

COMINCO LTD.

EXPLORATION
NTS: 94F/11E and W

WESTERN DISTRICT

ASSESSMENT REPORT

GEOLOGY, GEOCHEMISTRY

SOUTH KWAD PROPERTY

OMINECA M.D., BRITISH COLUMBIA

LATITUDE: 57°37'N; LONGITUDE: 125°17'W

WORK PERIOD: JUNE 13 TO JULY 15, 1981

part 1 of 2

9727

OCTOBER 1981

B.C. WATERS

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NTS: 94F/11E & W

WESTERN DISTRICT
13 October 1981

ASSESSMENT REPORT

GEOLOGY, GEOCHEMISTRY

SOUTH KWAD PROPERTY

OMINECA M.D., BRITISH COLUMBIA

I. SUMMARY

The South Kwad claim group which lies in the Omineca Mining District is located around 300 km NW of Mackenzie (B.C.) east of the Finlay River and south of the Kwadacha Wilderness Park. The property is composed of 211 units in 15 claim blocks 100% owned by Cominco Ltd. and staked during 1979 and 1980.

Exploration during 1981 from June 13 to July 15 involved the cutting of extensions to base lines A and B and of a new base line C, collection of soil and silt samples (2143) and rock samples (90) for geochemical analysis, and the geological mapping of the 50 km² area at a scale of 1:5,000. Total expenditure on the South Kwad group is estimated at \$58,765.

The geological mapping has further defined the regionally mineralized (Cirque, Driftpile, etc.) Mid to Upper Devonian "Gunsteel" baritic shale stratigraphy in two adjoining easterly thrusting wedges across the centre of the claims. Prospecting and geochemistry as a follow-up to the anomalies detected in 1980 has not resulted in the location of any sulphide mineralization on the property.

II. INTRODUCTION

A. Location

The Kwadacha area lies in the Omineca Mining District of B.C. around 30 km east of the Finlay River and about 300 km NW of the town of Mackenzie (Plate 8). The South Kwad claim group (Plate 9), around 7 km SE of Mt. Alcock, is immediately to the south of the Kwadacha Wilderness Park and is bounded to the north by the Kwadacha River. The centre of the claim group lies at Latitude 57° 37' and Longitude 125° 17' W on NTS 94F/11W.

Field work was carried out from a camp located on the property with helicopter support from a Bell 206B which was based at Sikanni Chief Lake, 80 km to the SE and supplied by float aircraft from Mackenzie.

The topography of the area is mainly mountainous with peaks averaging 2000 m, but to the NW are flat swamps associated with the terraces

2.

of the Kwadacha River. Thick spruce cover and consequent deep deadfall limits exposure below the 1600 m tree line to creeks and river cuts, but outcrop above is around 10%.

B. History and Previous Exploration

The claims Kwad #1-8 located and recorded in November, 1979 and comprising 143 units were granted following the cancellation (December, 1980) of several pre-existing, but improperly located claims.

During 1980 geological mapping at a scale of 1:10,000 and soil geochemical samples (625) collected at 25 m intervals on two 5 km base lines, with cross-line separation varying from 200 m to 500 m, produced several anomalies in Ba, Pb and Zn across Devonian "Gunsteel" baritic shales. These encouraging results lead to the staking of an additional 7 claims (Kwad 19-25) totalling 68 units in October, 1980 bringing the size of the group as a whole to 211 units.

C. Ownership

The South Kwad group is 100% owned by Cominco Ltd. Details of the claims are listed in Table 1.

Table 1

List of Claims - South Kwad Group

<u>Claim No.</u>	<u>Record No.</u>	<u>No. of Units</u>	<u>Recording Date</u>
Kwad 1	2335	20	Nov. 8, 1979
Kwad 2	2336	20	Nov. 8, 1979
Kwad 3	2337	20	Nov. 8, 1979
Kwad 4	2338	20	Nov. 8, 1979
Kwad 5	2339	5	Nov. 8, 1979
Kwad 6	2340	20	Nov. 8, 1979
Kwad 7	2341	20	Nov. 8, 1979
Kwad 8	2342	18	Nov. 8, 1979
Kwad 19	3310	15	Oct. 10, 1980
Kwad 20	3311	9	Oct. 10, 1980
Kwad 21	3312	12	Oct. 10, 1980
Kwad 22	3313	3	Oct. 10, 1980
Kwad 23	3314	4	Oct. 10, 1980
Kwad 24	3315	15	Oct. 10, 1980
Kwad 25	3316	10	Oct. 10, 1980

