

# MAR 19710014: BIGHORN

Received date: Dec 31, 1971

Public release date: Jan 01, 1973

## **DISCLAIMER**

By accessing and using the Alberta Energy website to download or otherwise obtain a scanned mineral assessment report, you ("User") agree to be bound by the following terms and conditions:

- a) Each scanned mineral assessment report that is downloaded or otherwise obtained from Alberta Energy is provided "AS IS", with no warranties or representations of any kind whatsoever from Her Majesty the Queen in Right of Alberta, as represented by the Minister of Energy ("Minister"), expressed or implied, including, but not limited to, no warranties or other representations from the Minister, regarding the content, accuracy, reliability, use or results from the use of or the integrity, completeness, quality or legibility of each such scanned mineral assessment report;
- b) To the fullest extent permitted by applicable laws, the Minister hereby expressly disclaims, and is released from, liability and responsibility for all warranties and conditions, expressed or implied, in relation to each scanned mineral assessment report shown or displayed on the Alberta Energy website including but not limited to warranties as to the satisfactory quality of or the fitness of the scanned mineral assessment report for a particular purpose and warranties as to the non-infringement or other non-violation of the proprietary rights held by any third party in respect of the scanned mineral assessment report;
- c) To the fullest extent permitted by applicable law, the Minister, and the Minister's employees and agents, exclude and disclaim liability to the User for losses and damages of whatsoever nature and howsoever arising including, without limitation, any direct, indirect, special, consequential, punitive or incidental damages, loss of use, loss of data, loss caused by a virus, loss of income or profit, claims of third parties, even if Alberta Energy have been advised of the possibility of such damages or losses, arising out of or in connection with the use of the Alberta Energy website, including the accessing or downloading of the scanned mineral assessment report and the use for any purpose of the scanned mineral assessment report so downloaded or retrieved.
- d) User agrees to indemnify and hold harmless the Minister, and the Minister's employees and agents against and from any and all third party claims, losses, liabilities, demands, actions or proceedings related to the downloading, distribution, transmissions, storage, redistribution, reproduction or exploitation of each scanned mineral assessment report obtained by the User from Alberta Energy.

REPORT  
ON  
THE GEOLOGY AND ECONOMIC POTENTIAL  
OF  
THE PROPERTIES OF KINTLA EXPLORATION LTD.  
WITHIN  
SOUTHEAST BRITISH COLUMBIA & SOUTHWEST ALBERTA

by

Prof. Roger D. Morton, B.Sc., Ph.D., P. Geol.

Consultant Geologist

## INDEX

	Page
SUMMARY .....	1
INTRODUCTION .....	2
LOCATION OF THE PROPERTIES AND ACCESSIBILITY .....	3
PHYSIOGRAPHY OF THE REGION .....	5
GENERAL GEOLOGY OF THE REGION .....	5
PREVIOUS HISTORY OF EXPLORATION .....	6
DETAILED GEOLOGY OF THE PROPERTIES:	7
(1) BIGHORN CLAIMS, ALBERTA .....	7
(2) BETH CLAIMS, BRITISH COLUMBIA .....	9
(3) SAGE CLAIMS, BRITISH COLUMBIA .....	10
(4) COMMERCE CLAIMS, BRITISH COLUMBIA .....	10
(5) FORUM CLAIMS, BRITISH COLUMBIA .....	11
(6) OPAL CLAIMS, BRITISH COLUMBIA .....	12
(7) LIN CLAIMS, BRITISH COLUMBIA .....	13
CONCLUSIONS .....	14
RECOMMENDATIONS .....	15
REFERENCES .....	16
PRELIMINARY COST ESTIMATE .....	18
CERTIFICATE .....	20

## FIGURES ACCOMPANYING REPORT

	Facing page
Figure 1: Location map of staked sectors	3
Figure 2: Claims map and geological sketch map of BIGHORN claims	3
Figure 3: Claims map and geological sketch map of BETH claims	3
Figure 4: Claims map and geological sketch map of SAGE and COMMERCE claims	4
Figure 5: Claims map and geological sketch map of FORUM claims	4
Figure 6: Claims map and geological sketch map of OPAL claims	4
Figure 7: Claims map and geological sketch map of LIN claims	4
Figure 8: Structural sketch map of region	6

## TABLES IN REPORT

Table 1	Stratigraphic succession of SW Canadian Precambrian (after Price, 1962)	6
---------	--	---

## SUMMARY

This report constitutes a description of the general geologic settings and known metalliferous mineral showings of the BIGHORN claims in SW Alberta and of the BETH, SAGE, FORUM, OPAL, LIN and COMMERCE claims in SE British Columbia. The information is based upon published works and upon cursory exploration during the period 1966-1971 in the Lewis Range. All the claims lie within the Lewis thrust sheet, principally over Precambrian rocks of the Lewis Series. A few claims of the COMMERCE group are staked over younger intrusive rocks. Stratabound Cu-Ag mineralization has been found on all the claim blocks and occurs particularly in the Appekunny, Grinnell, Siyeh, Gateway and Roosville Formations of the series. The mineralization usually occurs as finely disseminated, interstitial bornite-chalcocite-covellite in sandstones and quartzites, or rarely within argillites and limestones. One occurrence within Grinnell Formation quartzites on the OPAL claims exhibits an unusual concentration of Pb-Cu-Ag minerals and assayed at 3.5% Pb, 1.3% Cu, 17.8 oz/ton Ag and 0.02 oz/ton Au.

To date, a number of occurrences of 'modified stratabound' Cu-Ag mineralization have also been noted and these are thought to have originated by local hydrothermal effects enriching the Cu-Ag mineralization near faults and within and adjacent to younger Precambrian diorite sills. One such occurrence, within a sill on the BIGHORN claims, could contain a small, mineable deposit grading somewhere between 1.83 and 3.45% Cu and up to

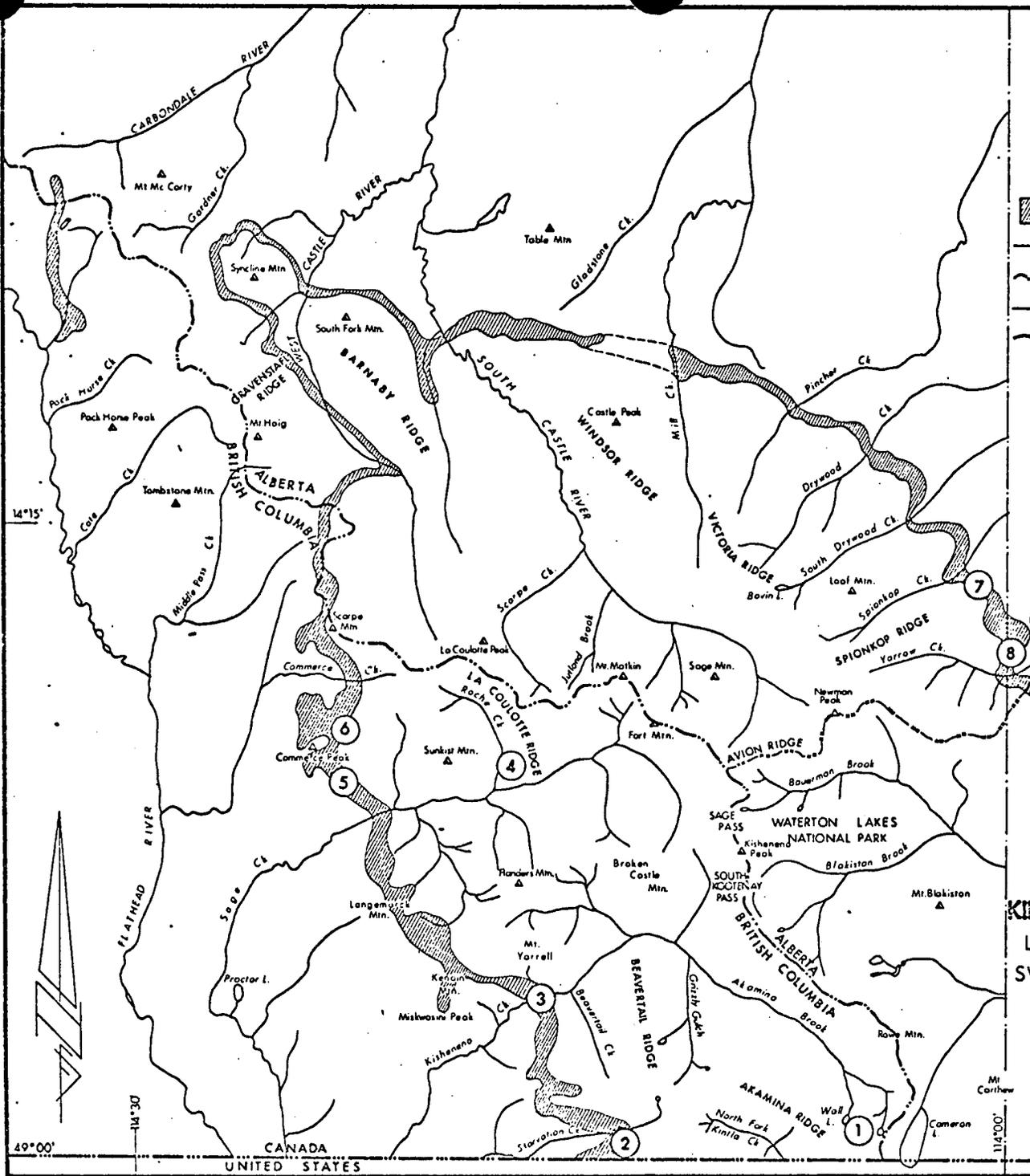
0.86 oz/ton Ag.

The COMMERCE claims of SE British Columbia are unique among the properties in that they contain outcrops of a 'gossan' within a syenite and sediments of the Siyeh Formation. This weathered, sulfide-rich zone has yielded grab assays at surface of 0.02 oz/ton Au and is adjacent to an old gold prospect which yielded an assay of \$72 Au/ton in 1935.

