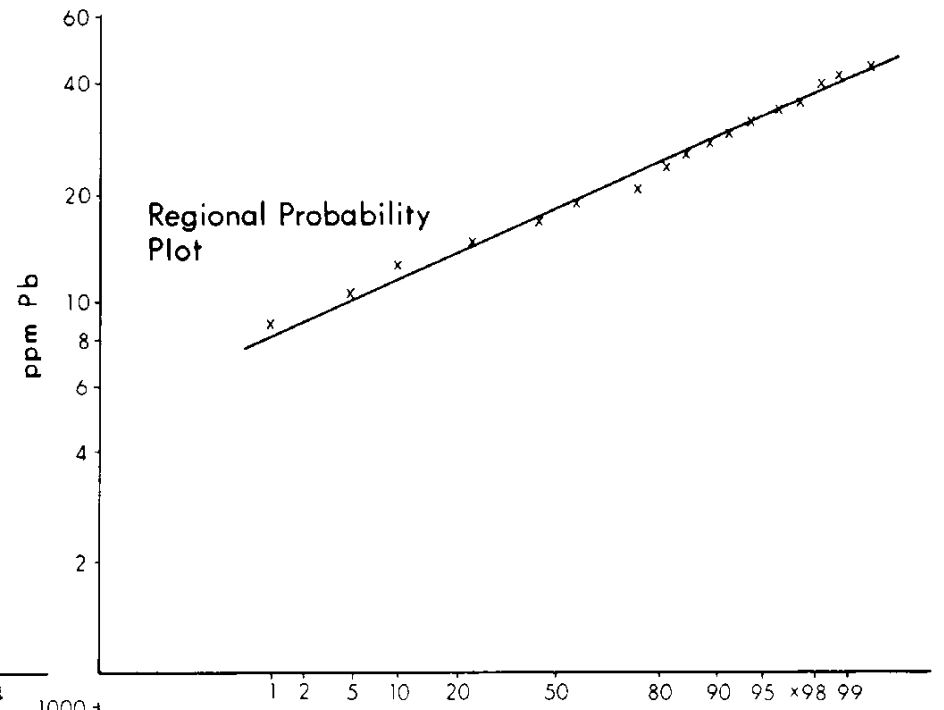
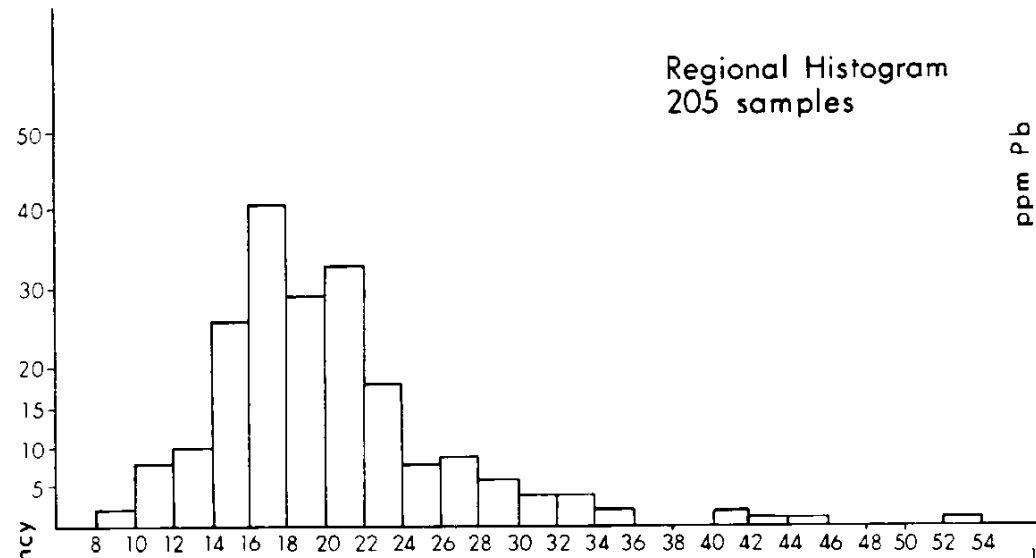
Grid  
probability plot



# Silver content of soil samples



# Lead content of soil samples



DIAMOND DRILLING

Three diamond drill holes (79-8, 79-11, and 79-12) were completed within the boundary of the Group IX (COG 7 - COG 15) claims. This drilling was carried out by Cameron McCutcheon Drilling Limited of Vancouver, British Columbia utilizing a longyear 38 drill.

	<u>At Collar</u> <u>Bearing</u>	<u>Dip</u>	<u>Depth</u>
CC-DDH-79-8	285°	-30°	36.60 metres
CC-DDH-79-11	033°	-72°	132.90 metres
CC-DDH-79-12	280°	-89°	35.35 metres

Several sections from each drill hole were assayed, the results of which are presented below.

<u>Hole</u> <u>#</u>	<u>Assay</u> <u>Tag #</u>	<u>Interval</u> <u>(metres)</u>	<u>Sample</u> <u>width</u> <u>(metres)</u>	<u>%Pb</u>	<u>%Zn</u>	<u>oz/ton</u> <u>Ag</u>	<u>oz/ton</u> <u>Au</u>
79-8	1476-0	11.80-12.05	0.25	tr	0.04	0.68	tr
	1477-0	12.05-12.13	0.08	tr	0.09	0.70	tr
	1478-0	16.45-17.05	0.60	tr	0.02	0.60	tr
	1479-0	20.30-20.55	0.25	tr	0.03	0.48	tr
	1480-0	20.55-21.00	0.45	tr	0.05	0.04	tr
	1481-0	21.00-21.10	0.10	0.02	0.03	0.10	tr
	1482-0	21.10-21.20	0.10	tr	0.01	0.02	tr
	1483-0	21.20-21.65	0.45	tr	0.02	0.16	tr
	1484-0	21.65-22.25	0.60	tr	0.01	0.08	tr
	1485-0	22.25-22.60	0.35	0.04	0.17	0.02	tr
	1486-0	22.60-22.90	0.30	2.48	7.43	1.72	0.03
	1487-0	22.90-23.15	0.25	2.00	2.80	2.34	tr
	1488-0	23.15-23.45	0.30	5.78	8.32	5.36	tr
	1489-0	23.45-23.95	0.50	7.85	11.64	8.84	tr

1490-0	23.95-24.30	0.35	10.59	15.39	10.70	0.01
1491-0	24.30-24.40	0.10	2.64	3.90	2.56	tr
1492-0	24.40-24.70	0.30	2.22	4.20	2.50	tr
1493-0	24.70-25.15	0.45	0.10	0.22	0.02	0.01
1494-0	25.15-25.30	0.15	0.02	0.04	0.02	tr
1495-0	25.30-25.70	0.40	0.02	0.02	0.02	tr
Composite 22.60-24.70 (2.1 m/6.9 ft.)			5.51%	8.75%	5.65	

<u>Hole #</u>	<u>Assay Tag #</u>	<u>Interval (metres)</u>	<u>Sample width (metres)</u>	<u>%Pb</u>	<u>%Zn</u>	<u>oz/ton Ag</u>	<u>oz/ton Au</u>
79-11	1629-0	88.30-89.25	0.90	tr	0.02	0.02	tr
	1628-0	94.05-94.55	0.50	0.04	0.03	0.02	tr
	1627-0	94.55-95.10	0.55	0.02	0.02	0.02	0.01
	1626-0	95.10-95.50	0.40	12.49	13.13	12.72	0.10
	1625-0	95.50-96.00	0.50	0.02	0.02	0.24	0.01
	1624-0	96.00-96.35	0.35	tr	0.02	0.02	0.01
	1623-0	96.35-97.70	1.35	tr	0.01	0.02	0.01
	1622-0	97.70-98.55	0.85	0.06	0.05	0.02	0.01
	1621-0	98.55-99.35	0.80	0.04	0.09	0.02	tr
	1620-0	99.35-100.07	0.72	0.14	0.05	0.02	0.01
	1619-0	100.07-100.25	0.18	1.62	8.20	1.44	0.01
	1618-0	100.25-100.70	0.45	0.02	0.09	0.02	0.01
	1617-0	100.70-101.40	0.70	0.08	0.21	0.02	tr
	1616-0	101.40-101.90	0.50	tr	0.01	0.10	tr
	1615-0	101.90-102.40	0.50	tr	0.01	0.02	0.01
	1614-0	106.70-107.20	0.50	0.04	0.07	0.02	tr
	1613-0	107.20-107.35	0.15	0.40	0.25	0.12	tr

1612-0	107.35-108.15	0.90	tr	0.01	0.02	tr
1611-0	110.15-110.75	0.60	0.04	0.13	0.14	tr
1610-0	110.75-111.00	0.25	0.96	0.06	0.02	0.01
1609-0	111.00-111.55	0.55	0.02	0.08	0.04	tr
1608-0	112.45-113.40	0.95	0.04	0.02	0.02	tr
1607-0	113.40-114.00	0.60	0.02	0.01	0.02	0.01
1606-0	114.00-114.10	0.10	5.40	0.42	4.28	0.02
1605-0	114.10-114.45	0.35	tr	0.01	0.02	0.01
1604-0	114.45-114.60	0.15	tr	0.01	0.02	tr
1603-0	114.60-115.25	0.65	tr	0.01	0.02	0.01
1602-0	115.25-115.90	0.65	tr	0.01	0.06	tr
1601-0	116.60-116.75	0.15	0.02	0.01	0.04	tr
1550-0	116.75-117.25	0.40	0.02	0.02	0.08	0.01
1549-0	118.05-118.15	0.10	7.40	14.50	20.50	0.04
1548-0	118.15-118.45	0.30	0.06	0.38	0.02	0.02
1547-0	118.45-119.25	0.80	tr	0.01	0.02	0.01
1546-0	119.25-119.65	0.40	tr	0.01	0.02	0.01
1545-0	119.65-120.00	0.35	tr	0.01	0.02	tr
1544-0	120.00-120.70	0.70	tr	0.01	0.02	0.03
1543-0	120.70-121.75	1.05	0.02	0.01	0.02	0.02
1542-0	121.75-122.65	0.90	0.04	0.03	0.02	0.01
1541-0	122.65-123.18	0.53	tr	0.03	0.02	0.01
1540-0	123.18-123.33	0.15	0.12	1.45	0.12	0.01
1539-0	123.33-123.45	0.12	tr	0.02	0.02	0.01
1538-0	123.45-123.75	0.30	0.04	0.11	0.02	0.01



1537-0	123.75-124.35	0.60	0.04	0.02	0.02	tr
1536-0	124.35-124.55	0.20	4.99	12.88	8.90	tr
1535-0	124.55-125.15	0.60	0.14	0.09	0.02	tr
1534-0	125.15-125.23	0.08	0.02	0.01	0.02	0.01
1533-0	125.23-125.58	0.35	15.44	1.45	14.92	tr
1532-0	125.58-125.85	0.27	tr	1.85	0.02	0.01
1531-0	125.85-126.57	0.72	0.02	0.08	0.02	tr
1530-0	126.57-126.65	0.08	0.18	4.58	0.32	tr
1529-0	126.65-126.80	0.15	0.02	0.49	0.18	tr
1528-0	126.80-127.45	0.65	tr	0.01	0.02	0.01
1527-0	127.45-128.10	0.55	tr	0.01	0.02	tr
1526-0	128.10-128.35	0.25	tr	0.01	0.02	tr
1525-0	128.35-128.95	0.60	tr	0.01	0.02	0.01
1524-0	128.95-129.35	0.40	tr	0.01	0.02	0.01
1523-0	129.35-129.85	0.50	tr	0.01	0.02	tr
1522-0	129.85-130.35	0.50	tr	0.01	0.02	0.02
1521-0	130.35-130.95	0.60	tr	0.02	0.02	0.03
1520-0	130.95-131.35	0.40	tr	0.01	0.02	tr
1519-0	131.35-131.80	0.45	tr	0.01	0.02	tr
1518-0	131.80-132.00	0.20	tr	0.01	0.14	0.02
1517-0	132.00-132.90	0.90	tr	0.01	0.02	0.01
Composite 123.18-126.80 (3.62m (11.9 ft.))			1.81	1.21	1.96	tr

<u>Hole #</u>	<u>Assay Tag #</u>	<u>Interval (metres)</u>	<u>Sample width (metres)</u>	<u>%Pb</u>	<u>%Zn</u>	<u>oz/ton Ag</u>	<u>oz/ton Au</u>
79-12	1630-0	6.70- 7.60	0.90	0.02	0.06	0.02	tr
	1631-0	7.60- 8.60	1.00	tr	0.03	0.02	tr
	1632-0	8.60- 9.40	0.80	tr	0.03	0.02	tr
	1633-0	9.40- 9.60	0.20	0.02	0.11	0.02	tr
	1635-0	9.60-10.65	1.05	0.94	1.95	0.96	tr
	1636-0	10.65-11.65	1.00	0.10	0.63	0.36	tr
	1637-0	11.65-12.20	0.55	0.94	0.25	0.02	0.01
	1638-0	12.20-12.50	0.30	0.12	0.05	0.06	tr
	1639-0	12.50-13.10	0.60	0.30	0.31	0.24	tr
	1640-0	13.10-13.70	0.60	1.02	1.55	2.40	tr
	1641-0	13.70-14.30	0.60	2.44	5.45	0.02	tr
	1642-0	14.30-14.95	0.65	0.02	0.02	0.02	tr
	1643-0	14.95-16.15	1.20	0.02	0.06	0.06	tr
	1644-0	16.15-16.65	0.50	tr	0.02	0.02	tr
	1645-0	16.65-16.70	0.05	tr	0.02	0.02	tr
	1646-0	16.70-17.70	1.00	0.08	0.01	0.02	tr
	1647-0	17.70-19.35	1.65	0.02	0.02	0.02	0.01
	1648-0	19.35-20.10	0.75	0.30	0.26	0.02	0.01
	1649-0	20.10-20.80	0.70	0.22	0.39	0.02	0.01
	1650-0	20.80-21.65	0.85	0.56	1.80	0.02	0.01
	1651-0	21.65-22.70	1.05	0.06	0.12	0.02	tr
	1652-0	22.70-23.75	1.05	0.02	0.01	0.02	tr

1653-0	23.75-24.40	0.65	tr	0.02	0.02	0.01
1654-0	24.40-25.00	0.60	0.04	0.12	0.02	0.01
1655-0	25.00-25.75	0.75	0.02	0.08	0.02	0.01
1656-0	25.75-26.50	0.75	tr	0.02	0.02	0.01
1657-0	26.50-26.95	0.45	tr	0.01	0.02	0.01
Composite	9.60-14.30					
	4.7m(15.4')		0.83	1.53	0.64	tr
	19.35-21.65					
	(2.3m/7.5)		0.37	0.87	0.02	0.01

STATEMENT OF QUALIFICATIONS

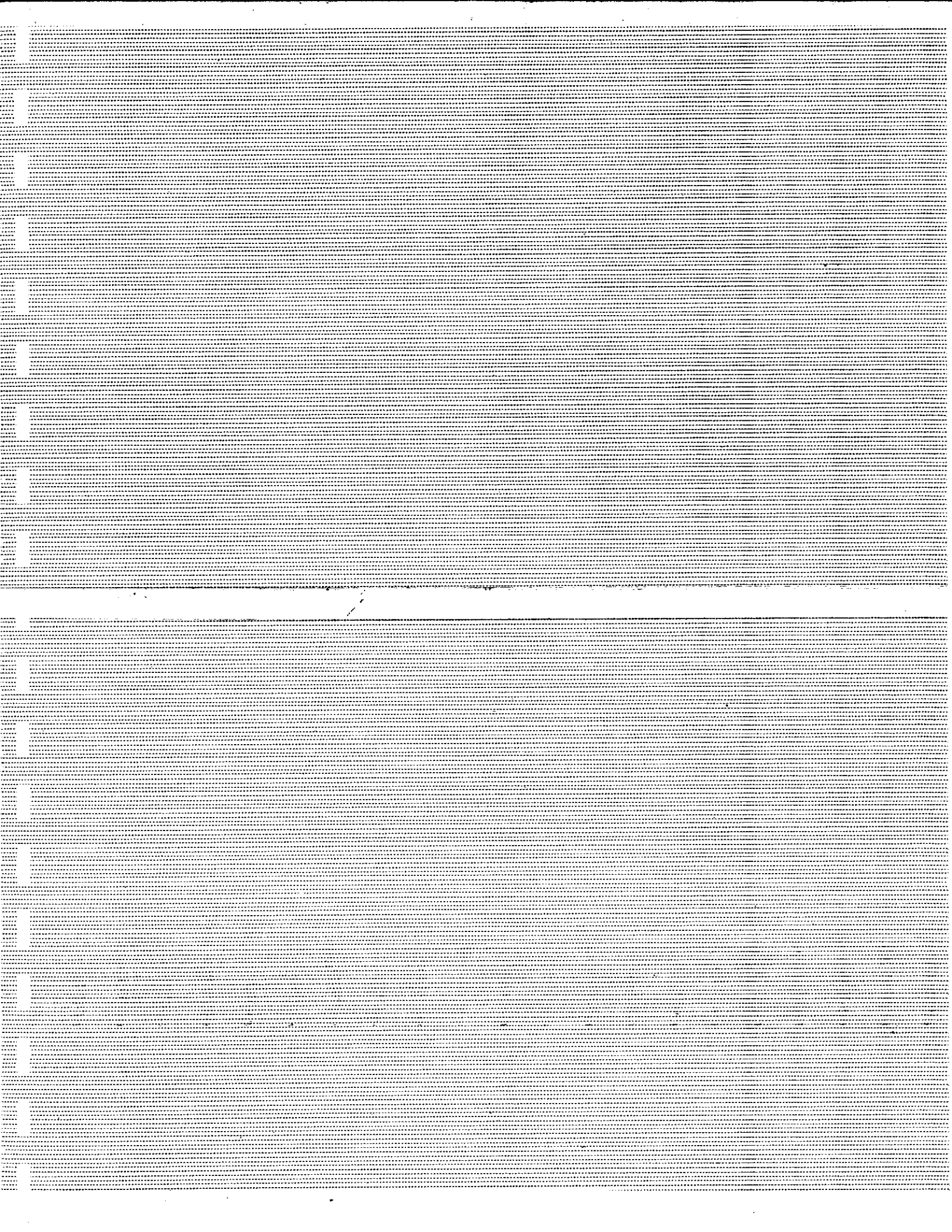
I, Laurie James Smith, of the City of Calgary in the Province of Alberta, do hereby state:

1. I am a graduate of the University of Calgary with a BSc degree in Geology.
2. I have been involved in all phases of geological exploration in many areas of Canada (British Columbia, Alberta, Saskatchewan, Northwest Territories, Ontario, Quebec, Nova Scotia, and New Brunswick) since graduation.
3. I personally supervised the geochemical soil sampling, geological mapping, and diamond drilling on Group IX (COG 7 - COG 15).
4. I am a member of the Association of Professional Engineers, Geologists, and Geophysicists of Alberta.
5. I am the holder of valid Free Miners Licence Number 197331.