III. EXPLORATION

The 1981 exploration program from June 13 to July 15 involved the collection of soil geochemical samples from 60 compass and chain surveyed cross lines on two base lines across the centre of the property and the sampling of silts from the creeks draining the eastern and western flanks. Rock geochemical samples were collected from many of the exposed Devonian shale sections.

3.

An additional 9 km of base line was cut and surveyed on the property, composed of a 5 km base line C to the west of base line A and extensions of base lines A and B north to the Kwadacha river.

Geological mapping and prospecting at a scale of 1:5,000 was conducted across the area using several enlargements from a 1:30,000 air-photo original as work sheets.

The program was carried out by B.C. Waters, B.A. 1977, assisted by A. Stanta, B.Sc. 1980, T. Adlington and C. Rayner.

IV. GEOLOGY

A. Geological Setting (from K.R. Pride Assessment Report 1980)

"A northwest trending belt of Devonian "Black Clastics" stratigraphy has been outlined by regional mapping programs conducted by the Geological Survey of Canada. The belt is located within the Rocky Mountain thrust and fold belt of the Columbian Orogen and is centered approximately 40 kilometers east of the Rocky Mountain Trench. The Devonian "Black Clastics" are continuous from the Ospika River, northwesterly to Braid Creek, a distance of 200 kilometers. This belt is part of the northwest trending Kechika Trough which may represent a southeasterly extension of the larger Selwyn Basin.

The Devonian "Black Clastics" succession is divisible into a lower proximal to distal turbidite assemblage formally named the Besa River Formation, which is the basinal equivalent of the Devonian Dunedin Formation platformal carbonates, and an upper division of silver-blue-grey weathering argillite, chert and pyritic carbonaceous black shale informally named the Gunsteel Formation.

The Gunsteel Formation hosts four significant, stratiform barite-lead-zinc occurrences, namely: Driftpile Creek, Mount Alcock, Cirque and Elf. These occurrences are comparable to the Tom and Jason barite-lead-zinc prospects of Selwyn Basin at MacMillan Pass in the Yukon."

B. Geology of the Property (Plates 1-7)

The geology of the area is dominated by NE vergent, SW dipping thrust faults probably developed during the Mesozoic Columbian orogeny, which induce the prevalent NW strike and SW dip of most lithologies.

The faults have exploited the lithological contacts between the Cambrian, Ordovician, Silurian, Lower Devonian and Upper Devonian (Table 2) and have produced tight folding and strong cleavage in all the clastic lithologies, (limestones show folding only) resulting in an overall tectonic shortening of around 50%.

The lithological composition of the Ordovician and Silurian does not vary significantly across the area, but the thrusting Lower Devonian sections suggest a progression from limestone reef deposition on an elevated ridge in the east of the claim to a restricted basinal turbiditic shale deposition across the centre of the area. This basinal environment is believed to have controlled the deposition of the Upper Devonian "Gunsteel" shales.

Cambrian sediments lie to the west of the permit and were not mapped during 1981; they include calc-siltstones, sandstones, quartzites and minor shales.

The Ordovician is a sequence of black carbonaceous and variably calcareous shales, silty shales and silts, elsewhere named the "Road-River" Formation. Locally this sequence contains pyrite lenses and in the westernmost section a thin vesicular orange-weathering volcanic horizon which includes tuffs and flows of intermediate composition. Towards the top of the sequence and exposed in the sole of the central-western and central-eastern thrust sheets just below the Silurian is a series of interbedded cherts and cherty shales with occasional limestone banks and calc-siltstone horizons probably indicating the brief establishment of a restricted basinal environment in late Ordovician, Caradoc time.

The Silurian is a sequence of brown weathering variably calcareous homogenous grey silts, with limestone and shale interbeds at the base (Ludlow) and occasional coarser grained sandstone horizons throughout. Heavy bioturbation, both in fan and cylindrical burrows, is common and in some sections burrows are filled by pyritic growths. The Silurian appears to show the thickest development of the basal shale member in the central section of the permit coincident with the site of the Upper Ordovician basinal facies.