It is concluded that the discoveries made by the officers of the company during the period 1966-1971, together with analogous discoveries made by other companies in nearby areas, clearly demonstrates that the Precambrian sequence of the Lewis Thrust sheet constitutes a major base metal target for both stratabound and modified stratabound ores. Recommendations are forwarded which will enable the company to perform detailed work on its COMMERCE claims, involving a two phase exploration program costing \$70,000 in the initial stages and \$33,000 subsequently, contingent upon the discoveries of the phase I program. It is also recommended that the company, being in the initial stages of growth, retain a high treasury balance by optioning the remaining properties to other corporations as soon as possible after an initial survey program. This procedure would thus enable the company to diversify within the field of metalliferous mineral exploration and to adopt an active exploration policy.

## INTRODUCTION

At the request of Messrs. E. Goble and F. Goble, directors of Kintla Explorations Ltd., this geologic report was written with the objective of



Legend:

-  Grinnell Formation
-  National Park Boundary
-  Alberta/British Columbia Boundary
-  Fifth Meridian
-  Canada/United States Boundary

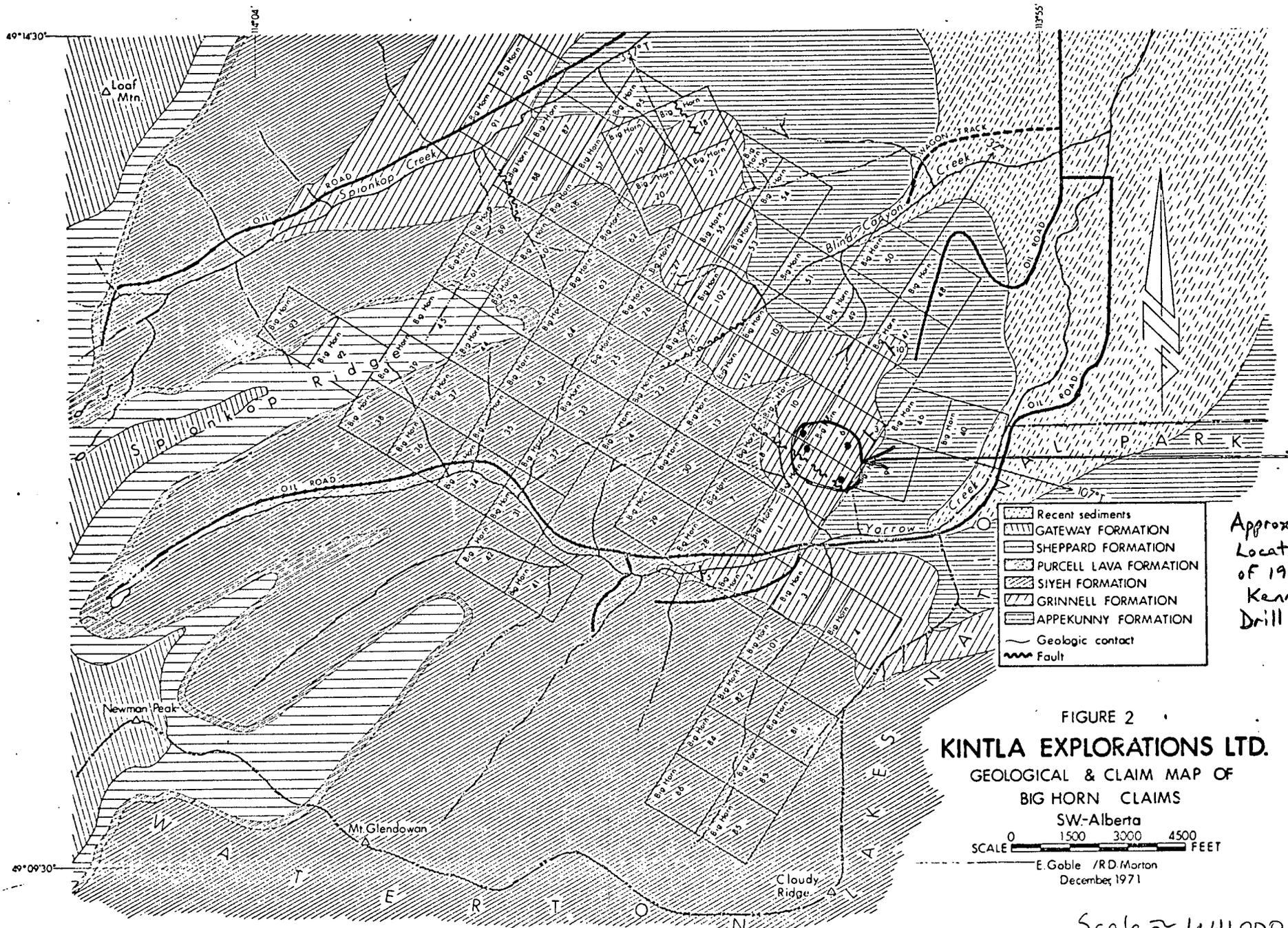
- ① FORUM CLAIMS
- ② OPAL CLAIMS
- ③ LIN CLAIMS
- ④ BETH CLAIMS
- ⑤ SAGE CLAIMS
- ⑥ COMMERCE CLAIMS
- ⑦ + ⑧ BIG HORN CLAIMS

FIGURE 1  
**KINTLA EXPLORATIONS LTD.**  
 LOCATION MAP OF CLAIMS  
 SW-Alberta / SE- British Columbia

SCALE  MILES

E. Goble / RD Morton  
 Dec., 1971

19710014



	Recent sediments
	GATEWAY FORMATION
	SHEPPARD FORMATION
	PURCELL LAVA FORMATION
	SIYEH FORMATION
	GRINNELL FORMATION
	APPEKUNNY FORMATION
	Geologic contact
	Fault

Approximate  
Locations  
of 1967  
Kenco  
Drill Holes

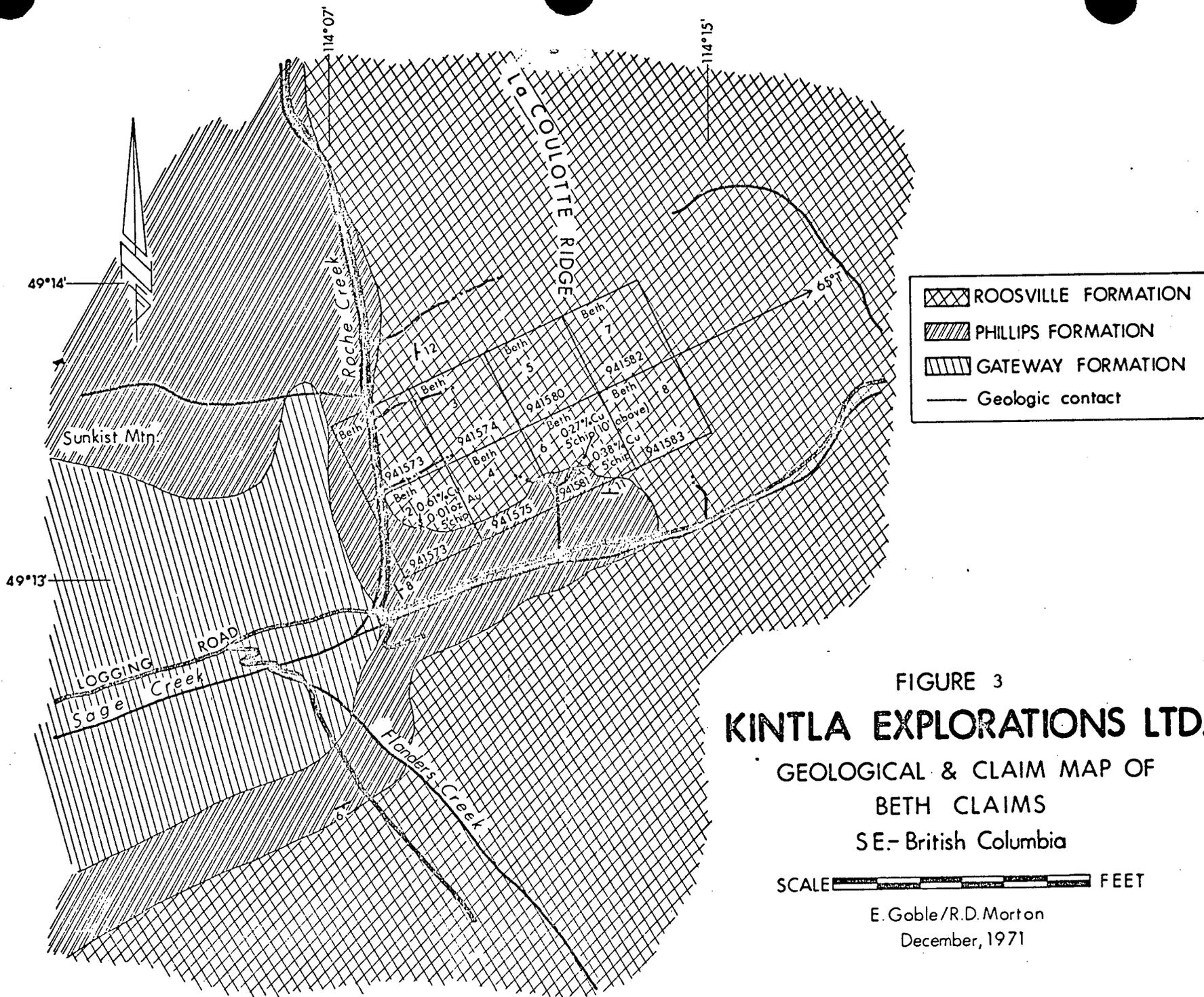
FIGURE 2  
**KINTLA EXPLORATIONS LTD.**  
GEOLOGICAL & CLAIM MAP OF  
BIG HORN CLAIMS  
SW-Alberta

