GEOLOGICAL AND GEOCHEMICAL

REPORT

ON THE

HATSOFF CLAIMS 1 TO 4

GOLDEN MINING DIVISION

LOCATED

FORTY KILOMETRES WEST-SOUTHWEST

OF INVERMERE, B.C.

50°27'N 116°34'W

NTS 82 K/7E

OWNER AND OPERATOR

UTAH MINES LTD.

BY

B. BOWEN, P.ENG.

PROJECT GEOLOGIST

UTAH MINES LTD.

OCTOBER, 1979

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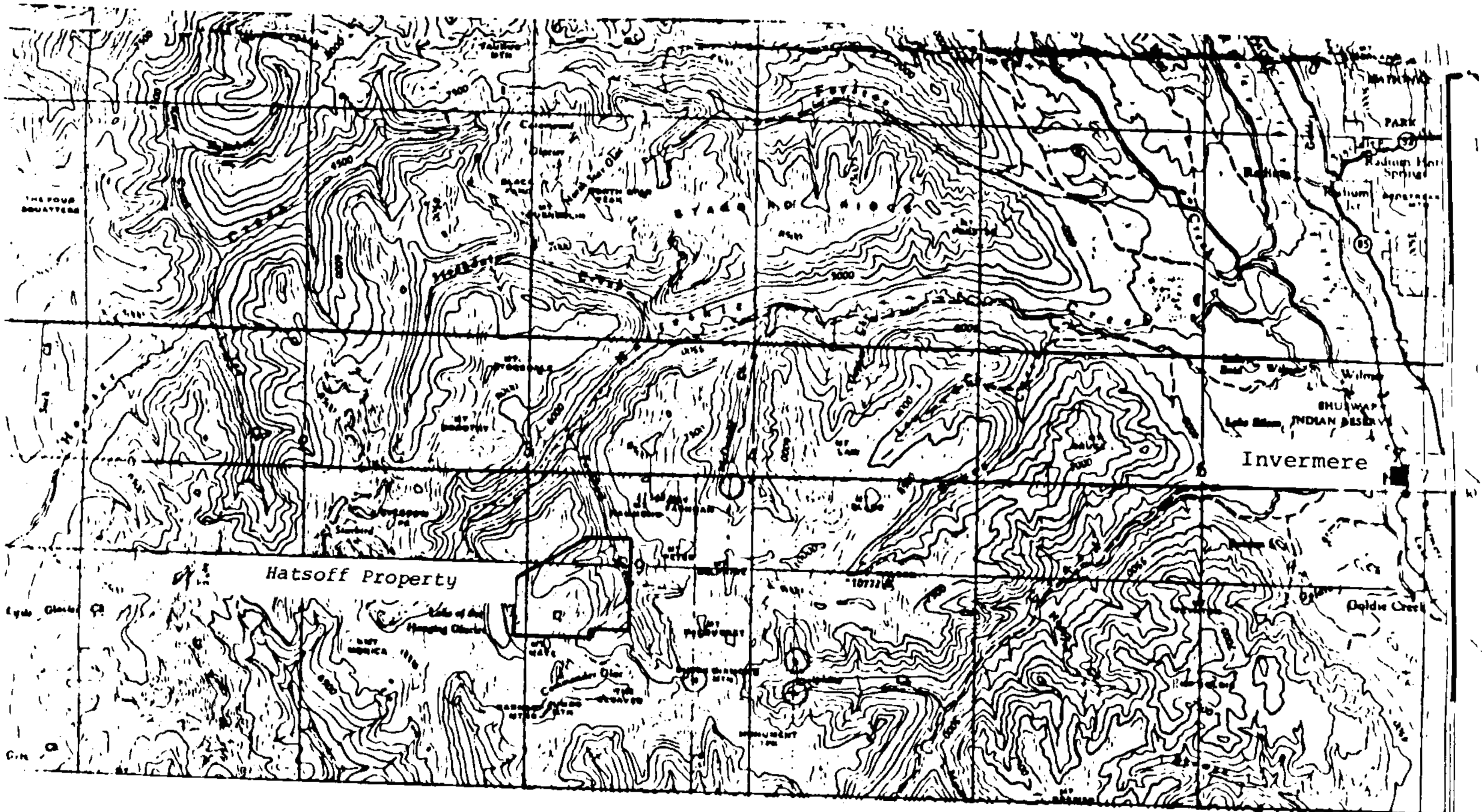
ILLUSTRATIONS (MAP POCKET)



INDEX MAP

HATSOFF CLAIMS

GOLDEN MINING DIVISION

50° 27' N 116° 34' W

82K-7E

SUMMARY

From the 26th to 28th July, 1978 and from the 17th July to 20th August, 1979, Utah did geological and rock geochemical work on the Hatsoff claims 1 to 4. The claims are located east of Lake of the Hanging Glacier, 40 kilometres west-southwest of Invermere, B. C.

The eastern half of the claims area is underlain by Precambrian sediments of the Purcell anticlinorium, intruded on the west by the Cretaceous Hanging Glacier stock. Near its eastern contact, an area of acid intrusives and related quartz-sericite-pyrite-molybdenite stockwork development is exposed. Minor base metallization occurs peripherally. Calcareous units are skarnified and contain scheelite, powellite, chalcopyrite and pyrrhotite.

GEOLOGICAL AND GEOCHEMICAL REPORT ON THE HATSOFF CLAIMS 1 TO 4

INTRODUCTION

From the 26th - 28th July, 1978 and also from the 17th July to 20th August, 1979 geological and geochemical work was done on the Hatsoff claims 1 to 4. The limited 1978 program consisted of preliminary geological mapping at 1:7500 scale and a rock geochemistry orientation survey. In 1979 the claims were mapped in detail at 1:5000 scale. Total area mapped is 750 hectares.

