

NORCEN ENERGY RESOURCES LIMITED

ASSESSMENT REPORT

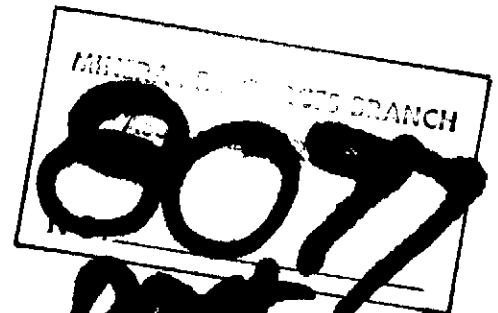
GEOCHEMICAL PROGRAM

GROUP XX

GOLDEN MINING DISTRICT

BRITISH COLUMBIA

CLAIMS: WC13, WC14  
LOCATION: 45 km south of Golden, British Columbia  
LATITUDE: 50° 50' N  
LONGITUDE: 116° 49' W



Part of 2 of 2

L. Smith, P. Geol.  
A. Slingsby

*[Handwritten signature]*  
*Laine Smith*

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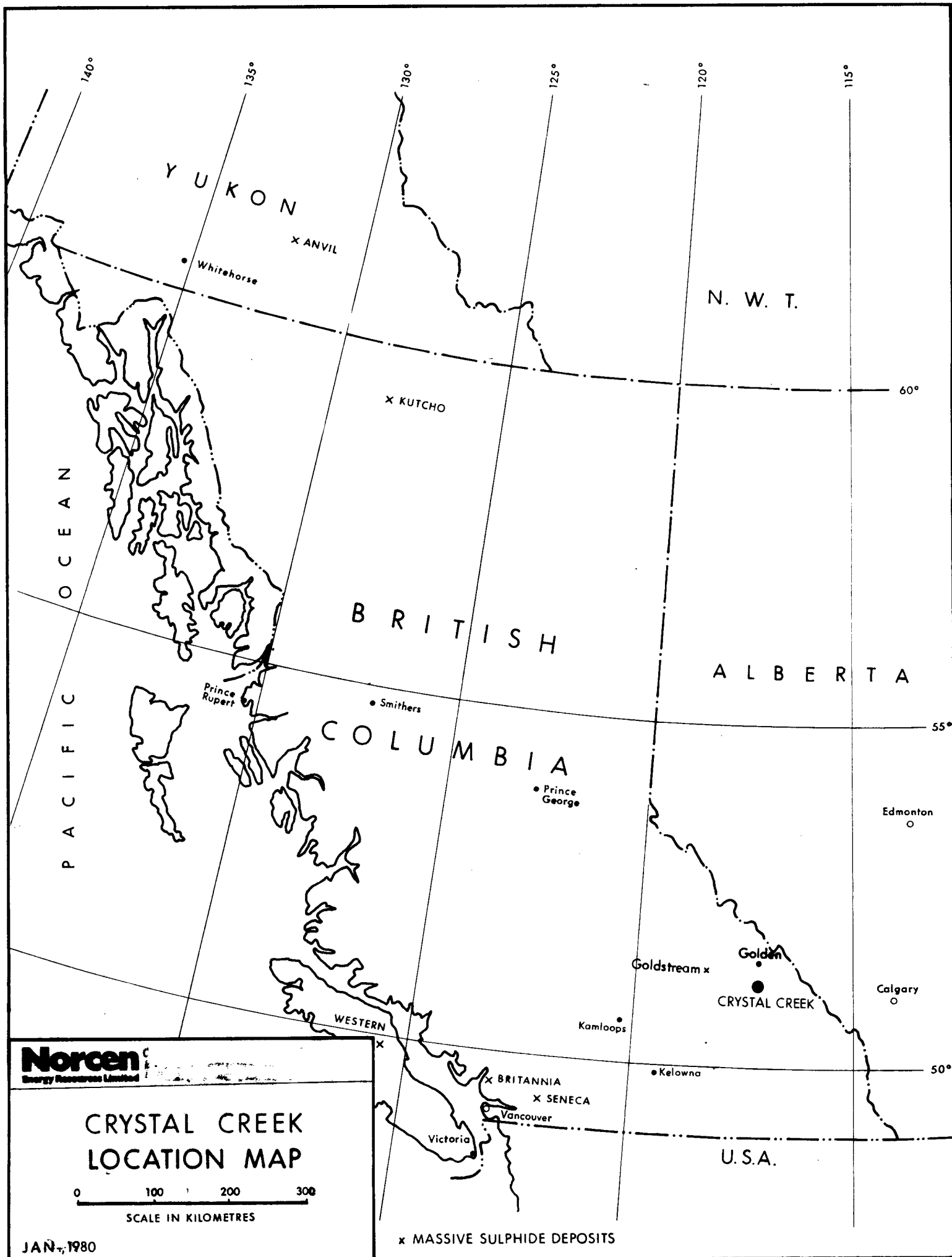
## SUMMARY

A total of 958 soil samples, 96 stream sediment samples and 26 rock samples were collected during a reconnaissance geochemical survey of the Crystal Creek property. The soil and stream sediments were analyzed for their content of iron, manganese, lead, zinc, copper and silver. Rock samples were analyzed by induction coupled argon plasma spectrometry for nine major oxides and 15 minor and trace elements. Of these samples 34 soil, 6 stream sediment samples were taken within the boundaries of Group XX. An 1:20,000 orthophoto produced from 1976 Energy, Mines and Resources aerial photograph by North West Survey Corporation International Ltd. of Edmonton, Alberta, was used for control of sampling points. The samples were taken on May 28, June 3, 5 and 6.

Soil samples were taken from B horizon where available. Notes as to topograph, vegetation, drainage, soil types, etc. were taken. Stream samples were taken where available. Rock samples were taken where soil was not available or where the rock appeared to have an anomalous metal content. The samples are generally of shale.

## LOCATION AND ACCESS

The claims are located in the Purcell Mountains approximately 45 kilometres south of Golden, British Columbia. Access to the property is by paved highway 95 to Parson, British Columbia and hence by 52 kilometres of logging road along Bobby Burns and Vowell Creeks.



**Norcen**  
Energy Resources Limited

# CRYSTAL CREEK LOCATION MAP


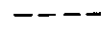
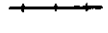
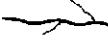

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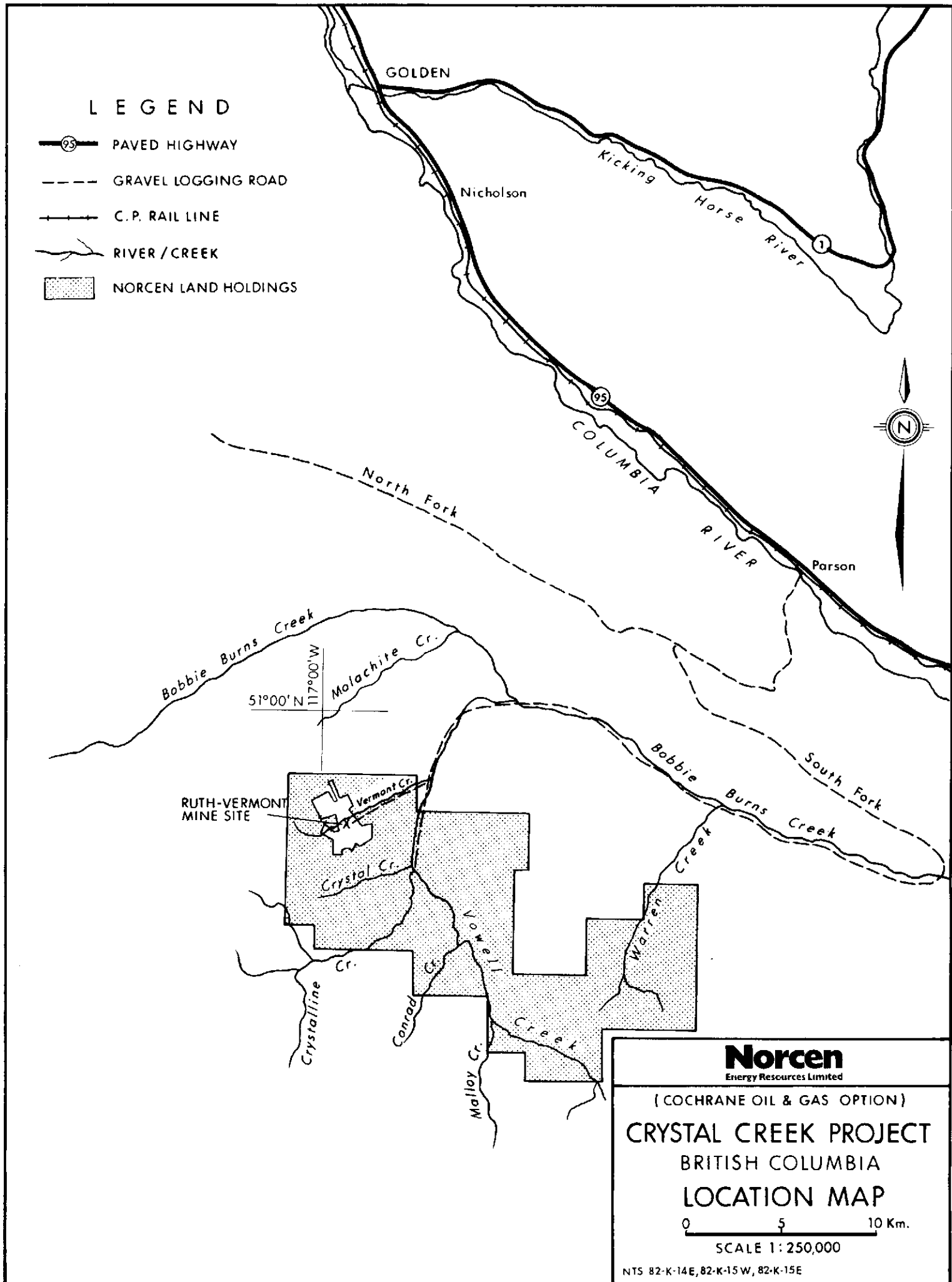
SCALE IN KILOMETRES

JAN 7, 1980

x MASSIVE SULPHIDE DEPOSITS

# LEGEND

-  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-15 W, 82-K-15E

CLAIMS STATUS

The WC13 and WC14 claims form part of the Crystal Creek property. They have been grouped together to form Group XX.

Claim Name	Record Number	Recorded Date	# of Units
WC13	318	June 18, 1979	12
WC14	319	June 18, 1979	12



## GEOCHEMICAL SAMPLING

A total of 34 soil samples and 6 stream sediment samples were collected on Group XX. All samples were sent to Barringer Magenta Limited of No. 105 3750 19th Street N.E., Calgary, Alberta. The soil and sediment samples were analyzed for lead, zinc, silver, copper, iron and manganese by atomic absorption.

Statistical analysis of the data for the entire property produced the following means and standard deviations:

Soils	Mean	Standard Deviation
Ag (ppm)	.319	.25
Cu (ppm)	27.1	24.4
Pb (ppm)	22.4	54.3
Zn (ppm)	65.0	43.4
Mn (ppm)	344	478
Fe (%)	3.41	1.19

## Stream Sediments

	Mean	Standard Deviation
Ag (ppm)	.206	.132
Cu (ppm)	33.0	22.8
Pb (ppm)	13.5	8.7
Zn (ppm)	52.0	31.3
Mn (ppm)	372	192
Fe (ppm)	4.15	1.28

Analysis of the soil samples from Group XX showed that the area was extremely low in metal content. The stream samples indicated a slightly higher metal content but still below average.

ITEMIZED STATEMENT OF EXPENDITURES

A. SALARIES

A. Slingsby - Project Preparation-April 16	\$ 125 00
- Supervision - June 3	125 00
P. Collender - Geochemical Sampling-May 28, June 3,5,6	500 00
D. Meyer - Geochemical Sampling - May 28	90 00
L. Hettinga - Geochemical Sampling - June 5, 6	180 00
R. Pryde - Geochemical Sampling - June 3	90

B. ACCOMMODATION AND MEALS

9 man days @ \$41/day	369 00
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C. TRANSPORTATION

Truck rental 4 days @ \$23.50/day	94 00
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D. ASSAYING AND ORTHOPHOTO

34 soils @ \$6/sample	204 00
6 stream @ \$5/sample	30 00
24 units (photo) @ \$10/unit	240 00

TOTAL EXPENDITURES	<u>\$2 047 00</u>
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STATEMENT OF QUALIFICATIONS

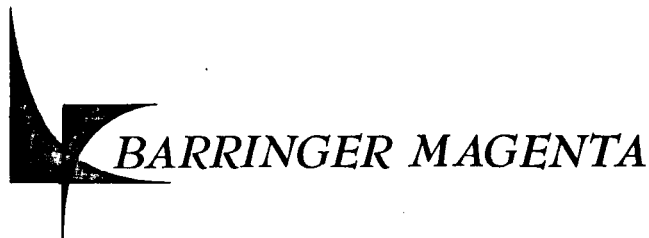
I, Laurie James Smith, of the City of Calgary in the Province of Alberta, do hereby state:

1. I am a graduate of the University of Calgary with a B Sc 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 supervised the geochemical soil sampling on Group XX.
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 License Number 197331.

Laurie J. Smith

APPENDIX I

ASSAY CERTIFICATES



BARRINGER MAGENTA LIMITED  
 OFFICES & MINERALS  
 LABORATORY:  
 3750 - 19th ST. N.E. SUITE 105  
 CALGARY, ALBERTA T2E 6V2  
 PHONE (403) 276-9701  
 TELEX 03-827584

AUTHORITY: ART SLINGSEY

29/AUG/80  
 PAGE 1 OF 6  
 WORK ORDER # NORCEN

NORCEN ENERGY RESOURCES  
 715-5TH AVE. S.W.  
 CALGARY, ALBERTA  
 T2P 2X7

SAMPLE GROUP #20

\*\*\*FINAL REPORT\*\*\*

G E O C H E M I C A L L A B O R A T O R Y R E P O R T

SAMPLE TYPE:  
 SOIL

SAMPLE NUMBER	AG PPM	CU PPM	FE %	MN PPM	PB PPM
2050	.3	23.	3.11	195.	13.
2051	.1	16.	2.52	215.	14.
2052	.1	17.	3.25	185.	9.
2053	.2	22.	2.52	125.	20.
3126	.2	24.	3.4	360.	12.
3127	N D	35.	4.3	290.	15.
3128	.7	10.	1.8	160.	5.
3129	.5	19.	3.3	140.	8.
3130	.2	14.	3.2	190.	9.
3131	.3	10.	3.1	320.	9.
3132	N D	30.	3.6	150.	13.
3134	N D	16.	3.2	130.	10.
3135	.2	26.	3.4	190.	15.
3136	.5	30.	3.4	100.	17.
3137	.1	30.	3.9	180.	11.
3138	.1	20.	3.7	170.	11.
3139	.3	15.	3.2	120.	12.
3140	.1	30.	4.	150.	11.
3141	.2	21.	4.3	120.	15.
3142	.2	23.	4.	110.	14.
3143	.3	19.	3.2	130.	13.
3168	N D	14.	3.45	440.	13.
3169	N D	6.	.72	38.	20.
3170	N D	25.	3.25	340.	16.
3171	.1	4.	.78	32.	12.
3172	N D	22.	3.47	237.	14.
3173	.1	30.	3.64	322.	16.
3174	N D	22.	4.42	196.	11.
3175	.2	17.	3.15	101.	18.
3176	.3	21.	4.24	154.	10.