SCALE 0 1500 3000 4500 FEET

E. Goble / R.D. Morton  
December, 1971

Scale ≈ 1:41,000

19710014



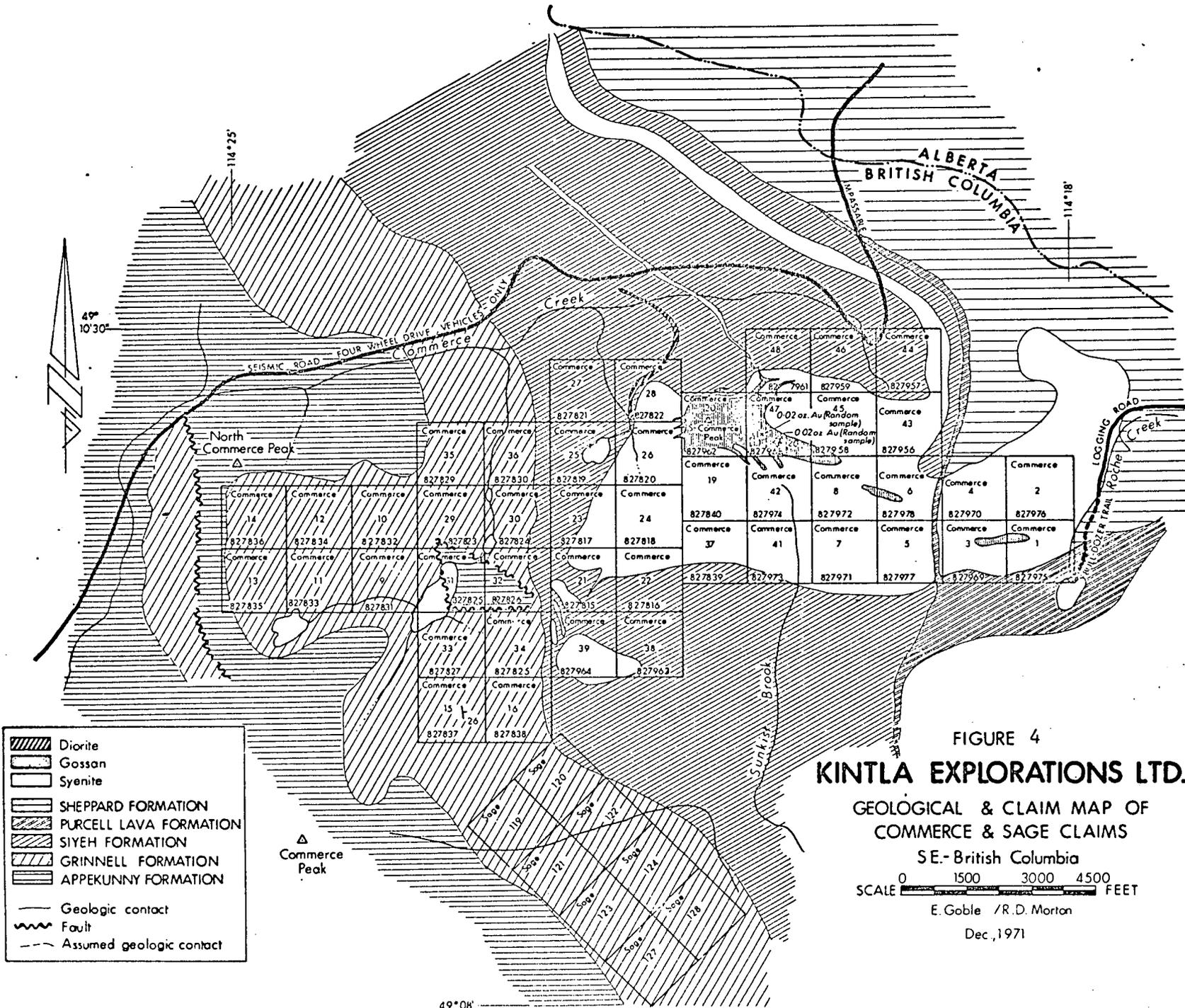
h1001461

elucidating the economic potentials of those properties held by the aforementioned company within SW Alberta and SE British Columbia. This report is based upon personal examinations of most of the properties, upon examination of specimens supplied therefrom during the period 1969-1971. The work is also based upon consultation of the published works cited herein and upon personal research carried out in the University of Alberta.

#### LOCATION OF PROPERTIES AND ACCESSIBILITY

The locations of the various staked sectors described herein are shown in Figure 1 and detailed claims maps for the groups are given in Figures 2 to 7 inclusive.

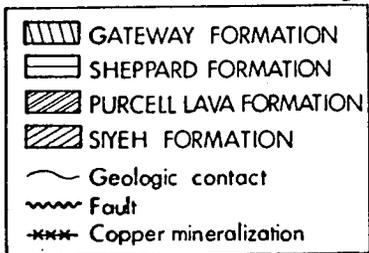
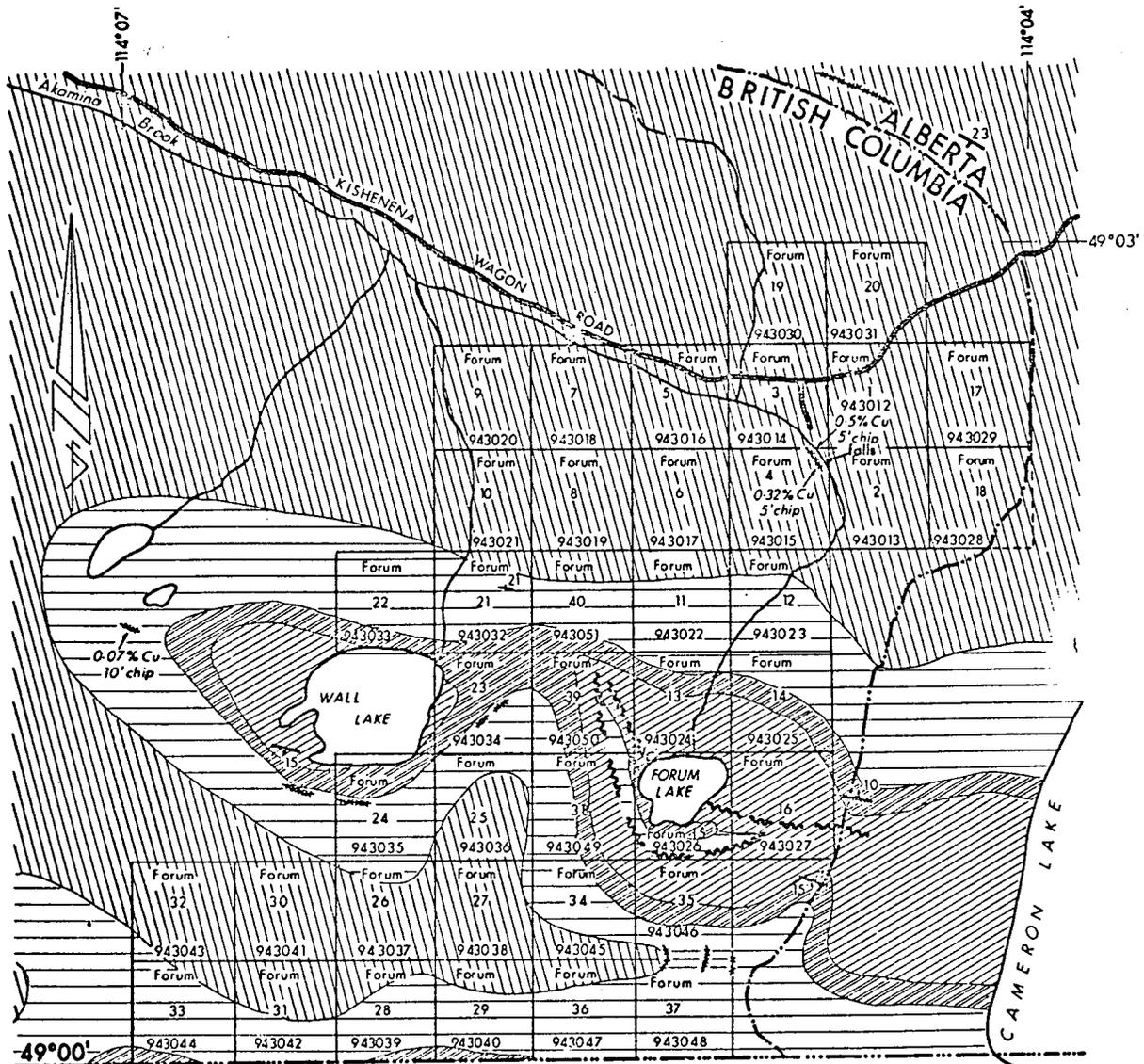
- (1) The BIGHORN claims: 68 full claims and 7 fractional claims, which cover 3749 acres, in a group centred upon Latitude  $49^{\circ}12'N$  and Longitude  $114^{\circ}W$  in Alberta. The claim block lies to the NE of Mount Glendowan on an area between Yarrow Creek, Blind Canyon Creek and Spionkop Creek; see Figure 2. Access to the claims is easy via the road up Yarrow Creek to the base of Spionkop Ridge and by the road up Spionkop Creek.
  
- (2) The BETH claims: A group of 8 full claims, covering a total of 414 acres, centred upon Latitude  $49^{\circ}9'W$  and Longitude  $114^{\circ}7'W$  on La Coulotte Ridge, W of Roche Creek in SE British Columbia; see Figure 3. Access to the claims is easy via the wagon trail along Sage Creek.