The field work was undertaken by B. Bowen and D. Crowe, geologists and M. Ball and D. Dunn, field assistants.

The property consists of 4 claims (30 units) staked by Utah Mines Ltd. in July, 1978. The area was previously staked (Sec claims) by Union Carbide Canada Ltd.

The Hatsoff claims occupy extremely rugged and heavily glaciated terrain of the Purcell Mountains. All the property is above treeline and elevations range from 2200 to 3200 metres. Approximately 30 to 40 percent of the claims area is covered by glacial ice.

The property is located approximately 40 kilometres west-southwest of Invermere, B. C. at latitude 50°27' and longitude 116°34' on NTS mapsheet 82 K/7E. Access is by 48 kilometres of 2 wheel-drive road which leaves Highway 95 at Radium and follows westerly and southerly along Horsethief and Farnham Creeks. Helicopter access is required for the last 4 kilometres from Farnham Creek to the property - a vertical distance of 1200 metres.

FIELD WORK

During the period July 26 - 28, 1978, an area about 1.6 kilometres in diameter (about 200 hectares in area) was geologically mapped (preliminary) at a scale of 1:7500 and 31 rock and 4 silt samples were collected for Mo, W F, Sn and U analyses.

The above work was done by geologists B. Bowen and D. Crowe, who commuted daily via helicopter from Invermere. A 1:5000 topography map, blown-up to 1:7500 in the area of interest, provided map control for pace and compass and altimeter traverses.

The 1979 program consisted of detailed geological mapping at a scale of 1:5000. Work was done by two 2-man parties. One fly camp was established at 2530 metre elevation in a cirque east of Lake of the Hanging Glacier and a second camp at 2050 metre elevation near Morraine Lake. A third camp was later occupied at Commander Glacier Cirque.

Crampons, ice axes and safety rope were used on snowfields and glaciers where necessary. No rock climbing was attempted and where rock faces were considered too precipitous to traverse safely, the area was left unmapped. Most untraversable areas were examined using binoculars and an attempt was made to correlate observations with known data in mapped areas. For control when using binoculars, brunton and clinometer readings were recorded on dominant structural elements.

In traversable areas, the method of survey was pace and compass, or topofil, supplemented by altimeter readings. A pencil manuscript prepared by Pacific Survey Corporation provided accurate topographic control.

GENERAL GEOLOGY

In the central Lardeau map-area, the Precambrian history is recorded by more than 30,000 feet of Purcell strata, unconformably overlain by as much as 8000 feet of Windermere strata. The Purcell rocks are uniformly fine-grained whereas the Windermere reflects rapid deposition of coarse to fine clastics.

In Mesozoic time occurred a period of regionally important orogeny, with associated regional metamorphism and emplacement of two distinct granitoid sequences. Earlier granitoid intrusions consist of mesocratic quartz diorite and granodiorite, syn to late-kinematic. A later granitoid phase includes quartz monzonites and granodiorites that are post kinematic. They superimpose a structural and metamorphic aureole on early regional structures and metamorphism.

Deformation, both folding and faulting, culminated in the mid-Mesozoic. Folds in the eastern Purcell anticlinorium are characteristically overturned eastward. Important reverse faults are found along the Rocky Mountain Trench and in the central eastern Purcell cutting across the Mount Forster syncline.

Deposits of most economic interest are silver-lead-zinc veins in competent Mount Nelson strata. Black sand placer concentrations containing the columbium-bearing minerals pyrochlore and euxinite are found below the outwash areas of active glaciers in the Bugaboo and Horsethief Batholiths. Non-metallic minerals are found mainly along the Rocky Mountain Trench; most common are barite, mined either for itself or as a by-product of metal mining, magnesite and silica.

DETAILED GEOLOGY

SEDIMENTARY ROCKS

Oldest rocks on the property are grey and black argillites and slates, minor quartzite and limestone of the Helikian Dutch Creek Formation. These rocks are exposed at the head of Farnham Glacier cirque, between East and Wen Glaciers, and in argillaceous exposures in the east half of Hatsoff 3.

Unconformably (?) overlying the Dutch Creek Formation is the Toby Formation, a pebble to cobble polymictic conglomerate. Chert particles predominate in a calcareous matrix. True thickness is approximately 70 metres. The Toby is the basal formation of the Windermere (Hadrynian) Series.

Conformably overlying the Toby conglomerate is the Horsethief Creek Group. Within and adjacent to the claims area only the basal section is exposed and consists of an interbedded sequence of argillite, limestone, quartzites, grits and calcareous argillite.

INTRUSIVE ROCKS:

A) Stocks: The western half of the property is underlain by the Hanging Glacier stock which is roughly 1.5 kilometres in diameter. The rock is medium-grained, 2-3mm, with abundant blocky flesh coloured potash feldspar giving the rock a crowded porphyry texture. Anhedral quartz comprises up to 20 percent of the rock and biotite, 10 - 20 percent as plates and fine books. Overall composition is that of quartz monzonite.

The Hanging Glacier Stock exhibits a border phase 150 to 300 metres wide. The rock is coarse-grained, 3-5mm+, and consists of 20 percent quartz, 25-30 percent platey 3mm biotite and the remainder anhedral white feldspar. Composition of the rock is in the granodiorite to quartz monzonite range. The core of the Hanging Glacier stock exhibits a coarsely porphyritic texture. Potash feldspar grains, 2 to 3cm, comprise 5 to 10 percent of the rock.

B) Plugs: A number of younger intrusive phases, plug-like in dimension, have intruded the Hanging Glacier stock near its eastern contact. These phases are partially exposed along the central ridge between West and East Glaciers. The northern third of the ridge is underlain by a fine-grained (< 1mm), equigranular, peppery-textured phase containing 20 percent quartz, 30 percent biotite and the remainder white anhedral feldspar. The rock is quartz monzonite to granodiorite in composition. Contacts with the medium-grained phase of the Hanging Glacier stock are vague.