Laurie J. Smith

ITEMIZED COST STATEMENT

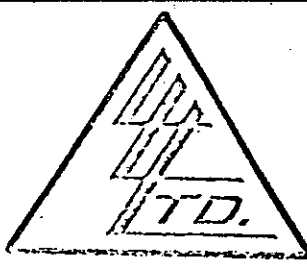
A.	<u>Geological Mapping, Geochemical Sampling, Diamond Drilling</u> - Supervision and core logging	
	R. Chad - Geochemical Sampler; July 9, 1979 1 day @\$75.00/day	\$ 75.00
	R. Kostiuk - Geochemical Sampler; July 11-17, 1979 7 days @\$75.00/day	525.00
	R. Laird - Geologist; July 9-23, 1979 15 days @\$90.00/day	1 350.00
	T. Bojczyszyn - Geologist; October 6-15, 1979 10 days @\$90.00/day	900.00
	T. Bojczyszyn - Geologist (Report Writing) December 10-12, 17-21, 1979 8 days @\$90.00/day	720.00
	J. Chapman - Geologist; October 9-15, 1979 7 days @\$90.00/day	630.00
	L. Smith - Supervision; August 1-3, 6, 7, October 10-12, 1979 8 days @\$125.00/day	1 000.00
B.	<u>Transport</u>	
	4 Wheel Drive Vehicle Rental \$30/day for 96 days	2 400.00
	Fuel for Vehicle \$5.00/day X 96 days	480.00
C.	<u>Accommodation and Meals</u>	
	48 man days X \$25.00/day	1 200.00
D.	<u>Assaying</u>	
	56 Geochemical Samples @\$5.00/sample	280.00
	140 Assays @\$25.00/sample	3 500.00
E.	<u>Diamond Drilling</u>	
	204.85 metres of diamond drilling @\$135.00/metre	<u>27 654.75</u>
		\$40 714.75



APPENDIX I

Assay Certificates

T : Norcen Energy Resources Limited  
 715 - 5th Avenue S.W.  
 Calgary, Alberta  
 T2P 2X7  
 ATTN: L. J. Smith



File No. 17610  
 Date Aug. 28, 1979  
 Samples Soil


Certificate of  
 ASSAY OF  
 LORING LABORATORIES LTD.

Page 1

SAMPLE No.	PPM Cu	PPM Fb	PPM Zn	PPM Ag
<u>Soil Samples</u>				
L400S 0+00W	25	29	330	0.7
0+25W	17	51	153	1.8
0+50W	17	30	132	1.1
0+75W	3	16	43	0.5
1+00W	15	20	98	0.8
1+25W	18	24	148	0.6
1+50W	27	41	157	1.2
1+75W	10	8	43	1.0
2+00W	33	18	106	0.7
2+25W	30	23	87	0.5
2+50W	26	26	83	0.7
2+75W	34	30	76	0.7
L350S 0+00	22	22	360	0.7
0+25W	14	28	188	0.9
0+50W	12	121	127	1.2
0+75W	22	1700	470	5.0
1+00W	11	28	124	1.5
1+25W	31	31	91	0.7
1+50W	18	28	89	0.8
1+75W	16	16	117	1.4
2+00W	20	28	90	1.2
2+25W	73	3480	6600	22.0
2+50W	51	1480	3180	7.5
2+75W	42	410	720	1.9
3+00W	14	258	340	0.9
3+25W	22	210	330	1.0
3+50W	27	112	250	1.4

I Herby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

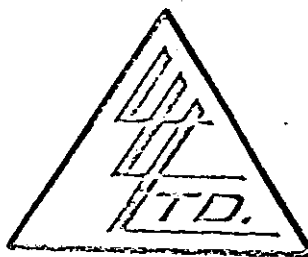
Objects Retained one month.  
 Pips Retained one month  
 Less specific arrangements  
 Made in advance.



Licensed Assayer of British Columbia



T Norcen Energy Resources Limited  
 715 - 5th Avenue S.W.  
 Calgary, Alberta  
 T2P 2X7  
 ATTN: L.J. Smith



File No. 17610  
 Date Aug. 28, 1979  
 Samples Soil

Certificate of  
 ASSAY OF  
 LORING LABORATORIES LTD.

Page 2

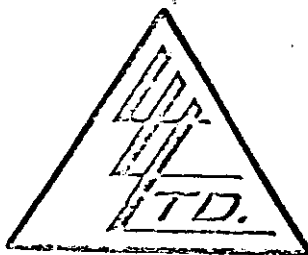
SAMPLE No.	PPM Cu	PPM Pb	PPM Zn	PPM Ag
L300S				
0+75W	6	22	80	0.8
1+00W	7	29	270	0.5
1+25W	15	37	108	1.0
1+50W	48	112	145	2.5
1+75W	35	18	112	0.5
2+00W	12	59	100	1.0
2+25W	66	3600	1560	4.6
2+50W	52	420	1450	2.0
2+75W	28	350	390	1.5
3+00W	13	120	300	0.5
3+25W	31	310	550	1.1
3+50W	22	48	89	0.7
L250S				
1+25W	8	16	72	0.5
1+50W	18	54	107	0.7
1+75W	17	27	88	1.7
<p>I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE            ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .</p>				

ejects Retained one month.  
 Retained one month  
 s specific arrangements  
 ce in advance.

  
 Licensed Assayer of British Columbia

Morcen Energy Resources Limited  
 715 - 5th Avenue S.W.  
 Calgary, Alberta  
 T2P 2X7  
 ATTN: L. J. Smith

File No. 17610  
 Date Aug. 28, 1979  
 Samples Soil



Certificate of  
**ASSAY OF**  
**LORING LABORATORIES LTD.**

Page 3

SAMPLE No.	PPM Cu	PPM Pb	PPM Zn	PPM Ag
L250S 2+00W	11	34	169	0.8
2+25W	49	2720	3540	12.0
2+50W	9	21	157	0.8
2+75W	17	107	330	1.2
3+00W	17	76	390	1.2
L200S				
2+00W	10	73	230	0.7

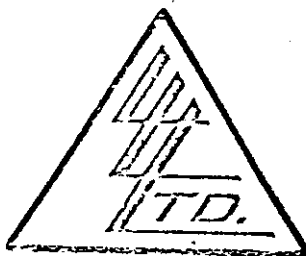
**I Hereby Certify** THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Specimens Retained one month.

For specific arrangements  
 please contact in advance.

Licensed Assayer of British Columbia

T Norcen Energy Resources Limited  
715 - 5th Avenue S.W.  
Calgary, Alberta  
T2P 2X7



File No. 17610  
Date Aug. 28, 1979  
Samples Soil

ATTN: I. J. Smith

Certificate of  
ASSAY of  
LORING LABORATORIES LTD.

Page 4

SAMPLE No.	PPM Cu	PPM Pb	PPM Zn	PPM Ag
L200S 2+25W	26	600	1740	5.8
2+50W	61	660	1180	4.0

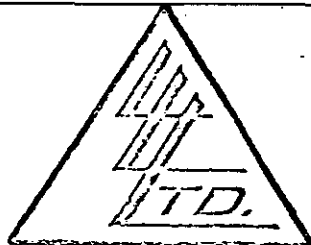
I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Refracts Retained one month.  
Pb's Retained one month  
is specific arrangements  
in advance.

*R. J. McIsaac*

Licensed Assayer of British Columbia

TO NORCEN ENERGY RESOURCES LIMITED,  
 27th Flr., 715 - 5th Avenue S.W.,  
 Calgary, Alberta T2P 2X7



File No. 17124  
 Date August 3, 1979  
 Samples Rock Chips

ATTN: Laurie Smith

Certificate of  
 ASSAY OF  
 LORING LABORATORIES LTD.

Page # 1

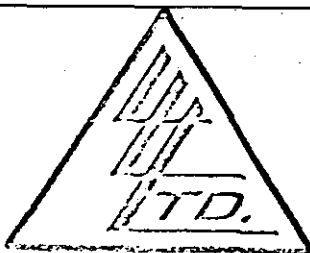
SAMPLE No.	OZ./TON GOLD	OZ./TON SILVER	% Cu	% Pb	% Zn	% Cd	% Sb
"Rock Chips"							
77-3- 1	Trace	.02	.01	Trace	.07	Trace	.04
77-3- 2	Trace	.02	.01	.10	.37	Trace	.03
77-3- 3	Trace	.02	.01	.08	.50	Trace	.02
77-3- 4	Trace	.02	.01	.06	.22	Trace	.03
77-3- 5	Trace	.02	.01	.04	.31	Trace	.02
77-3- 6	Trace	.50	.01	.60	.78	Trace	.03
77-3- 6 A	Trace	.76	.03	.94	3.20	.02	.03
77-3- 7	.010	2.69	.03	2.56	5.65	.03	.04
77-3- 7 A	Trace	.50	.01	.62	2.45	.02	.04
77-3- 8	.010	2.23	.03	1.58	.88	.01	.04
77-3- 9	Trace	2.28	.03	2.62	4.59	.03	.04
77-3- 9 A	Trace	.02	.02	.16	2.40	.01	.02
77-3-10	Trace	.02	.03	1.06	5.55	.04	.05
77-3-11	Trace	.22	.02	.54	2.74	.02	.01
77-3-12	.010	18.73	.15	6.21	2.75	.02	.13
77-3-13	.010	2.65	.06	1.96	.99	Trace	.05
77-3-14	Trace	.78	.03	.64	1.40	.01	.03
77-3-15	Trace	.02	.01	.08	.33	Trace	.04
77-3-16	Trace	.02	.01	.10	.27	Trace	.02

I Herby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Objects Retained one month.  
 Pulps Retained one month  
 Less specific arrangements  
 to be made in advance.

*L. L. McFarlane*  
 Licensed Assayer of British Columbia

TO NORGEN ENERGY RESOURCES LIMITED,  
 27th Flr., 715 5th Avenue S.W.,  
 Calgary, Alberta T2P 2X7



File No. 17424  
 Date August 3, 1979  
 Samples Rock Chips

ATTN: Laurie Smith

Certificate of  
 ASSAY of  
 LORING LABORATORIES LTD.

Page # 2

SAMPLE No.	OZ./TON GOLD	OZ./TON SILVER	% Cu	% Pb	% Zn	% Cd	% Sb
77-3-17	Trace	.18	.01	.26	.73	.01	.03
77-3-18	Trace	.02	.01	.04	.38	Trace	.03
77-3-19	Trace	.02	.01	.02	.28	Trace	.02
77-3-20	Trace	.02	.01	.04	.22	Trace	.04
77-3-21	Trace	.44	.01	.04	.10	Trace	.04
77-3-22	Trace	.02	.01	.04	.09	Trace	.03
77-3-23	Trace	.02	.01	.02	.03	Trace	.04
77-3-24	Trace	.02	.01	.06	.09	Trace	.02
77-3-25	Trace	.02	.01	.04	.05	Trace	.03
77-3-26	.010	.02	.01	.04	.03	Trace	.02
77-3-27	Trace	.03	.01	.02	.04	Trace	.02
CC-BL-1	Trace	.24	.02	.34	2.96	.01	.02
CC-BL-2	.010	4.42	.07	5.80	8.79	.06	.04
CC-BL-3	Trace	4.94	.02	6.39	6.61	.04	.03
CC-BL-4	.010	1.54	.01	2.41	3.05	.02	.03
CC-BL-5	Trace	4.76	.02	3.56	6.20	.06	.04
75-3B-1	Trace	.06	.01	.24	.17	Trace	.02
75-3B-2	Trace	1.82	.02	2.02	.14	Trace	.02
75-3B-3	Trace	8.08	.10	9.39	5.32	.03	.05
75-3B-4	Trace	2.84	.03	3.20	4.10	.02	.03
75-3B-5	Trace	.54	.02	.20	.12	Trace	.03

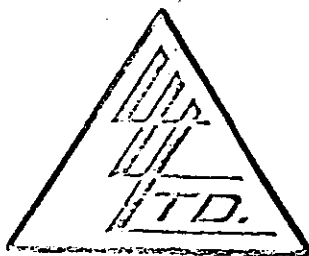
I Herby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Objects Retained one month.  
 Pellets Retained one month  
 Less specific arrangements  
 made in advance.

*L. M. J. Doe*

Licensed Assayer of British Columbia

TORCEN ENERGY.....  
 715-5th Avenue S.W.....  
 Calgary, Alberta.....  
 T2P 2X7.....  
 ATTN: L. Smith.....



File No. 17928.....  
 Date October 6, 1979.....  
 Samples Core.....

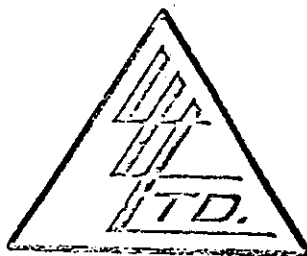
Certificate of  
 ASSAY of  
 LORING LABORATORIES LTD.

SAMPLE No.	OZ./TON GOLD	OZ./TON SILVER	% Pb	% Zn
<u>"CORE SAMPLES"</u>				
1176-0	Trace	.68	Trace	.04
1177-0	Trace	.70	Trace	.09
1178-0	Trace	.60	Trace	.02
1179-0	Trace	.48	Trace	.03
1180-0	Trace	.04	Trace	.05
1181-0	Trace	.10	.02	.03
1182-0	Trace	.02	Trace	.01
1183-0	Trace	.16	Trace	.02
1184-0	Trace	.08	Trace	.01
1185-0	Trace	.02	.04	.17
1186-0	.030	1.72	2.48	7.43
1187-0	Trace	2.34	2.00	2.80
1188-0	Trace	5.36	5.78	8.32
1189-0	Trace	8.84	7.85	11.64
1190-0	.010	10.70	10.59	15.39
1191-0	Trace	2.56	2.64	3.90
1192-0	Trace	2.50	2.22	4.20
1193-0	.010	.02	.10	.22
1194-0	Trace	.02	.02	.04
1195-0	Trace	.02	.02	.02
<p>I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE          ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .</p>				

Rejects Retained one month.  
 Passes Retained one month  
 Specific arrangements  
 made in advance.

*L. Smith*  
 Licensed Assayer of British Columbia

TORONTO ENERGY RESOURCES LIMITED,  
 7th Flr., 715 - 5th Avenue S.W.,  
 Calgary, Alberta T2P 2X7



File No. 18032  
 Date October 19, 1979  
 Samples Cores

ATTN: Laurie Smith

Certificate of  
 ASSAY OF  
 LORING LABORATORIES LTD.

Page # 3

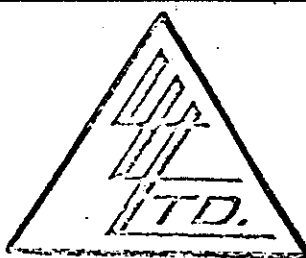
SAMPLE No.	OZ./TON GOLD	OZ./TON SILVER	% Pb	% Zn
1601-0	Trace	.04	.02	.01
1602-0	Trace	.06	Trace	.01
1603-0	.010	.02	Trace	.01
1604-0	Trace	.02	Trace	.01
1605-0	.010	.02	Trace	.01
1606-0	.020	4.28	5.40	.42
1607-0	.010	.02	.02	.01

I Heroby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Objects Retained one month.  
 Prints Retained one month  
 For specific arrangements  
 call in advance.

  
 Licensed Assayer of British Columbia

NORCEN ENERGY RESOURCES LIMITED,  
 7th Flr., 715 - 5th Avenue S.W.,  
 Calgary, Alberta T2P 2X7



File No. 18032  
 Date October 19, 1979  
 Samples Cores

ATTN: Laurie Smith

Certificate of  
 ASSAY OF  
 LORING LABORATORIES LTD.