- Diorite
- Gossan
- Syenite
- SHEPPARD FORMATION
- PURCELL LAVA FORMATION
- SIYEH FORMATION
- GRINNELL FORMATION
- APPEKUNNY FORMATION
- Geologic contact
- Fault
- Assumed geologic contact

FIGURE 4  
**KINTLA EXPLORATIONS LTD.**  
 GEOLOGICAL & CLAIM MAP OF  
 COMMERCE & SAGE CLAIMS  
 SE.- British Columbia  
 SCALE FEET  
 E. Goble / R.D. Morton  
 Dec., 1971

19710514



**FIGURE 5**  
**KINTLA EXPLORATIONS LTD.**

GEOLOGICAL & CLAIM MAP OF  
FORUM CLAIMS  
SE - British Columbia

SCALE FEET

E.Goble /R.D.Morton  
December, 1971

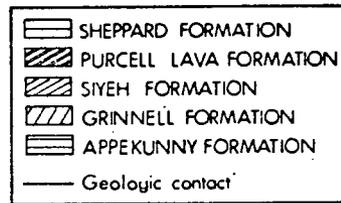
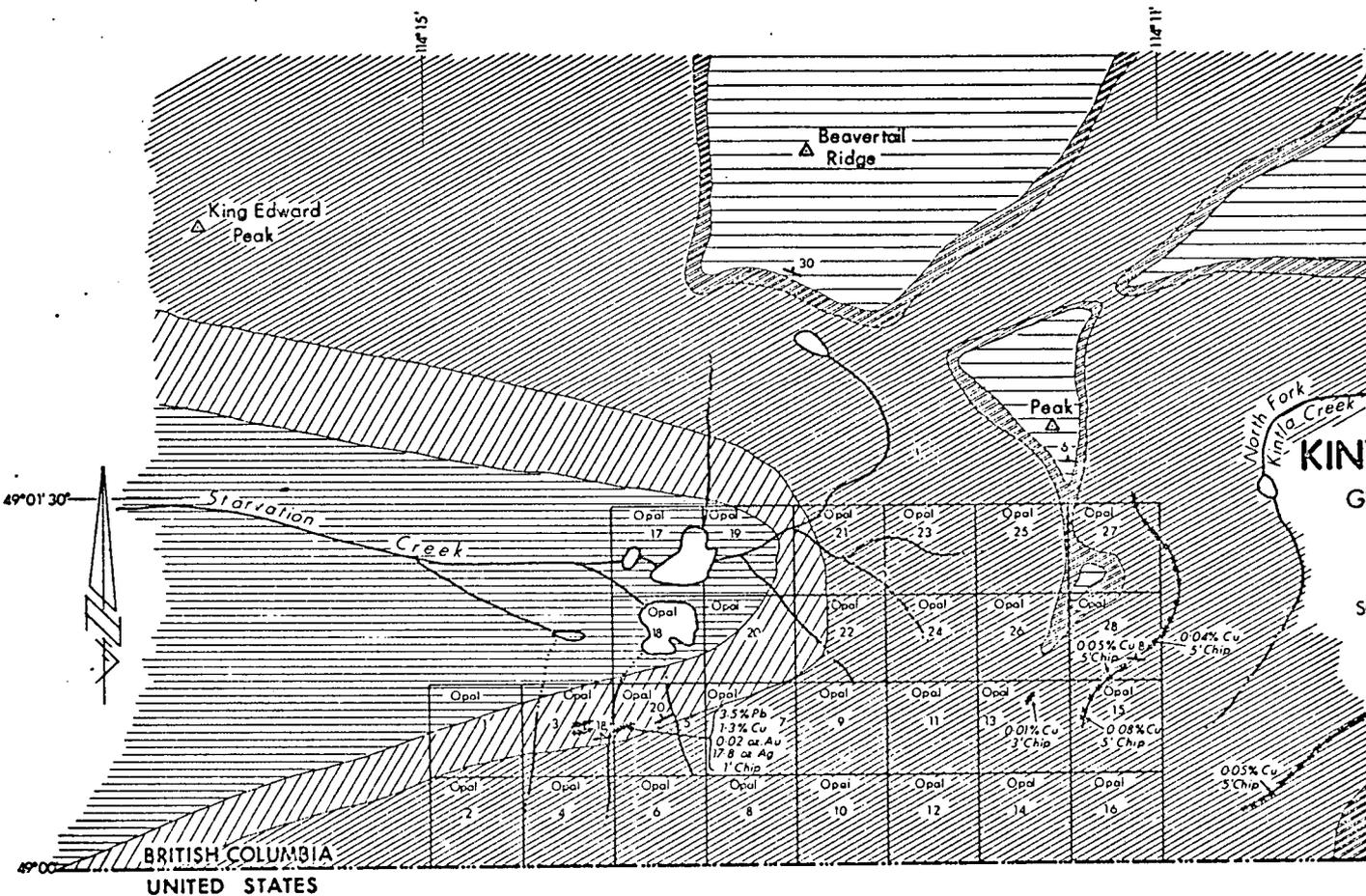


FIGURE 6  
**KINTLA EXPLORATIONS LTD.**

GEOLOGICAL & CLAIM MAP OF

OPAL CLAIMS

SE- British Columbia

SCALE 0 1500 3000 4500 FEET

E. Goble / R. D. Marton  
 December, 1971

19715014

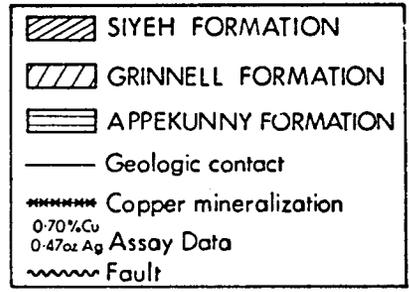
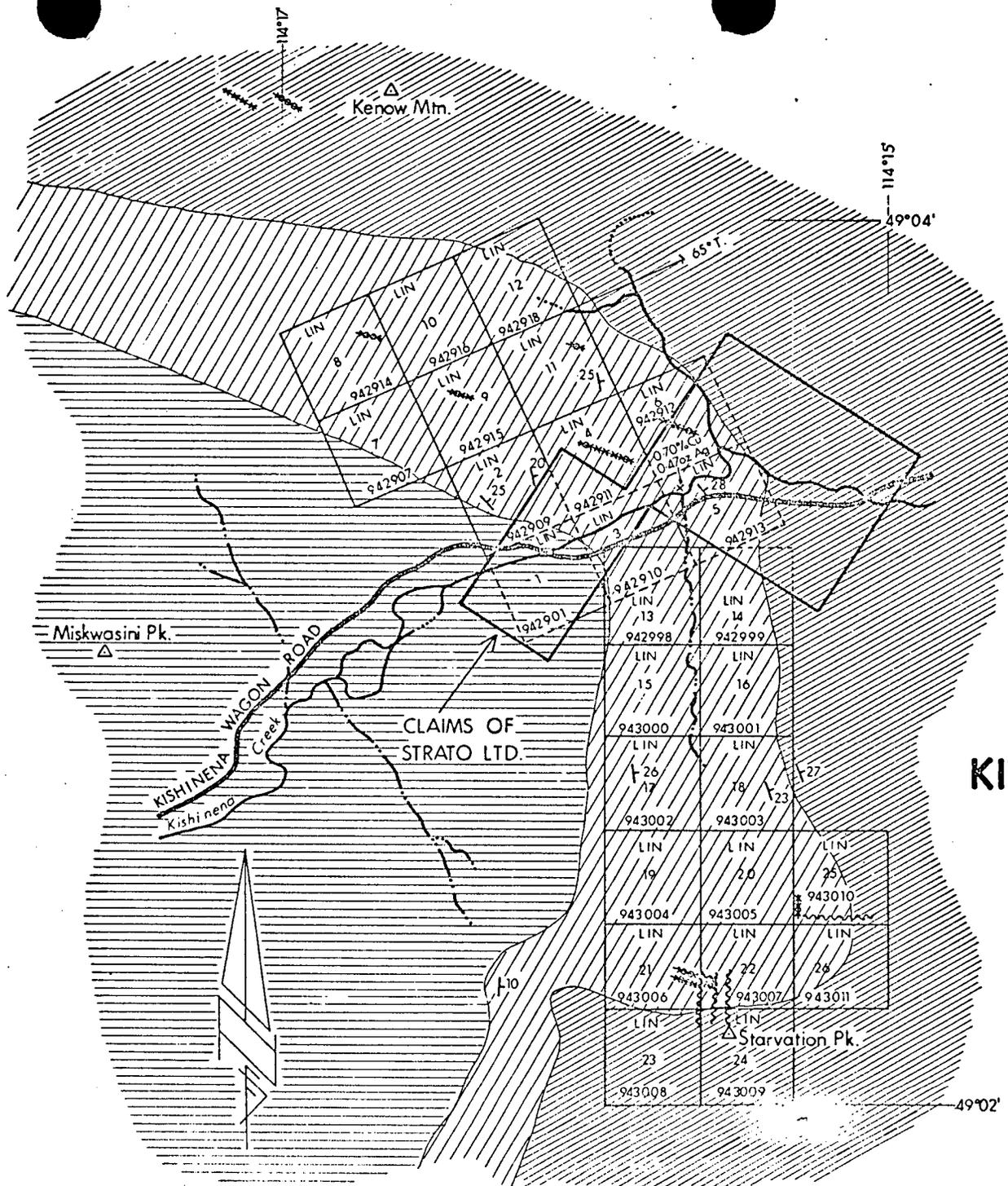


FIGURE 7  
**KINTLA EXPLORATIONS LTD.**

GEOLOGICAL & CLAIM MAP OF  
 LIN CLAIMS

S.E.- British Columbia

SCALE 0 1500 3000 4500 FEET

E. Goble / R.D. Morton  
 December, 1971.

12710014

- (3) The SAGE claims: A group of 8 full claims, covering 414 acres, centred upon Latitude  $49^{\circ}8'$  N and Longitude  $114^{\circ}18'$  W, approximately 1 mile ESE of Commerce Peak in SE British Columbia; see Figure 4.
- (4) The FORUM claims: 40 full claims, covering 2068 acres, in a group centred about Latitude  $49^{\circ}1'$  N and Longitude  $114^{\circ}5'$  W, adjacent to the extreme SE corner of British Columbia by the Alberta - United States border. The claims block lies just west of Cameron Lake; see Figure 5. The claims in the northern part of the Forum group are easily reached via the Kishinena Creek wagon road and the Akamina Pass.
- (5) The OPAL claims: 28 full claims, with an areal extent of 1448 acres, in a block centred upon Latitude  $49^{\circ}1'$  N and Longitude  $114^{\circ}13'$  W, at the headwaters of Starvation Creek in SE British Columbia, just N of the United States border; see Figure 6. These claims are accessible on foot via Starvation Creek from the west or via Kintla Creek from the east.
- (6) The LIN claims: 18 full claims and 8 fractional claims, in a block centred upon Latitude  $49^{\circ}2'$  N and Longitude  $114^{\circ}13'$  W, near Kishinena Creek and E of Miskwasini Peak in SE British Columbia; see Figure 7. The claims are accessible via the wagon road along Kishinena Creek.
- (7) The COMMERCE claims: 45 full claims, covering 2327 acres, in a block centred upon Latitude  $49^{\circ}9'$  N and Longitude  $114^{\circ}23'$  W, approximately 2 miles northeast of Commerce Peak in SE British Columbia; see Figure 4.