The Devonian section begins with a light grey weathering dark grey reefal limestone containing crinoids and stromatoporoids and resting unconformably on Silurian siltstones. Grey-brown weathering black carbonaceous, calcareous, turbiditic silts exposed in the central part of the area were probably deposited as a basinal facies contemporaneous with the reefal limestones. Thrusting or poor exposure prevents a clear definition of the Lower Devonian/Upper Devonian unconformity. The Upper Devonian "Gunsteel" shale mapped in two thrust slices across the central sections of the property is a cyclic repetitive sequence of light grey weathering dark grey shale, silty shale, black chert shale and chert with a thin and irregularly developed barite lensed shale horizon overlying the second main cycle of chert and cherty shale deposition. A thin horizon of rusty weathering grey "chert grit" containing angular varicoloured mm sized chert fragments underlies and is partly contemporaneous with the lowermost parts of the baritic shale section.

Recent deposition of small Iron-Manganese cementation breccias derived from the weathering of pyrite in shales, occurs both over the Ordovician and the Devonian shale sections. Calcrete (Travertine) deposition has occurred especially in areas of lower relief and it is probably linked to seepage zones associated with faults.

Soil cover in areas of moderate slope shows a deep organic humus layer overlying a well developed "A" horizon of black soil and a lower "B" horizon of brown-grey soil which grades down into weathered rock.

V. MINERALIZATION

Very minor sphalerite was found in grains in some of the Ordovician cherts, but otherwise no sulphide showings have been located on the property.

Barite showings are common across the area within the exposed strips of Devonian shale. Barite is present as small flecks or elliptical sectioned lenses up to $\frac{1}{2}$ cm across either with a radiating acicular crystalline fabric or with a homogenous fine grained dark grey texture. Most of the baritic shale also contains fine grained pyrite. The baritic shale layers are present as bands several metres thick within non-baritic light grey weathering dark grey silty shale occasional bands of massive barite several cm in thickness were found in float debris, and these too show varied fine grained or acicular crystalline texture. The overall thickness of the baritic section averages 10 metres.

VI. GEOCHEMISTRY

A. Procedure

The program involved the collection from base lines A and B on compass and chain surveyed grids of 2100 soil and silt samples at 25 m intervals from 60 cross lines ranging in length from 500 m to 1500 m, so supplementing the 1980 sample program to produce an overall coverage of 25 m sample separation on cross lines spaced between 100 m and 200 m along the entire strike length of the Devonian shale horizons. In addition, streams draining the western and eastern flanks of the permit group were silt sampled at roughly 200 m spacings and 90 rock geochemical samples were collected from exposed sections of the baritic Devonian shales.

Where possible soil samples were collected from the "B" horizon with a sampling hoe, however in many areas of lower relief and deep organic cover the "B" horizon was not reached and the "A" horizon was therefore sampled. Samples were packed and sent in kraft sample bags to the Cominco Laboratory, 1486 E. Pender Street, Vancouver, B.C., where they are stored. Following sample preparation (sieving to -80 mesh) the samples were digested in perchloric acid and analysed for Pb, Zn and Ag using Atomic Absorption Spectrometry. Analysis was made for Ba using X-ray Fluorescence. Rock Samples were prepared by grinding -200 mesh and analysed by the same methods as above for Pb, Zn, Ba, Ag and Mn.

Data treatment was done using a computer program to establish class limits and plot log transform histograms and cumulative probability plots for each element analysed both for the grouped values of silts and soils and for rocks as a separate class. Significance levels were determined together with contour intervals from the cumulative probability curves, Table 3 shows these values.

B. Results (Plate 1a - 6a, 1b - 6b, 1c - 6c)

Contoured at the 1800 ppm level, Ba values clearly outline the width of the Devonian "Gunsteel" shales where they subcrop. In areas of greater

Table 3
Significance Levels and Contour Intervals
South Kwad Geochemistry

		Pb	Zn	Ba	Ag	Mn	Cu
Soils and Silts	Significant	50 ppm	1000 ppm	1800 ppm	1 ppm	-	-
	Contour Int.	25 ppm	500 ppm	5000 ppm	1 ppm	-	-
Rocks	Significant	40 ppm	800 ppm	1600 ppm	1 ppm	250 ppm	30 ppm

depth of burial towards the NW values are depressed and the scattered anomalies are probably linked to slumped barite rich shales in glacial debris. Outcropping sections of barite lensed shale correlate closely with the anomalies at over 5000 ppm.