Q=QUESTIONABLE PRECISION; \*I=INTERFERENCE; IS=INSUFFICIENT SAMPLE  
 NA=NOT ANALYZED; ND=NOT DETECTED; MS=MISSING SAMPLE; T-TRACE



BARRINGER MAGENTA LIMITED  
 OFFICES & MINERALS  
 LABORATORY:  
 3750 - 19th ST., N.E., SUITE 105  
 CALGARY, ALBERTA T2E 6V2  
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 TELEX 03-827584

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 PAGE 2 OF 6  
 WORK ORDER # NORCEN

NORCEN ENERGY RESOURCES  
 715-5TH AVE. S.W.  
 CALGARY, ALBERTA  
 T2P 2X7

SAMPLE GROUP #20

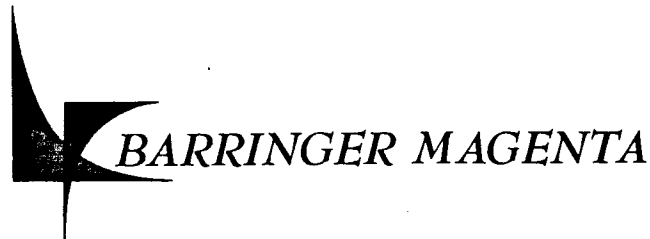
\*\*\*FINAL REPORT\*\*\*

G E O C H E M I C A L L A B O R A T O R Y R E P O R T

SAMPLE TYPE:  
 SOIL

SAMPLE NUMBER	AG PPM	CU PPM	FE %	MN PPM	PB PPM
3177	.2	12.	3.71	102.	13.
3178	N D	36.	4.23	654.	54.
3179	N D	18.	4.24	135.	10.
3180	N D	11.	3.94	123.	11.

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**BARRINGER MAGENTA**

AUTHORITY: ART SLINGSBY

**BARRINGER MAGENTA LIMITED**  
OFFICES & MINERALS  
LABORATORY:  
3750 - 19th ST., N.E., SUITE 105  
CALGARY, ALBERTA T2E 6V2  
PHONE (403) 276-9701  
TELEX 03-827584

29/AUG/80  
PAGE 3 OF 6  
WORK ORDER # NORCEN

NORCEN ENERGY RESOURCES  
715-5TH AVE. S.W.  
CALGARY, ALBERTA  
T2P 2X7

SAMPLE GROUP #20

\*\*\*FINAL REPORT\*\*\*

G E O C H E M I C A L L A B O R A T O R Y R E P O R T

SAMPLE TYPE: SOIL

SAMPLE NUMBER	ZN PPM
2050	47.
2051	44.
2052	54.
2053	33.
3126	56.
3127	69.
3128	24.
3129	54.
3130	54.
3131	49.
3132	57.
3134	MS
3135	56.
3136	59.
3137	73.
3138	62.
3139	54.
3140	75.
3141	72.
3142	64.
3143	47.
3168	68.
3169	10.
3170	65.
3171	8.
3172	63.
3173	59.
3174	65.
3175	30.
3176	55.

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**BARRINGER MAGENTA**

AUTHORITY: ART SLINGSBY

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715-5TH AVE. S.W.  
CALGARY, ALBERTA  
T2P 2X7

SAMPLE GROUP #20

\*\*\*FINAL REPORT\*\*\*

G E O C H E M I C A L   L A B O R A T O R Y   R E P O R T

SAMPLE TYPE:  
SOIL

SAMPLE NUMBER	ZN PPM
3177	42.
3178	78.
3179	56.
3180	32.



BARRINGER MAGENTA LIMITED  
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 CALGARY, ALBERTA  
 T2P 2X7

SAMPLE GROUP #20

\*\*\*FINAL REPORT\*\*\*

G E O C H E M I C A L L A B O R A T O R Y R E P O R T

SAMPLE TYPE:  
 STREAM SEDIMENT

SAMPLE NUMBER	AG PPM	CU PPM	FE %	MM PPM	PB PPM
8					
2020	N D	1.	.47	40.	2.
2021	.1	33.	7.07	265.	17.
2022	.2	38.	6.06	280.	13.
2023	N D	15.	3.94	170.	6.
2024	N D	19.	4.8	165.	7.
3133	N D	31.	4.78	285.	8.

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29/AUG/80  
PAGE 6 OF 6  
WORK ORDER # NORCEN

NORCEN ENERGY RESOURCES  
715-5TH AVE., S.W.,  
CALGARY, ALBERTA  
T2P 2X7

SAMPLE GROUP #20

\*\*\*FINAL REPORT\*\*\*

G E O C H E M I C A L L A B O R A T O R Y R E P O R T

SAMPLE TYPE:  
STREAM SEDIMENT

SAMPLE NUMBER	ZN PPM
8	
2020	5.
2021	89.
2022	83.
2023	65.
2024	71.
3133	6.

WD NO:80-0457 ANALYSTS DATE: 09/07/80 MATRIX: BF

FILE:T0-0457

SAMPLE ID	AL2O3 %	FE2O3 %	CaO %	SiO2 %	TiO2 %	MnO2 %	K2O %	Na2O %	P2O5 %
1106-R	22.8	8.76	.277	2.87	.402	.0821	.771	4.13	.13
2001-R	10.9	7.35	.124	.989	.282	.0243	.315	2.93	.10
2002-R	5.73	5.09	.512	.570	.0590	.110	.623	.932	.03
2003-R	11.3	7.19	1.65	2.10	.243	.229	.464	1.41	.06
2004-R	22.3	10.6	1.45	3.63	.533	.370	1.25	3.23	.11
5001-R	29.8	11.1	.213	3.34	.598	.119	1.06	3.58	.15
5002-R	21.4	9.24	.119	2.81	.571	.0673	.900	4.07	.09
5003-R	23.6	10.3	.084	2.19	.469	.118	1.05	3.17	.13
5004-R	7.84	4.76	1.37	.407	.193	.0871	1.40	.722	.02
1187-R	14.1	5.13	.119	2.97	.385	.0313	1.97	2.14	.05
1180-R	10.6	7.88	.090	2.48	.394	.0522	1.85	1.23	.05
1194-R	13.1	4.79	.078	1.58	.693	.0385	1.19	2.04	.03
2005-R	14.3	13.3	3.29	3.19	.422	.695	.755	1.63	.02
2006-R	15.6	10.7	3.19	3.18	.420	.761	.750	2.33	.06
2007-R	9.16	8.74	20.4	9.52	.166	2.12	.336	2.40	.18
2008-R	26.1	6.31	.169	1.98	.547	.0514	1.24	4.53	<.01
2009-R	24.1	8.77	.061	3.14	.565	.0513	1.12	3.58	.05
2010-R	24.5	12.8	.584	2.46	.313	2.28	1.02	3.83	.20
3001-R	8.61	4.03	.081	1.34	.126	.0574	2.82	.647	.03
3002-R	.625	1.12	.022	.0355	.0034	.0188	<.003	.102	<.01
3003-R	.592	2.82	.865	.0804	.0029	.0156	<.003	.118	.52
3004-R	.464	3.98	.048	.0277	.0033	.0536	<.003	.075	<.01
3005-R	1.95	38.5	.003	.0325	.0232	.0091	.019	.465	<.01
3006-R	4.60	6.28	2.15	1.07	.0545	.124	.185	.903	.07
5005-R	4.71	1.96	.774	.218	.0435	.0413	1.72	.405	.01
5006-R	14.3	8.64	.102	2.82	.416	.142	1.30	3.11	.09
5007-R	9.56	4.65	.470	1.24	.356	.0610	2.09	1.05	.04
5008-R	22.7	8.03	.168	2.38	.423	.105	1.21	3.66	.15

WD 00:80-0457 ANALYSTS DATE: 09/07/80 MATRIX: HF

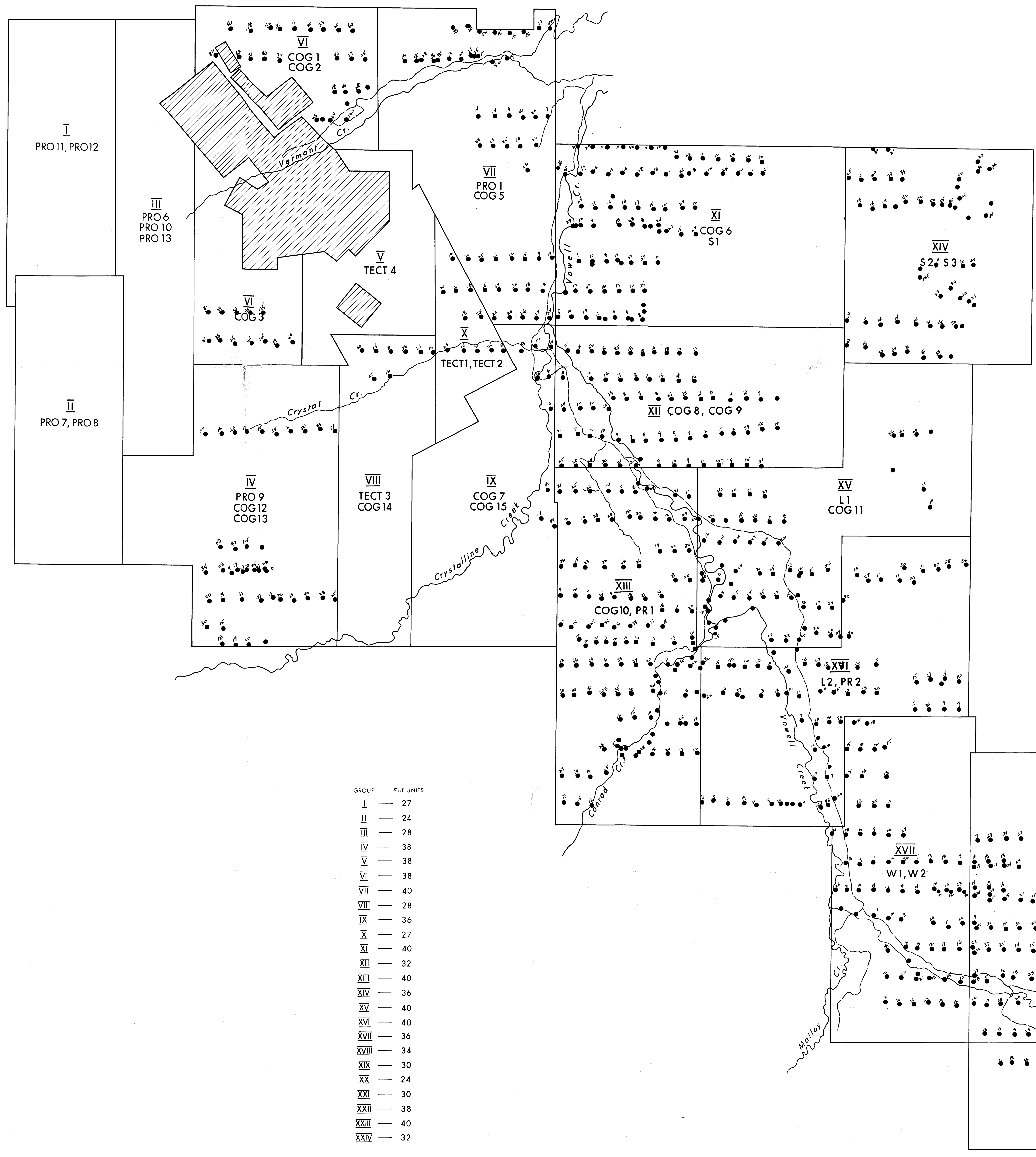
FILE:10-0457

SAMPLE ID	HF PPM	CO PPM	CR PPM	CD PPM	CU PPM	PR PPM	NI PPM	AG PPM
1106-R	2.0	<7	385	31	14.9	<5	68	<5
2001-R	1.2	<7	2240	40	27.4	35	26	<5
2002-R	.7	<7	1890	57	27.7	30	44	<5
2003-R	.9	<7	1180	46	68.1	<5	57	<5
2004-R	2.1	<7	322	46	45.5	15	95	<5
5001-R	2.0	<7	178	30	35.7	<5	78	<5
5002-R	2.8	<7	414	25	40.1	500	71	<5
5003-R	2.0	<7	341	29	44.9	<5	73	<5
5004-R	.7	7	1090	26	23.2	<5	36	<5
1187-R	1.5	<7	1120	28	7.1	<5	53	<5
1189-R	.6	<7	1700	36	23.1	15	60	<5
1190-R	1.5	<7	1150	29	9.1	<5	41	<5
2005-R	1.2	<7	502	38	47.6	10	88	<5
2006-R	1.6	<7	576	33	82.0	20	77	<5
2007-R	.9	10	84.9	17	5.1	70	32	<5
2008-R	3.5	<7	369	<3	8.1	10	40	<5
2009-R	2.5	<7	189	18	25.1	<5	58	<5
2010-R	2.9	<7	82.7	67	57.9	5	118	<5
3001-R	.4	<7	1120	23	9.5	25	37	<5
3002-R	.1	36	1480	23	833	41000	13	462
3003-R	.1	442	837	17	2000	10000	15	493
3004-R	.2	83	4560	64	9560	17200	47	263
3005-R	.4	<7	1100	152	94.3	1450	152	12
3006-R	.7	<7	1250	25	37.6	430	39	<5
5005-R	.2	<7	1580	24	8.9	165	17	<5
5006-R	2.1	<7	455	31	25.8	40	64	<5
5007-R	.6	<7	1240	31	2.9	75	39	<5
5008-R	2.5	<7	224	22	32.2	115	58	<5