Page # 4

SAMPLE No.	OZ./TON GOLD	OZ./TON SILVER	% Pb	% Zn
1603-0	Trace	.02	.04	.02
1609-0	Trace	.04	.02	.08
1610-0	.010	.02	.96	.06
1611-0	Trace	.14	.04	.13
1612-0	Trace	.02	Trace	.01
1613-0	Trace	.12	.40	.25
1614-0	Trace	.02	.04	.07
1615-0	.010	.02	Trace	.01
1616-0	Trace	.10	Trace	.01
1617-0	Trace	.02	.08	.21
1618-0	.010	.02	.02	.09
1619-0	.010	1.44	1.62	8.20
1620-0	.010	.02	.14	.05
1621-0	Trace	.02	.04	.09
1622-0	.010	.02	.06	.05
1623-0	.010	.02	Trace	.01
1624-0	.010	.02	Trace	.02
1625-0	.010	.24	.02	.02
1626-0 *	.100	12.72	12.49	13.13
1627-0	.010	.02	.02	.02
1628-0	Trace	.02	.04	.03

Sample Contains  
Copper

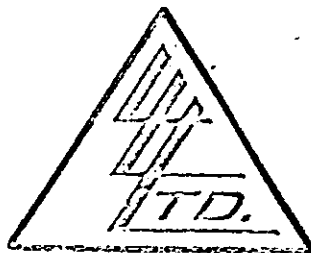
**I** **Hereby Certify** THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Specimens Retained one month.  
 Samples Retained one month  
 For specific arrangements  
 please in advance.

*James J. Mac*  
 Licensed Assayer of British Columbia



TORCEN ENERGY RESOURCES LIMITED,  
 7th Flr., 715 - 5th Avenue SW.,  
 Calgary, Alberta T2P 2X7



File No. 18032  
 Date October 19, 1979  
 Samples Cores

ATTN: Laurie Smith

Certificate of  
 ASSAY OF  
 LORING LABORATORIES LTD.

Page # 5

SAMPLE No.	OZ./TON GOLD	OZ./TON SILVER	% Pb	% Zn
1629-0	Trace	.02	Trace	.02
1630-0	Trace	.02	.02	.06
1631-0	Trace	.02	Trace	.03
1632-0	Trace	.02	Trace	.03
1633-0	Trace	.02	.02	.11
1634-0	.030	.02	.03	.12
1635-0	Trace	.96	.94	1.95
1636-0	Trace	.36	.10	.63
1637-0	.010	.02	.94	.25
1638-0	Trace	.06	.12	.05
1639-0	Trace	.24	.30	.31
1640-0	Trace	2.40	1.02	1.55
1641-0	Trace	.02	2.44	5.45
1642-0	Trace	.02	.02	.02
1643-0	Trace	.06	.02	.06
1644-0	Trace	.02	Trace	.02
1645-0	Trace	.02	Trace	.02
1646-0	Trace	.02	.08	.01
1647-0	.010	.02	.02	.02
1648-0	.010	.02	.30	.26
1649-0	.010	.02	.22	.39

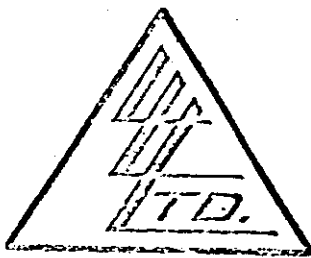
I Heroby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Rejects Retained one month.  
 Samples Retained one month  
 unless specific arrangements  
 made in advance.

*L. M. J. J. J.*  
 Licensed Assayer of British Columbia

INORCEN ENERGY RESOURCES LIMITED,  
 7th Flr., 715 - 5th Avenue S.W.,  
 Calgary, Alberta T2P 2X7

File No. 18032  
 Date October 19, 1979  
 Samples Cores



ATTN: Laurie Smith

Certificate of  
 ASSAY OF  
 LORING LABORATORIES LTD.

Page # 6

SAMPLE No.	OZ./TON GOLD	OZ./TON SILVER	% Pb	% Zn
1650-0	.010	.02	.56	1.80
1651-0	Trace	.02	.06	.12
1652-0	Trace	.02	.02	.01
1653-0	.010	.02	Trace	.02
1654-0	.010	.02	.04	.12
1655-0	.010	.02	.02	.03
1656-0	.010	.02	Trace	.02
1657-0	.010	.02	Trace	.01

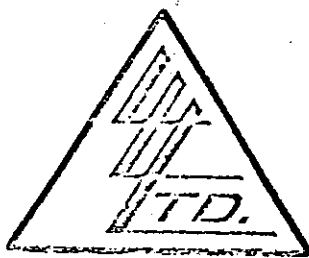
I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Rejects Retained one month.  
 s Retained one month  
 ss specific arrangements  
 e in advance.

*L. M. J. [Signature]*

Licensed Assayer of British Columbia

NOBCEM ENERGY RESOURCES LIMITED,  
 7th Flr., 715 - 5th Avenue S.W.,  
 Calgary, Alberta T2P 2X7



File No. 18032  
 Date October 19, 1979  
 Samples Cores

By: Laurie Smith

Certificate of  
 ASSAY OF  
 LORING LABORATORIES LTD.

Page # 2

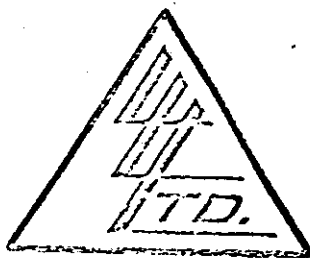
SAMPLE No.	OZ./TON GOLD	OZ./TON SILVER	% Pb	% Zn
1517-0	.010	.02	Trace	.01
1518-0	.020	.14	Trace	.01
1519	Trace	.02	Trace	.01
1520-0	Trace	.02	Trace	.01
1521-0	.030	.02	Trace	.02
1522-0	.020	.02	Trace	.01
1523-0	Trace	.02	Trace	.01
1524-0	.010	.02	Trace	.01
1525-0	.010	.02	Trace	.01
1526-0	Trace	.02	Trace	.01
1527-0	Trace	.02	Trace	.01
1528-0	.010	.02	Trace	.01
1529-0	Trace	.18	.02	.49
1530-0	Trace	.32	.18	4.58
1531-0	Trace	.02	.02	.08
1532-0	.010	.02	Trace	1.85
1533-0	Trace	14.92	15.44	1.45
1534-0	.010	.02	.02	.01
1535-0	Trace	.02	.14	.09
1536-0	Trace	8.90	4.99	12.88

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Subjects Retained one month.  
 P.C. s Retained one month  
 for specific arrangements  
 to be made in advance.

*admj*  
 Licensed Assayer of British Columbia

NORCEN ENERGY RESOURCES LIMITED,  
 7th Flr., 715 - 5th Avenue S.W.,  
 Calgary, Alberta T2P 2X7



File No. 18032  
 Date October 19, 1979  
 Samples Cores

ATTN: Laurie Smith

Certificate of  
 ASSAY OF  
 LORING LABORATORIES LTD.

Page # 3

SAMPLE No.	OZ./TON GOLD	OZ./TON SILVER	% Pb	% Zn
1537-0	Trace	.02	.04	.02
1538-0	.010	.02	.04	.11
1539-0	.010	.02	Trace	.02
1540-0	.010	.12	.12	1.45
1541-0	.010	.02	Trace	.03
1542-0	.010	.02	.04	.03
1543-0	.020	.02	.02	.01
1544-0	.030	.02	Trace	.01
1545-0	Trace	.02	Trace	.01
1546-0	.010	.02	Trace	.01
1547-0	.010	.02	Trace	.01
1548-0	.020	.02	.06	.38
1549-0 *	.040	20.50	7.40	14.50
1550-0	.010	.08	.02	.02

Sample Contains  
 Copper

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Refractometer Retained one month.  
 Balance Retained one month  
 All other specific arrangements  
 made in advance.

*Edma J. Mac*  
 Licensed Assayer of British Columbia

APPENDIX II

Diamond Drill Logs



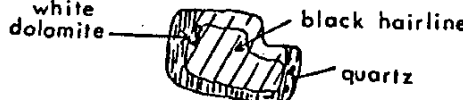
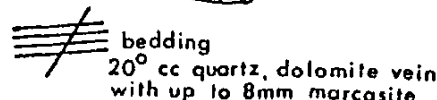
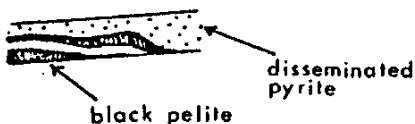
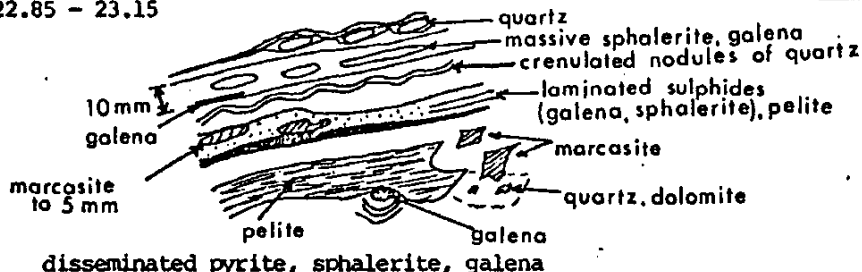


NORCEN ENERGY RESOURCES LIMITED  
DIAMOND DRILL LOGS

PROPERTY: CRYSTAL CREEK

HOLE NUMBER: CC DDH 79-8

SHEET NUMBER: 3 of 5

DESCRIPTION	DEPTH (metres)	% CORE RECOVERY	INTERVAL (metres)	ASSAY NUMBER	%Pb	oz/ton		%W	
						%Zn	Ag		Au
20.65 - 20.95: 1mm stringers, (quartz, dolomite), 50mm vein: quartz, pale yellow dolomite, long black foliated pelite fragments, pyrite	20.20		0.10	1482-0	tr	0.01	0.02	tr	
21.05 - 21.15: 5mm marcasite clusters with quartz rims									
21.15: massive white quartz and yellow dolomite, pebbles and fragments after vein (poor recovery)									
21.45 - 22.15: marcasite to 10mm, disseminated pyrite <1mm	21.65	82	0.45	1483-0	tr	0.02	0.16	tr	
									
@22.15 	22.25		0.60	1484-0	tr	0.01	0.08	tr	
@22.25 	22.60		0.35	1485-0	0.04	0.17	0.02	tr	
most marcasite concentrated top of black pelite bands	22.90								
@22.85 - 23.15 									
				0.30	1486-0	2.48	7.43	1.72	0.03






NORCEN ENERGY RESOURCES LIMITED

DIAMOND DRILL LOGS

PROPERTY: CRYSTAL CREEK

HOLE NUMBER: CC DDH 79-8

SHEET NUMBER: 5 of 5

DESCRIPTION	DEPTH (metres)	% CORE RECOVERY	INTERVAL (metres)	ASSAY NUMBER	%Pb	%Zn	oz/ton	oz/ton	%W
							Ag	Au	
24.20 - 24.70									
25.10 - 25.30									
25.70 - 26.00									
26.05 - 26.95 (broken)	27.60	92							
27.75 - 28.20 (broken)		80							
quartz dolomite veins									
@25.60	28.35	98							
@29.65 - one shows 5mm displacement by foliation, foliation also shows minor displacement	31.40	98							
30.70 - black pelitic fragments caught up in foliation									
31.70 - 32.80: 14 veins averaging 5mm, 1mm-10mm									
32.10: 60 mm 45° white quartz, yellow dolomite,									
36.00: 40 mm rusty brown siderite	34.00								
@32.00									
									
nodular quartz dolomite vein parallel foliation, other crosscutting foliation showing minor displacement									
@34.20: 1mm vein parallel foliation and other 7° oblique to first									
34.20 - 36.10: 36 1mm veins									
@36.30: 30 mm quartz, dolomite, siderite vein									
END OF HOLE	36.60	98							
Casing left in hole.									

NORCEN ENERGY RESOURCES LIMITED  
DIAMOND DRILL LOGS

PROPERTY: CRYSTAL CREEK

SHEET NUMBER: 1 of 4      N.T.S. NUMBER: 82K/15W      STARTED: Oct. 9, 1979      COMPLETED: Oct. 13, 1979      HOLE NUMBER: CC DDH 79-11  
CLAIM NAME: TECT 2      COLLAR:      ELEVATION:      BEARING: 65.88m 031° 132m 025°  
LOGGED BY: TOM BOJCZYSZYN      PROPOSED DEPTH:      ULTIMATE DEPTH: 132.90      DIP:      -71°      -64°

DESCRIPTION	DEPTH (metres)	% CORE RECOVERY	INTERVAL (metres)	ASSAY NUMBER	%Pb	%Zn	oz/ton	oz/ton	%W
							Ag	Au	
Overburden	9.15								
9.15 - 16.45: pebbles and cobbles of:	10.65								
- light green quartzite									
- medium grey, dark grey pelite and laminated pelite	14.35								
- quartz to 40 mm	15.85								
CASING	16.45								
Entire hole to 102.30 consists of laminated and bedded:	18.90	104							
black pelite (10 mm)	20.10	104							
dark grey pelite (1-10 mm)	23.15	93							
medium grey pelite (5-30 mm)									
light grey pelite (5, 20, 30, 50, 100 mm)	26.20	100							
@19.70: 5mm quartz, pale yellow dolomite vein has sawtooth appearance due to later movement along foliation	32.30	98							
- marcasite rich horizons occur every 5-100mm to 24.75	35.35	100							
- massive white quartz veins, near 36.35 (50, 10, 30 mm), have up to 3mm rims and patches of dolomites, often have black pelite fragments, chlorite coloration, and talc	38.40	100							
	41.75	91							
	43.90	79							
	46.50	112							
	47.55	101							
@53.65: 2mm pentagonal pyrite associated with vertical to core 10 mm quartz veins	50.60	98							
	53.65	100							
@87.50: light grey pelite contains 1mm pentagonal pyrite crystals, while in adjacent medium grey pelite clusters of pyrite have vague shapes of marcasite crystals to 5mm	55.45	102							
	58.50	103							
	59.75	84							
	62.80	98							
95.15 - 95.50: black pelite, shallow 15 mm quartz vein contains 20% sphalerite (honey brown, black) 10% to galena, 4% arsenopyrite, 20% finely disseminated pyrite and subeuhedral pentagonal pyrite crystals to 1mm, 1% chalcopyrite	65.85	97							
	68.90	101							
	71.95	100							
	75.00	98							
- 4mm quartz stringer has blotch arsenopyrite, chalcopyrite and galena showing exsolution	81.10	100							
	84.15	98							

NORCEN ENERGY RESOURCES LIMITED  
DIAMOND DRILL LOGS

PROPERTY: CRYSTAL CREEK

HOLE NUMBER: CC DDH 79-11

SHEET NUMBER: 2 of 4

DESCRIPTION	DEPTH (metres)	% CORE RECOVERY	INTERVAL (metres)	ASSAY NUMBER	%Pb	oz/ton		%W
						%Zn	Ag	
	87.20	100						
quartzite: @90.85 - 20mm								
@91.05 - 30mm	90.25	80	0.90	1629-0	tr	0.02	0.02	tr
@91.15 - 20mm								
91.25 - 91.35, 92.05, 93.70 - 94.15	93.30	98						
96.35 - 98.65, 107.90 - 111.55			0.50	1628-0	0.04	0.03	0.02	tr
			0.55	1627-0	0.02	0.02	0.02	0.01
			0.40	1626-0	12.40	13.13	12.72	0.01
			0.50	1625-0	0.02	0.02	0.24	0.01
coarse quartzite:	96.35	101	0.35	1624-0	tr	0.02	0.02	0.01
98.65 - 101.40	97.70	103						
106.10 - 106.30 - pebbly	99.35	100						
			0.70	1617-0	0.08	0.21	0.02	tr
			0.50	1616-0	tr	0.01	0.10	tr
coarse quartzite grit to pebbly grit	102.40	98	0.50	1615-0	tr	0.01	0.02	0.01
102.30 - 107.90, 111.55 - 132.90	104.55	93						
	106.40	110						
	106.70		0.50	1614-0	0.04	0.07	0.02	tr
			0.15	1613-0	0.40	0.25	0.12	tr
			0.90	1612-0	tr	0.01	0.02	tr
	108.50	100						
			0.60	1611-0	0.04	0.13	0.14	tr
			0.25	1610-0	0.25	0.06	0.02	0.01
	111.55	96	0.55	1609-0	0.02	0.08	0.04	tr
	113.40	86						
			0.60	1607-0	0.02	0.01	0.02	0.01
			0.10	1606-0	5.40	0.42	4.28	0.02
Quartz and dolomite veins are common throughout:	114.16	116	0.35	1605-0	tr	0.01	0.02	0.01
	116.75	102						
prior to 35.85: 1-4mm, quartz - pale yellow dolomite veins, 45°	117.65	82						
and steep to bedding	118.05							
35.85 - 44.70: quartz veins:			0.10	1549-0	7.40	14.50	20.50	0.04
(50, 10, 30mm), 1.45m, (10, 10, 50, 40, 40mm)	118.40	105	0.30	1548-0	0.06	0.38	0.02	0.02
	120.70	85	0.70	1544-0	tr	0.01	0.02	0.03
	123.45		0.15	1540-0	0.12	1.45	0.12	0.01
			0.12	1539-0	tr	0.02	0.02	0.01
			0.30	1538-0	0.04	0.11	0.02	0.01
- veins often have dolomite margin or irregular patches,	123.75	103	0.60	1537-0	0.04	0.02	0.02	tr



NORCEN ENERGY RESOURCES LIMITED

DIAMOND DRILL LOGS

PROPERTY: CRYSTAL CREEK

HOLE NUMBER: CC DEH 79-11

SHEET NUMBER: 4 of 4

DESCRIPTION	DEPTH (metres)	% CORE RECOVERY	INTERVAL (metres)	ASSAY NUMBER	%Pb	oz/ton		%W
						Ag	Au	
<u>massive white quartz veins:</u>								
115.90 - 116.65, 117.05 - 117.65, 118.40 - 119.20, 119.50, 120.80 - 121.00, 121.30 - 123.25								
123.65 - 124.15: 5mm 45° quartz veins (7)								
@124.45: 80mm vertical to core vein (90% sphalerite, 5% galena, 5% fine grained pyrite)								
124.50: 6mm hexagonal pyrite, fine grained pyrite (35%), few 5mm clusters of sphalerite								
@125.25: massive 10mm galena vein (1mm)								
@125.65: 10mm vein, 80% sphalerite								
@128.20: branching quartz vein with sulphide margin carries 2mm bladed arsenopyrite between 5mm veins								
128.95 - 132.90: quartz dolomite veins are found generally parallel to foliation while quartz veins cut these at 25°, arsenopyrite is found associated with quartz veins (128.30 - 128.50, 128.95 - 129.45, @129.05, 103.05 - 130.15) as 1/5 X 5mm blades								
	129.85	100						
			0.50	1522-0	tr	0.01	0.02	0.02
			0.60	1521-0	tr	0.02	0.02	0.03
			0.20	1518-0	tr	0.01	0.14	0.02
END OF HOLE	132.90	100	0.90	1517-0	tr	0.01	0.02	0.01

Overburden cored from 9.15 to 16.45.  
Casing later set to 16.45.