Pb values are judged anomalous over the 50 ppm level. Several anomalies occur over both the central sections of base line A and base line B, where they are linked both to Ordovician and Devonian shales. In most cases the maximum values of these anomalies do not exceed 200 ppm, but two single point anomalies reach almost 300 ppm and one reaches 700 ppm. None of these anomalies were traceable to mineralization.

Zn anomalies above 1000 ppm occur mostly in the base line A area and appear to be linked to Ordovician cherts. Large strong anomalies in Zn up to 9000 ppm are seen in several areas of low marshy ground associated with seepage zones where enrichment in Zn is probably linked to the formation of calcrete deposits.

Ag anomalies are widespread throughout the exposed and subcropping sections of Ordovician and Devonian shale with maximum values up to 8 ppm strongly correlated to the areas of chert and cherty shale. A single rock specimen of Silurian pyritic siltstone float from near the Kwadacha River shows 15 ppm of Ag.

Mn and Cu analyses were returned for rocks only and at present there is insufficient data to suggest any meaningful enrichment pattern.

VII. CONCLUSIONS


Geological prospecting and geochemistry across the Devonian baritic shales of the South Kwad claim group has not lead to the discovery of any sulphide mineralization.

7.

Further work should be organized around stratigraphic measuring and detailed rock geochemistry.

Report by: B.C. Waters
B.C. Waters
Geologist

Endorsed by: A. B. Mawer
A.B. Mawer
Senior Geologist

Approved for
Release by: 
G. Harden, Manager
Exploration
Western District

Distribution:
Mining Recorder (2)
Western District (1)
BCW (1)

BCW/vmk

APPENDIX A

STATEMENT OF EXPENDITURES

SOUTH KWAD CLAIM GROUP

JUNE 13 - JULY 15, 1981

Salaries and Wages

B.C. Waters - 33 days @ \$107.58/day	\$ 3,550.00
A Stanta - 33 days @ \$ 92.42/day	3,050.00
C. Rayner - 26 days @ \$ 84.61/day	2,200.00
T. Adlington - 33 days @ \$ 84.84/day	2,800.00

Linecutting - 9km at \$388.9 per km \$ 3,500.00

Assays and Geochemical Analysis

Cominco Lab - Soils & silts - 2143 @ \$ 6.50	\$13,929.50
- Rocks - 90 @ \$12.45	1,120.50

Field Equipment and Supplies \$ 7,350.00

Camp Maintenance \$ 8,560.00

Transportation

Rotary Wing - 22.6 hours at \$365/hour	\$ 8,250.00
Fixed Wing - 1178 miles at \$2.25/mile	2,650.00
Miscellaneous	405.00

Report Writing, Research, Drafting

B.C. Waters - 9 days @ \$111.11/day	\$ 1,000.00
Drafting Supplies	400.00

Total \$58,765.00

B.C. Waters

B.C. Waters
Geologist

BCW/vmk

APPENDIX B

STATEMENT OF QUALIFICATIONS

I, B.C. WATERS, GEOLOGIST, WITH BUSINESS ADDRESS AT 700 - 409 GRANVILLE STREET, VANCOUVER, BRITISH COLUMBIA AND RESIDENTIAL ADDRESS AT 235 W. 4TH, NORTH VANCOUVER, BRITISH COLUMBIA, HEREBY CERTIFY THAT: -

1. THAT I am a graduate in Geological Sciences with a B.A. (Hons.) in 1977 from the University of Cambridge.
2. THAT from 1977 to the present I have been employed as a geologist and have been actively engaged in exploration geology and mining geology in Svalbard, Germany, Saudi Arabia, Italy and British Columbia.
3. THAT I personally participated in the field work on the South Kwad Claim Group and have interpreted all the data resulting from this work.