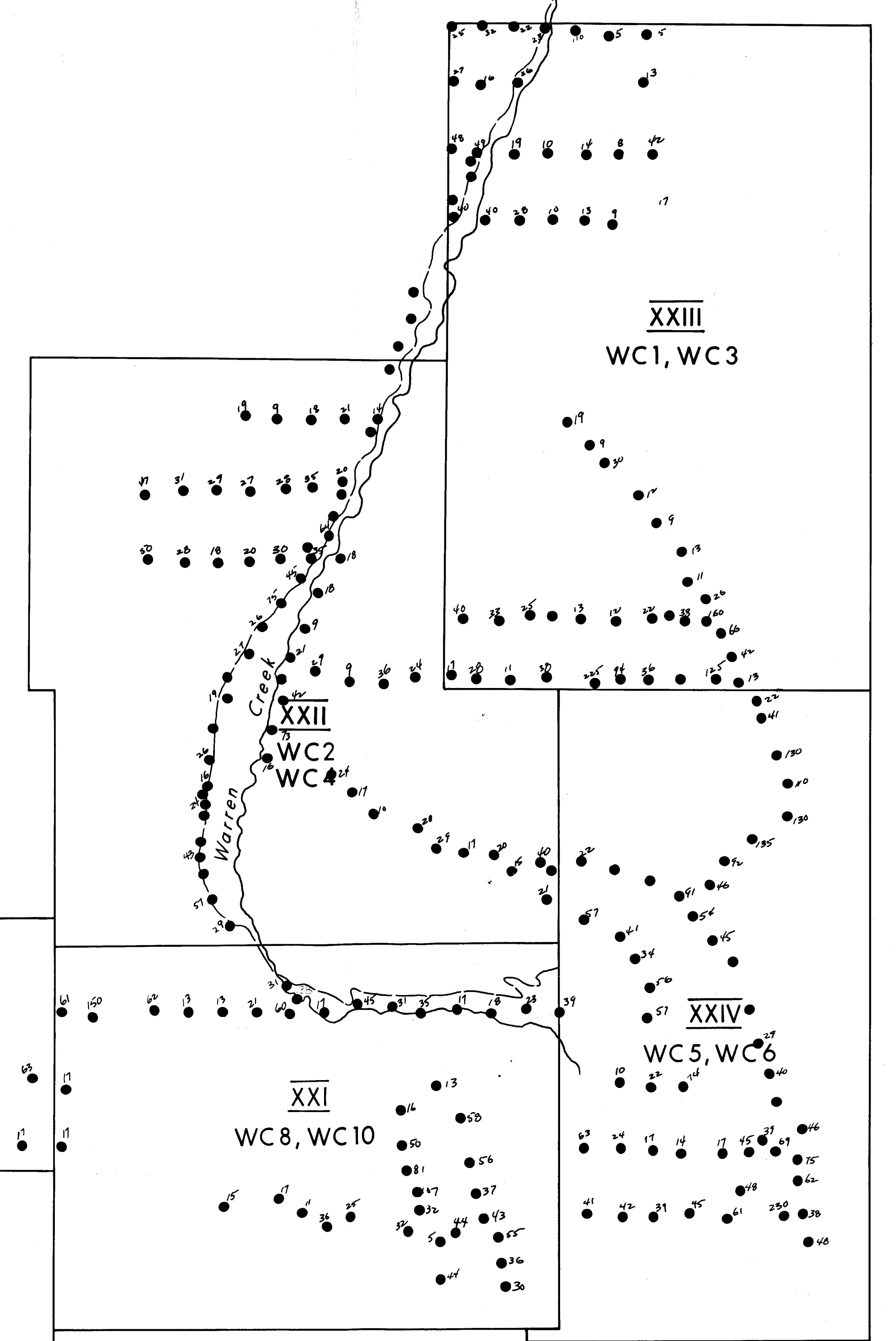
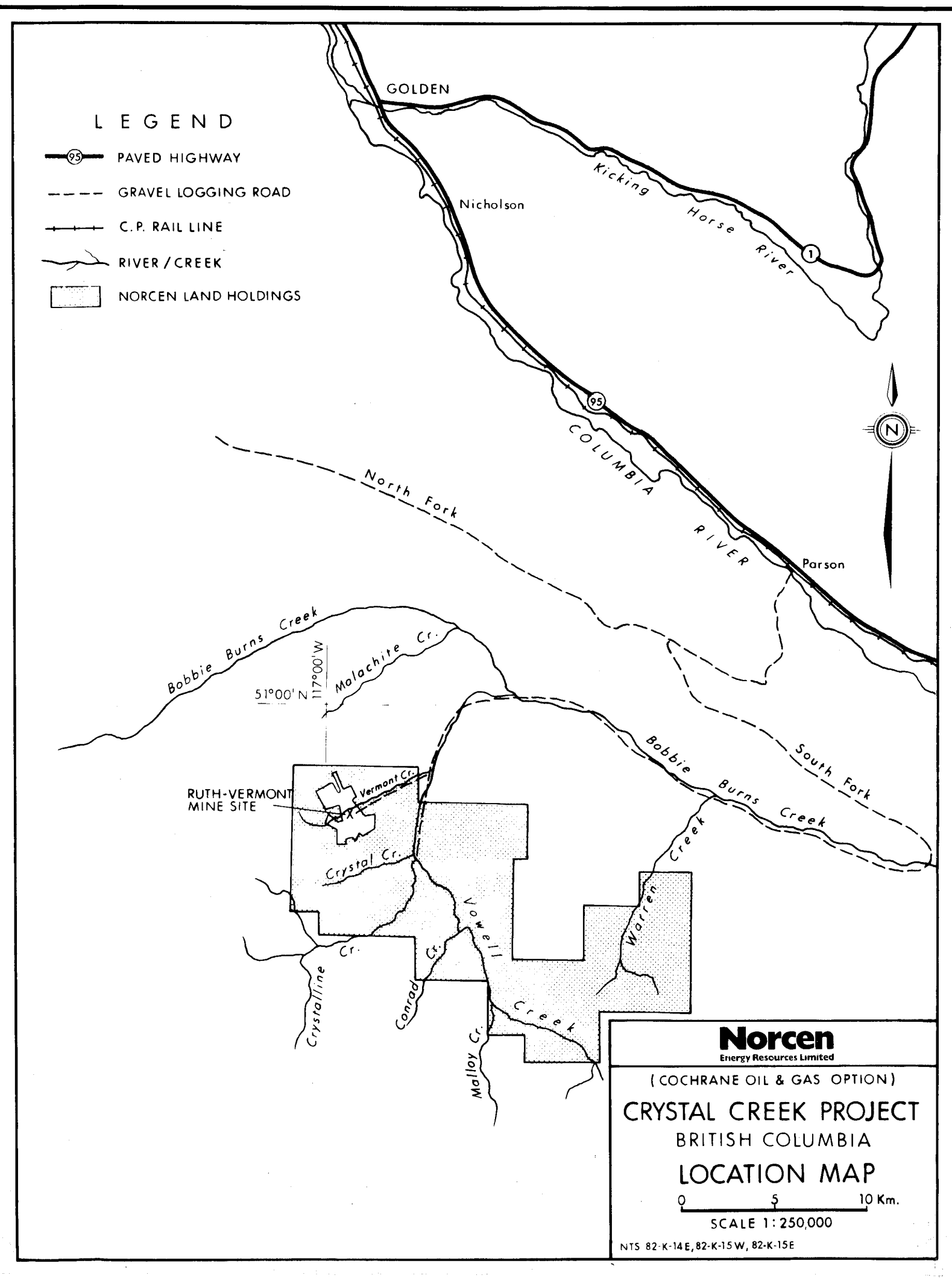
WD NO: 80-0457 ANALYSIS DATE: 09/07/90 MATRIX: HF

FILE: 10-0457

SAMPLE TO	SR PPM	TR PPM	TK PPM	V PPM	TD PPM	MO PPM
1146-R	68.3	23	50	100	93	<30
2001-R	41.8	20	56	124	27	40
2002-R	28.4	14	15	99.7	28	30
2003-R	48.9	18	49	103	72	40
2004-R	123	28	94	114	116	30
5001-R	110	22	97	118	112	<30
5002-R	43.3	19	119	120	114	<30
5003-R	115	25	90	113	102	<30
5004-R	80.2	12	22	73.9	33	<30
1197-R	67.8	8	45	104	39	<30
1199-R	43.3	9	33	114	52	<30
1194-R	43.3	28	42	153	36	<30
2005-R	83.0	13	46	111	132	<30
2006-R	121	15	30	106	87	<30
2007-R	274	11	37	45.3	41	<30
2008-R	149	14	94	122	77	<30
2009-R	114	18	93	118	95	<30
2010-R	137	15	61	100	184	30
3001-R	56.7	9	23	75.5	34	<30
3002-R	17.8	<6	<3	72.9	5090	<30
3003-R	64.0	<6	<3	36.3	86800	<30
3004-R	6.2	<6	<3	205	3990	<30
3005-R	13.8	<6	10	48.2	217	<30
5006-R	97.5	<6	10	77.9	86	<30
5005-R	19.2	<6	14	69.1	33	<30
5008-R	80.9	17	75	106	87	<30
5007-R	38.2	12	21	99.9	53	<30
5008-R	134	17	91	97.6	113	<30

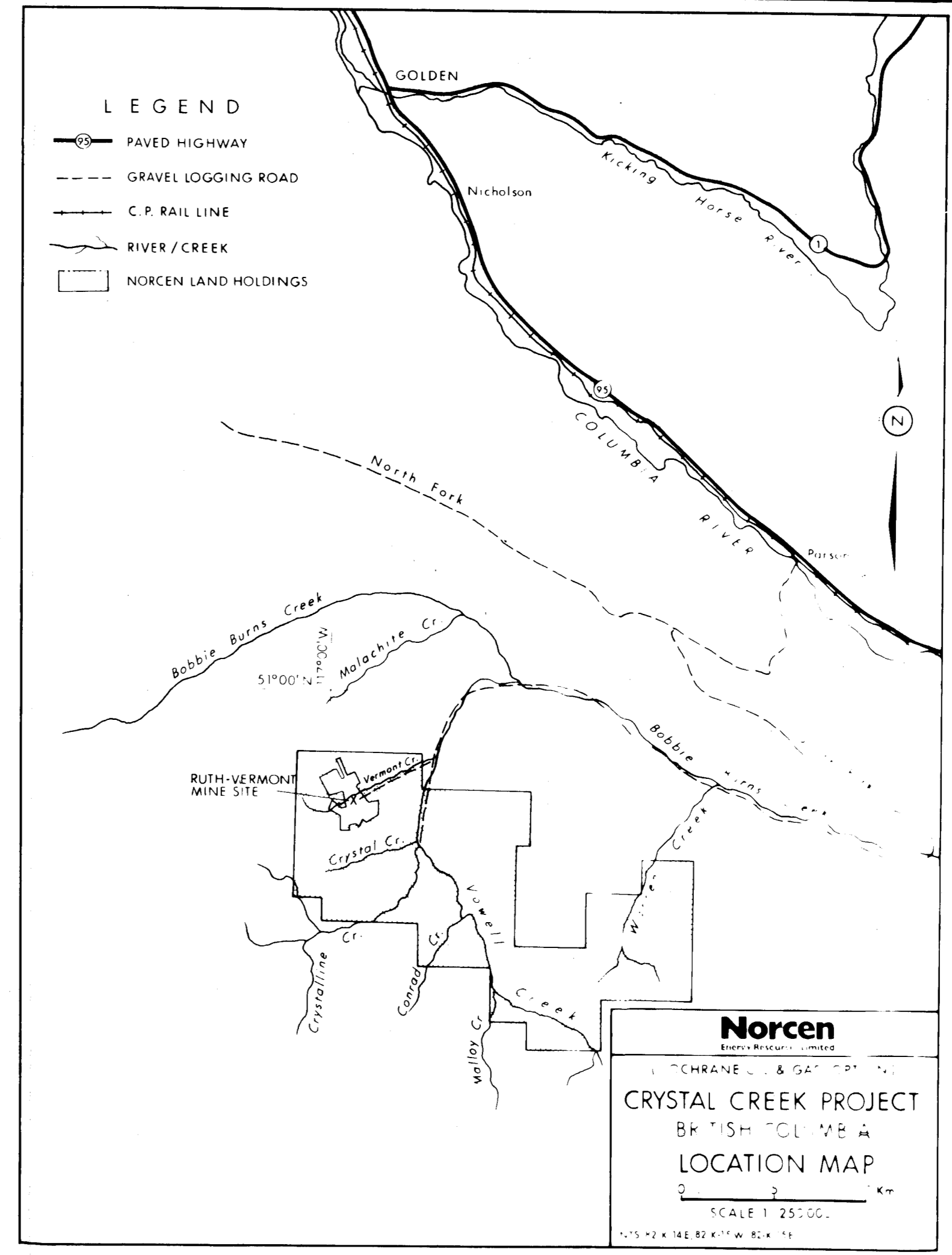
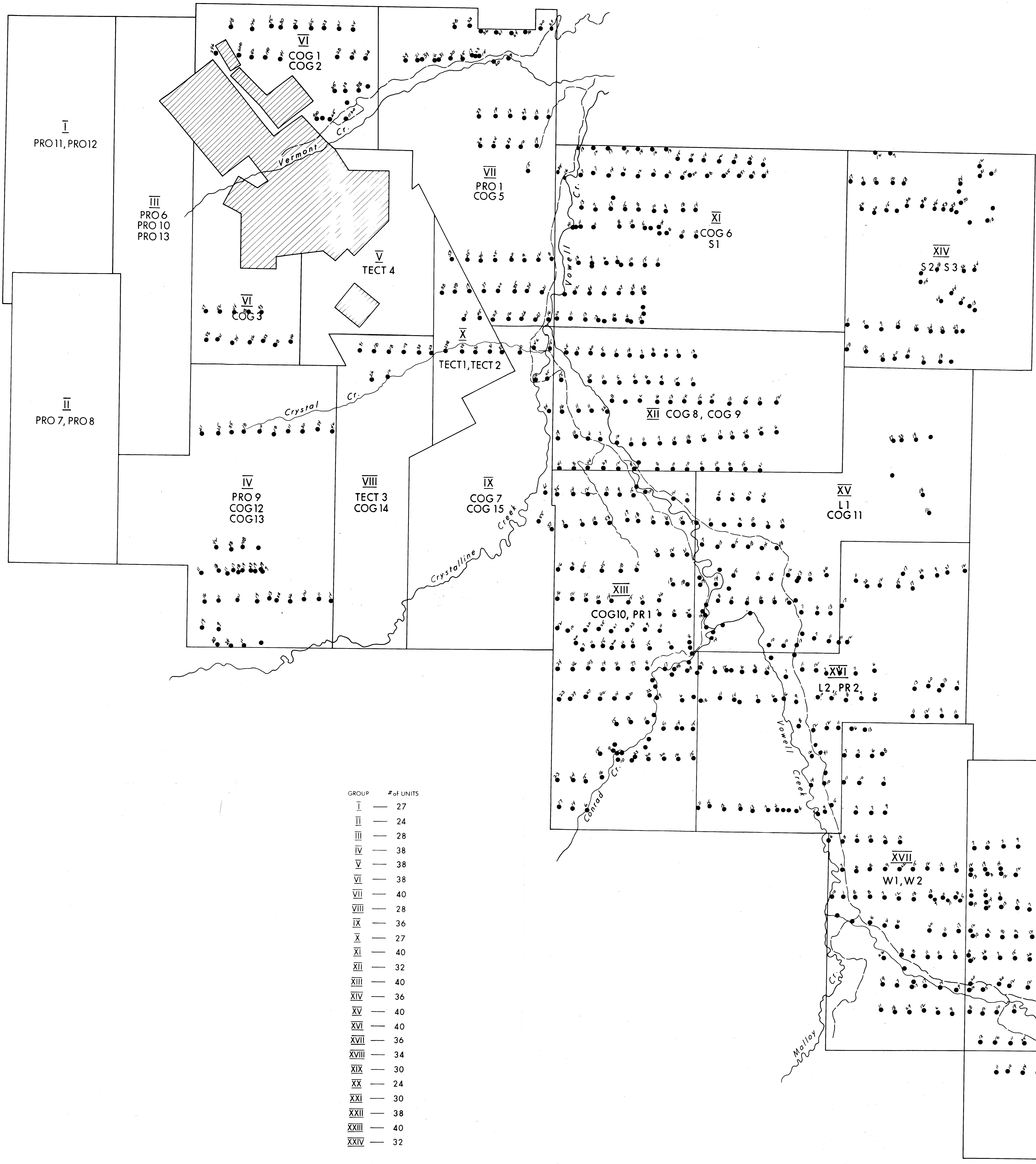