NORCEN ENERGY RESOURCES LIMITED  
DIAMOND DRILL LOGS

PROPERTY: CRYSTAL CREEK

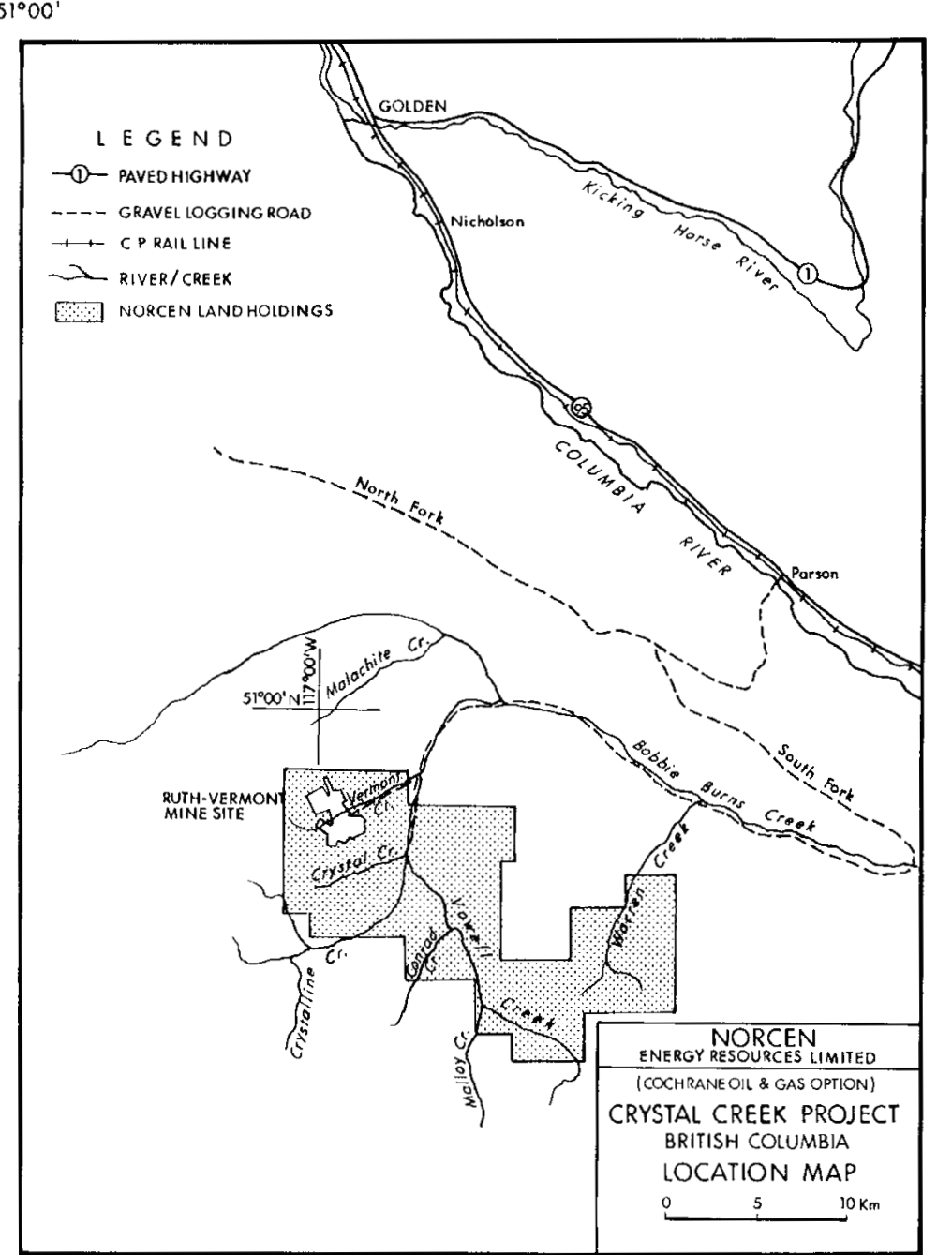
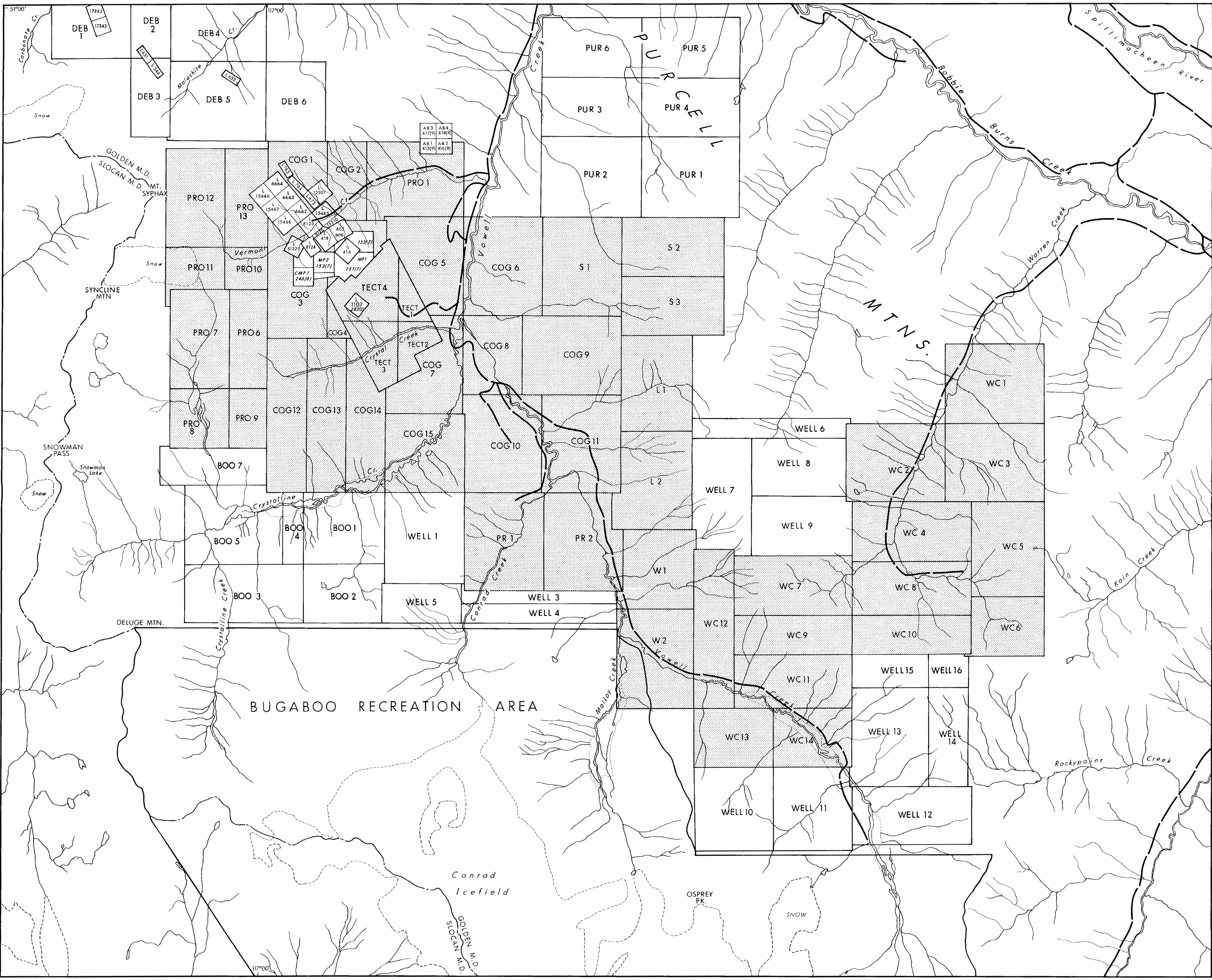
SHEET NUMBER: 1 of 1      N.T.S. NUMBER: 82K/15W      STARTED: Sept. 13/79      COMPLETED: Sept. 14/79      HOLE NUMBER: CC DH 79-12  
 CLAIM NAME: TECT 1, 2      COLLAR:      ELEVATION:      BEARING: 33,55 296°  
 LOGGED BY: TOM BOJCZYSZYN      PROPOSED DEPTH:      ULTIMATE DEPTH: 35.35      DIP:      -87°

DESCRIPTION	DEPTH (metres)	% CORE RECOVERY	INTERVAL (metres)	ASSAY NUMBER	%Pb	oz/ton		oz/ton Au	%W
						%Zn	Ag		
CASING	6.10								
6.10 - 7.00: quartz pebbles to 60mm	7.60	27							
9.75 - 10.65: foliation has destroyed bedding, marcasite to 4mm in various stages of replacement	10.65	49	0.20	1633-0	0.02	0.11	0.02	tr	
			1.05	1635-0	0.94	1.95	0.96	tr	
10.65-12.60: fragments to 10mm, sections massive sulphide, fine grained pyrite 30-40% sandstone matrix to 1mm, minor visible galena <1mm	12.20	61	1.00	1636-0	0.10	0.63	0.36	tr	
			0.55	1637-0	0.94	0.25	0.02	0.01	
			0.30	1638-0	0.12	0.05	0.06	tr	
			0.60	1639-0	0.30	0.31	0.24	tr	
@12.80: 10mm bed of fine grained galena aggregates to 10mm and sphalerite clusters to 10mm in white to light grey quartz, pale yellow dolomite matrix	13.70	67	0.60	1640-0	1.02	1.55	2.40	tr	
			0.60	1641-0	2.44	5.45	0.02	tr	
			0.65	1642-0	0.02	0.02	0.02	tr	
14.00 - 14.40: fine veinlets of galena and sphalerite parallel to core, very fine grained disseminated sulphides	16.15	71							
	17.70	74							
	19.35	55							
	20.10	67	0.75	1648-0	0.30	0.26	0.02	0.01	
			0.70	1649-0	0.22	0.39	0.02	0.01	
20.10 - 20.60: massive sulphide band shows inner folding between black pelite bedding - partial sulphide rich zones, clusters of galena and sphalerite - marcasite to 10mm confine to light grey horizons - near 30.00: 5mm clusters of fine grained pyrite forming crude marcasite outline	21.65	106	0.85	1650-0	0.56	1.80	0.02	0.01	
			1.05	1651-0	0.06	0.12	0.02	tr	
	23.75	100	1.05	1652-0	0.02	0.01	0.02	tr	
	25.00	72	0.60	1654-0	0.24	0.12	0.02	0.01	
	26.50	80							
	28.35	92							
	31.10	100							
	33.55	94							
END OF HOLE	35.35	97							

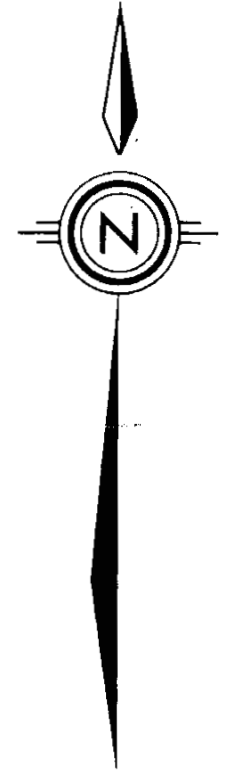
Entire hole consists of bedded and laminated:  
 medium grey pelite (2-20mm), black pelite (1-40mm), white  
 speckled pelite (<10mm), light grey pelite (2, 5, 10, 20, 30, 40,  
 50 mm)

Casing and shoe left in hole.





NORCEN  
ENERGY RESOURCES LIMITED  
(COCHRANE OIL & GAS OPTION)  
CRYSTAL CREEK PROJECT  
BRITISH COLUMBIA  
LOCATION MAP  
0 5 10 Km

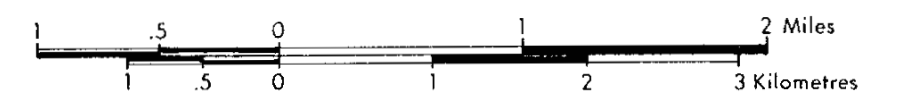


MINERAL RESOURCES BRANCH  
ASSESSMENT REPORT  
**8154**

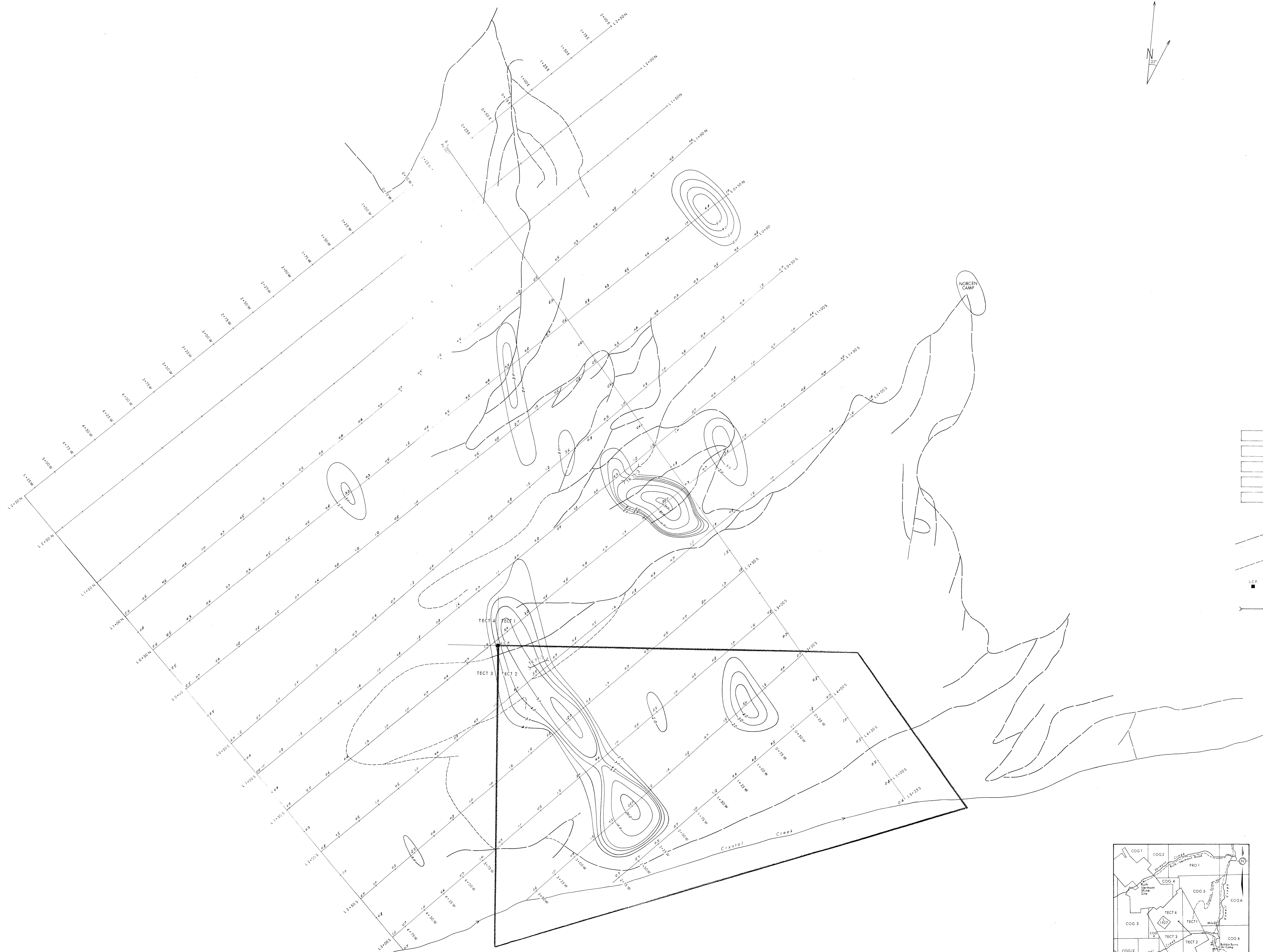
NORCEN LAND HOLDINGS  
TRUCK ROAD






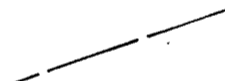
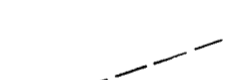
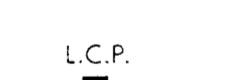
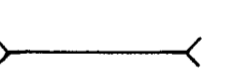
**Norcen**  
Energy Resources Limited