The Commerce group may be reached via an old seismic vehicle road (4 wheel drive only) up Commerce Creek. However, it should be noted that in 1970 this road was found to be extremely deteriorated and consequently impassible east of the Commerce claim #44.

### PHYSIOGRAPHY OF THE REGION

All the claims held by the Company within SE British Columbia and SW Alberta are situated in areas of mountainous terrain characteristic of the Lewis Range of the southern Canadian Rockies. In this area the relief is rugged and the altitude varies generally between 4000 ft. and 6000 ft. above sea level, occasionally attaining between 6000 ft. and 8000 ft. The areas are heavily forested on the lower slopes with a mixture of Lodgepole pine, White spruce and Engelmann spruce prevailing, whilst the higher slopes, where the claims are sited, are typical Alpine meadows with small stands of coniferous trees wherever sufficient shelter is afforded.

The mean January temperature of the region at around the 4000 ft. level is 16°-32°F and the mean July temperature at that altitude is 62°-72°F. The area experiences a mean annual precipitation of around 24" and a considerable proportion of this falls as 80" of snow.

### GENERAL GEOLOGY OF THE REGION

All the properties of the Company are situated within a region underlain by Precambrian rocks of the Lewis Series. The stratigraphic succession of the

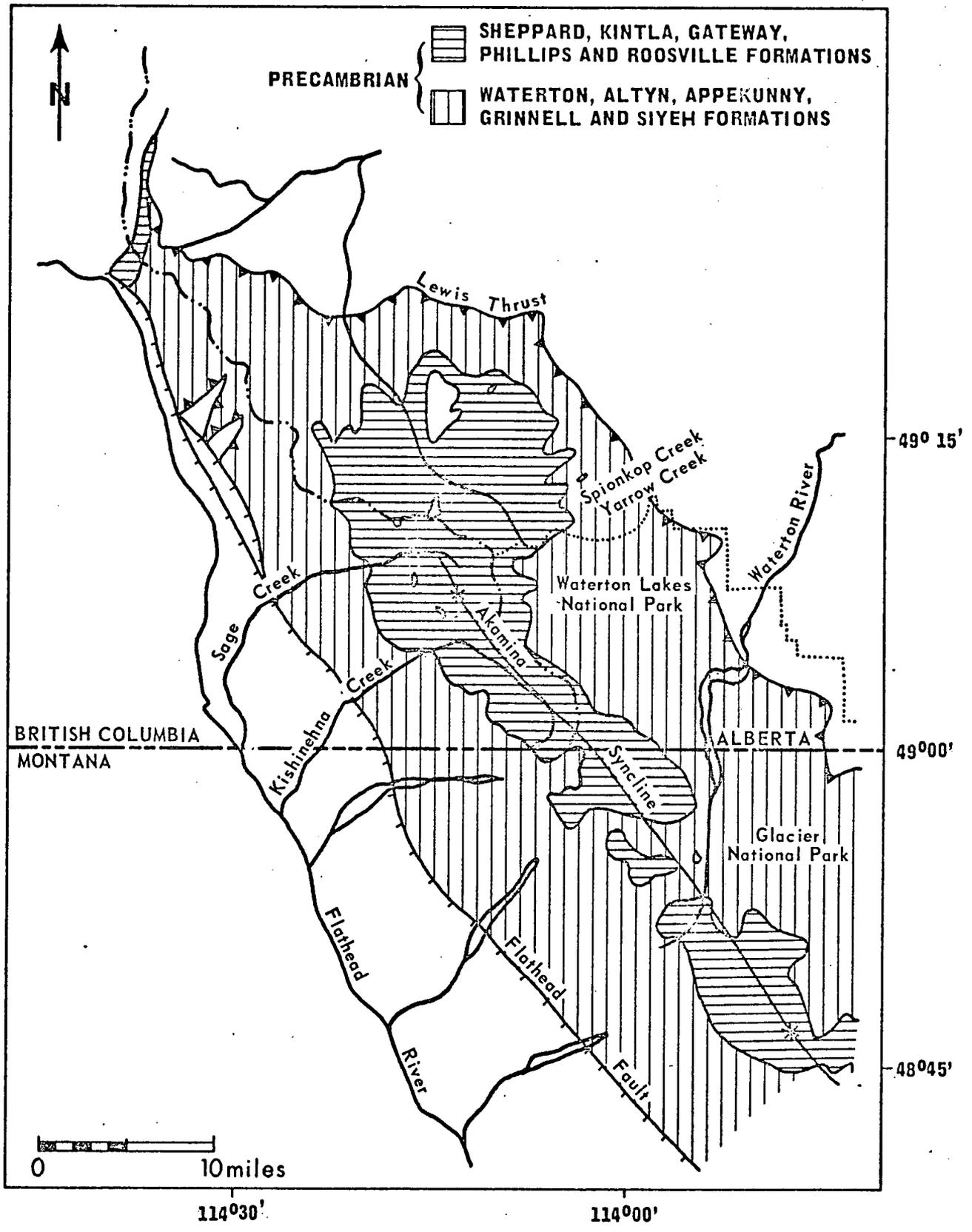


FIG.8. Sketch Map of the Regional Geology of the Lewis Thrust Sheet (after Price 1965)

S.W. Canadian Precambrian (after Price, 1962) is given in Table 1. The areas staked are for the most part underlain by quartzites, argillites and carbonate horizons, with minor intercalated submarine lavas. Reesor (1957) and Price (1964) postulated that the Lewis Series sediments were deposited in the shallow waters of a deltaic basin and were in part of subaerial origin.

The Clarke Range is, according to Price (1962), characterized by a series of thrust faults and associated folds, cut by younger SW- or W-dipping normal faults. Bally et al., (1966) suggest that the thrusts are of late Mesozoic to early Tertiary age and that later faults were late Tertiary structures of the listric type, which perhaps merge with thrusts at depth. Figure 8 illustrates the general structural setting of the region and illustrates the extent of the Lewis thrust sheet which is folded into a broad synclinorium (the Akamina syncline) and truncated to the west by the Flathead fault.

The region is also characterized by a series of amygdaloidal, porphyritic quartz-dabase sills and dykes up to 100 ft. thick and by stock-like intrusions of syenitic character. The quartz-diabases are thought to be of Precambrian age and perhaps contemporaneous with the extrusion of the Purcell lavas. The age of the syenites is still unknown.

#### PREVIOUS HISTORY OF EXPLORATION

The occurrence of copper mineralization in Purcell lavas and diabases of the North Kootenay Pass region in SW Alberta was first reported by Dawson (1886). During the first decade of the 20th Century, small-scale

ERA	PERIOD OR EPOCH	GROUP FORMATION	LITHOLOGY	THICKNESS (feet)	
		EROSIONAL UNCONFORMITY			
PRECAMBRIAN	PURCELL	MOYIE INTRUSIONS	Diorite sills and dykes		
	PURCELL (LEWIS)	GATEWAY KINTLA	ROOSVILLE FORMATION	Green argillite, siltstone, sandstone, stromatolitic dolomite	3500+ <sub>-</sub>
			PHILLIPS FORMATION	Red sandstone, siltstone, argillite	500- 700
			GATEWAY FORMATION (upper member)	Argillite, argillaceous siltstone, dolomite dolomitic sandstone, and argillite	1150-3000
			SHEPPARD FORMATION	Quartzitic & dolomitic sandstone, dolomite, oolitic dolomite, argillite, siltstone, pillowed andesite	150- 900
			EROSIONAL UNCONFORMITY IN PART		
			PURCELL LAVA	Chloritized andesite, & amygdaloidal andesite, pillowed andesite	00- 600
			SIYEH FORMATION	Limestone, dolomite, argillite & sandy limestone & dolomite, argillite, stromatolitic limestone	1130-3000
			GRINNELL FORMATION	Red argillite, sandstone & siltstone; white, green & red quartzite	350-1700
			APPEKUNNY FORMATION	Green argillite; white, grey & green quartzite; sandy argillaceous dolomite & dolomitic argillite; siltstone	1500-2000
			ALTYN FORMATION	Argillaceous limestone & dolomite; sandy dolomite, argillite, & stromatolitic dolomite	500-4000
		WATERTON FORMATION	Limestone & dolomite, argillite, & argillaceous dolomite	1500+	

Table 1. Stratigraphic succession of SW Canadian Precambrian (after Price, 1962)

mining operations were located on two copper-bearing diabase dykes on Blakiston Brook, Waterton Lakes and on Chief Mountain in Glacier National Park. Initial staking of cupriferous sandstones in the Yarrow Creek area of SW Alberta was done during this period, but owing to the low grade of the outcrops, no further work was done until the showings were re-staked in 1963.

In 1966, Kennco Explorations (Western) Ltd. carried out an exploration program for mineralization in the Grinnell Formation. Further surface exploration and drilling was later performed in the district by Akamina Minerals Ltd. (now Alcor Minerals Ltd.) and by Cominco Ltd. whose program terminated in 1970.

In summary one can conclude that previous exploration has been rather cursory with respect to the regional aspects of base metal mineralization in the Lewis Series. Detailed programs by larger companies have naturally been concentrated upon only a few higher grade showings which by virtue of their parochial nature have subsequently not appealed to such organizations, who at present are more concerned with rapid development of large tonnage - low grade, 'porphyry type' copper occurrences abroad and in British Columbia.