A quartz porphyry phase outcrops as two separate bodies. The southern body intrudes the Hanging Glacier border phase, is elongate in a north-south direction and measures 300 by 100 metres. Contacts are gradational over a few metres. The northern body is only partially exposed and exhibits sharp contacts with the medium-grained phase of the Hanging Glacier stock.

The quartz porphyry phase is characterized by 10 percent rounded, smokey quartz eyes, 2-5mm+, 10-15 percent flakey biotite, 1-2mm, set in fine (< .5mm) granular groundmass of quartz and feldspar.

The northern porphyry body is cut by an alaskite phase which is only partially exposed for about 100 metres on the western side of the central ridge. The rock is medium-grained, 2 to 4mm, leucocratic (< 2 percent biotite), quartz rich and contains abundant flakey muscovite. The rock carries 1 percent disseminated pyrite and specks of disseminated molybdenite.

C) Dikes: Aplite and related felsic dikes are common in the contact area of the Hanging Glacier stock, and extend from within the coarse border phase to 100 metres or more into the sediments. The dikes are buff to cream coloured, aphanitic to fine-grained and sometimes carry traces of disseminated pyrite.

Alaskite dikes are variable in texture but generally are somewhat finer grained than the alaskite plug. Alaskite dikelets within 50 metres of the contact carry 1-2 percent disseminated pyrite and appreciable disseminated molybdenite. An alaskite dike a few metres wide outcrops at 11950N and 12520E and strikes 145° dipping 75° SW. It carries disseminated pyrite and traces of molybdenite on fracture planes. In the vicinity of 12550N and 12600E, 3 alaskite dikes striking 070° and dipping moderately to steeply north and south cut argillite. The dikes are less than 0.5m wide and carry up to 2 percent disseminated pyrite and trace to minor disseminated molybdenite.

At 12,100N and 12,450E a 4-6 metre wide muscovite-rich dike strikes 150° and dips 65° SW. The dike contains remnant clay-altered feldspars, 5-10 percent 5mm quartz eyes, and 2 percent disseminated pyrite. Molybdenite occurs as trace disseminations and in moderate amounts as fracture fillings with quartz.

A third dike rock 0.5 to 1 metre in width strikes 135° and dips 70-85° SW. It outcrops discontinuously over a strike length of 1000 metres from the SW corner of Hatsoff 2 to the centre of Hatsoff 1. The rock is dark greenish grey and weakly magnetic. It contains 5-10 percent smokey rounded quartz eyes up to 5mm, 30 percent anhedral to subhedral feldspar, 2-4mm and 10 percent bookish biotite. The groundmass is a fine-grained assemblage of biotite, quartz and feldspar. Rock name is feldspar-quartz-biotite porphyry.

STRUCTURE

The Purcell anticlinorium is the dominant structural feature in the map-area and vicinity. Three synclinal closures are well exposed on the north wall of the West Farnham Creek cirque to the northeast of the claims area. The most westerly closure outcrops immediately north of Hatsoff 1 claim and has an amplitude of 800 to 1000 metres. The trough of a second closure is exposed on the southwest margins of Wen Glacier. Folds are generally symmetric and plunge 5 to 15° north at average azimuth 337°. Axial planes are near vertical or dipping steeply to the east.

No major regional breaks have as yet been recognized in the immediate vicinity of the Hatsoff claims. The only significant fault-shear direction is 080 to 090°, dipping vertically or steeply north and south. Faults are generally less than 1 metre wide with moderate gouge development and associated clay-chlorite alteration.

Fracture density is variable. A fracture stockwork zone in intrusive is exposed for about 300 metres on the precipitous east-facing slope of the central ridge. Stockwork development is generally weak to moderate, and consists of quartz veinlets or quartz-muscovite (sericite)-pyrite fracture filling. A similar stockwork is developed in hornfelsed sediments immediately east of East Glacier. Width of this zone is approximately 500 metres and extends from 12,200N to 12,700N. Fractures contain narrow veinlets of quartz-pyrite with up to 5cm of muscovite (sericite) selvage. Later fractures cutting the above stockwork are filled with quartz-carbonate-pyrite. Away from the stockwork zone, there is a transition zone, 100 to 200 metres wide, of relatively weak random fracturing.

Beyond the transition zone, fracture development is weak but roughly arranged in a convergent pattern. Attitudes of fractures immediately west of West Glacier vary from 050°/50-80°N to 095/60-88°S and project to a point of convergence at about 11900N and 12400E. This point coincides with the strongest stockwork development and also is the approximate centre of the southern quartz porphyry plug.

Attitudes of fractures immediately west of Wen Glacier are weakly convergent and vary from azimuth 055-085°, both sets generally dipping vertically or steeply north. There is insufficient data to determine whether these fractures are an expression of the Hanging Glacier stock emplacement or later plug activity.

ALTERATION

A) Thermal Metamorphism: Strongest thermal effects in the sediments are within and adjacent to the quartz-sericite-pyrite stockwork zone. Metamorphic biotite imparts a purplish-brown colouration to slates and argillites. Spotted hornfels (cordierite, andalusite) was noted in several locations. These stronger effects may be related to intrusive activity at depth. In other areas, the contact aureole of the Hanging Glacier stock exhibits strong baking or hornfelsing and extends several 100's of metres beyond the contact. All limestone units have been recrystallized to marble.

B) Skarn Development: Quartz-tremolite development is widespread in pure limestone units, calcareous argillite and in the calcareous matrix of the Toby conglomerate. Within and adjacent to the stockwork zone, calcareous units show a higher thermal grade of skarnification to quartz-garnet-diopside.