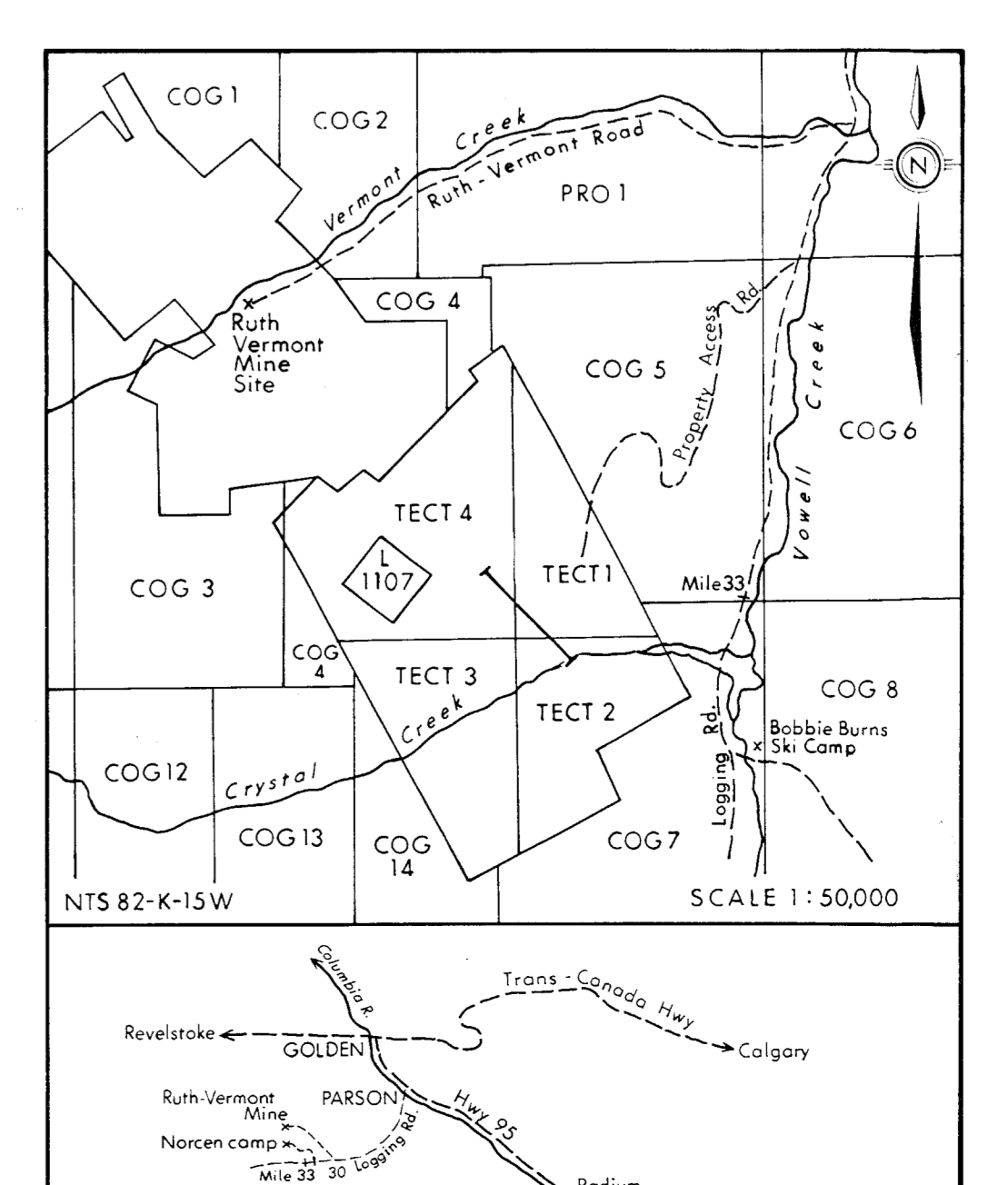
(COCHRANE OIL AND GAS OPTION)  
CRYSTAL CREEK PROJECT  
BRITISH COLUMBIA  
LAND HOLDINGS MAP







-  20-30 ppm Ag
-  30-40 ppm Ag
-  40-50 ppm Ag
-  50-100 ppm Ag
-  Greater than 10 ppm Ag
-  EXISTING ROADS
-  NORCEN CAT TRAILS
-  L.C.P. LEGAL CORNER POST
-  TRENCH



MINERAL RESOURCES BRANCH  
**8154**

**Norcen**  
 Energy Resources Limited

(COCHRANE OIL & GAS LTD. OPTION)

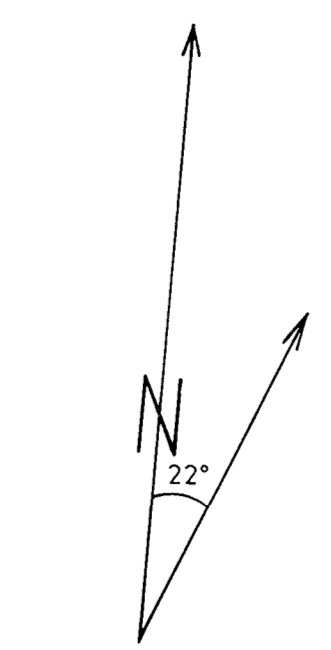
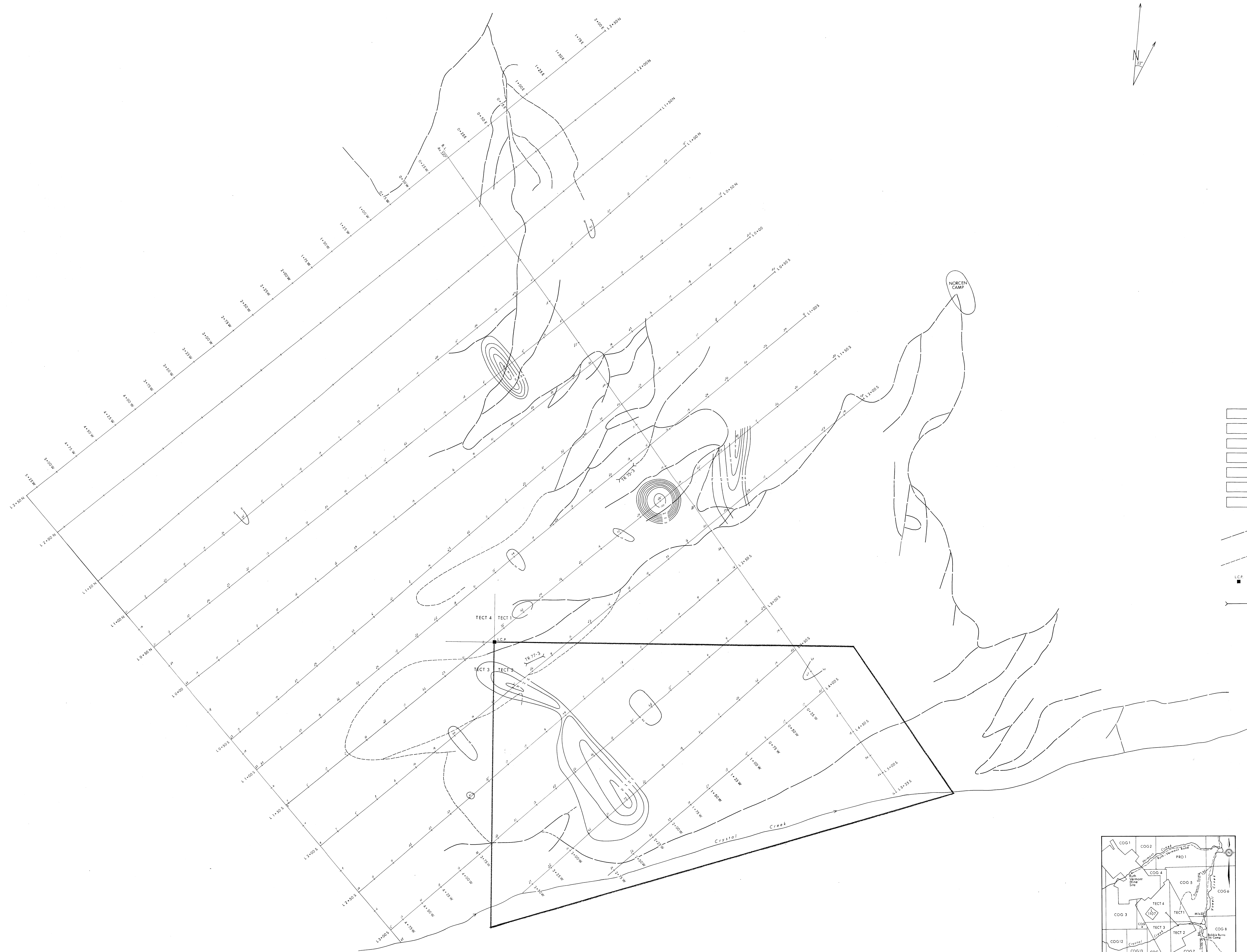
**CRYSTAL CREEK PROJECT**

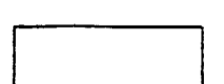

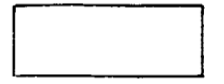
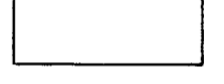

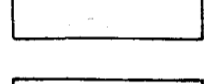





BRITISH COLUMBIA

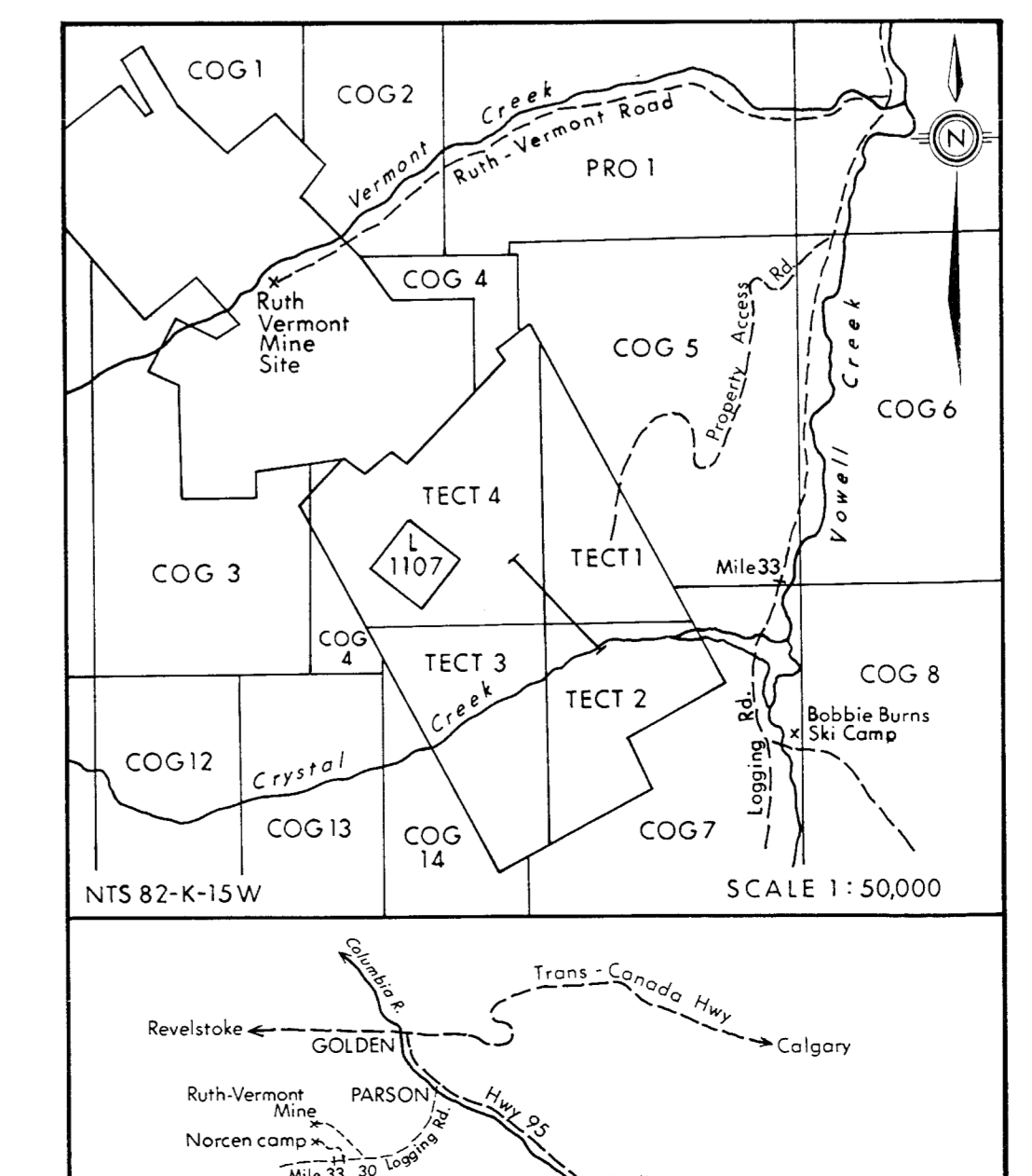
Ag in Soils Geochemical Survey

0 25 50 75 100 metres

NTS 85-K-15W November, 1979



-  40-50 ppm Cu
-  50-60 ppm Cu
-  60-70 ppm Cu
-  70-80 ppm Cu
-  80-90 ppm Cu
-  90-100 ppm Cu
-  GREATER THAN 100 ppm Cu
-  EXISTING ROADS
-  NORCEN CAT TRAILS
-  LEGAL CORNER POST
-  TRENCH



MINERAL RESOURCES BRANCH  
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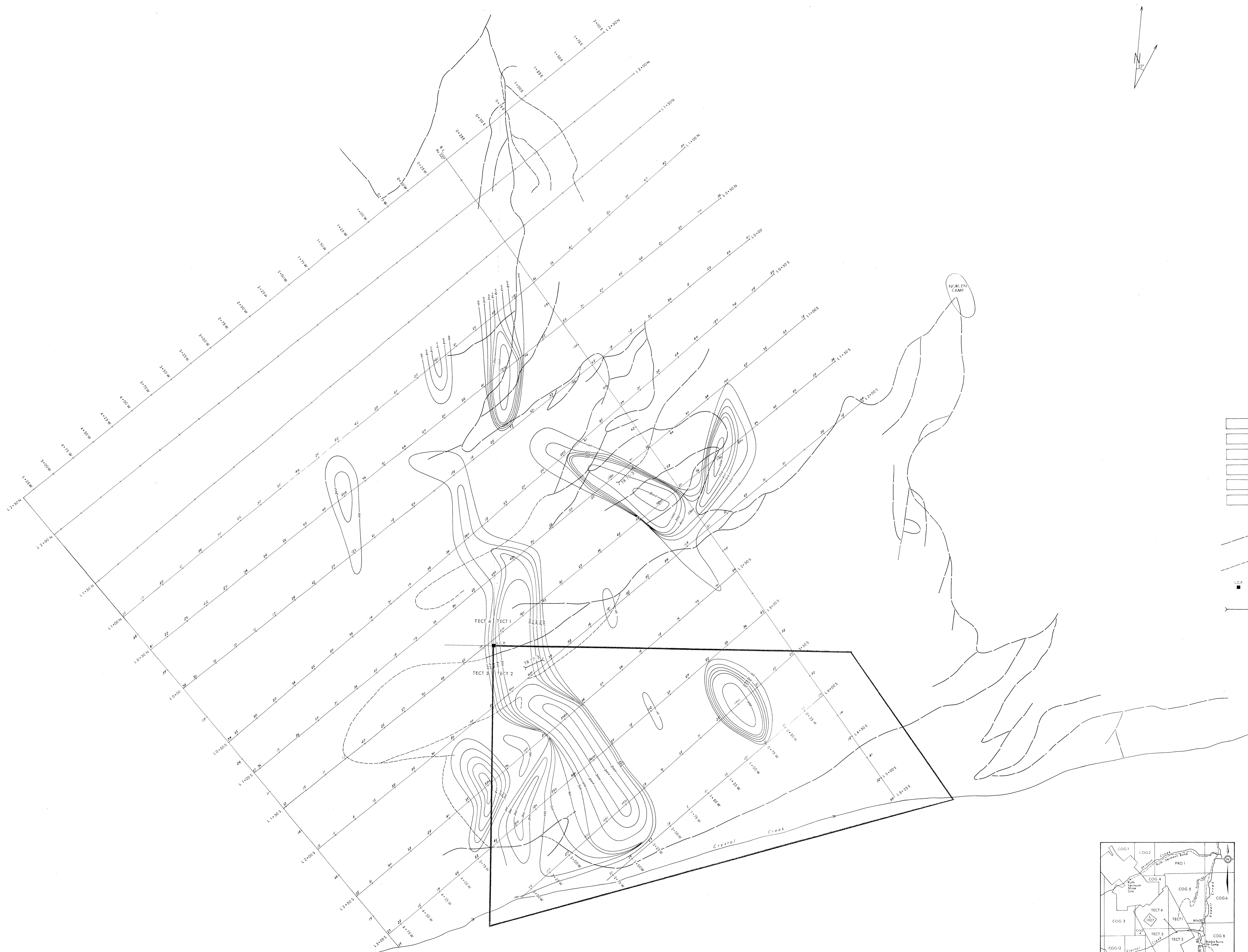
(COCHRANE OIL & GAS LTD. OPTION)