#### DETAILED GEOLOGY OF THE PROPERTIES

##### (1) THE BIGHORN CLAIMS

The geology of the BIGHORN claims is better known than any other of the Company's properties. Details of the local geology were given by

Stevenson (1968) and by Goble (1970). The sketch map of Figure 2 shows that the claims are staked on the east side of the Lewis Thrust sheet over a sequence of Precambrian rocks belonging mainly to the Appekunny, Grinnell and Siyeh Formations. A few claims in the NW portion of the group were staked over rocks of the younger Precambrian Purcell lavas and sedimentary Sheppard and Gateway Formations. The rocks all dip  $5^{\circ}$ - $10^{\circ}$  in an E or NE direction. Minor normal faults occasionally are seen to cut the Grinnell and Appekunny Formation rocks.

Numerous showings of copper-(silver) mineralization have been observed by the author and previous workers within this claim group. The report of Stevenson (1968) provides details of surface exploration and shallow drilling on these claims. The most noteworthy mineralization observed to date is :

- 1) in a 3-8 ft. thick, Upper Grinnell, quartzite bed which can be traced between Yarrow and Smith Creeks. Grab assays of the quartzite have shown 1-2% Cu in most instances (the mineralization occurs as interstitial bornite, chalcocite and covellite). It is noteworthy that higher grades of mineralization are occasionally encountered near the later faults. Studies performed by the author and R. Goble in 1970 suggest that the local enrichment of the copper mineralization is probably due to concentration of original 'stratabound' mineralization by later minor hydrothermal activity associated with the faulting.
- 2) in minor dioritic intrusives (sills) which occur on the ridge between Blind Canyon and Smith Creek. Here Stevenson (1968) observed that there were

significant reserves (<1 million tons) of up to 3½% Cu in one intrusive which dips 20° SW. The upper sector of the sill (~1000 ft x 1000 ft x 10 ft in size) was concluded by Stevenson (1968) to contain mineable grades of chalcocite-bornite mineralization grading 1.83% Cu to 3.45% Cu and up to 0.86 oz/ton Ag. However, it should be noted that this observation was made prior to the discovery of other mineralized sills nearby by F. Goble.

Other showings of low-grade Cu mineralization have also been noted in sediments of the Lower Grinnell, Upper Appekunny and basal Siyeh Formations of this claim group.

## (2) THE BETH CLAIMS

Figure 3 shows that the BETH claims are staked for the most part over rocks of the Precambrian Roosville Formation which overlies rocks of the Phillips and Gateway Formations. In the western sector some of the claims are staked over outcrops of the Phillips Formation. These rocks dip 12°E in the north part of the claims and 11° N in the eastern sector (near the lower contact of the Roosville Formation).

Preliminary (cursory) prospecting has already revealed two significant showings on the BETH claims:

- 1) In BETH #2 near the base of the Roosville Formation the sediments were sampled by a 5 ft. chip and assayed at 0.61% Cu and 0.01 oz/ton Au.
- 2) In BETH #6, again in the same horizon as the mineralization of the previous

locality, a 5 ft. chip sample assayed at 0.38% Cu. The copper mineralization was continuous for a thickness of 10 ft. above this horizon and at this upper level another 5 ft. chip sample assayed at 0.27% Cu. The sediments at this locality dipped 11° N.

(3) THE SAGE CLAIMS

The SAGE claim group has been staked in the western sector of the Lewis Thrust sheet, almost entirely over outcrops of Grinnell Formation sediments which dip ENE 25°. In the NE corner of the group outcrops of Siyeh Formation occur. The map, Fig. 4 illustrates the general geologic setting. The principal showings of mineralization located to date are confined to Grinnell Formation quartzites and appear to be similar in character to the stratabound types seen on the BIGHORN claims (i.e. interstitial bornite-covellite).

(4) THE COMMERCE CLAIMS

The COMMERCE claims are, as can be seen from Fig. 4, staked over a sequence of sedimentary rocks belonging to the Precambrian Appekunny, Grinnell, Siyeh and Sheppard Formations and in part over Purcell Lavas, all of these horizons being intruded by a large stock of younger 'syenite' and in part by small dioritic bodies (e.g. claim #28). Faulting is intense in parts of the claim group and a faulted inlier of Appekunny Formation is a prominent feature 1.5 miles SE of North Commerce Peak in claims #29, 30, 31 and 32.

This group of claims contains some of the most interesting showings seen by the author on the Company's properties. Firstly numerous beds of Appekunny quartzite occurring in the NW face of Commerce Ridge above the lake in claims #31, 32 were seen to be characterized by copper mineralization directly analogous with that seen on the BIGHORN claims in SW Alberta. It is also noteworthy that two quartz veins located near the summit of Commerce Ridge contained tetrahedrite and secondary azurite (grab samples assaying 1.3 to 2.1% Cu and trace to 0.6 oz/ton Ag).

Secondly the presence of an extensive, rusty, gossan-like zone in the 'syenite' of claims #1, 3, 6, 8, 20, 42 and 47 is noteworthy. This zone was examined briefly by the author in October 1971 and two random grab samples of the syenite (all of which were rich in sulfides) assayed at 0.02 oz/Au ton (70¢/ton).

The occurrence of gold mineralization is not unknown in this sector for it is said that Mr. Charles Wise located gold mineralization during trenching on the ridge between Sunkist Mountain and S. Commerce Peak in 1935. This trench yielded an assay of equivalent gold = \$72/ton. It is also noteworthy that the rusty weathering zone has been observed cutting the Siyeh sediments on the south side of Commerce Mountain in an area which is, as yet, unprospected.

#### (5) THE FORUM CLAIMS

The FORUM claims have been staked, in the central part of the Lewis Thrust sheet, on a sequence of Precambrian Gateway, Sheppard, and Siyeh

Formations with the intercalated Purcell Lava, around Forum Lake. An E-W trending gentle anticlinal structure appears to be centred on Forum and Wall Lakes for to the north of these lakes the sediments dip at  $21^{\circ}$  N and to the south at  $15^{\circ}$  S.

Numerous showings of copper mineralization have been located on these claims, the principal ones discovered to date being:

- 1) A number of copper mineralization showings in the L. Sheppard rocks of claims #23 and 24.
- 2) Copper mineralization in dolomitic sediments of the Gateway Formation underlying Forum #4 claim by Forum Falls. Two 5 ft. chip samples from this horizon assayed at 0.32 and 0.54% Cu respectively.

(6) THE OPAL CLAIMS

The OPAL claims (Fig. 6) are mostly underlain by a gently dipping sequence of Siyeh Formation overlying Grinnell and Appekunny sediments. However, the 4 claims #25, 26, 27 and 28 are characterized by outcrops of the younger Sheppard Formation and Purcell Lava.

Showings of copper (+ Pb and Ag) mineralization are numerous in these claims and occur:

- 1) At 3 levels in the Upper Grinnell quartzites of claims #3 and 5. These showings occur along some 700 ft. of strike length. One assay (1 ft. chip) from these sediments revealed 3.5% Pb, 1.3% Cu, 17.8 oz Ag and 0.02 oz Au.

- 2) At two levels, over some 2000 ft. strike length, in the Siyeh rocks of claims #13, 15, 27 and 28. The assays from 5 ft. chip samples from these horizons ranged between 0.01% and 0.08% Cu.

(7) THE LIN CLAIMS

As can be seen from Fig. 7, the LIN claims are staked over an outcrop of Grinnell Formation sediments overlying Appekunny rocks and overlain themselves by Siyeh Formation lithologies. The rocks all dip at 23° to 27° ENE. The Grinnell Formation quartzites of these claims and adjacent areas have revealed a number of showings of copper mineralization. The mineralization seems to be more predominant in the Upper Grinnell sediments. The original claims staked by the Company included ground, north of Kisheneen Creek (SE of claim #6), which was subsequently lost to Strato Ltd. by virtue of a registration timing dispute. These original claims contained quartzite which gave a grab sample assay of 0.3% Cu and 0.47 oz Ag/ton.

However, other showings of copper mineralization have been noted in claims #21, 22 and 26 below Starvation Peak near faults cutting the Grinnell sediments. It is possible that hydrothermal activity associated with these faults may have locally enriched the grades of copper mineralization occurring in the sediments. Such a situation is directly analogous to that encountered in parts of the Yarrow Creek - Spionkop Creek area of the BIGHORN claim group.

Other showings noted during preliminary exploration occur in Grinnell quartzites outcropping on claims #4, 6, 8, 9 and 11. These showings are of

finely disseminated, interstitial bornite-chalcocite and chalcopyrite in the sediments. Other notable Cu showings in Grinnell quartzites and dioritic dykes occur N of Starvation Peak on claims #21, 22, 23 and 24.

### CONCLUSIONS

The economic potential of the Company's properties within SW Alberta and SE British Columbia may be considered in two contexts.

Firstly, it is clear from the showings already encountered on all the claim blocks and on other adjacent properties that the Purcell-Belt rocks of the Lewis Thrust sheet constitute accessible, potential major base metal targets. Not only is there considerable evidence of Cu-Ag mineralization in many horizons (particularly the Upper Grinnell sediments), but there is also evidence of the occurrence of Pb-Cu-Ag mineralization on the OPAL claims. The nature of the mineralization is in all cases suggestive of a stratabound type, comparable with the important deposits of Idaho and Montana which were described by Clarke (1970). However, recent surveys have also revealed that local enrichment of the mineralization occurs adjacent to faults and within minor dioritic intrusions in the district.

Secondly, the occurrence of extensive traces of Au mineralization on the COMMERCE claims is extremely important. Here, in a relatively unexplored sector, traces of gold have been found associated with an extensive 'gossan' zone cutting both the syenite and the Siyeh sediments. Further detailed exploration

of this sector is of high priority.

Finally it should be emphasized that the copper deposits occurring within the diorite sill on the BIGHORN claims may already constitute a small but rich orebody, which with the help of a modest drilling program could well prove mineable in the near future.