C) Stockwork and Related Hydrothermal Features: The majority of hydrothermal features are structurally controlled. The stockwork zone of quartz veinlets or quartz-muscovite (sericite)-pyrite fracture filling has been described. In the vicinity of 11,900N 12,500E, a zone of 2 dominant sets of intense phyllic structures at 080°/90° and 000°/60-70°E is associated with minor shearing and faulting. The phyllic features vary from a few centimetres up to 0.5 metres wide. Where fracture density approaches more than 6 per foot, the rock exhibits pervasive phyllic alteration. Otherwise, exposures are fresh to moderately argillized.

In the transition zone, quartz veining is weak to locally moderate, there is the occasional stong phyllic structure and most fractures are coated with sericite-pyrite-(quartz). In convergent fractures on the ridge west of West Glacier, quartz filling is up to 30 cm in width with sericitic selvages.

Pervasive silica and lesser sericite occurs locally within and adjacent to the stockwork zone in sediments. Moderate to strong clay, with lesser chlorite is associated with most faults and shears.

MINERALIZATION

Pyrite is the most abundant and widespread sulphide. It occurs as masses up to a few centimetres across in quartz veins in amounts up to 5 to 10 percent; as strong disseminations in phyllic structures; in sericitic selvage of quartz veins; as fracture coatings in intrusives and sedimentary rocks; as fine disseminations and smears along foliae in argillite and slates within and adjacent to the stockwork zone, and in quartz-carbonate veins which crosscut the stockwork.

Molybdenite is the second most common sulphide. It was frequently noted in the stockwork exposure on the east face of the central ridge in quartz veinlets and associated sericitic selvage, in phyllic structures and less commonly as fracture coatings with pyrite and sericite; as disseminations and fracture fill in the alaskite plug and dikes and in minor amounts in the convergent fracture set to the west. Minor molybdenite was also noted in sediments within and adjacent to the stockwork zone. Here it occurs in quartz veins and veinlets, as smears along fractures and foliation planes, as coarse rosettes in tremolitic skarn and as disseminations in quartz-garnet-diopside skarn.

Minor base metallization occurs peripheral to the stockwork zone. Sphalerite was noted in quartz fracture fill in the vicinity of 12300N 12200E. Galena and malachite occur in a quartz vein at 12200N 12850E. Coarse galena float was noted at 12240N 12720E and 12420N 13100E. Chalcopyrite and pyrrhotite are found in quartz-garnet-diopside skarn at 12930N, 12580E and 12730N, 12750E. In places the pyrrhotite occurs as bands a few 10's of centimetres thick.

Minor scheelite is associated with skarnified calcareous units. The better concentrations are found associated with powellite in the chalcopyrite and pyrrhotite bearing skarns.

Secondary minerals observed include limonite, ferrimolybdite, powellite (after molybdenite) and very minor malachite. Other gangue minerals in quartz veins or as fracture fill include fluorite at 12250N 12170E and beryl (in quartz vein float).

ROCK GEOCHEMISTRY

In July, 1978 a suite of 34 rock samples was collected for Mo, W, F, Sn and U analyses. Results are plotted on Plate 1. Most samples collected were unmineralized wallrock. Qualitative remarks on analytical results are given below:

(i) The general magnitude of results is low but some weak trends are apparent.

(ii) The phyllically altered zone contains above background amounts of Mo (up to 75 ppm vs 1-2 ppm background), W (6-22 ppm vs 2 ppm background) and F (?) ($>$700 ppm vs $<$600 ppm backgound).

(iii) Alaskite dike varieties contain consistently higher amounts of Mo (7-100 ppm, avg. 32 ppm), W (4-6 ppm) and U (2.5-8.5 ppm, avg. 6 ppm).

(iv) Strongest peaks for Mo, W and F occur in altered limestone and calc-silicates, but statistically these are not significant and represent only a lithologic bias to the sampling.

(v) Uranium values in the sediments are low ($<$ 0.5 ppm) relative to background values in the intrusives (1-4 ppm range).

(vi) All Sn values are background (1-2 ppm range).

CONCLUSIONS

The best molybdenum potential is in the zone of quartz-sericite-pyrite-molybdenite stockwork. Field relationships strongly suggest a genetic relationship between alaskite and pyrite-molybdenite mineralization.

Tungsten as scheelite in skarn is best developed in narrow skarn layers within and adjacent to the stockwork zone. Thicker marble units in the basal section of the Horsethief series do not project into the stockwork zone and are only weakly mineralized.

The rock geochemistry orientation survey returned rather bland results and proved not to be a definitive decision making survey in the early stages of prospect investigation.

B.K. Bowen

B.K. Bowen P.Eng.
Project Geologist

/cn

<u>REFERENCES</u>

REESOR, J.E. G.S.C. Memoir 369: Geology of the Lardeau map-area, East-Half, British Columbia, 1973.

Geology, Exploration and Mining in British Columbia, B. C. Department of Mines and Petroleum Resources, p. 73, 1972 (Sec claims).

APPENDIX A

STATEMENT OF QUALIFICATIONS

STATEMENT OF QUALIFICATIONS

The field work for the report was done by the following persons whose qualifications are outlined below:

1. B. BOWEN, P.Eng., Project Geologist for Utah Mines Ltd., Vancouver, British Columbia.
   Completed B.A.Sc. at the University of British Columbia in 1970; worked as a student during the summer field seasons with Cominco Ltd. in 1967 and 1968 and with Wayland S. Read, Consulting Geologist, Vancouver, British Columbia in 1969; employed as a field geologist, Gibralter property, May, 1970 to October, 1970 by Placer Development Ltd.; employed as a field geologist, Alice Springs, N.T., Australia, from March, 1971 to December, 1971 by Central Pacific Minerals, N.L.; employed as mine geologist, Tungsten, Northwest Territories, Canada from May, 1972 to March, 1974 by Canada Tungsten Mining Corporation; employed by Utah Mines Ltd. from March, 1974 to date as a geologist under the supervision of A.J. Schmidt, P.Eng.