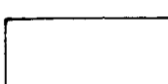


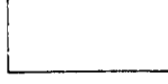


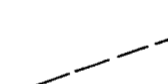


**CRYSTAL CREEK PROJECT**  
BRITISH COLUMBIA

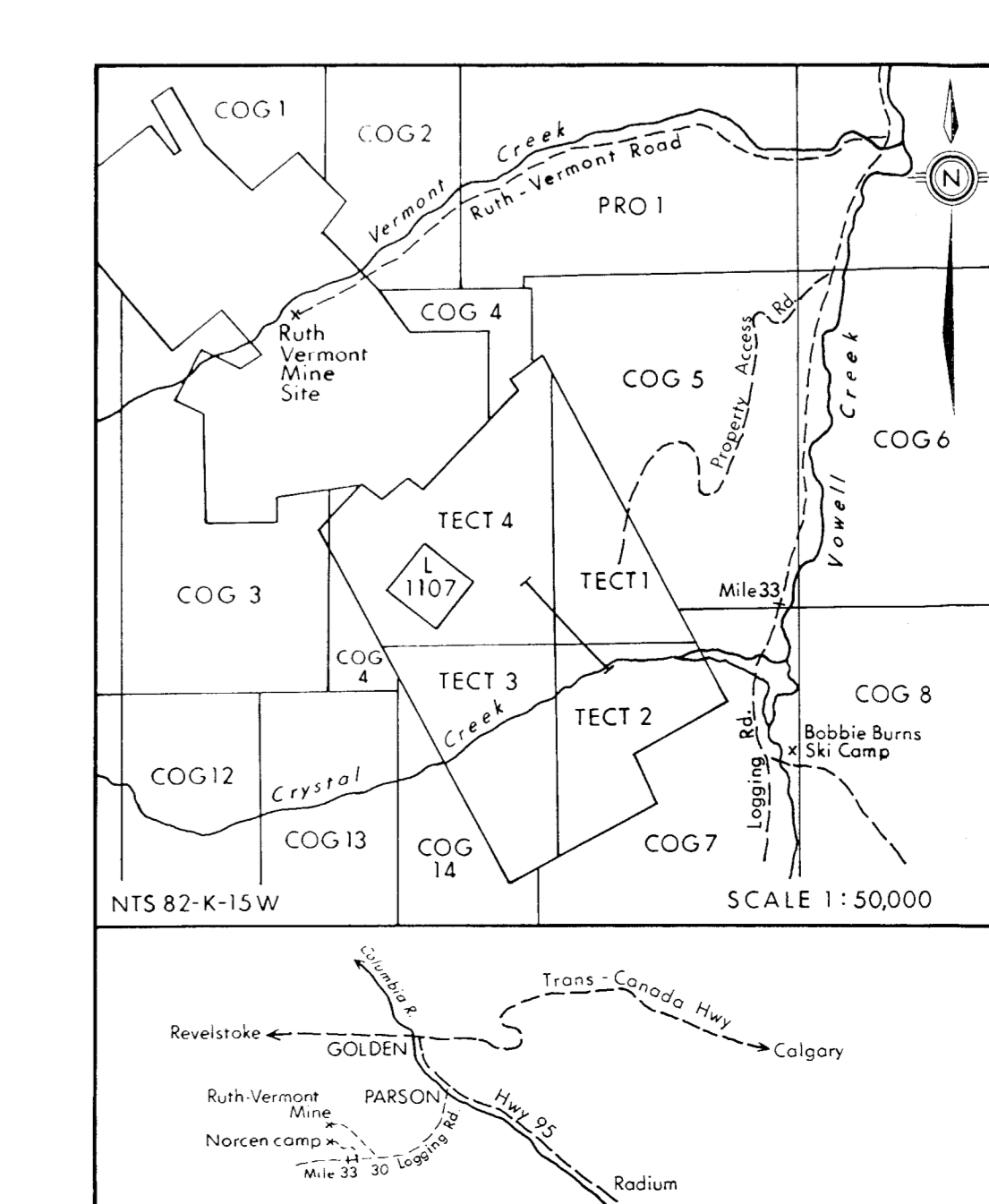
**Cu in Soils Geochemical Survey**

NTS 85-K-15W November, 1979





-  100-200 ppm Pb
-  200-300 ppm Pb
-  300-400 ppm Pb
-  400-500 ppm Pb
-  500-1000 ppm Pb
-  Greater than 1000 ppm Pb
-  EXISTING ROADS
-  NORCEN CAT TRAILS
-  LEGAL CORNER POST
-  TRENCH



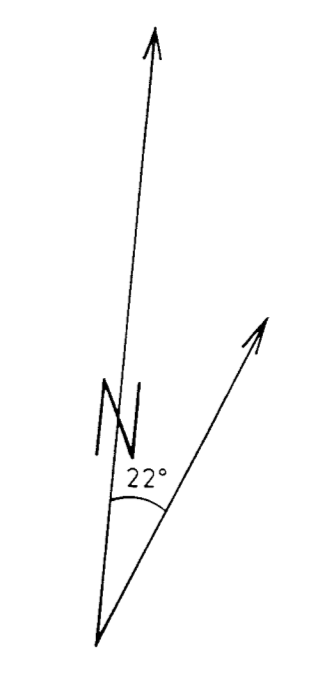
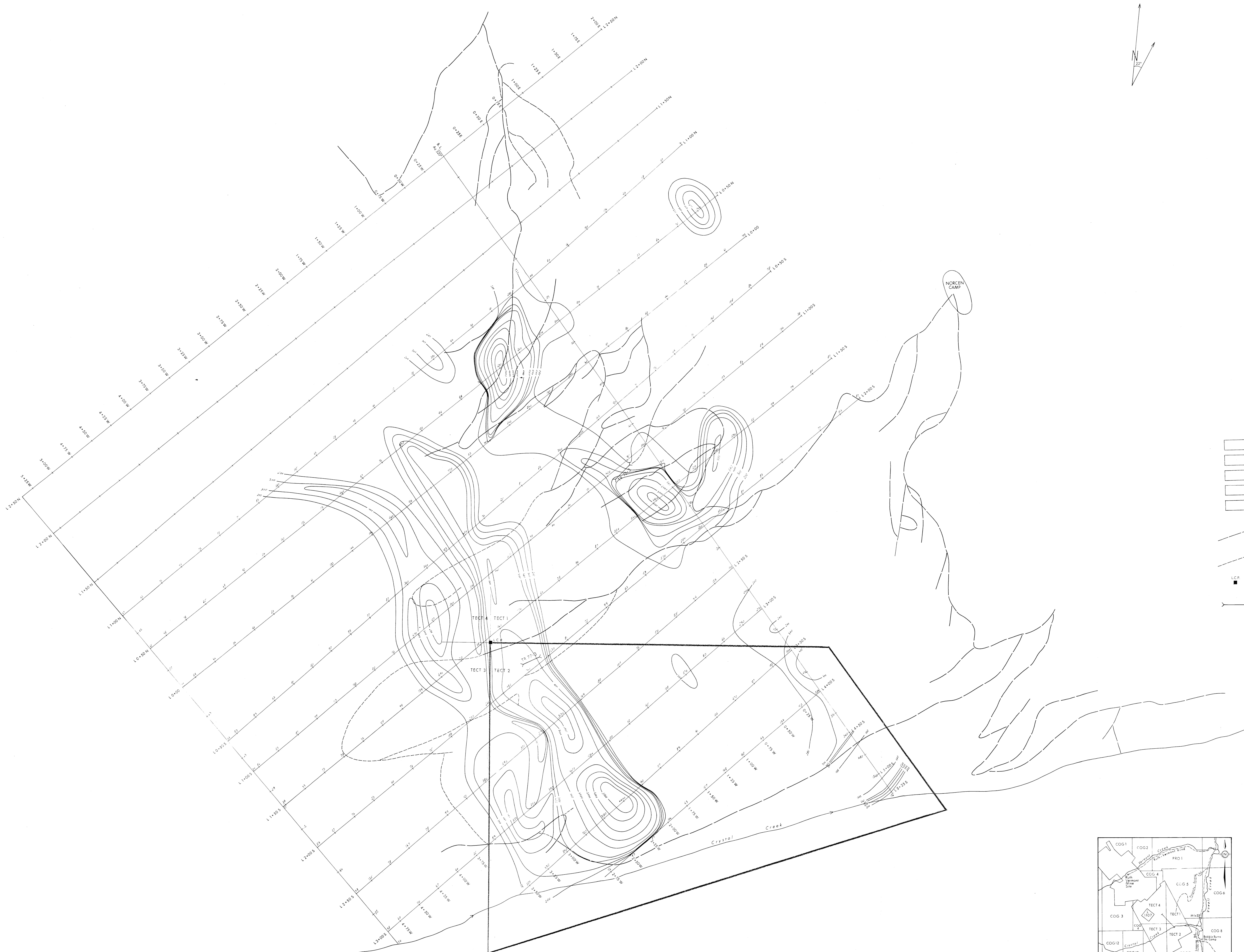
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 (COCHRANE OIL & GAS LTD. OPTION)  
**CRYSTAL CREEK PROJECT**  
 BRITISH COLUMBIA  
**Pb in Soils Geochemical Survey**

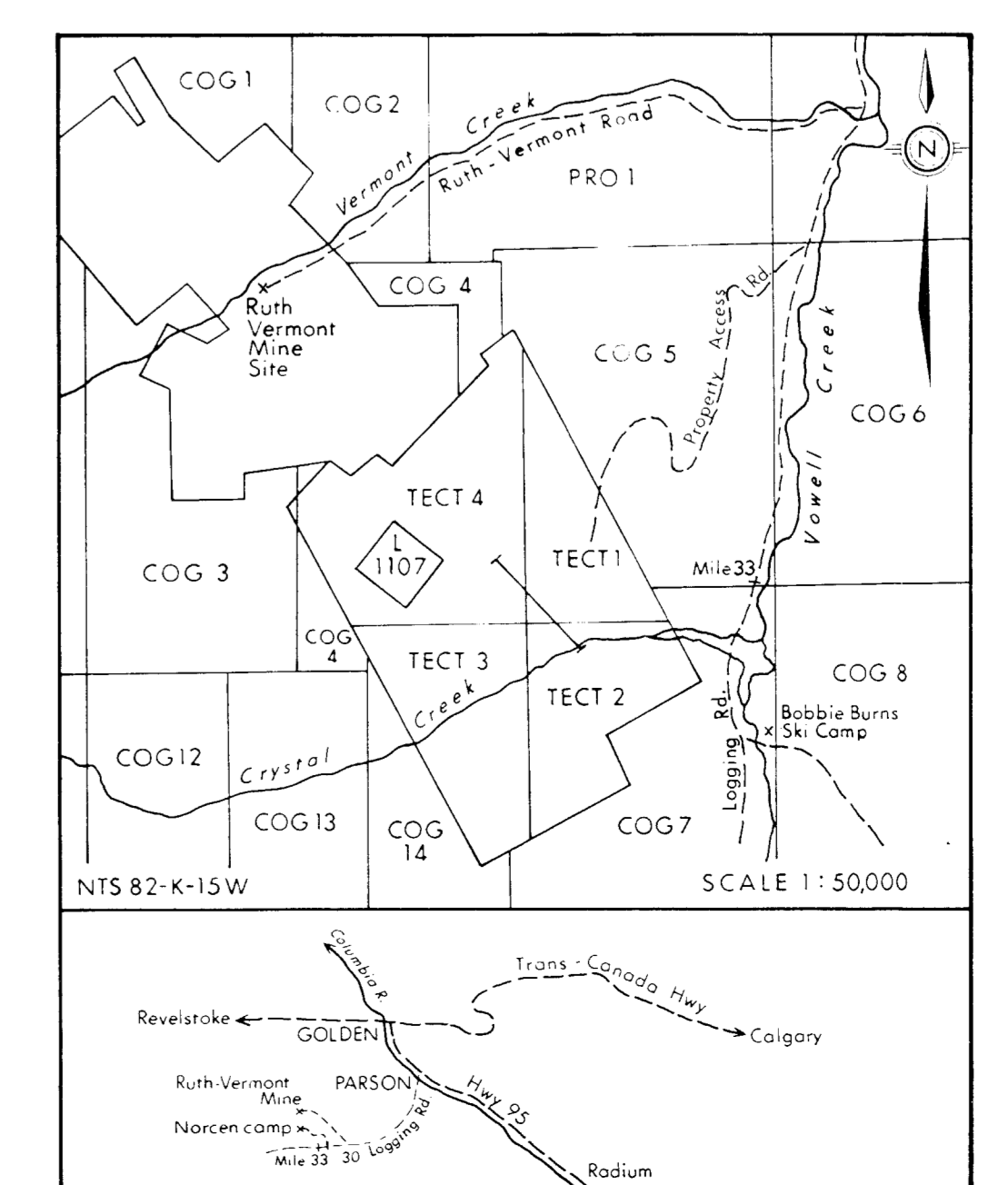
0 25 50 75 100 metres

NTS 85-K-15W November, 1979





- 200-300 ppm Zn
- 300-400 ppm Zn
- 400-500 ppm Zn
- 500-1000 ppm Zn
- GREATER THAN 1000 ppm Zn
- EXISTING ROADS
- NORCEN CAT TRAILS
- LEGAL CORNER POST
- TRENCH

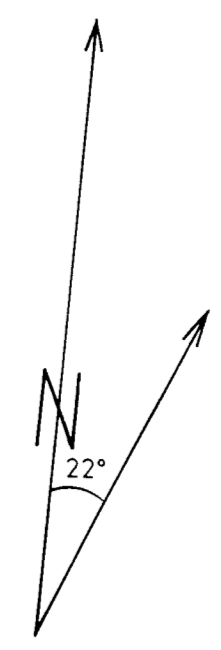
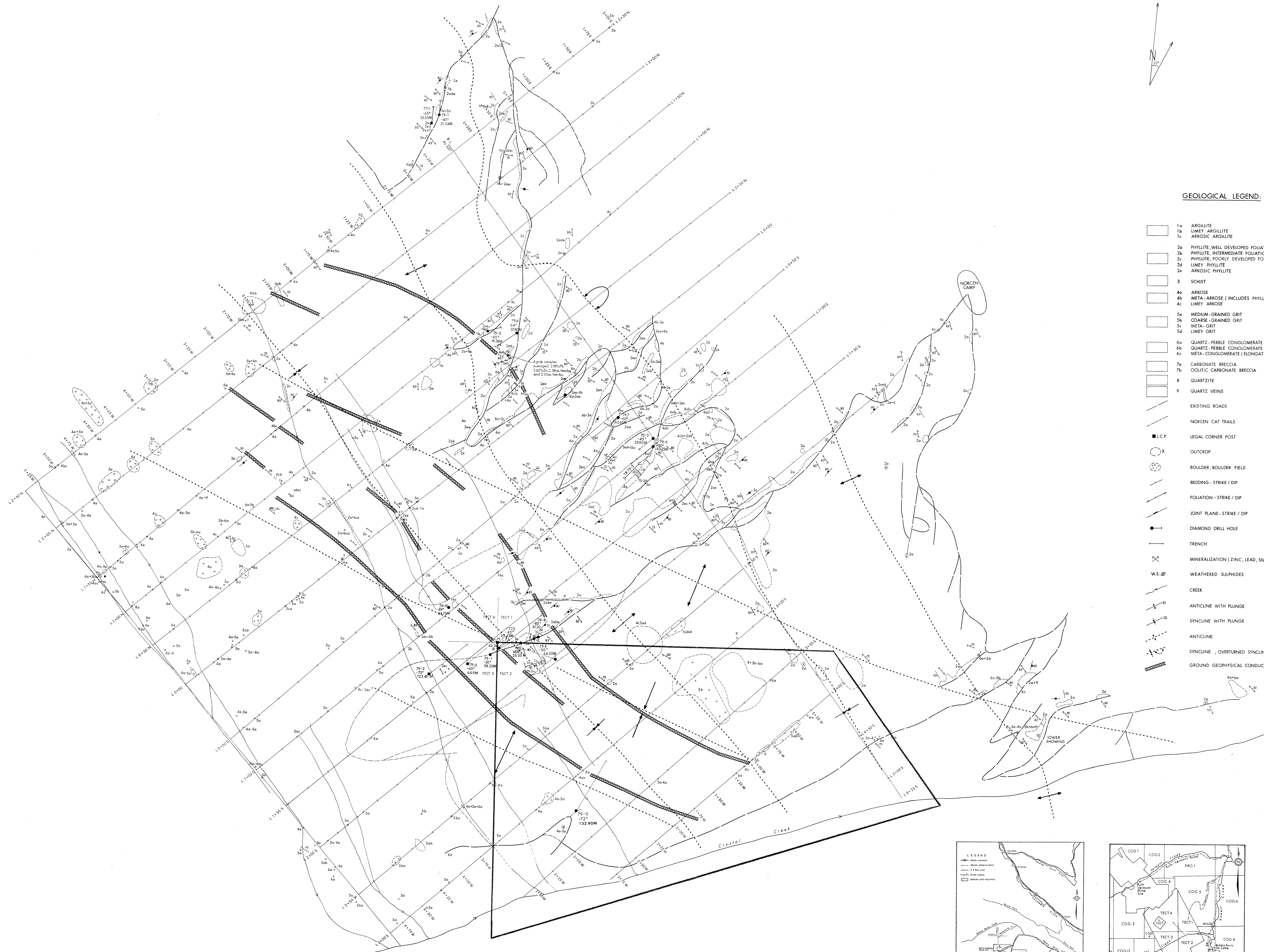