### RECOMMENDATIONS

The author concludes that immediate further detailed exploration of all the Company's claims is warranted. However, considering the logistic problems and extreme financial involvement which would be resultant upon the Company attempting to complete such a program alone it is proposed that the Company consider the initiation of its operations according to the following plan:

- (1) The COMMERCE claims should be retained wholly by the Company and a detailed exploration program be initiated, over the areas showing gold and copper anomalies. This program would comprise an initial prospecting phase and, contingent upon the success of the prospecting a subsequent drilling phase.
- (2) The remaining claim blocks in Alberta and British Columbia should be surveyed and prospected as soon as possible and then optioned to larger corporations who have the exploration personnel and support facilities immediately available to initiate more detailed exploration and/or

drilling on the properties.

- (3) Drill programs should be carried out on any of the properties which show promise during the primary exploration phases.

Such a plan, if adopted by the Company, would serve to avoid immediate treasury depletion and to permit the adoption of a policy of digression and active exploration, by virtue of a good cash flow and well maintained assets.

The cost of the initial exploration programs outlined herein are given in the appended estimate.

#### REFERENCES

- BALLY, A.W., GORDY, P.L., and STEWART, G.A., 1966: Structure, seismic data, and orogenic evolution of the Southern Canadian Rocky Mountains, Bull. Can. Petrol. Geol. 14, pp. 337-381.
- CLARKE, A.L., 1970: Stratabound copper sulfides in the Precambrian Belt Supergroup, Northern Idaho and Northwestern Montana. Proceedings of I.M.A. - I.A.G.O.D. Meetings, Japan, p. 98.
- DAWSON, G.M., 1886: Preliminary report on the physical and geological features of that portion of the Rocky Mountains between Latitudes 49 and 51 30'. Geol. Surv. Can. Ann. Rept. 1, pt. B.
- HUME, G.S., 1932: Waterton Lakes - Flathead Valley area, Alberta and British Columbia. Geol. Surv. Can. Summ. Rept., pt. B, pp. 1-20.
- PRICE, R.A., 1964: The Precambrian Purcell system in the Rocky Mountains of Southern Alberta and British Columbia. Bull. Can. Petrol. Geol. 12, pp. 399-426.
- REESOR, J.E., 1957: The Proterozoic of the Cordillera in Southeastern British Columbia and Southwestern Alberta in The Proterozoic in Canada. Roy. Soc. Canada, Spec. Pub. no. 2, pp. 150-177.

STEVENSON, R.W., 1968: Final Report - 1967, Waterton Copper Project,  
Waterton area, Alberta. Kennco Explorations (Western) Ltd.,  
Report.

COST ESTIMATE FOR PRELIMINARY EXPLORATION PROGRAM

(KINTLA EXPLORATIONS LTD)

COMMERCE CLAIMS, SE BRITISH COLUMBIA

Phase 1

Preliminary Geological Survey and Prospecting

(a) Salaries: Geological personnel (8)	\$ 17,000
Cooks (2)	4,000
Helpers (4)	6,000
(b) Camp supplies (tents, sleeping bags etc.)	6,000
(c) Camp operating costs	5,000
(d) Instrumentation (surveying)	2,000
(e) Blasting supplies (drill and explosives)	4,000
(f) Transportation (4-wheel drive vehicle, bulldozer rental etc.)	10,000
(g) Air support (helicopter rental)	5,000
(h) Assaying costs	2,500
(i) Consultants fees	4,000
	<hr/>
Subtotal	\$ 65,500
Add contingency	4,500
	<hr/>
Total cost Phase I	<u><u>\$ 70,000</u></u>

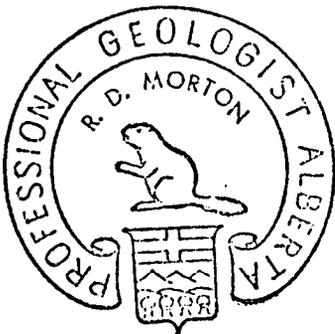


Phase 2

Subsequent drill programs

(a) To drill 10 diamond drill cores (AXT) of 200 ft. @ \$12/ft.	\$ 24,000
(b) Assaying costs	2,000
(c) Geological supervision	5,000
(d) Camp operating costs	3,000
(e) Transportation	4,000
(f) Consultants fees	2,000
	<hr/>
Subtotal	\$ 30,000
Add contingency	3,000
	<hr/>
Total cost Phase 2	\$ 33,000
Total cost of Phase 1 and Phase 2	\$ <u>103,000</u>

Respectfully submitted,



A handwritten signature in cursive script, appearing to read "Roger D. Morton".

Roger D. Morton, B.Sc., Ph.D., P. Geol.

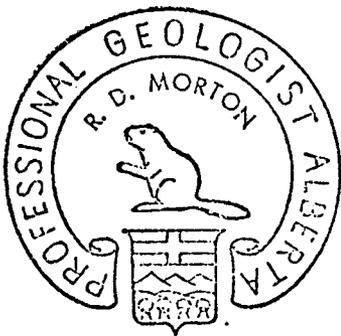
CERTIFICATE

I, Roger D. Morton, of the City of Edmonton, in the Province of Alberta,

hereby declare:

- (1) That I am a registered Professional Geologist in the Province of Alberta.
- (2) That I am a graduate of the University of Nottingham, England with the degrees of Bachelor of Science (Honours Geology) 1956 and Doctor of Philosophy (Geology) 1959.
- (3) That I hold the tenured position of Associate Professor of Geology at the University of Alberta and also serve the mining industry as a Consulting Geologist from my office at 9103 - 118 Street, Edmonton 61, Alberta.
- (4) That I have no interest, either direct or indirect in the properties described in this report nor any interest direct or indirect in Kintla Explorations Ltd.
- (5) That this report is based upon both personal examination of most of the properties during 1969, 1970 and 1971 and upon information contained within those publications cited herein.

Dated at Edmonton, Alberta this 29th day of December, 1971.



A handwritten signature in cursive script that reads "Roger D. Morton".

Roger D. Morton, B.Sc., Ph.D., P. Geol.  
Consultant Geologist

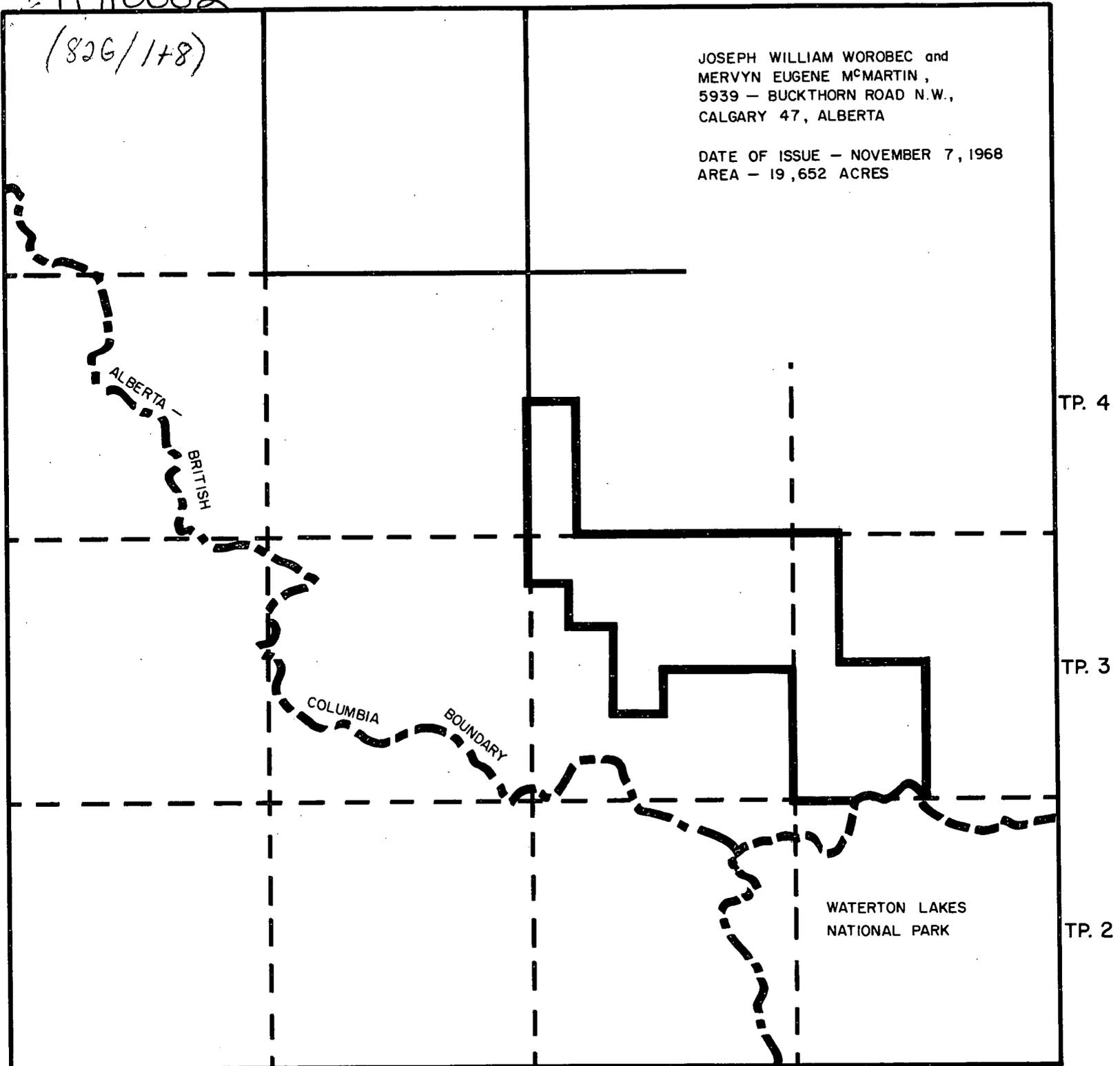
# QUARTZ MINERAL EXPLORATION PERMIT No. 70