GROUP	# of UNITS
I	27
II	24
III	28
IV	38
V	38
VI	38
VII	40
VIII	28
IX	36
X	27
XI	40
XII	32
XIII	40
XIV	36
XV	40
XVI	40
XVII	36
XVIII	34
XIX	30
XX	24
XXI	30
XXII	38
XXIII	40
XXIV	32

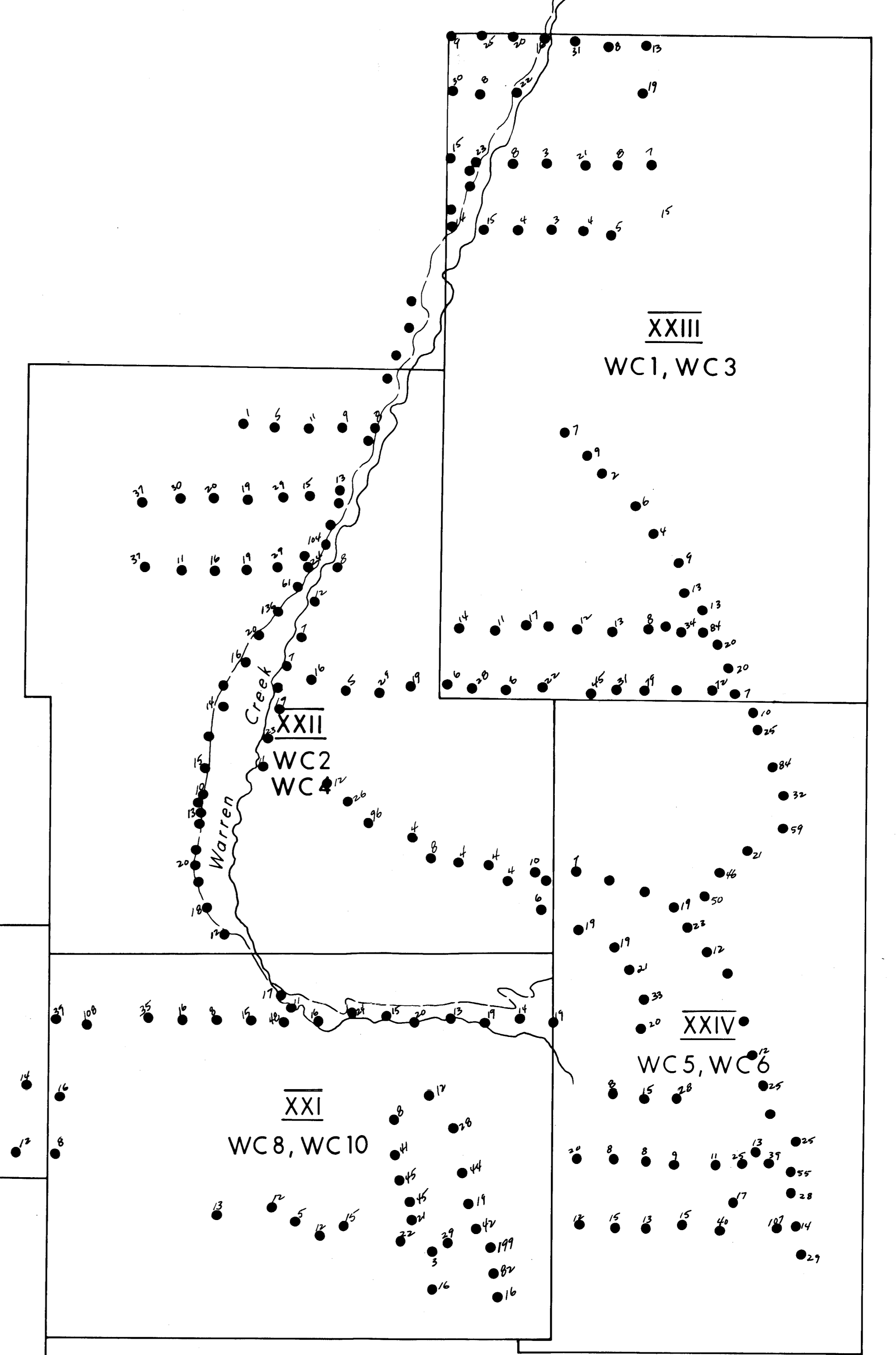


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 part 2 of  
**Norcen**  
 (COCHRANE OIL AND GAS OPTION)  
 CRYSTAL CREEK PROJECT  
 BRITISH COLUMBIA  
**Cu content in soils (ppm)**

0 1km  
 NTS 82-K-14E, 15W, 15E Scale 1:20,000 JUNE, 1980



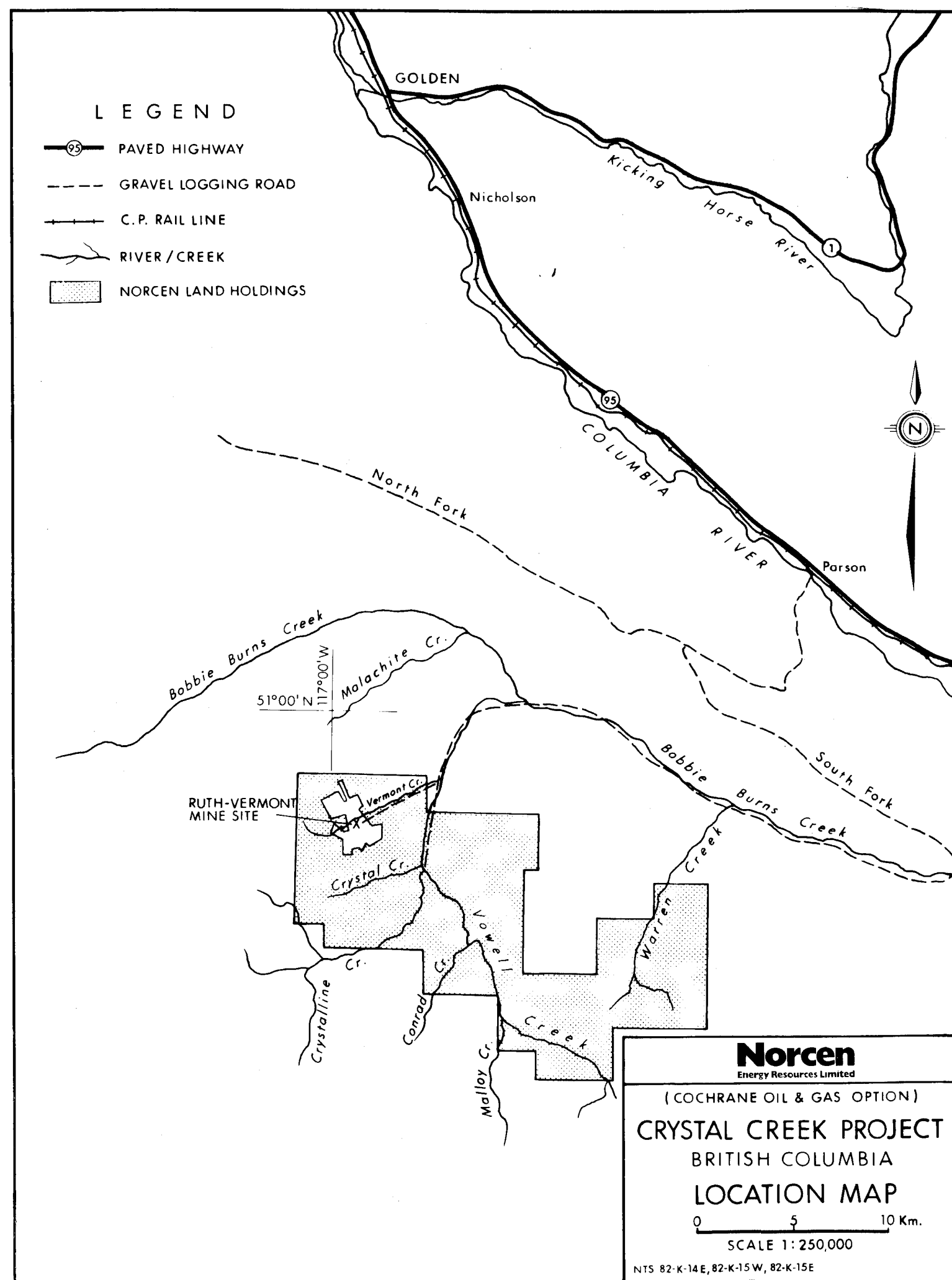
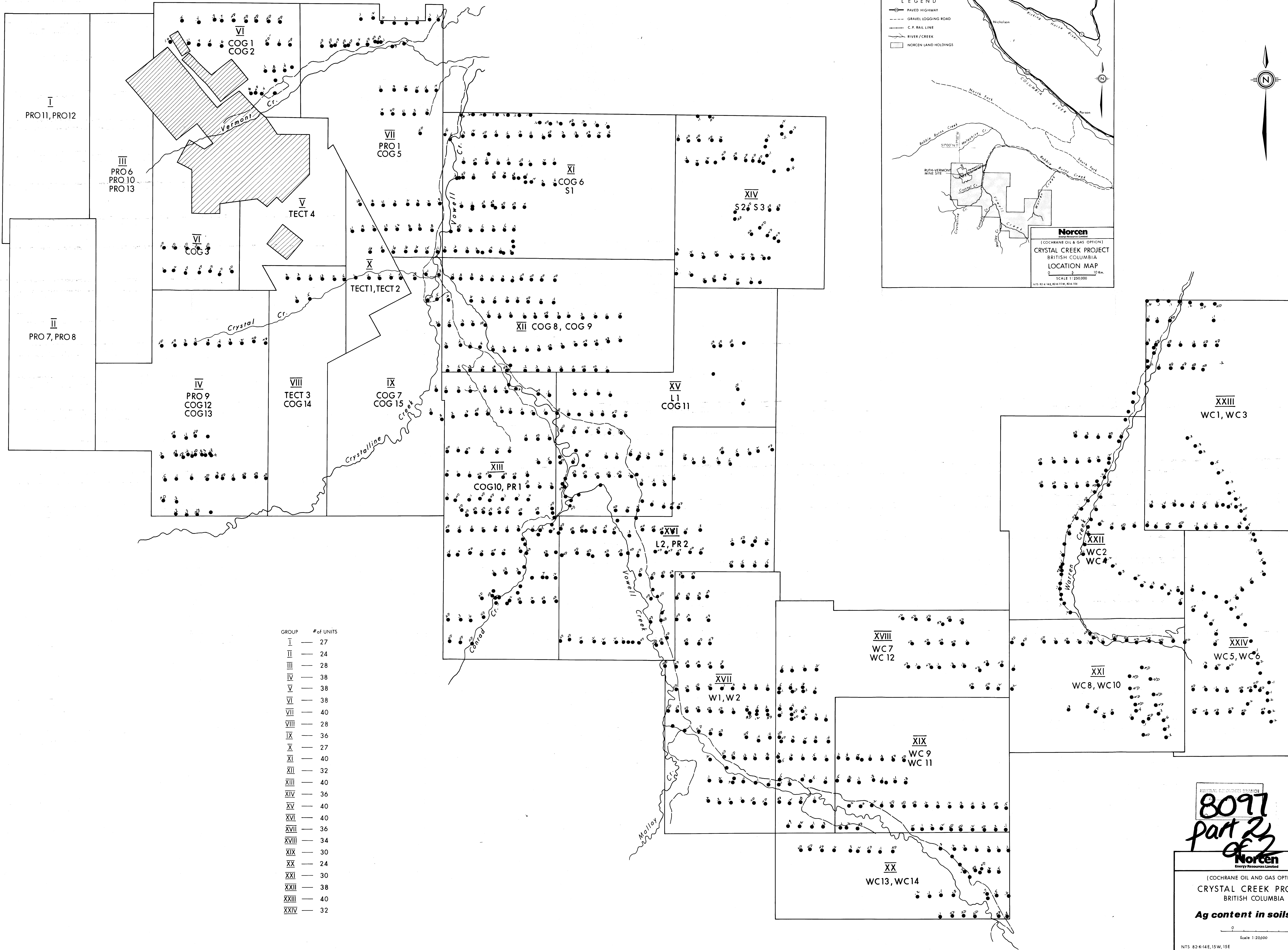
GROUP	# of UNITS
I	27
II	24
III	28
IV	38
V	38
VI	38
VII	40
VIII	28
IX	36
X	27
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XII	32
XIII	40
XIV	36
XV	40
XVI	40
XVII	36
XVIII	34
XIX	30
XX	24
XXI	30
XXII	38
XXIII	40
XXIV	32



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BRITISH COLUMBIA  
**Pb content in soils (ppm)**  
Scale 1:20,000  
NTS 82-K14E, 15W, 15E  
JUNE, 1980



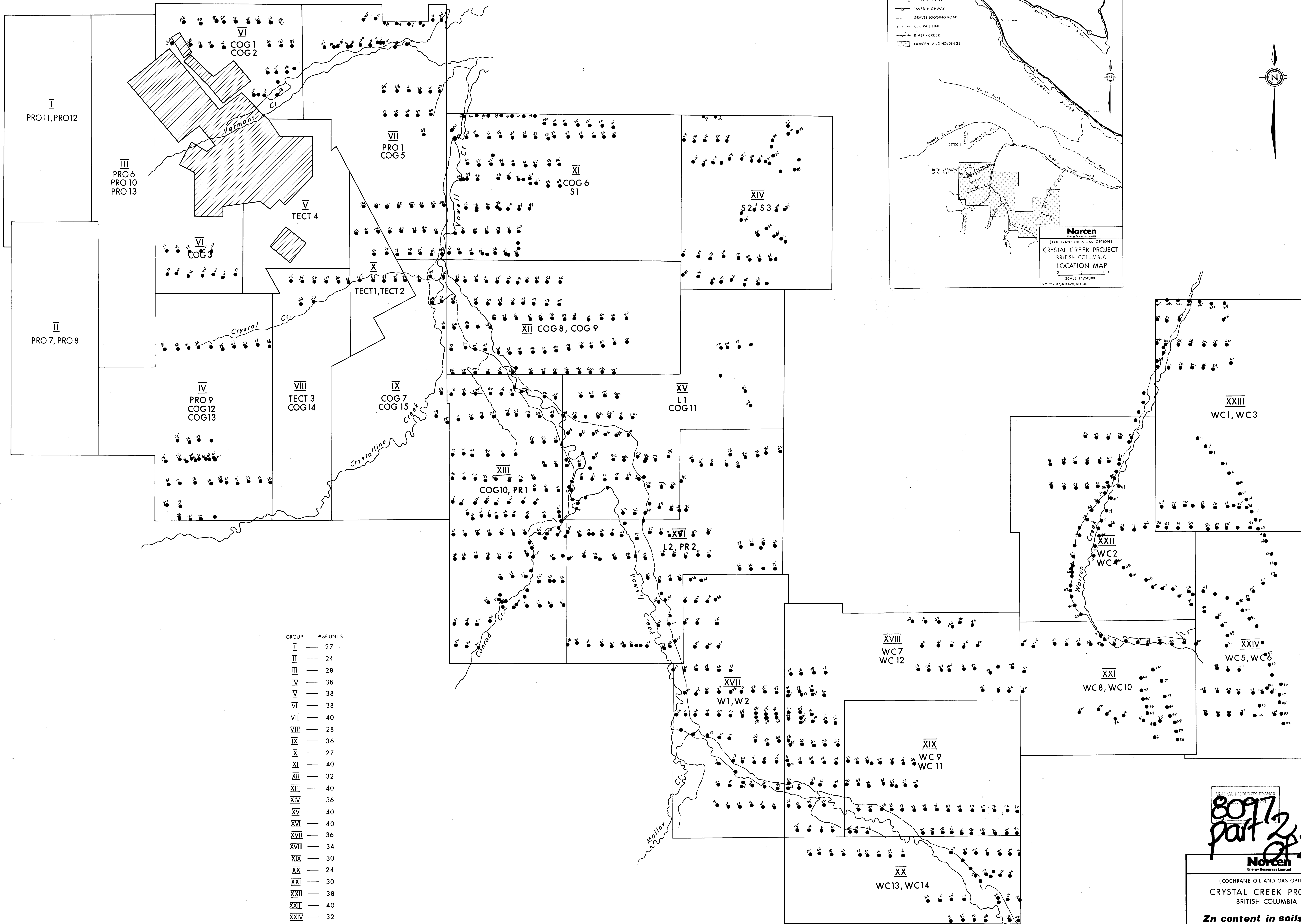


GROUP	# of UNITS
I	27
II	24
III	28
IV	38
V	38
VI	38
VII	40
VIII	28
IX	36
X	27
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XII	32
XIII	40
XIV	36
XV	40
XVI	40
XVII	36
XVIII	34
XIX	30
XX	24
XXI	30
XXII	38
XXIII	40
XXIV	32