Signed: B.C. Waters
B.C. Waters
Geologist

BCW/vmk

M 94F/11W

M 94F/11E

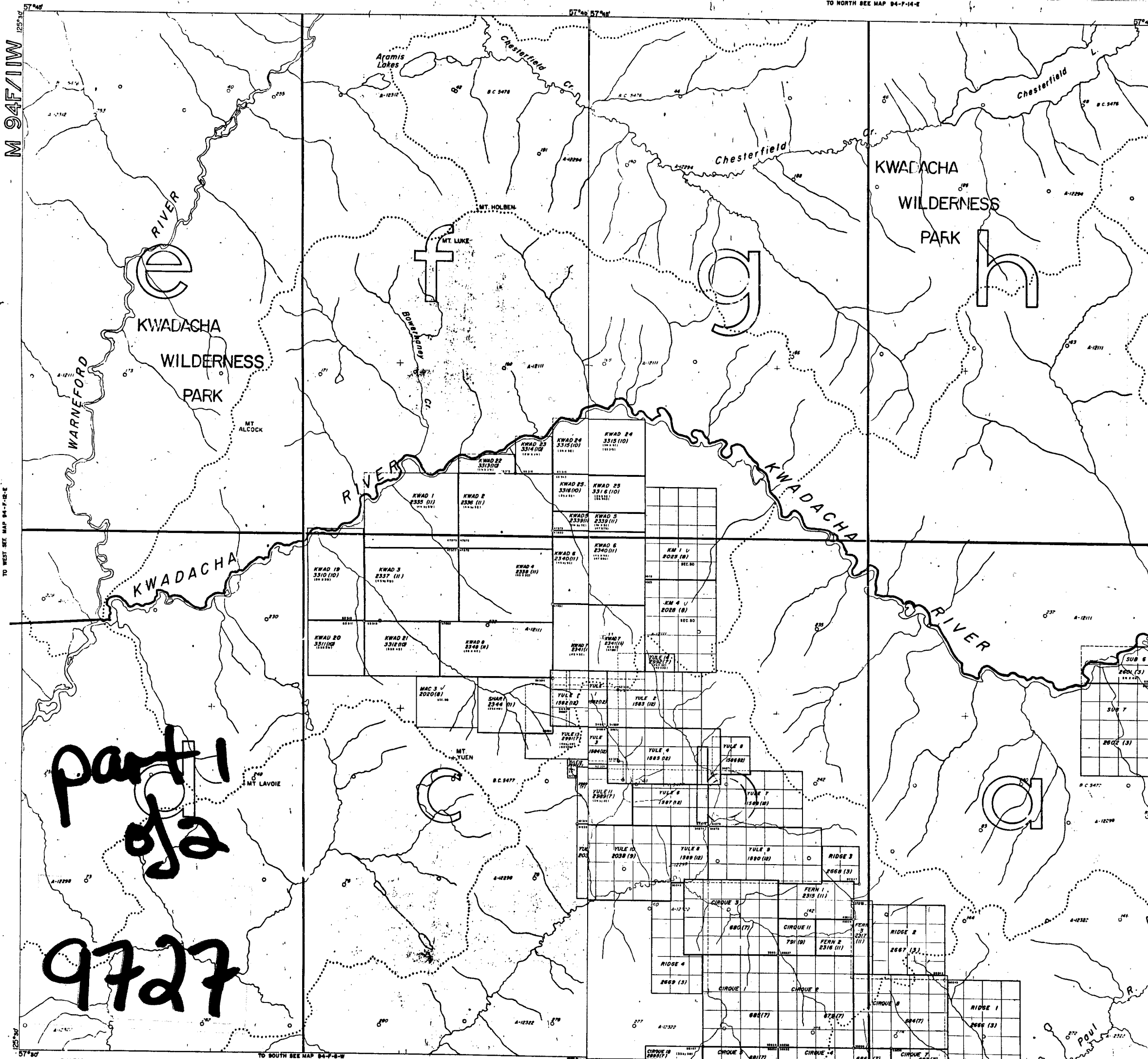


PLATE 9