19710002

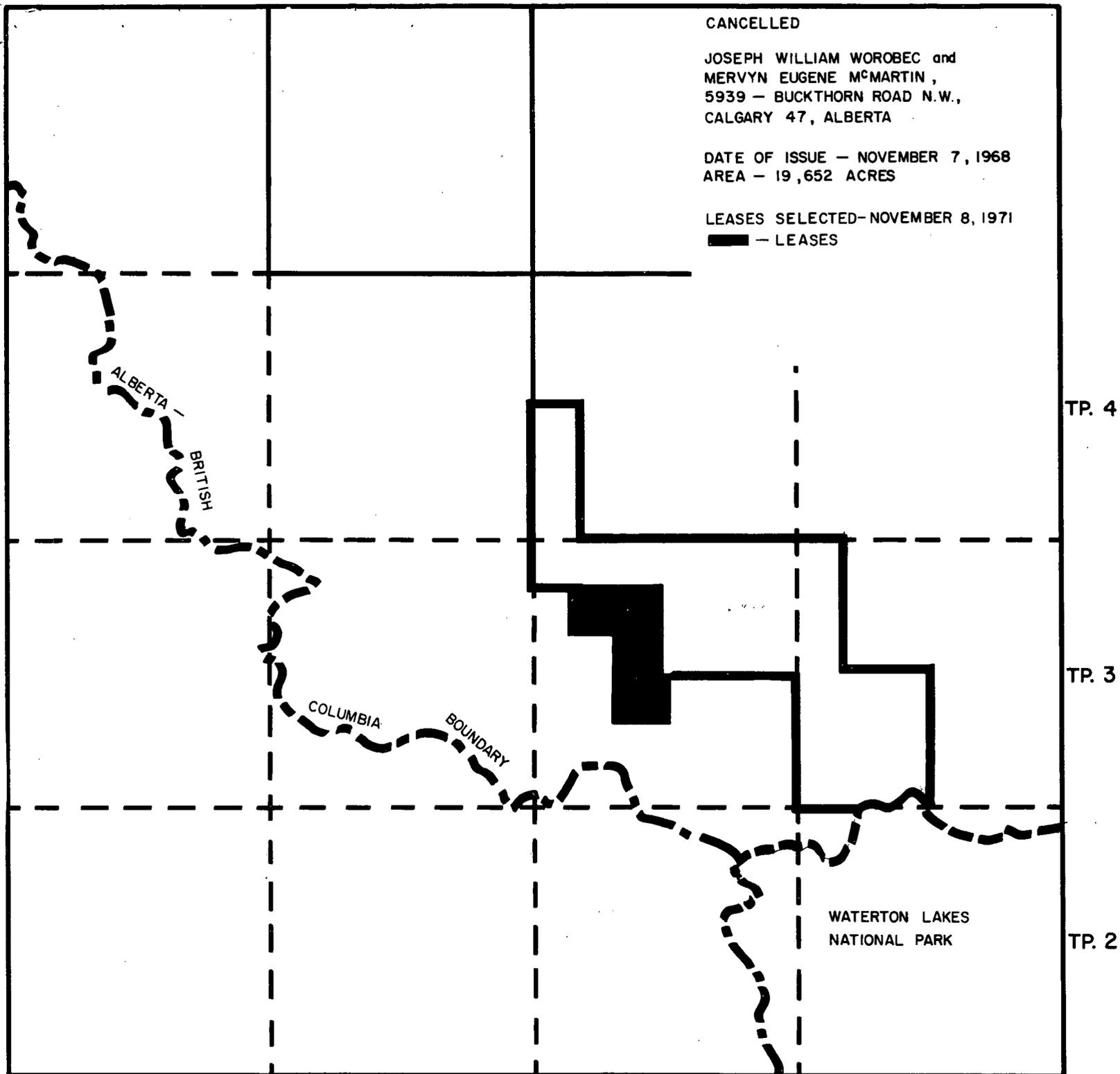
(826/1+8)

JOSEPH WILLIAM WOROBEK and  
MERVYN EUGENE McMARTIN,  
5939 - BUCKTHORN ROAD N.W.,  
CALGARY 47, ALBERTA

DATE OF ISSUE - NOVEMBER 7, 1968  
AREA - 19,652 ACRES



# QUARTZ MINERAL EXPLORATION PERMIT No. 70

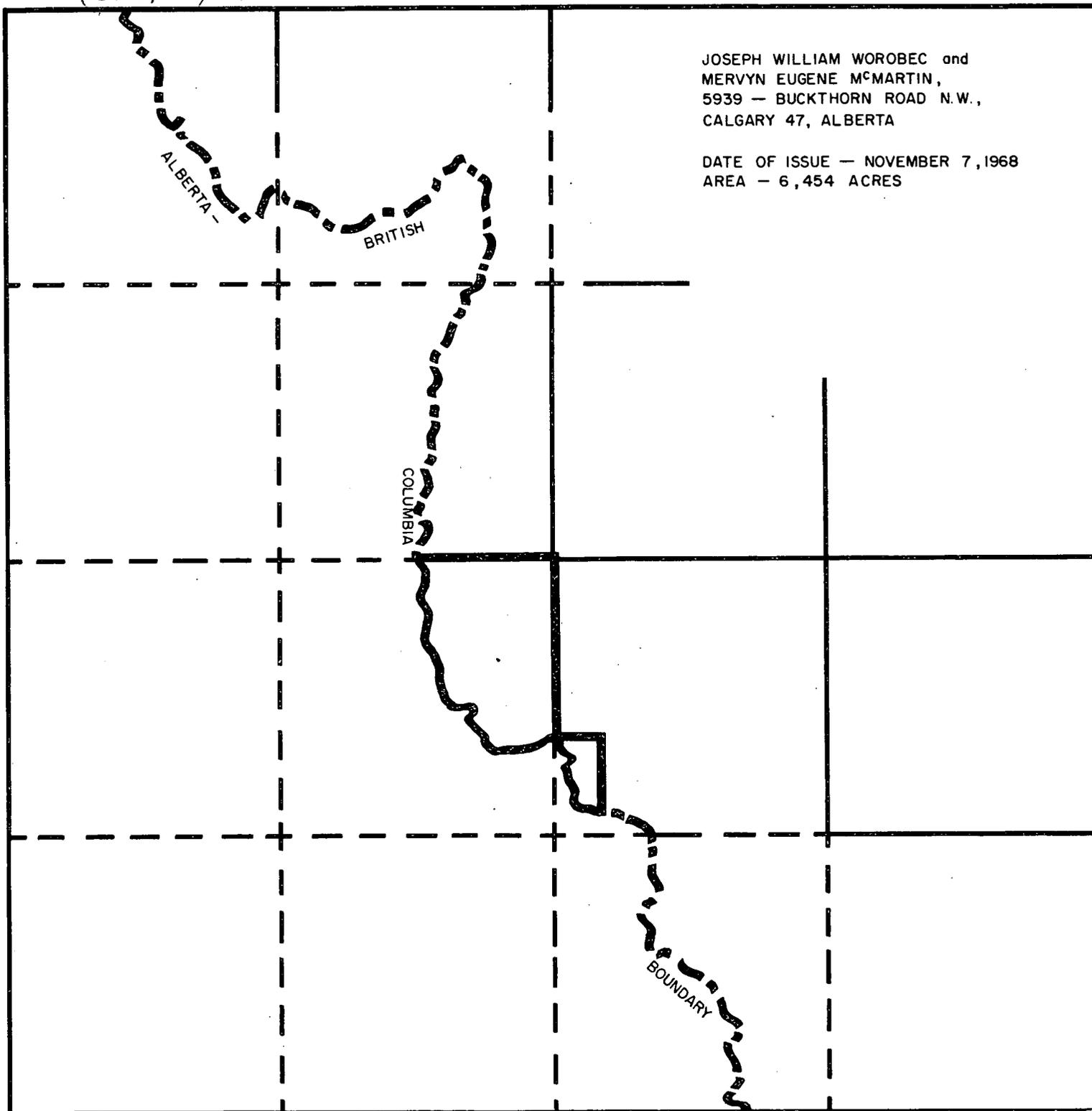


# QUARTZ MINERAL EXPLORATION PERMIT No. 71

(826/7)

JOSEPH WILLIAM WROBEC and  
MERVYN EUGENE M<sup>C</sup>MARTIN,  
5939 - BUCKTHORN ROAD N.W.,  
CALGARY 47, ALBERTA

DATE OF ISSUE - NOVEMBER 7, 1968  
AREA - 6,454 ACRES



R. 5

R. 4

R. 3 W. 5 M.

TP. 6

TP. 5

TP. 4

# QUARTZ MINERAL EXPLORATION PERMIT No. 160

(826/8)

~~CANCELLED~~

JOHN CAMERON PROWSE,  
303 NOBLE BLDG.,  
86th AVENUE and 109th STREET,  
EDMONTON, ALBERTA

DATE OF ISSUE - SEPTEMBER 28, 1970  
AREA - 9,920 ACRES

NO LEASES SELECTED

*Copper*

BRITISH COLUMBIA BOUNDARY  
ALBERTA

TP. 5

TP. 4

R. 4

R. 3

R. 2 W. 5 M.

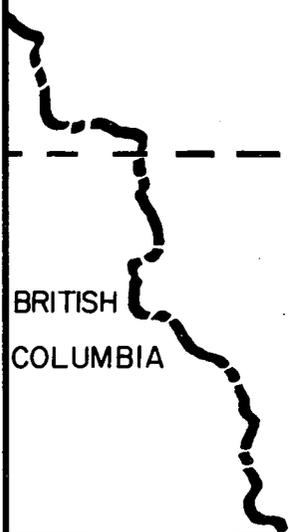
# QUARTZ MINERAL EXPLORATION PERMIT No. 161

(826/8)

ALCOR MINERALS LTD.,  
401 NORTHGATE BLDG.,  
EDMONTON 15, ALBERTA

DATE OF ISSUE - OCTOBER 5, 1970  
AREA - 17,920 ACRES

*Copper*



BRITISH  
COLUMBIA

TP.5

TP.4

R. 3

R. 2

R. 1 W. 5 M.