2. D. CROWE, Temporary Geologist, Utah Mines Ltd., Vancouver, British Columbia.
   Completed B.Sc. at the University of British Columbia in 1976; employed by Cominco Ltd., Canex Placer Ltd. and Utah Mines Ltd. in the summers of 1973, 1974 and 1975 respectively as an assistant geologist; employed by Utah Mines Ltd. in the 1976-79 field seasons as a geologist under the supervision of A.J. Schmidt, P.Eng.

APPENDIX B

STATEMENT OF COSTS

STATEMENT OF COSTS

A) PRELIMINARY GEOLOGICAL SKETCH MAP AND ROCK GEOCHEMISTRY ORIENTATION SURVEY

SALARIES

B. BOWEN - July 26-28/78 inclusive 3 days @ $71.00 per day	$213.00	
D. Crowe - July 26-28/78 inclusive 3 days @ $50.00 per day	$150.00	
	$363.00	$ 363.00

ACCOMODATION

6 man days @ $25.00 per day		$ 150.00

HELICOPTER

Jet Ranger (206) 3.9 hours @ $315.00	$1228.50	
Fuel 3.9 hours @ $ 25.00	$ 97.50	
	$1326.00	$1326.00

ASSAYS

Total cost		$ 615.04

REPORT

Total cost		$ 200.00
	TOTAL	$2654.04

B) DETAILED GEOLOGICAL MAPPING

SALARIES

B. BOWEN -	July 17-30, August 4, 19, 20/79 17 days @ $80.00 per day	$1360.00	
D. CROWE -	July 17-30, August 4-5, 19-20/79 18 days @ $58.00 per day	$1044.00	
M. BALL -	July 18-30, August 3-6, 19-20/79 19 days @ $45.00 per day	$ 855.00	
D. DUNN -	July 18-30, August 3-6, 19-20/79 19 days @ $48.00 per day	$ 912.00	
		$4171.00	$ 4171.00

ACCOMODATION

11 man days @ $30.00 per man day	$ 330.00

GROCERIES

Total cost	$ 602.82

MISCELLANEOUS HARDWARE

Total cost	$ 100.62

MOUNTAIN CLIMBING EQUIPMENT

Total cost	$ 242.00

SBX-11A RENTAL

18 days @ $6.25 per day	$ 112.50

PENCIL MANUSCRIPT

Total cost	$ 960.00

B) <u>DETAILED GEOLOGICAL MAPPING</u> - Continued

<u>HELICOPTER</u>

Jet Ranger (206)	11.6 hours @ $335.00	$3886.00	
Fuel	11.6 hours @ $ 25.00	$ 290.00	
		$4176.00	$ 4176.00

<u>REPORT COST</u>

Total cost		$ 1000.00
	TOTAL	$11694.94
A) Preliminary Geological Sketch Map and Rock Geochemistry Orientation Survey		$ 2654.04
B) Detailed Geological Mapping		$11694.94
	GRAND TOTAL	$14348.98

B. K. Bower
Oct. 6/79

APPENDIX C

ANALYTICAL RESULTS

CHEMEX LABS LTD.

... AVE
... VANCOUVER B.C.
... V7J 2C1
TELEPHONE 985-0648
AREA CODE 604
TELEX 043-52597

ANALYTICAL CHEMISTS GEOCHEMISTS REGISTERED ASSAYERS

CERTIFICATE NO. 34062
INVOICE NO. 26963
RECEIVED August 1, 1978
ANALYSED August 7, 1978

TO: Utah Mines Ltd.,
1600 - 1050 W. Pender St.,
Vancouver, B.C.
V6E 3S7
ATTN:

SAMPLE NO. :	% MoS_2	% WO_3	
30041	0.006	0.03	←
76468	<0.001	0.03	← HATSOFF.

MEMBER CANADIAN TESTING ASSOCIATION

CHEMEX LABS LTD.

... ROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE 985-0648
AREA CODE 604
TELEX 043-52597

ANALYTICAL CHEMISTS GEOCHEMISTS REGISTERED ASSAYERS

CERTIFICATE NO. 44744
INVOICE NO. 27389
RECEIVED August 1/78
ANALYSED August 9/78

TO: Utah Mines Ltd.
1600 - 1050 W. Pender
Vancouver, B.C.

ATTN: ALL HATSOFF cc: B. K. Bowen

SAMPLE NO. :	PPM Mo	PPM Sn	PPM W	PPM U	PPM F	PPM Cu	Rocks
30031	2		2		640		
30032	1		2		510		
30033	1		2		470		
30034	1		2		350		
30035	2		2		270		
30036	2		2		355		
30037	1	2	2		430		
30038	1	16	2		155		
30039	1	1	2		315		
30040	165	2	4		260		
67755	1		110 ✓				
67756	> 200		2				
67757	77		55 ✓				
67758	200		200 ✓				
67759	8		70		1450		
67760	9		250				
67761	2		2		550		
67762	130	1	2	< 0.5	480		
67763	13		6		600		
67764	1	1	2	2.0	75		
67765	1		2		65		
67766	1		2		360		
67767	1		2		110		
67768	1	1	2	1.5	520		
67769		1	2				
67770		1	2				
67771	100		2		530		
67772	14		6		470		
67773	5		2		830	4	
67774	2		22		780		
67775	1		2		950		
76464	12		20		720		
76465	1		2		890		
76466	1		2		540		
76467	6		2		620		
76469	74		10		520		
76470	25		4		335		
76471	7		2		285		
76472	1		2		740		
76473	2		6		700		
STD.	5		2				

Note: Tungsten values below detection limit of 4 ppm reported as 2 ppm.