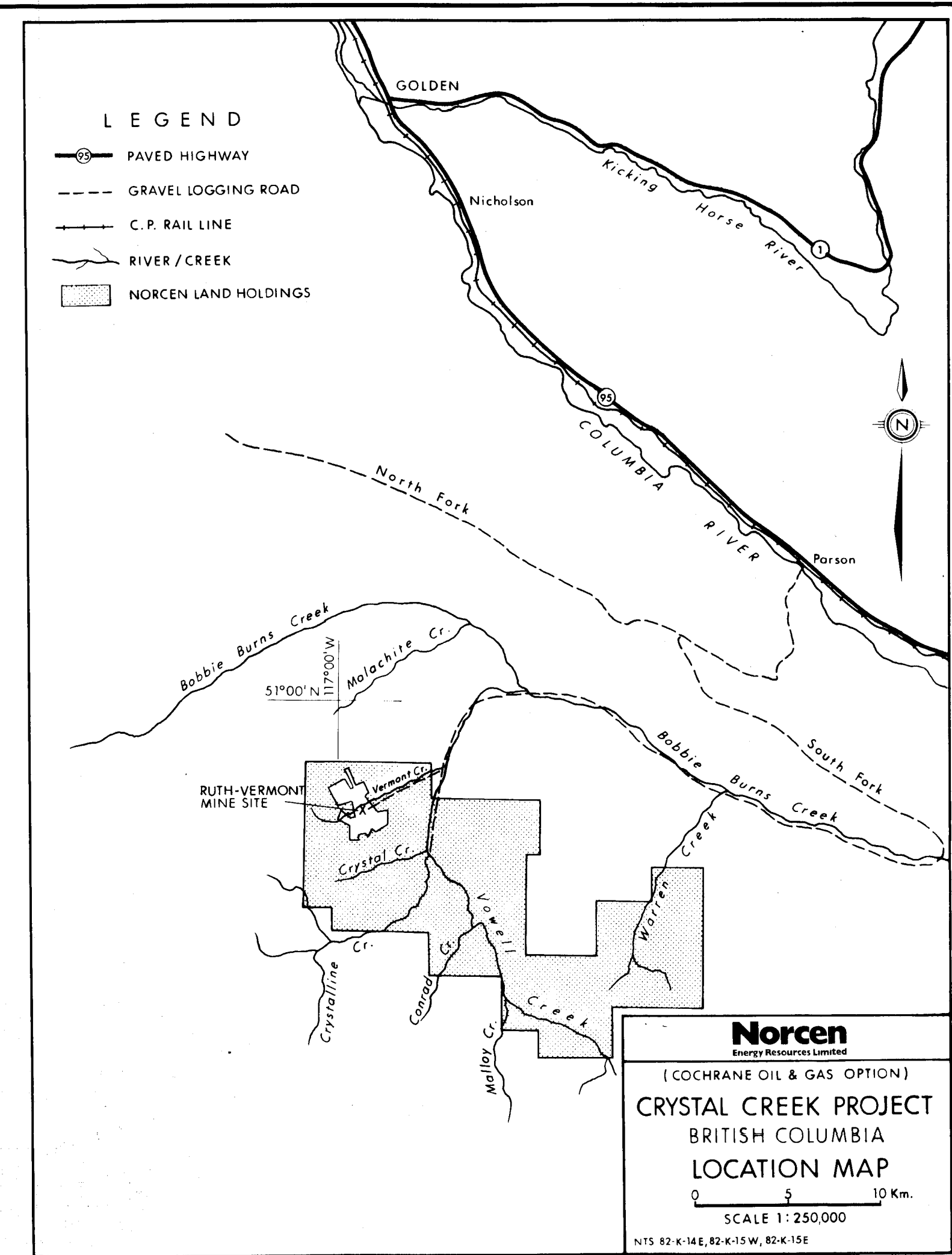
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**CRYSTAL CREEK PROJECT**  
BRITISH COLUMBIA  
**Ag content in soils (ppm)**

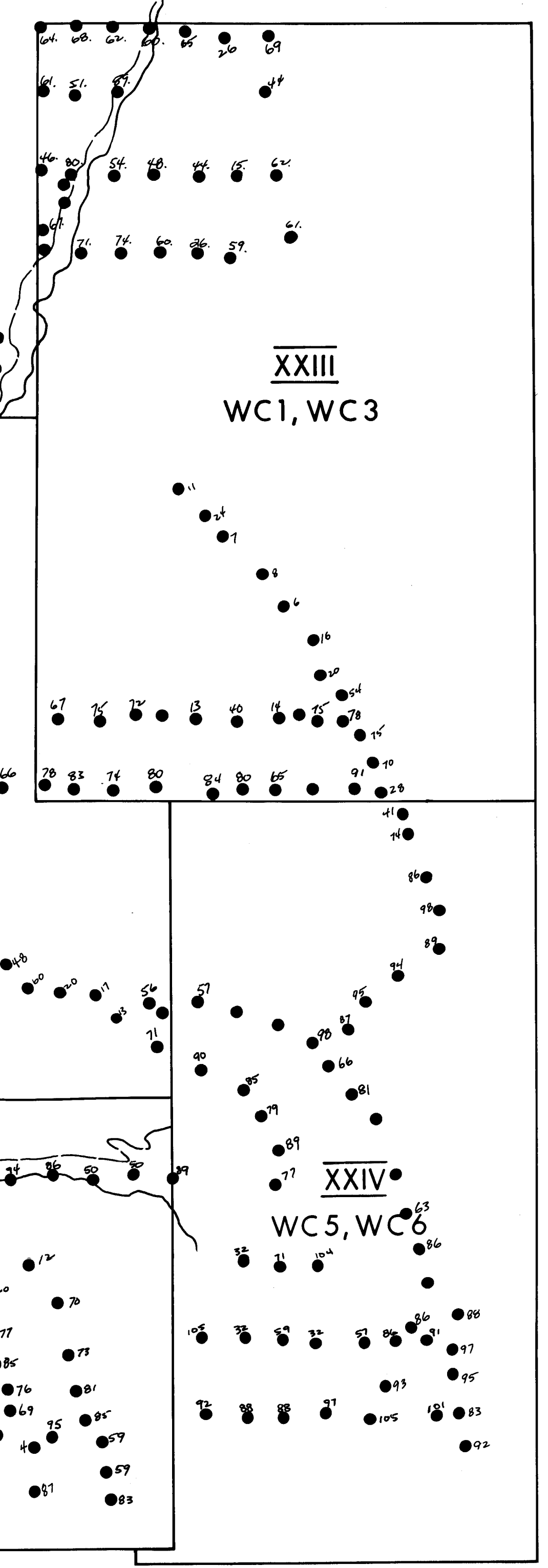
Scale 1:25000  
NTS 82-K-14E, 15W, 15E  
JUNE, 1980



GROUP	# of UNITS
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II	24
III	28
IV	38
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VII	40
VIII	28
IX	36
X	27
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XIII	40
XIV	36
XV	40
XVI	40
XVII	36
XVIII	34
XIX	30
XX	24
XXI	30
XXII	38
XXIII	40
XXIV	32



**Norcen**  
 (COCHRANE OIL & GAS OPTION)  
**CRYSTAL CREEK PROJECT**  
 BRITISH COLUMBIA  
 LOCATION MAP  
 SCALE 1:250,000  
 NTS 82-K-14E, 15W, 15E



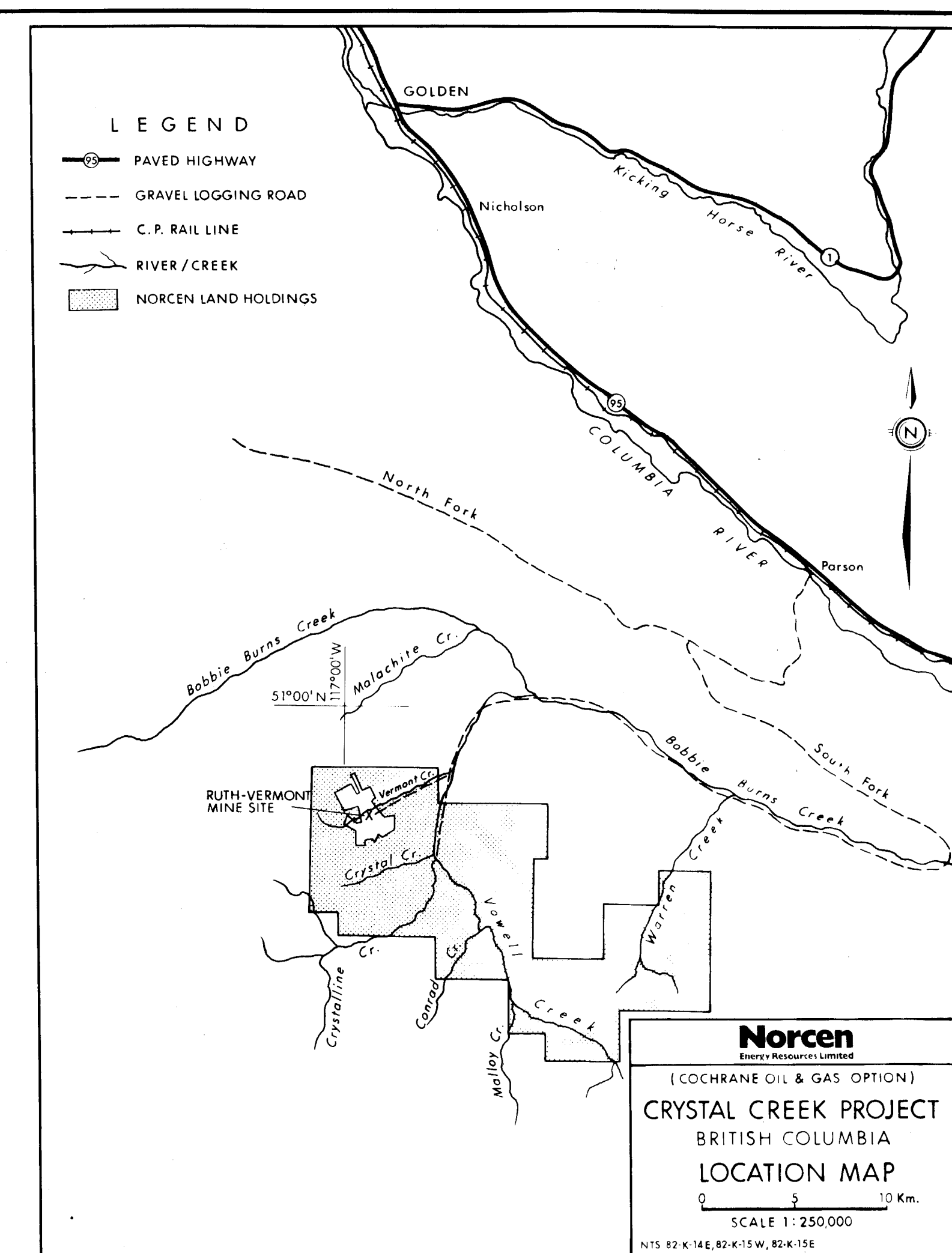
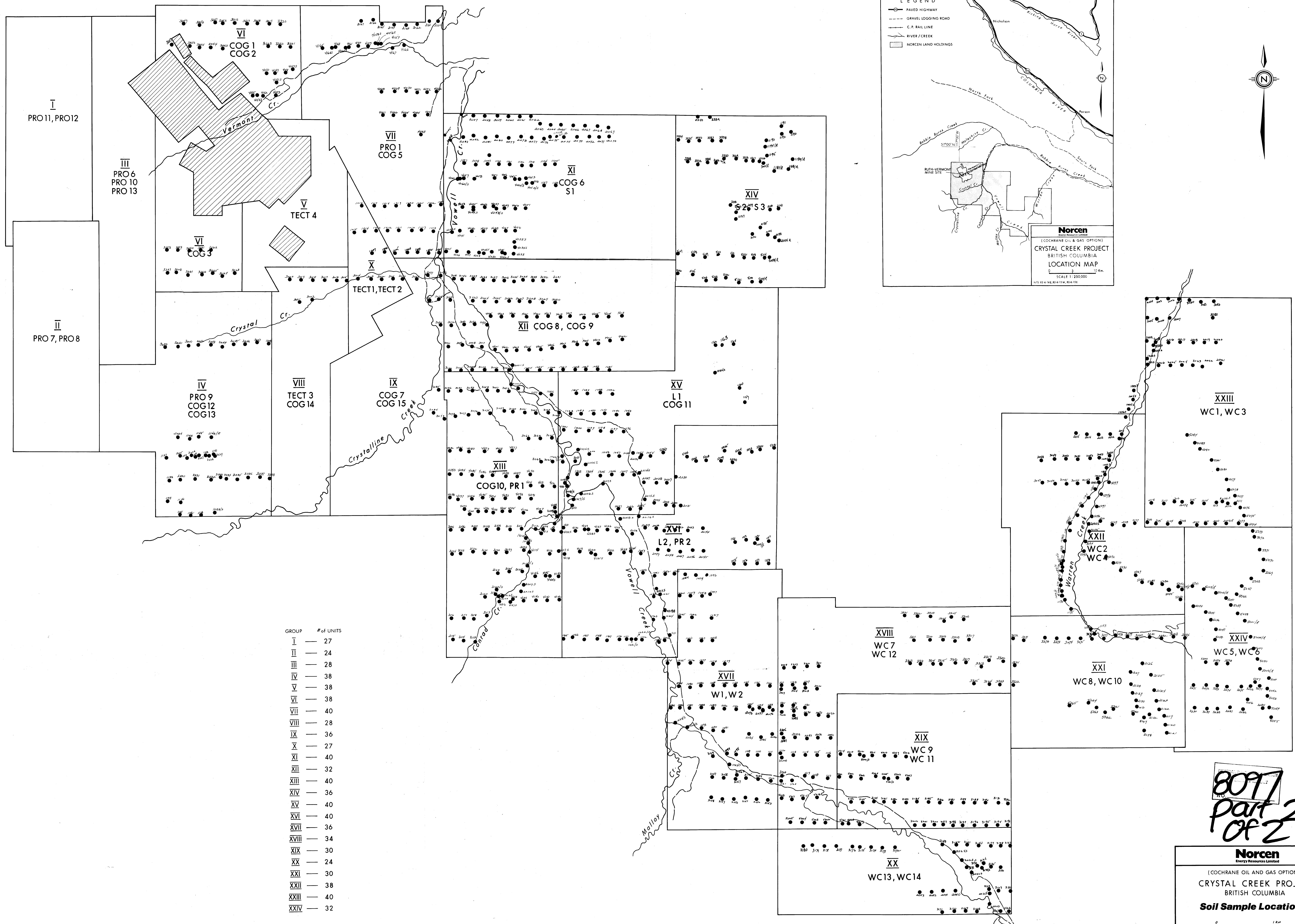
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 part 2 of 2