 CLAIM MAP 1:100,000 NTS 94F 11

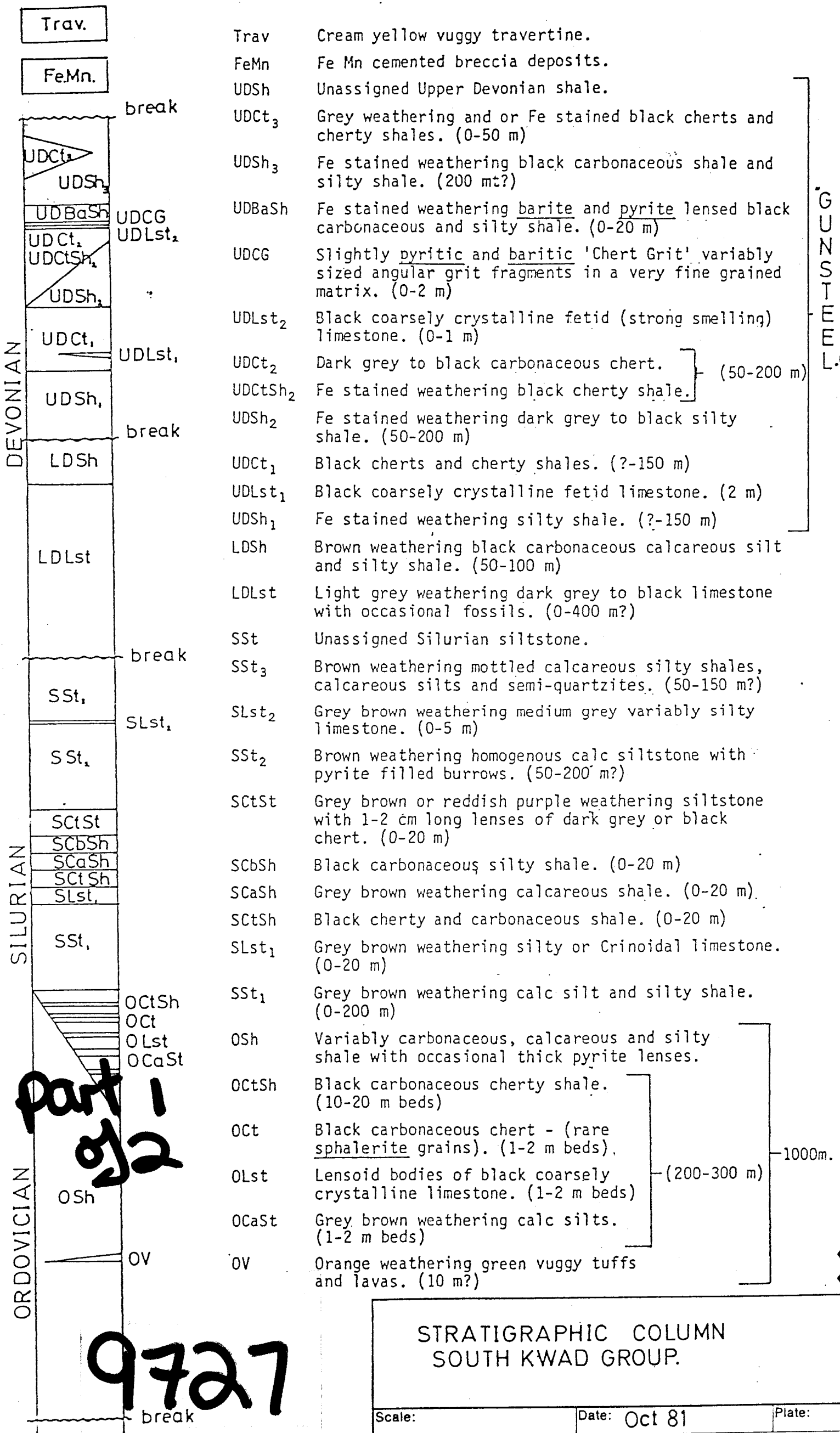
TO WEST SEE MAP 94-F-14-W TO EAST SEE MAP 94-F-14-E