RECEIVED
AUG 2 ... 1978
UTAH MINES LTD.
EXPLORATION ...

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: [signature]

CHEMEX LABS LTD.

2 ?C ?SBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE 985-0648
AREA CODE: 604
TELEX: 043-52597

ANALYTICAL CHEMISTS GEOCHEMISTS REGISTERED ASSAYERS

CERTIFICATE NO. 44745
INVOICE NO. 27389
RECEIVED August 1/78
ANALYSED August 9/78

TO: Utah Mines Ltd.
1600 - 1050 W. Pender
Vancouver, B.C.

ATTN: HATSOFF.

cc: B. K. Bowen

SAMPLE NO. :	PPM Mo	PPM w	PPM F
76474	2	2	500

Note: Tungsten values below detection limit of 4 ppm reported as 2 ppm.

RECEIVED
AUG 2 ? 1978
UTAH MINES LTD.
EXPLORATION DEPT.

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: [signature]

CHEMEX LABS LTD.

2 ... ROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE 985-0648
AREA CODE 604
TELEX 043-52597

ANALYTICAL CHEMISTS GEOCHEMISTS REGISTERED ASSAYERS

CERTIFICATE NO. SP 0397
INVOICE NO. 27394
RECEIVED August 1/78
ANALYSED August 10/78

TO: UTAH Mines Ltd.
1600 - 1050 W. Pender
Vancouver, B.C.

ATTN: HATSOFF cc: B. Bowen

RECEIVED AUG 15 1978 UTAH MINES ... EXPLORATION DEPT

SAMPLE NO. :	Lower Concentration Limit (PPM)	67762	67764	67768
Antimony	50	bcl	bcl	bcl
Arsenic	50	bcl	bcl	bcl
Barium	5	70	150	700
Beryllium	5	bcl	bcl	bcl
Bismuth	5	bcl	bcl	bcl
Boron	20	bcl	bcl	100
Cadmium	20	bcl	bcl	bcl
Calcium	0.05%	10%	0.7%	0.5%
Chromium	10	70	100	100
Cobalt	10	bcl	bcl	bcl
Copper	1	1	2	30
Gallium	2	< 5	10	10
Germanium	20	bcl	bcl	bcl
Indium	50	bcl	bcl	bcl
Iron	0.05%	1%	0.2%	2%
Lead	5	5	20	10
Magnesium	0.02%	5%	0.05%	1%
Manganese	5	500	300	100
Molybdenum	10	bcl	bcl	bcl
Nickel	5	bcl	bcl	bcl
Niobium	50	bcl	bcl	bcl
Silver	1	bcl	bcl	bcl
Strontium	2	50	20	50
Tellurium	200	bcl	bcl	bcl
Thorium	100	< 200	< 200	< 200
Tin	10	bcl	bcl	10
Titanium	5	500	300	1500
Vanadium	10	< 20	< 20	< 20
Zinc	50	100	bcl	bcl
Zirconium	20	bcl	50	100

SEMI QUANTITATIVE SPECTROGRAPHIC ANALYSES

>5000 ppm => 5000 ppm | 50 ppm = 25–100 ppm
5000 ppm = 2500–10000 ppm | 20 ppm = 10–50 ppm
2000 ppm = 1000–4000 ppm | 10 ppm = 5–20 ppm
1000 ppm = 500–2000 ppm | 5 ppm = 2–10 ppm

500 ppm = 250–1000 ppm | 2 ppm = 1–4 ppm
200 ppm = 100–400 ppm | 1 ppm = 0.5–2 ppm
100 ppm = 50–200 ppm | bcl = below concentration limit

Ranges for Iron, Calcium & Magnesium are reported in %

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: [signature]

CHEMEX LABS LTD.

2... ROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: 985-0648
AREA CODE: 604
TELEX: 043-52597

ANALYTICAL CHEMISTS GEOCHEMISTS REGISTERED ASSAYERS

CERTIFICATE NO. 45113

TO: Utah Mines Ltd.
1600 - 1050 W. Pender
Vancouver, B.C.
V6E 3S7

ATTN: B.K. Bowen

INVOICE NO. 27629

RECEIVED August 14, 1978

ANALYSED August 21, 1978

ROCKS

SAMPLE NO. :	PPM Mo	PPM U	PPM W	PPM F	PPM Sn	
30042	250	1.0	6	165	1	HATSOFF
30043	250	7.0	6	790	1	
30044	115	1.0	10	620	1	
30045	100	< 0.5	4	117	1	
30046		< 0.5	2			
30047	2	4.0	2	155		

UTAH MINES LTD. EXPLORATION DEPT.

MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: Hart Bichler

... BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE 985-0648
AREA CODE: 604
TELEX: 043-52597

CHEMEX LABS LTD.

ANALYTICAL CHEMISTS GEOCHEMISTS REGISTERED ASSAYERS

CERTIFICATE NO. 45045
INVOICE NO. 27564 (65)
RECEIVED August 10, 1978
ANALYSED August 18, 1978

TO: Utah Mines Ltd.
1600 - 1050 W. Pender
Vancouver, B.C.
V6E 3S7

ATTN: B.Bowen

ALL HATSOFF

Prev. Cert. 44744 & 44745

SAMPLE NO. :	PPM U	PPM Sn	PPM F
30031	3.0	2	
32	0.5	2	
33	0.5	1	
34	0.5	1	
35	3.0	1	
30036	2.0	1	
67755	< 0.5	1	2150
56	< 0.5	1	470
57	< 0.5	1	1100
58	< 0.5	1	420
59	1.0	1	
60	< 0.5	1	1100
61	< 0.5	2	
63	6.5	1	
71	3.0	1	
72	2.5	1	
73	2.5	1	
74	4.0	1	
67775	1.5	1	
76464	1.5	1	
65	1.5	1	
66	1.5	1	
67	1.0	1	
69	1.0	1	
70	8.5	1	
71	2.5	1	
72	3.5	1	
73	1.5	1	
76474	4.5	1	

RECEIVED
AUG 25 1978
UTAH MINES LTD.
EXPLORATION DEPT.