**Norcen**  
 Energy Resources Limited

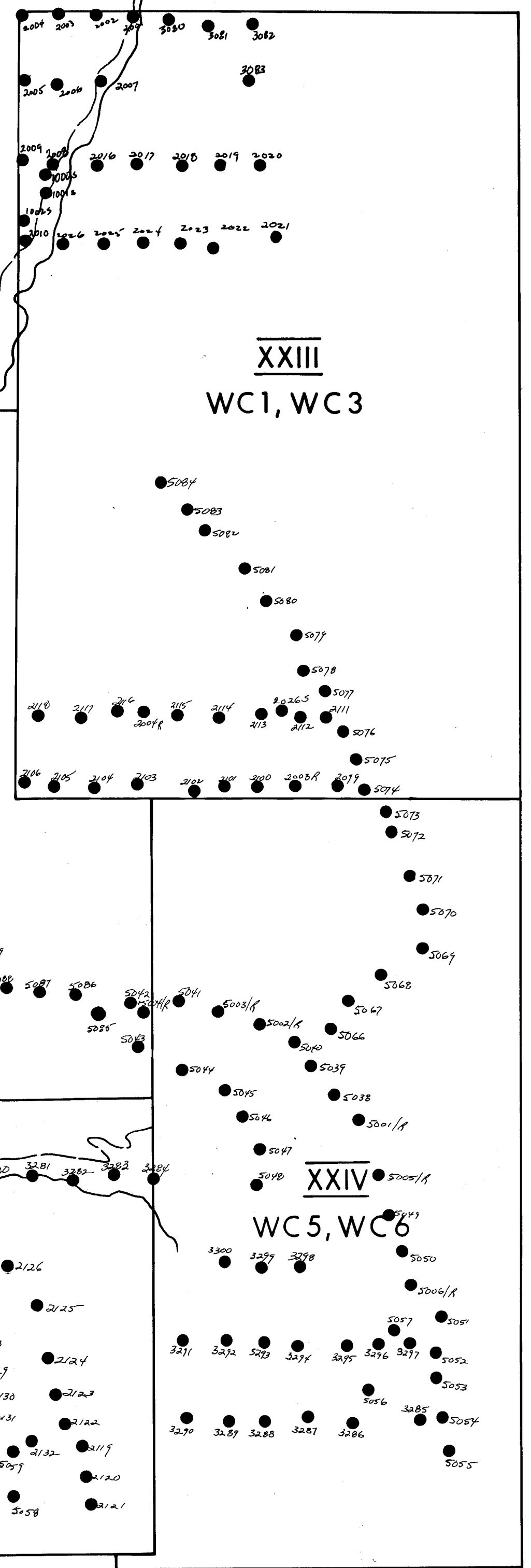
(COCHRANE OIL AND GAS OPTION)  
**CRYSTAL CREEK PROJECT**  
 BRITISH COLUMBIA

**Zn content in soils (ppm)**

Scale 1:20000  
 NTS 82-K-14E, 15W, 15E  
 JUNE, 1980



GROUP	# of UNITS
I	27
II	24
III	28
IV	38
V	38
VI	38
VII	40
VIII	28
IX	36
X	27
XI	40
XII	32
XIII	40
XIV	36
XV	40
XVI	40
XVII	36
XVIII	34
XIX	30
XX	24
XXI	30
XXII	38
XXIII	40
XXIV	32



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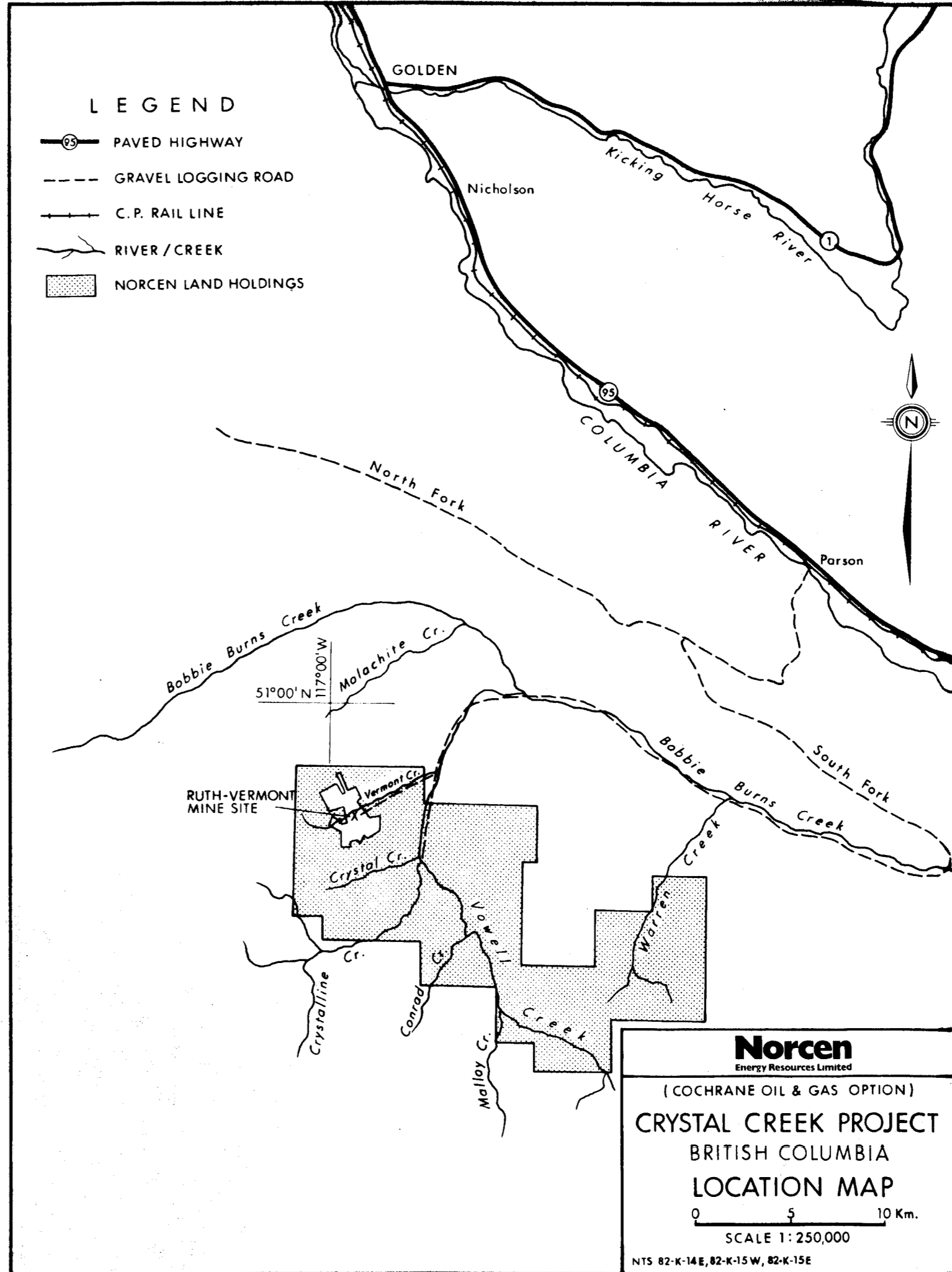
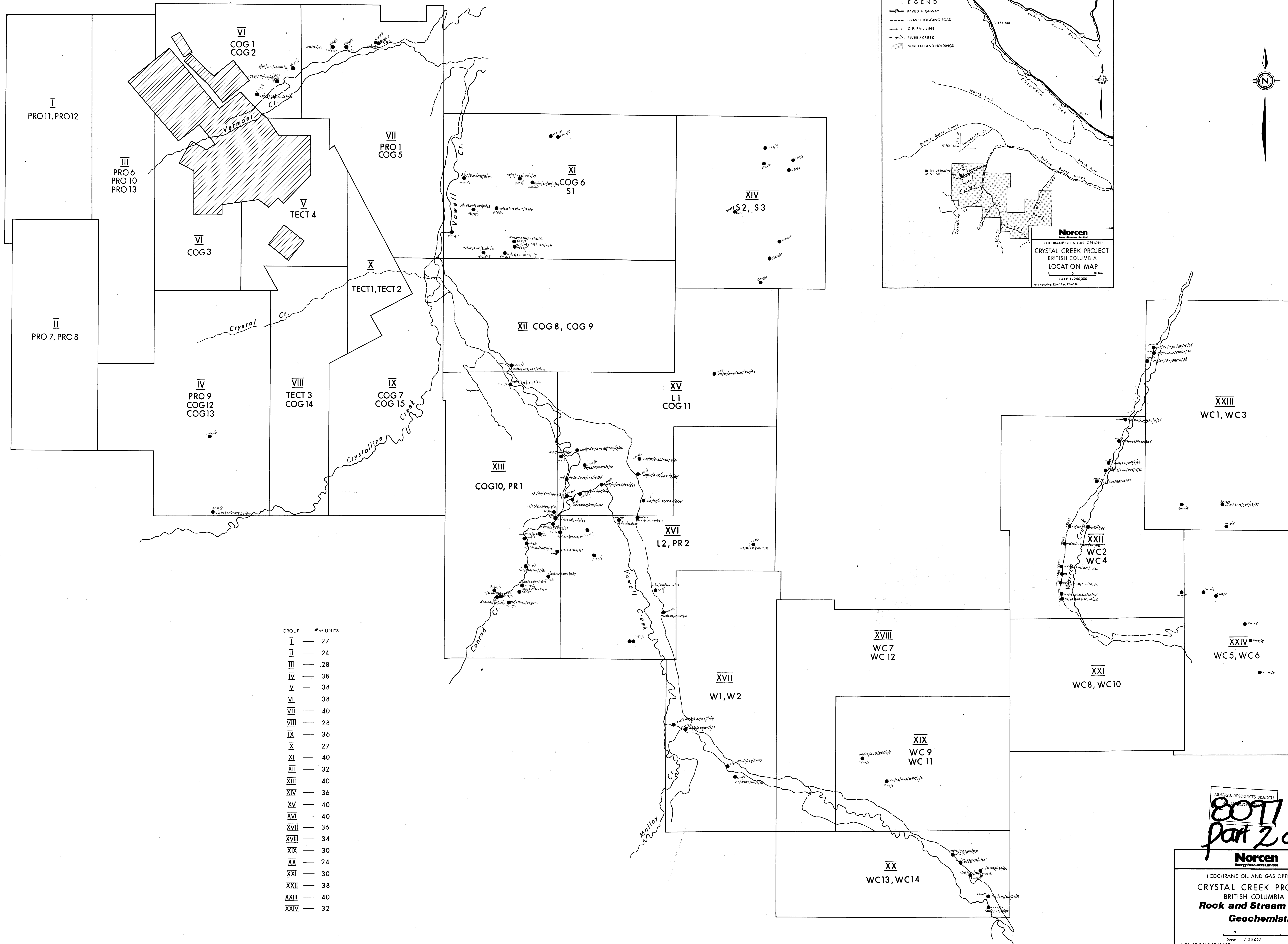
**Norcen**  
Energy Resources Limited