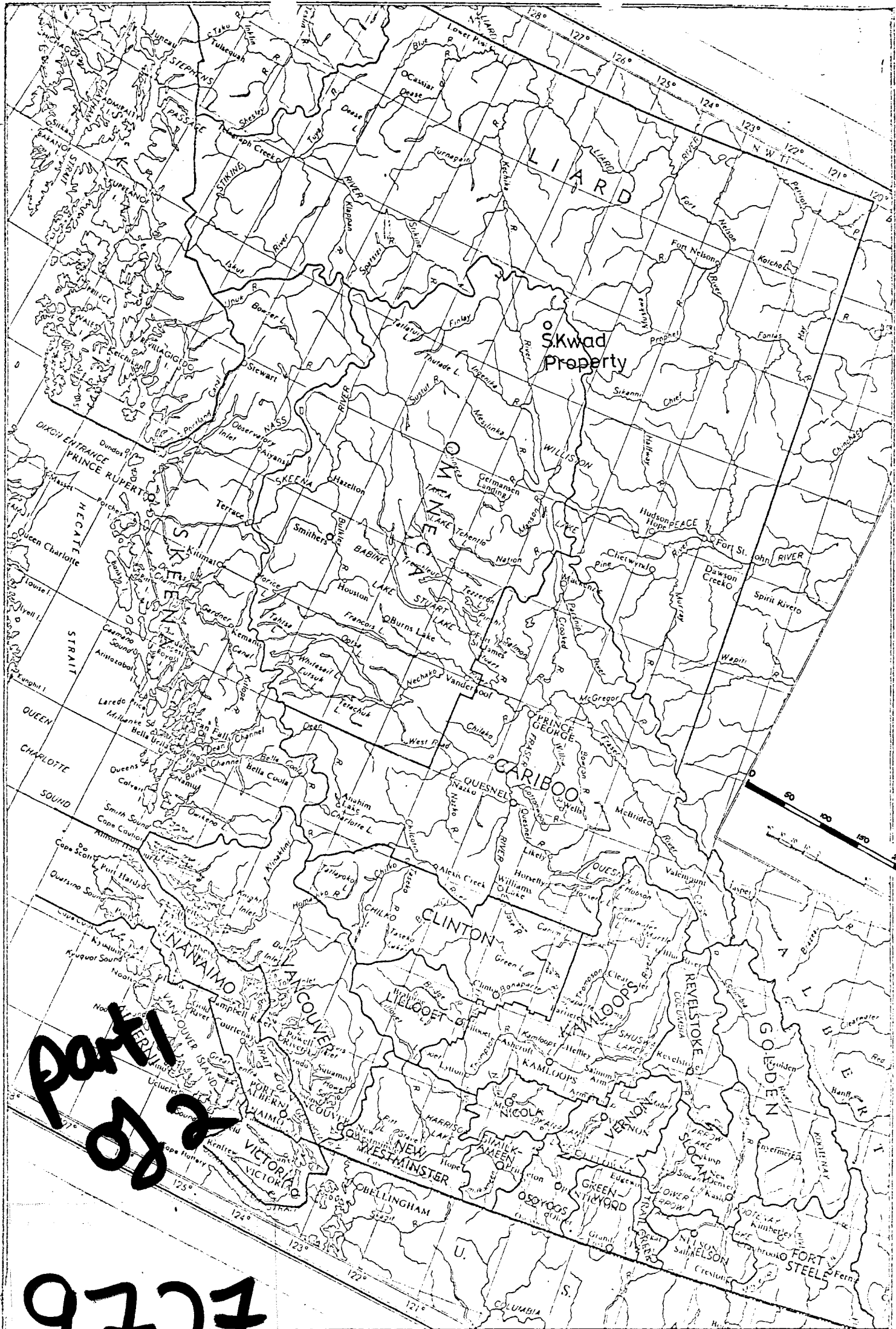
LEGEND
 Dotted line: Provincial Boundary
 Solid line: Mining Division Boundary
 Dashed line: Power Transmission Line
 Circle with cross: Mine
 Circle with dot: Tunnel
 Circle with horizontal lines: Pipeline
 Circle with vertical lines: Stream

Scale: 1:100,000
 1 cm = 1 km
 1 inch = 25.4 mm

DATE OF MICROFILM: 81-02-26

TABLE 2.





Part
of 2

9727



Drawn by:	Traced by:
Revised by Date	Revised by Date

LOCATION MAP

Scale: 1: 5,300,000 Date: Plate: 8