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**8154**

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[COCHRANE OIL & GAS LTD. OPTION]  
**CRYSTAL CREEK PROJECT**  
BRITISH COLUMBIA  
**Zn in Soils Geochemical Survey**

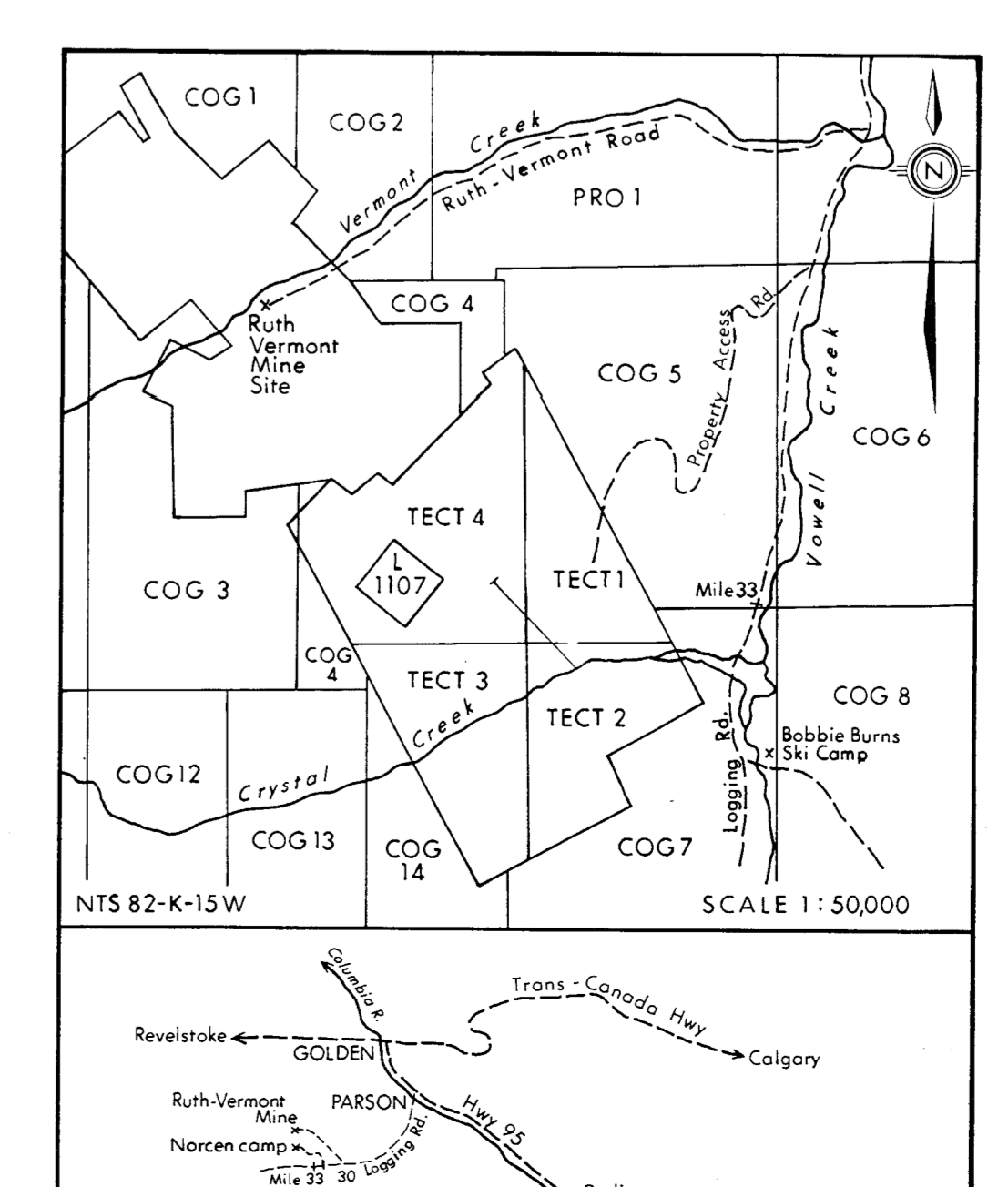
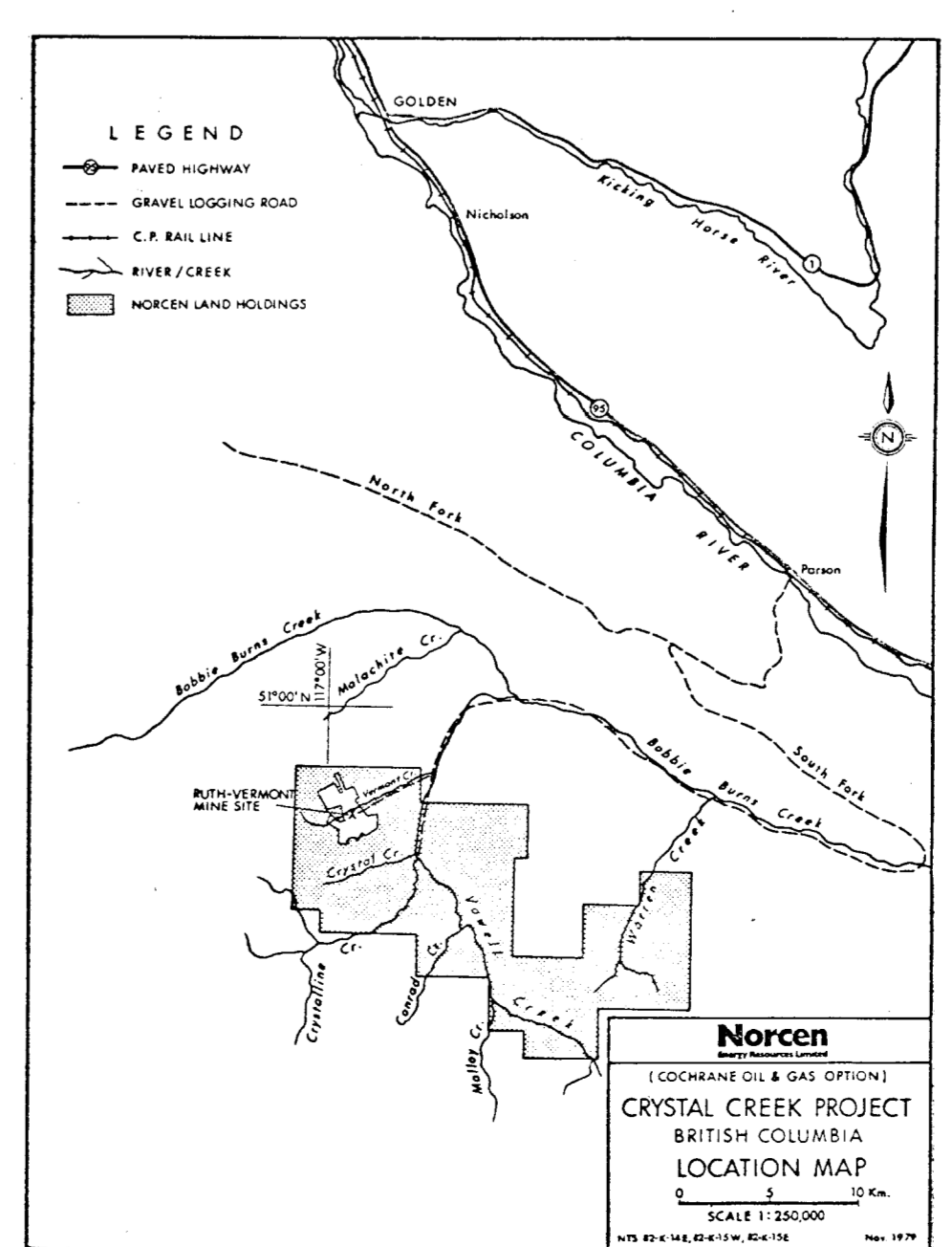
NTS 85-K-15W November, 1979





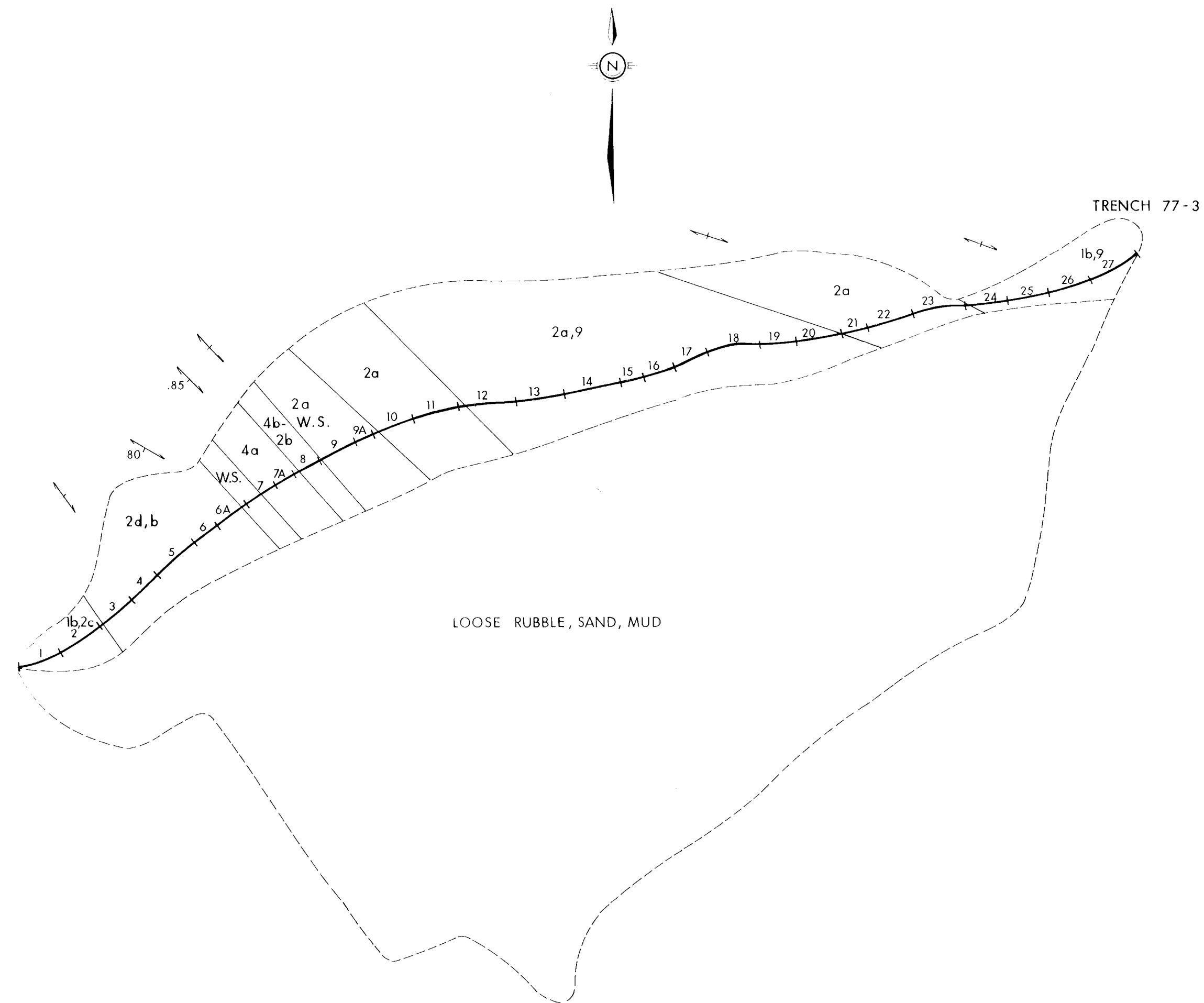
**GEOLOGICAL LEGEND:**

- 1a ARGILLITE
- 1b LIMY ARGILLITE
- 1c ARKOSIC ARGILLITE
- 2a PHYLLITE, WELL DEVELOPED FOLIATION
- 2b PHYLLITE, INTERMEDIATE FOLIATION
- 2c PHYLLITE, POORLY DEVELOPED FOLIATION
- 2d LIMY PHYLLITE
- 2e ARKOSIC PHYLLITE
- 3 SCHIST
- 4a ARKOSE
- 4b META-ARKOSE (INCLUDES PHYLLITIC ARKOSE)
- 4c LIMY ARKOSE
- 5a MEDIUM-GRAINED GRIT
- 5b COARSE-GRAINED GRIT
- 5c META-GRIT
- 5d LIMY GRIT
- 6a QUARTZ-PEBBLE CONGLOMERATE
- 6b QUARTZ-PEBBLE CONGLOMERATE WITH CHERT
- 6c META-CONGLOMERATE (ELONGATED PEBBLES)
- 7a CARBONATE BRECCIA
- 7b OOLITIC CARBONATE BRECCIA
- 8 QUARTZITE
- 9 QUARTZ VEINS
- EXISTING ROADS
- NORCEN CAT TRAILS
- LEGAL CORNER POST
- OUTCROP
- BOULDER, BOULDER FIELD
- BEDDING - STRIKE / DIP
- FOLIATION - STRIKE / DIP
- JOINT PLANE - STRIKE / DIP
- DIAMOND DRILL HOLE
- TRENCH
- MINERALIZATION (ZINC, LEAD, SILVER)
- W.S. WEATHERED SULPHIDES
- CREEK
- ANTICLINE WITH PLUNGE
- SYNCLINE WITH PLUNGE
- ANTICLINE
- SYNCLINE, OVERTURNED SYNCLINE
- GROUND GEOPHYSICAL CONDUCTOR

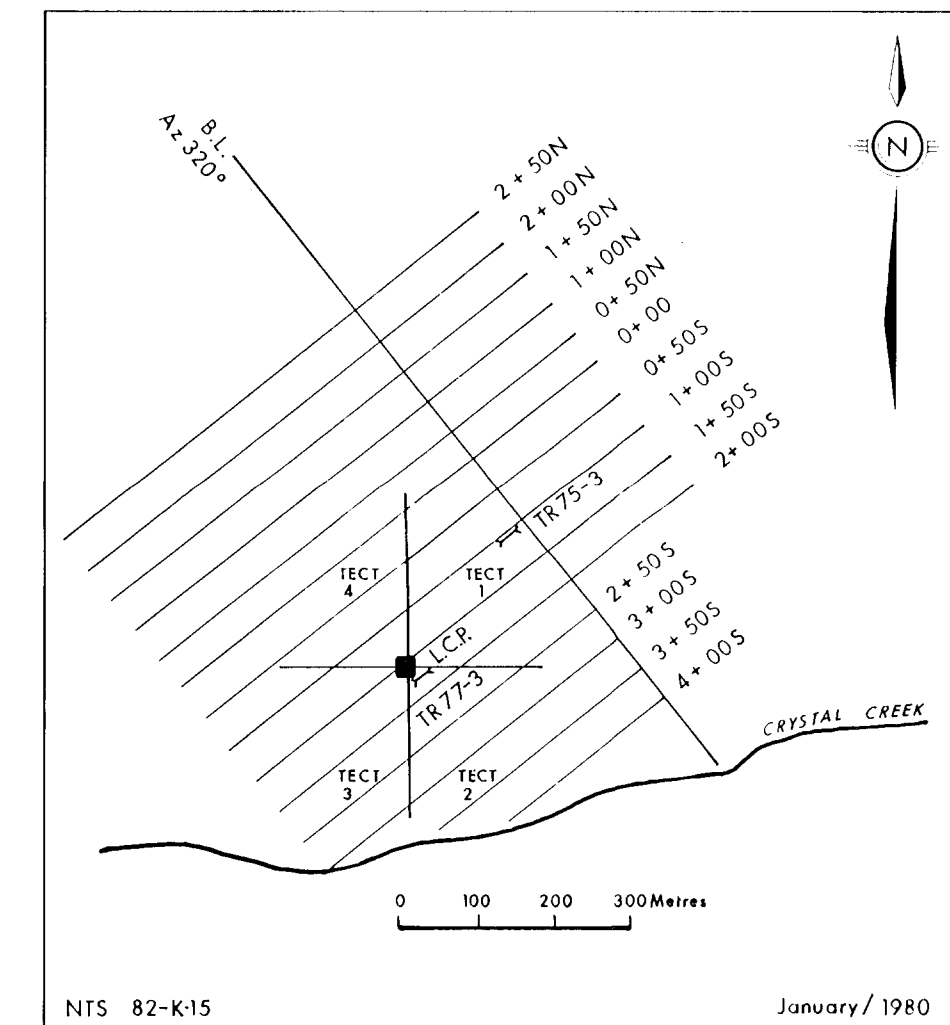


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 (COCHRANE OIL & GAS LTD. OPTION)  
**CRYSTAL CREEK PROJECT**  
 BRITISH COLUMBIA  
**DETAILED GEOLOGY**  
 SCALE 1:50,000  
 R. LAIRD  
 November, 1979