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

**Soil Sample Locations**

Scale 1:20,000

NTS 82-K-14E, 15W, 15E      JUNE, 1980



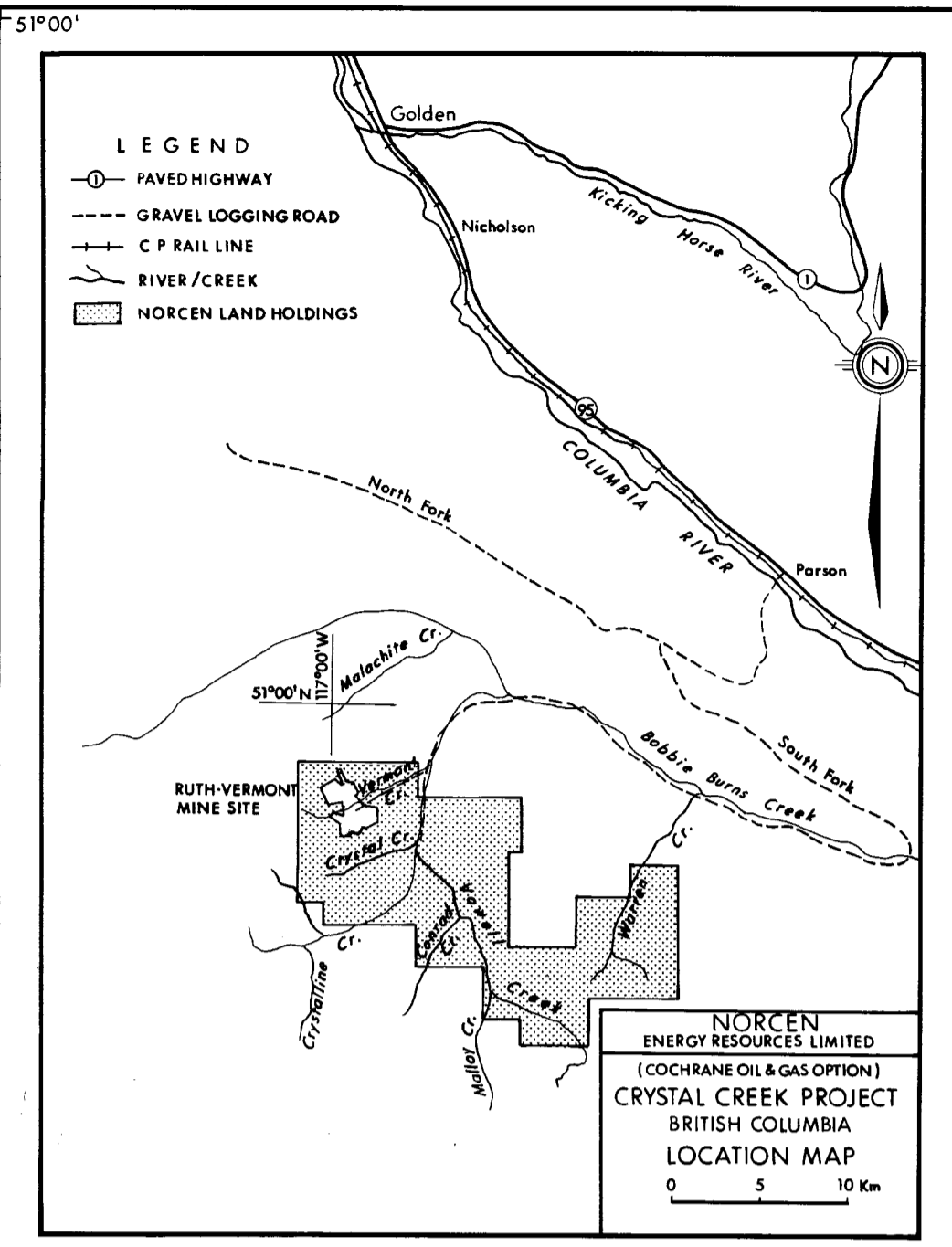
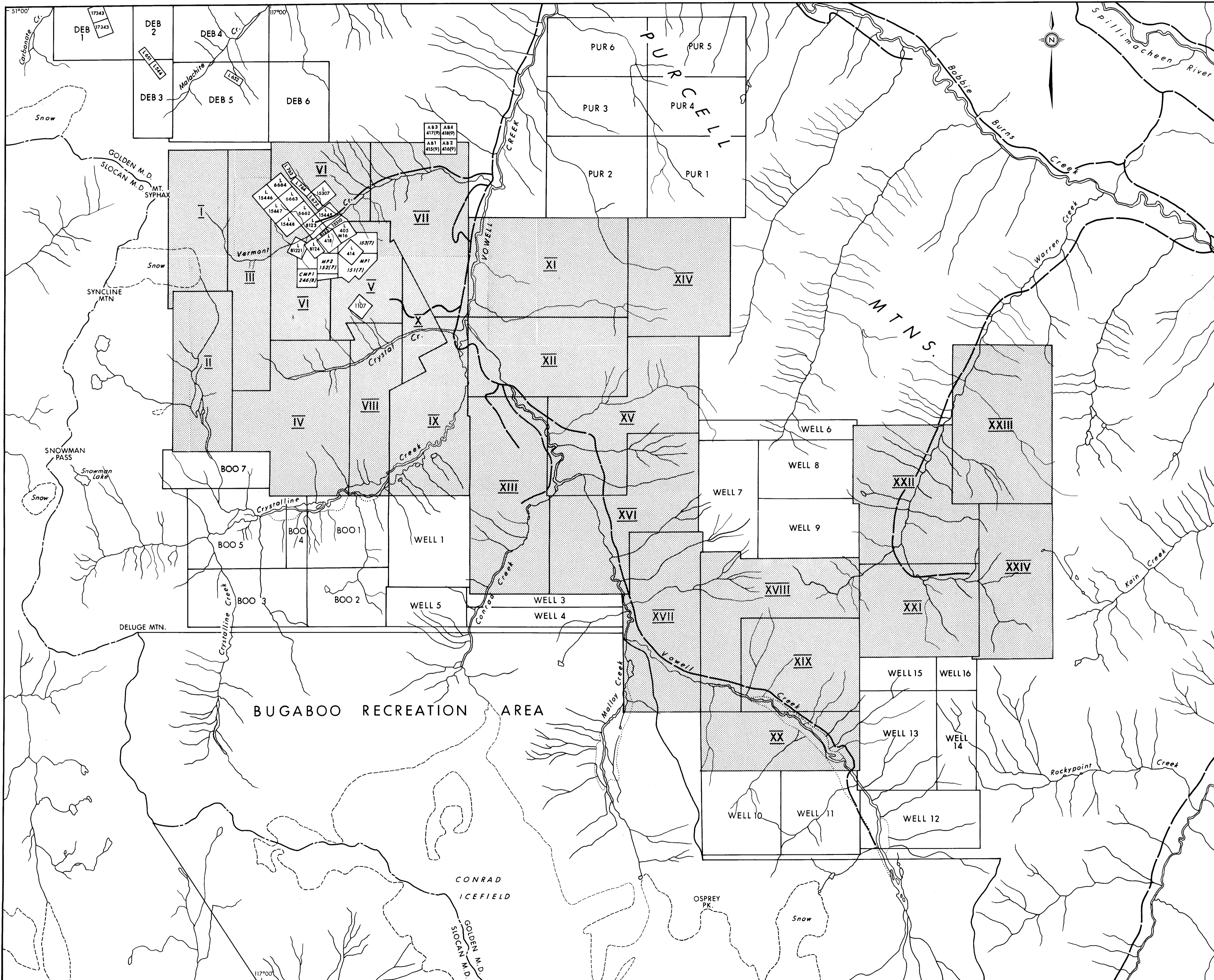
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(COCHRANE OIL AND GAS OPTION)  
**CRYSTAL CREEK PROJECT**  
BRITISH COLUMBIA  
**Rock and Stream Sediment  
Geochemistry**

Scale 1:20,000  
NTS 82-K-14E, 15W, 15E  
JUNE, 1980



GROUP	Number of units
I	27
II	24
III	37
IV	38
V	38
VI	38
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VIII	28
IX	36
X	27
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XII	32
XIII	40
XIV	36
XV	40
XVI	40
XVII	36
XVIII	34
XIX	30
XX	24
XXI	30
XXII	38
XXIII	40
XXIV	32
<b>TOTAL</b>	<b>825</b>

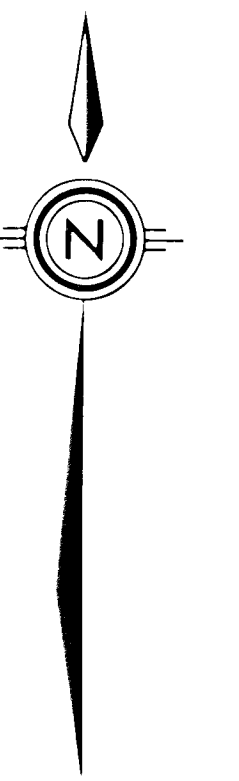
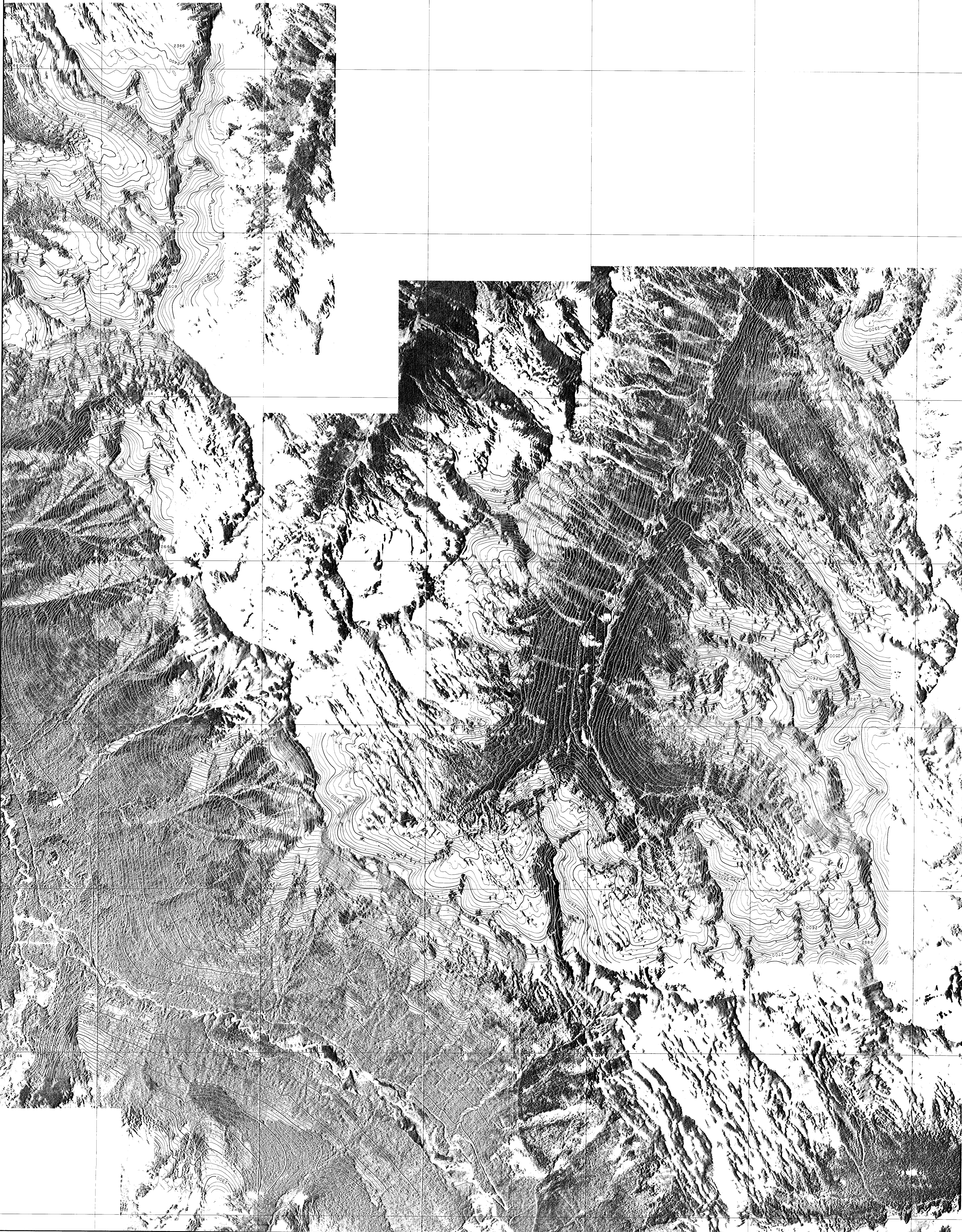
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NORCEN LAND HOLDINGS  
TRUCK ROAD

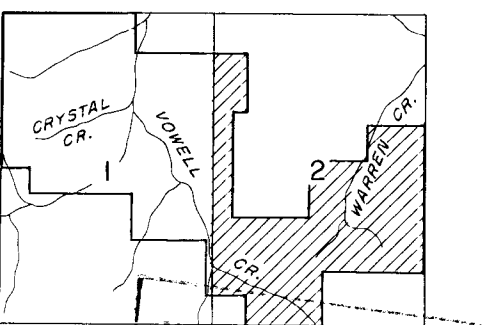
**Norcen**  
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**CRYSTAL CREEK PROJECT**  
BRITISH COLUMBIA  
**LAND HOLDINGS MAP**

SCALE IN KILOMETRES  
0 1 2 3



SHEET INDEX



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NORCEN  
ENERGY RESOURCES LIMITED

**CRYSTAL CREEK PROJECT**  
BRITISH COLUMBIA

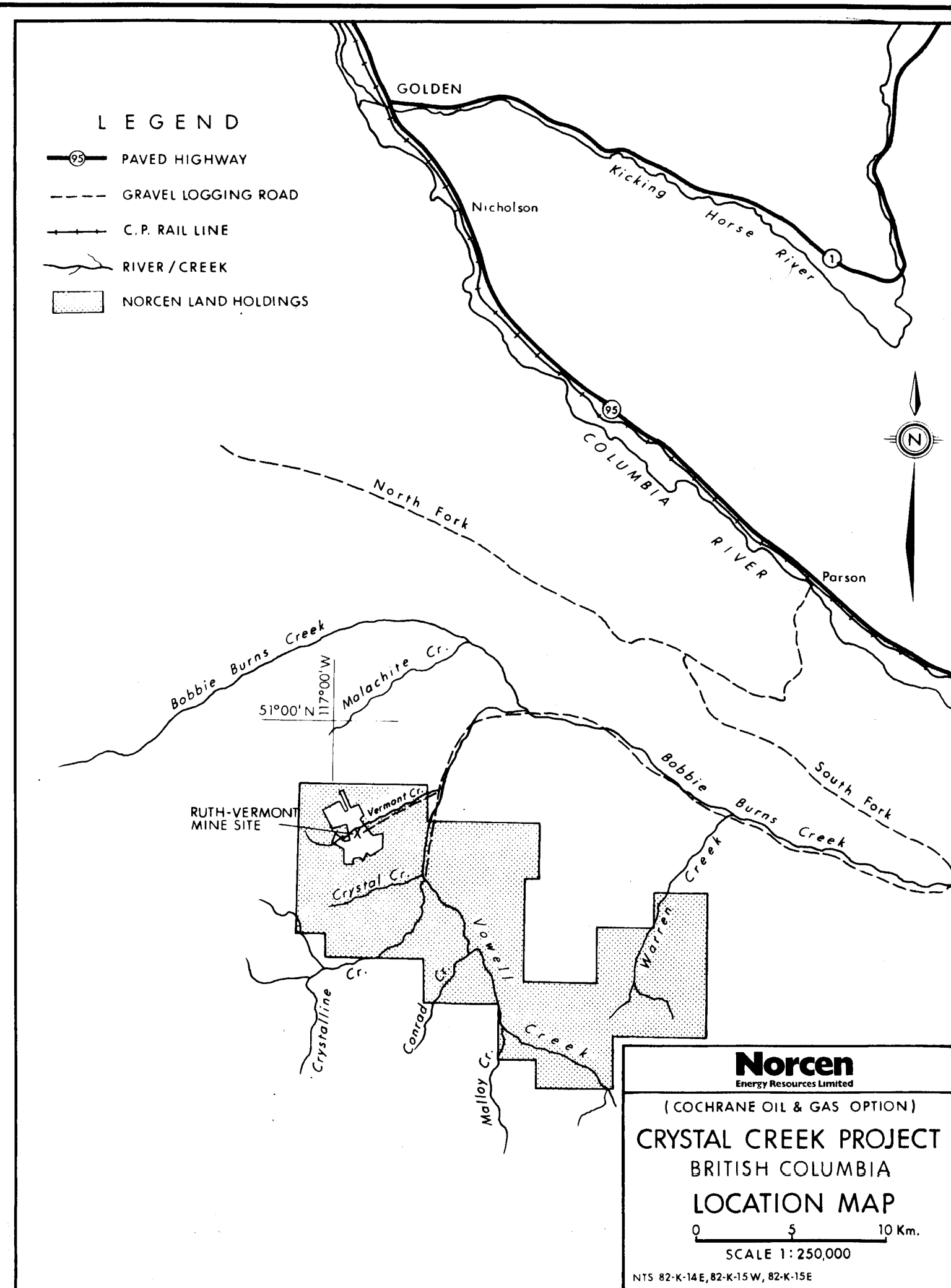
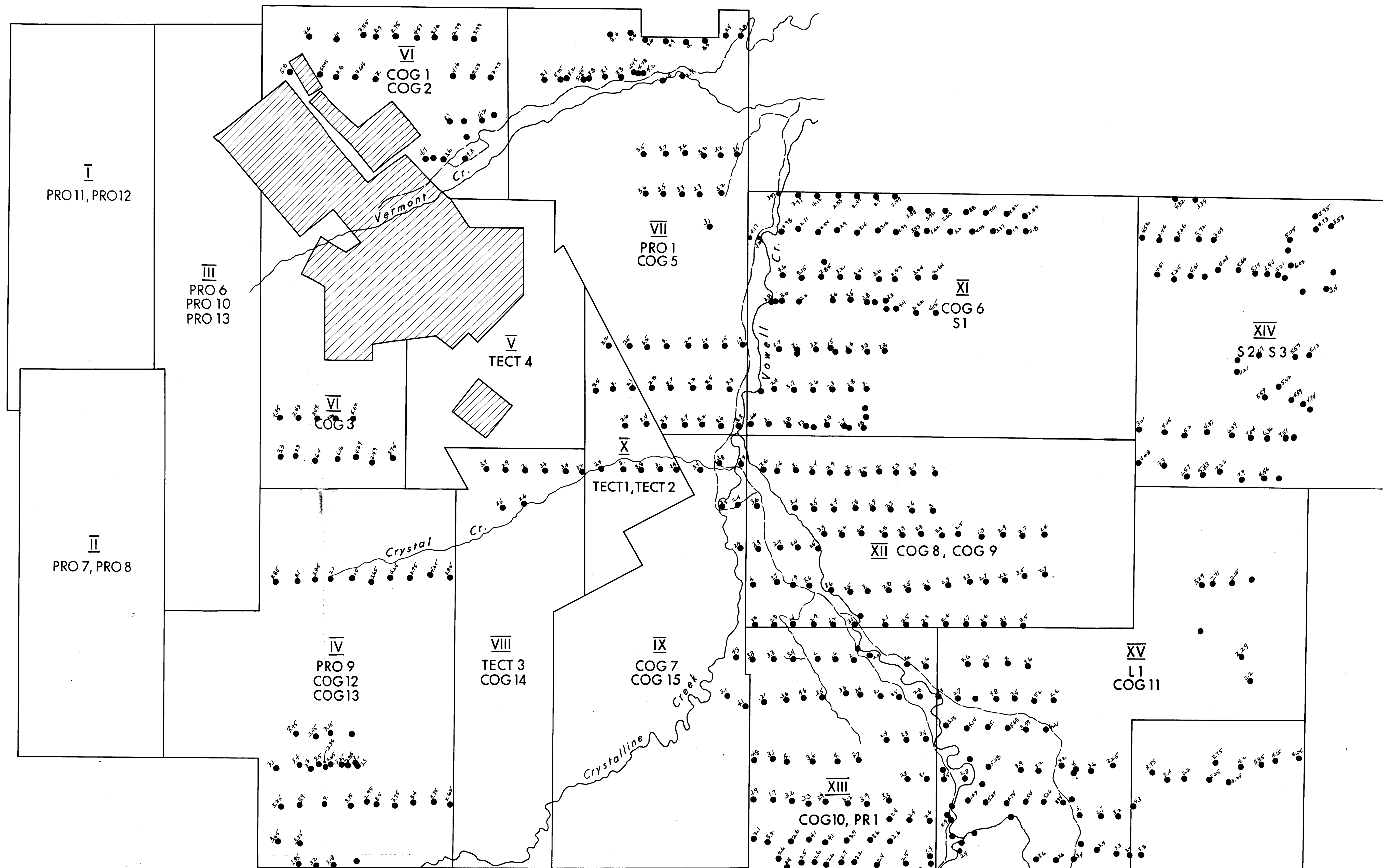
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METRES METRES