SAMPLE No.	SAMPLE WIDTH METRES	OZ./TON GOLD	OZ./TON SILVER	% Cu	% Pb	% Zn	% Cd	% Sb
77-3-1	.55	Trace	.02	.01	Trace	.07	Trace	.04
77-3-2	.6	Trace	.02	.01	.10	.37	Trace	.03
77-3-3	.5	Trace	.02	.01	.08	.50	Trace	.02
77-3-4	.45	Trace	.02	.01	.06	.22	Trace	.03
77-3-5	.59	Trace	.02	.01	.04	.31	Trace	.02
77-3-6	.34	Trace	.50	.01	.60	.78	Trace	.03
77-3-6A	.44	Trace	.76	.03	.94	3.20	.02	.03
77-3-7	.46	.010	2.69	.03	2.56	5.65	.03	.04
77-3-7A	.26	Trace	.50	.01	.62	2.45	.02	.04
77-3-8	.34	.010	2.23	.03	1.58	.88	.01	.04
77-3-9	.49	Trace	2.28	.03	2.62	4.59	.03	.04
77-3-9A	.2	Trace	.02	.02	.16	2.40	.01	.02
77-3-10	.51	Trace	.02	.03	1.06	5.55	.04	.05
77-3-11	.55	Trace	.22	.02	.54	2.74	.02	.01
77-3-12	.7	.010	18.73	.15	6.21	2.75	.02	.13
77-3-13	.56	.010	2.65	.06	1.96	.99	Trace	.05
77-3-14	.69	Trace	.78	.03	.64	1.40	.01	.08
77-3-15	.3	Trace	.02	.01	.08	.33	Trace	.04
77-3-16	.39	Trace	.02	.01	.10	.27	Trace	.02
77-3-17	.42	Trace	.18	.01	.26	.73	.01	.03
77-3-18	.64	Trace	.02	.01	.04	.38	Trace	.03
77-3-19	.44	Trace	.02	.01	.02	.28	Trace	.02
77-3-20	.56	Trace	.02	.01	.04	.22	Trace	.04
77-3-21	.35	Trace	.44	.01	.04	.10	Trace	.04
77-3-22	.59	Trace	.02	.01	.04	.09	Trace	.03
77-3-23	.65	Trace	.02	.01	.02	.03	Trace	.04
77-3-24	.50	Trace	.02	.01	.06	.09	Trace	.02
77-3-25	.54	Trace	.02	.01	.04	.05	Trace	.03
77-3-26	.53	.010	.02	.01	.04	.03	Trace	.02
77-3-27	.59	Trace	.08	.01	.02	.04	Trace	.02



MINERAL RESOURCES BRANCH  
ASSESSMENT REPORT  
**8154**  
No.

**GEOLOGICAL LEGEND:**

- 1a ARGILLITE
- 1b LIMEY ARGILLITE
- 1c ARKOSIC ARGILLITE
- 2a PHYLITE, WELL DEVELOPED FOLIATION
- 2b PHYLITE, INTERMEDIATE FOLIATION
- 2c PHYLITE, POORLY DEVELOPED FOLIATION
- 2d LIMEY PHYLITE
- 2e ARKOSIC PHYLITE
- 3 SCHIST
- 4a ARKOSE
- 4b META-ARKOSE (INCLUDES PHYLITIC ARKOSE)
- 4c LIMEY ARKOSE
- 5a MEDIUM-GRAINED GRIT
- 5b COARSE-GRAINED GRIT
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- 6c META-CONGLOMERATE (ELONGATED PEBBLES,
- 7a CARBONATE BRECCIA
- 7b OOLITIC CARBONATE BRECCIA
- 8 QUARTZITE
- 9 QUARTZ VEINS

**LEGEND:**

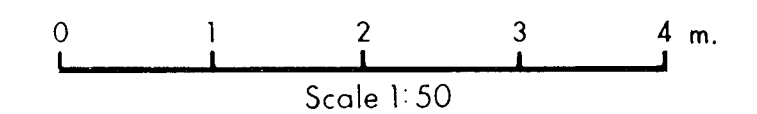
- W.S. WEATHERED SULFIDES
- FOLIATION (STRIKE/dip)

**Norcen**  
Energy Resources Limited

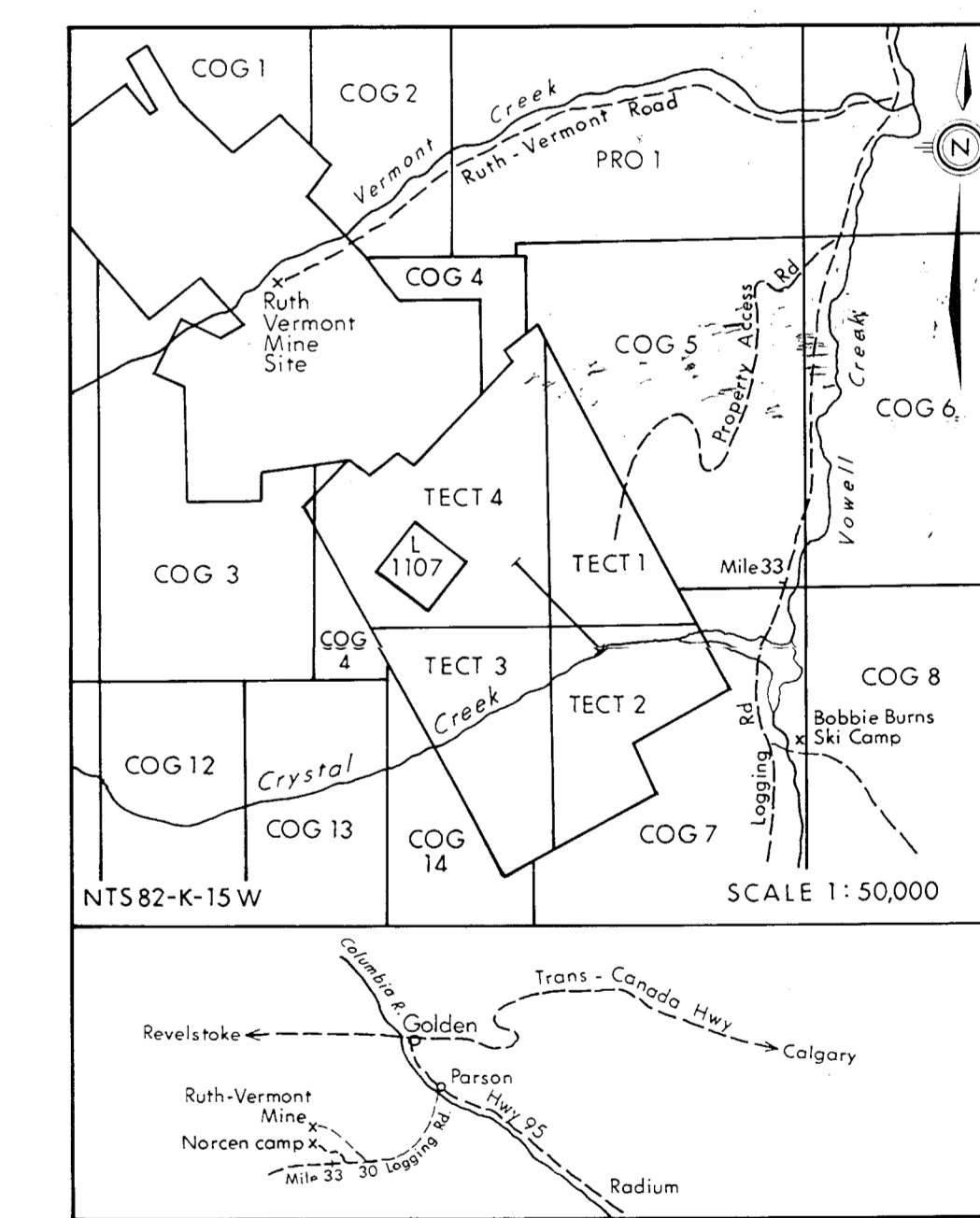
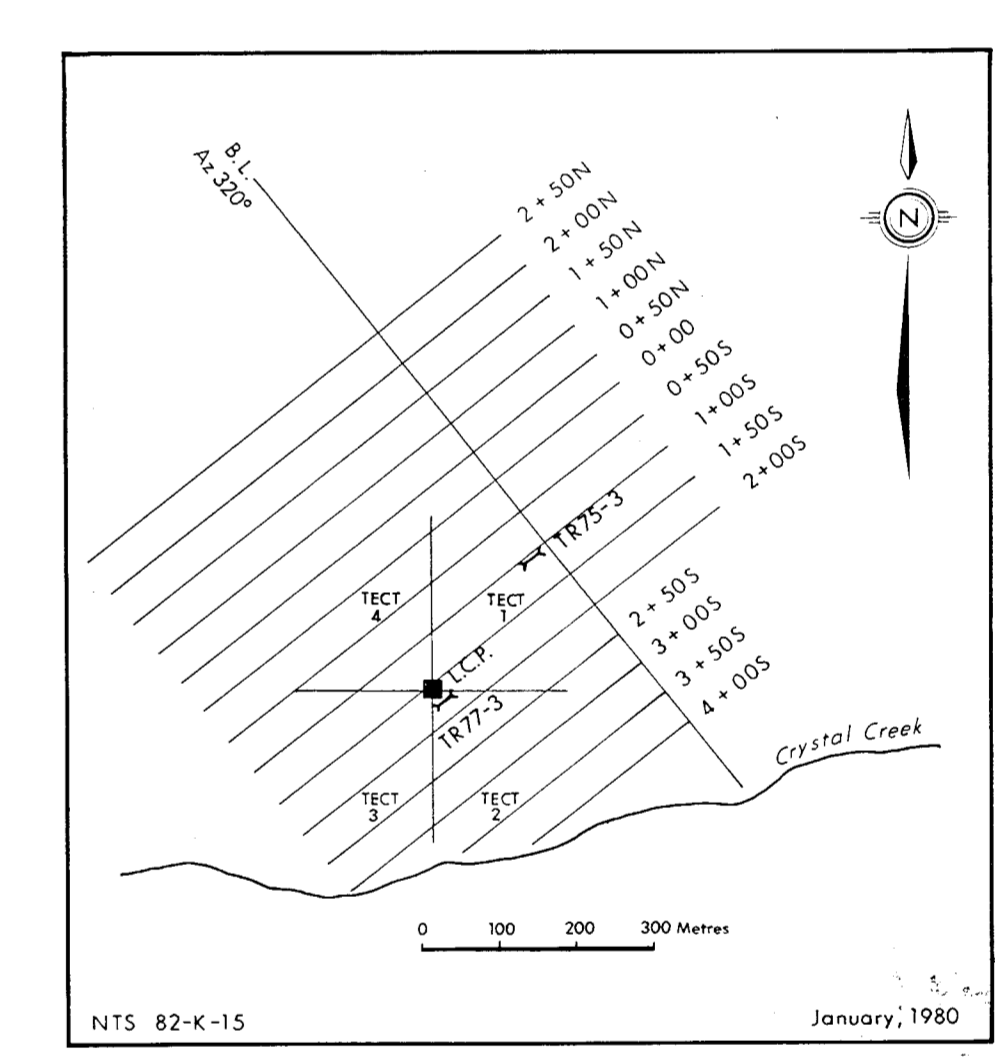
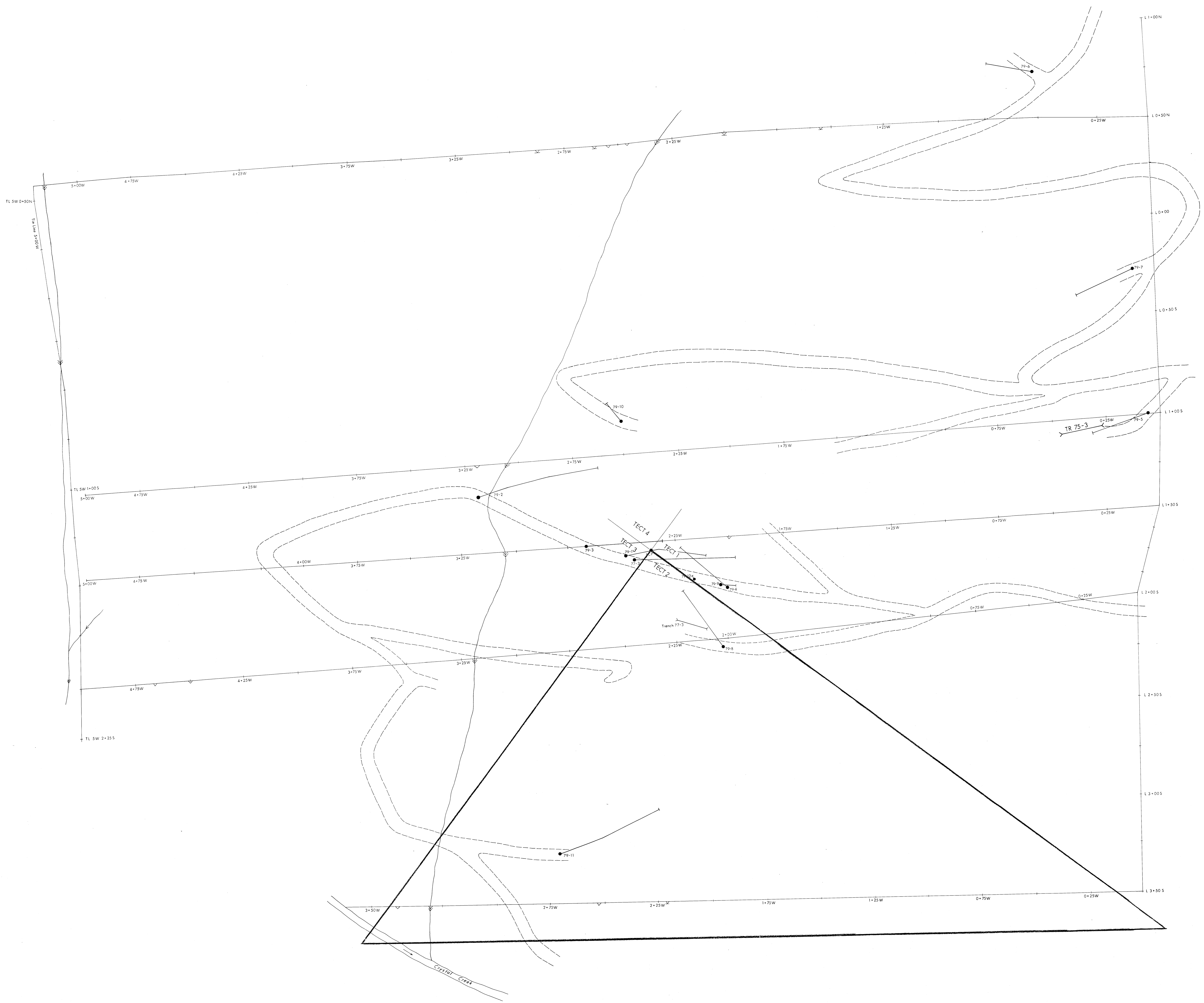
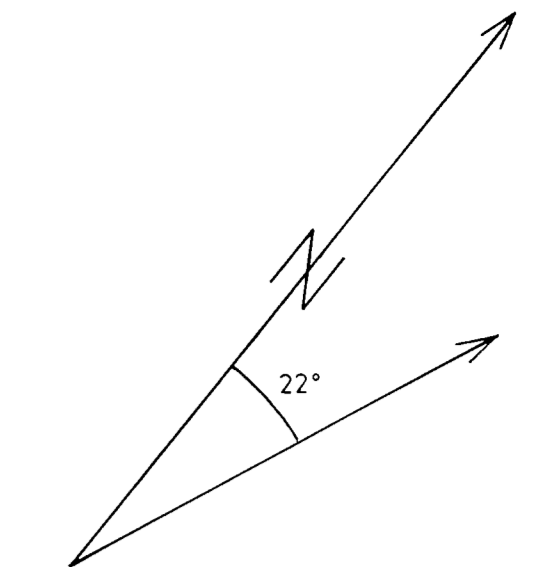
COCHRANE OIL AND GAS OPTION  
CRYSTAL CREEK PROJECT

BRITISH COLUMBIA

TRENCH MAP TR 77-3







- LEGEND
- CAT TRAILS
  - MAJOR CREEK
  - MINOR CREEK
  - SEEP OR GUILLEY
  - DIAMOND DRILL HOLE
  - CREEK
  - TRENCH

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**CRYSTAL CREEK PROJECT**  
BRITISH COLUMBIA

DIAMOND DRILL HOLE LOCATION MAP

0 5 10 15 20 25 meters  
SCALE 1:500

NTS 82-K-15 W November, 1979