1 : 20 000  
CONTOUR INTERVAL 20 METRES

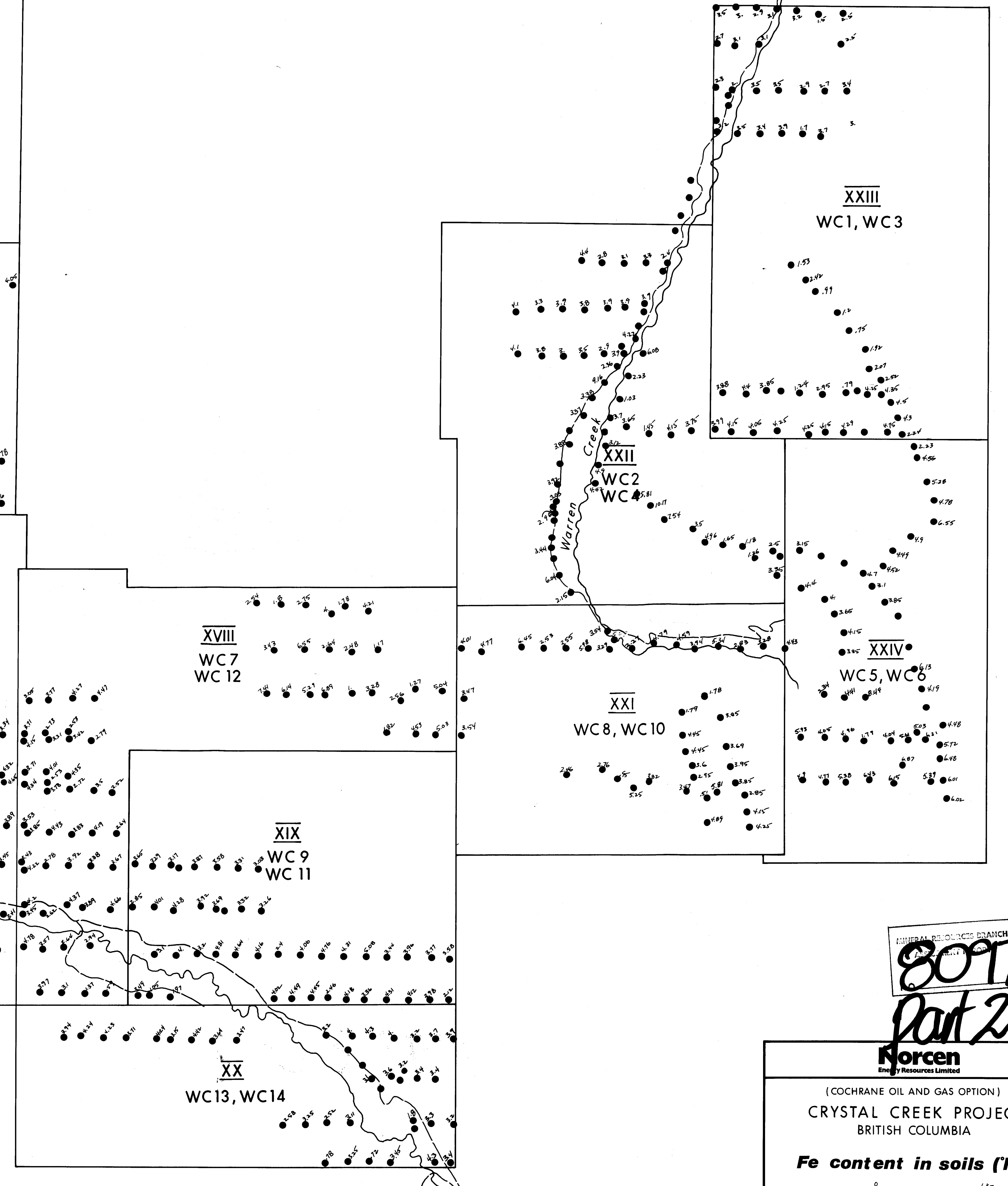
AERIAL PHOTOGRAPHY BY GOVT. OF CANADA, JULY 1976 CONTROL BY N.T.S. 82K, 1:250,000

 NORTH WEST SURVEY CORPORATION INTERNATIONAL LTD.

DRAWN BY R.A. DATE MAY 1980 CHECKED BY V.V. JOB NO. 80-142 SHEET 2 OF 2



GROUP	# of UNITS
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XVII	36
XVIII	34
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XXIII	40
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Part 2 of 2

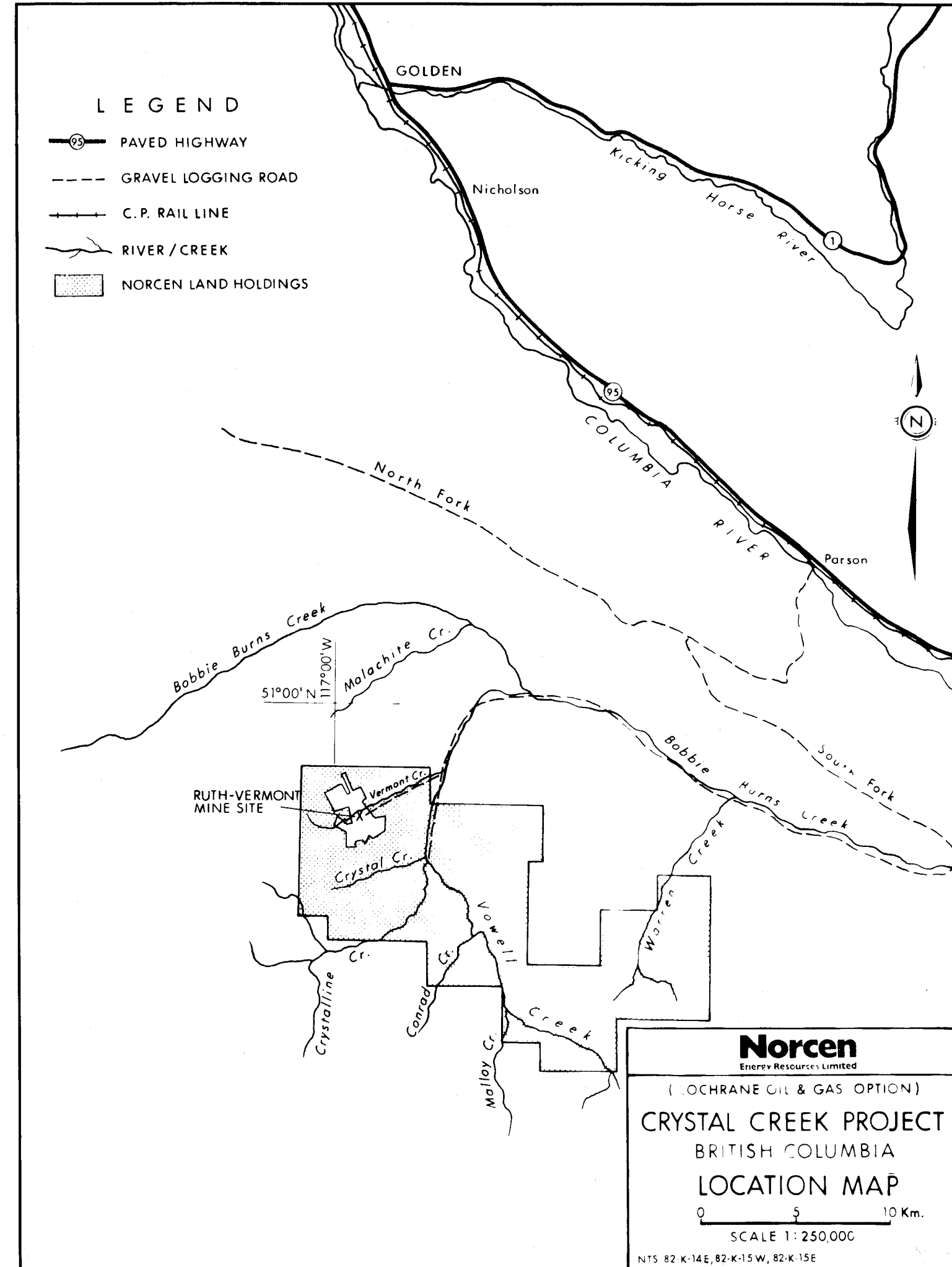
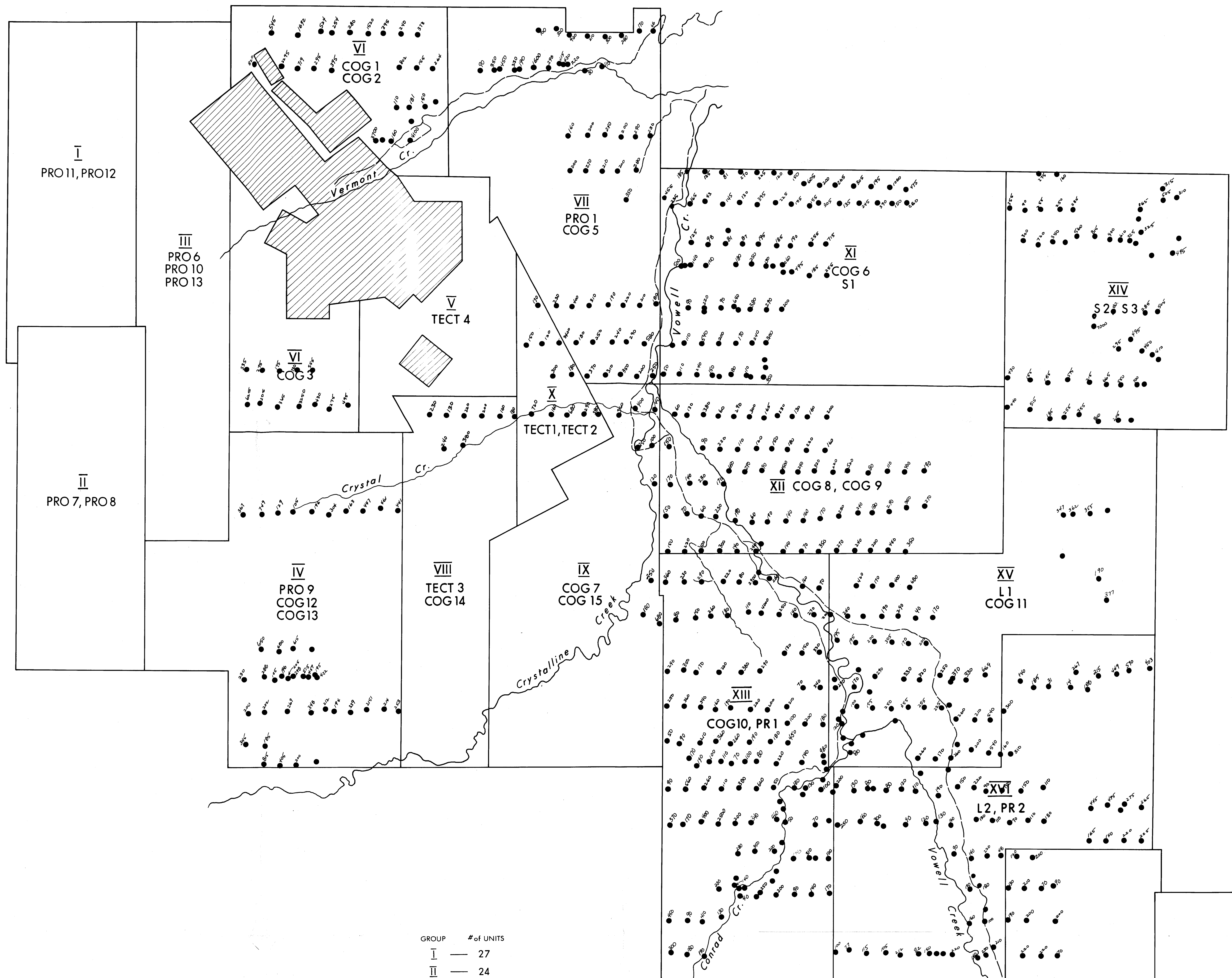
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CRYSTAL CREEK PROJECT  
BRITISH COLUMBIA

**Fe content in soils (I.)**

Scale 1:50,000

NTS 82-K-14E, 15W, 15E JUNE, 1980



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Energy Resources Limited

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

**Mn content in soils  
(ppm)**

Scale 1:20,000  
NTS 82-K-14E, 15W, 15E  
JUNE, 1980