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: Hart Bichler

CHEMEX LABS LTD.

ANALYTICAL CHEMISTS   GEOCHEMISTS   REGISTERED ASSAYERS

CANADA V7J 2C1
TELEPHONE 985-0648
AREA CODE 604
TELEX 043-52597

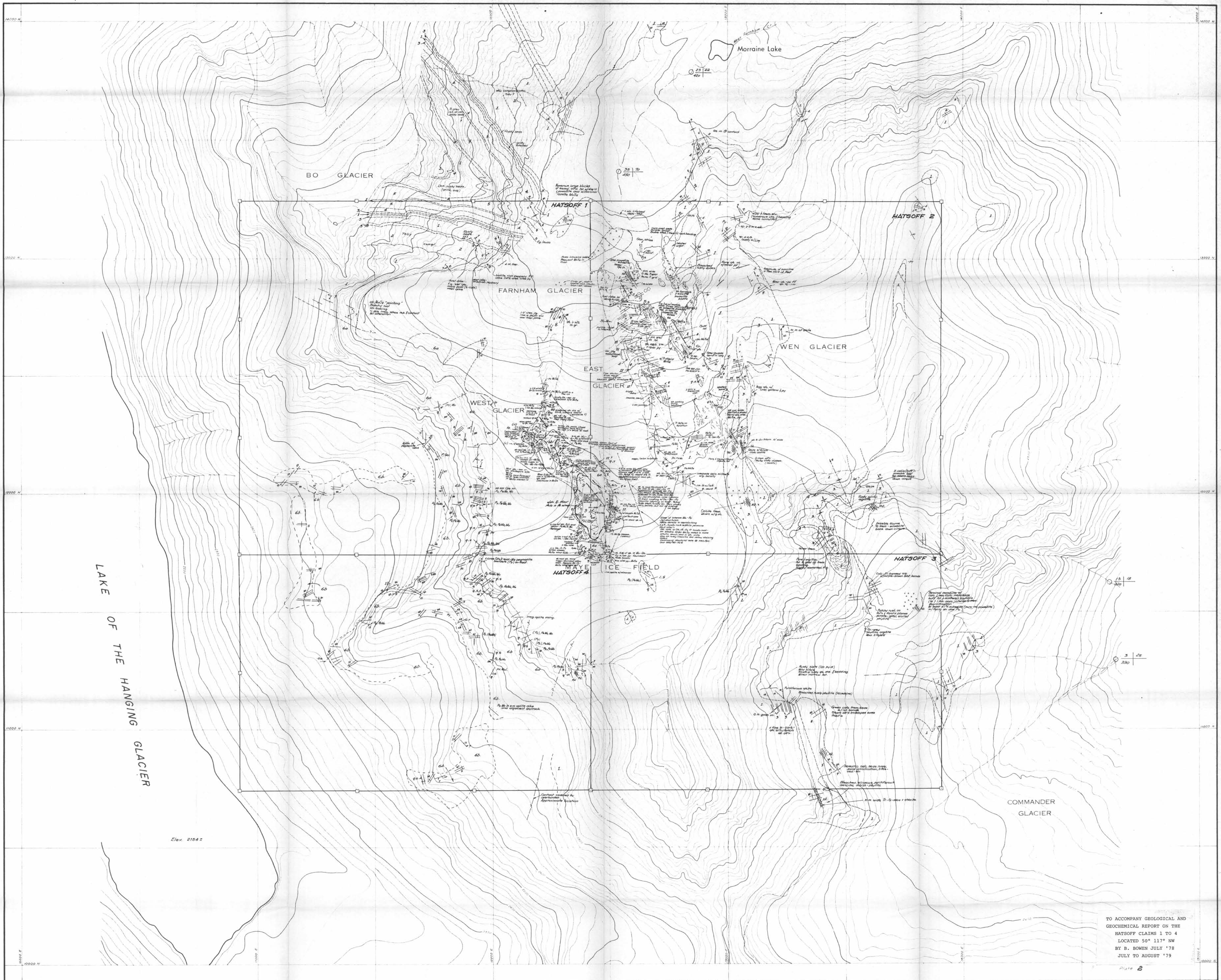
CERTIFICATE NO. 34431
INVOICE NO. 28304
RECEIVED Sept. 21/78
ANALYSED Sept. 28/78

TO: Utah Mines Ltd.,
1600 - 1050 W. Pender St.,
Vancouver, B.C.
V6E 3S7

ATTN: ALL HATSOFF.   DON CROW

SAMPLE NO. :	% Mo	% WO_3	
76500	0.003	0.02	Cert # 33966
67756	0.232		" 44744
67758	0.026	0.04	" 44744
67760		0.05	" 44744

CTA MEMBER CANADIAN TESTING ASSOCIATION



TO ACCOMPANY GEOLOGICAL AND
GEOCHEMICAL REPORT ON THE
HATSOFF CLAIMS 1 TO 4
LOCATED 50° 117° NW
BY B. BOWEN JULY '78
JULY TO AUGUST '79

Plate 2

LEGEND:

INTRUSIVE ROCKS

- 11 Alaskite: plug, dike
- 10 Quartz feldspar biotite porphyry dike
- 9 Quartz porphyry
- 8 Fine grained phase
- 7 Aplite
- 6b Medium grained quartz monzonite
- 6a Coarse grained quartz monzonite

SEDIMENTARY ROCKS

- 5 Calcareous argillite
- 4 Grit, quartzite
- 3 Limestone
- 2 Conglomerate
- 1 Slate, argillite

ALTERATION

- Quartz Veins
- Phyllic structures: Quartz-muscovite (Sericite) pyrite
- Sericite-pyrite-(quartz) fracture filling
- Kaolinization
- Skarn: Tr.-tremolite, g-garnet, diop.-diopside, e-epidote

MINERALIZATION

Sulphides:
Py-pyrite, MoS_2-molybdenite, Cpy-chalcopyrite
Sph.-sphalerite, Gal.-galena, Po-pyrrhotite

Others:
Scheelite, powellite, F-fluorite, FeMo-ferrimolybdite
Lim.-limonite

Pyrite smears and disseminations along foliae

SYMBOLS

- Bedding (inclined, vertical)
- Joints, fractures: number of lines shows relative intensity.
- Shear, fault
- Syncline (defined, approximate) Arrow indicates plunge
- Anticline (defined, approximate) Arrow indicates plunge
- Float, talus rubble
- Approximate limit of outcrop
- Silt sample, values in ppm.
- Geologic contact (observed, inferred, doubtful)
- Topographic contours in meters
- Limit of glacier
- Creek
- LCP Legal Corner Post
- Corner Post or Identification Post

7534

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

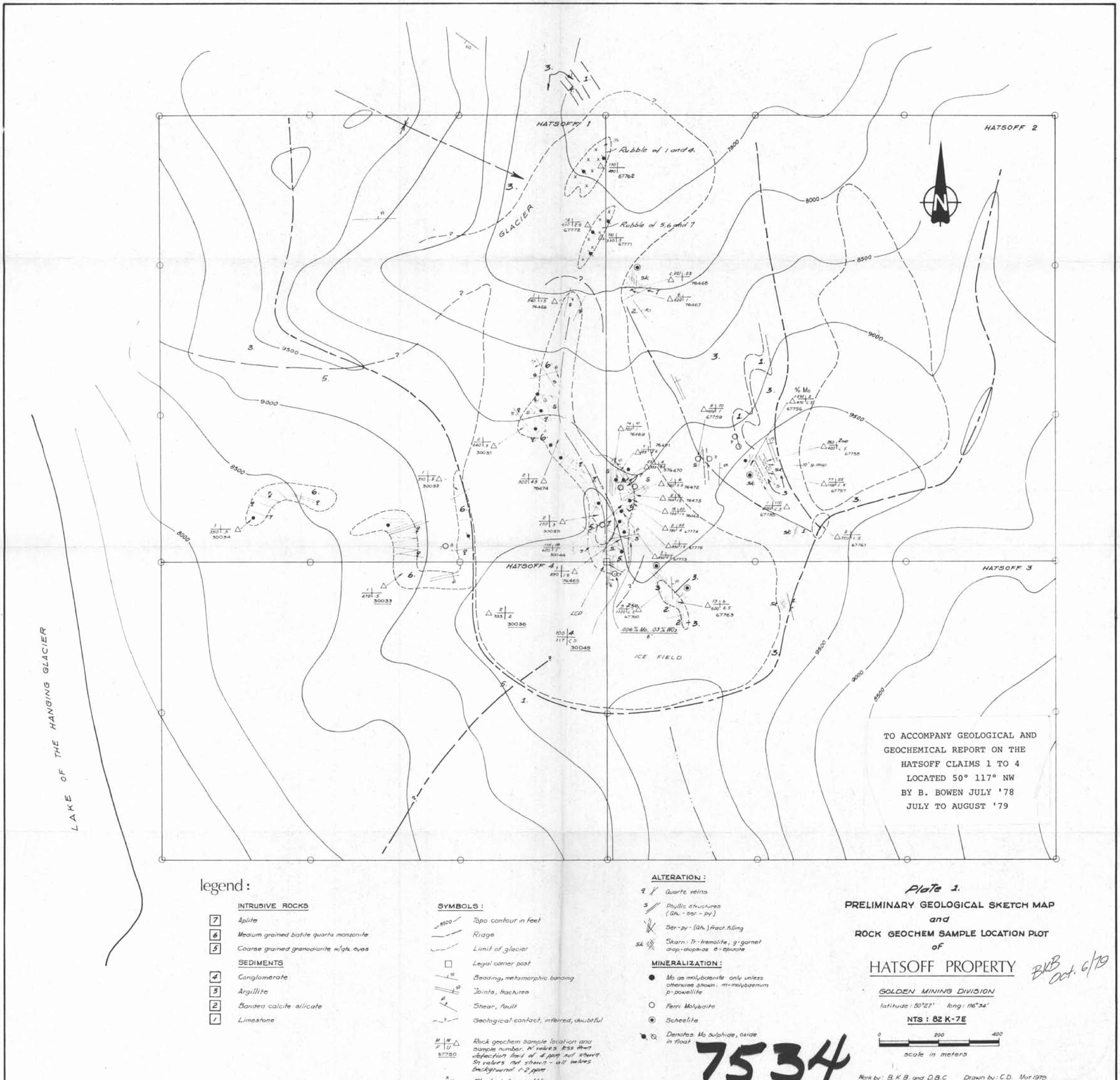
BKB Oct 6/79

HATSOFF Mo PROSPECT

GEOLOGY

Work by: B.K.B. & D.B.C.	Date: June 1979	NTS Ref: 82 K 7E
Drawn by: C. Donideau	Revised:	1:5000

0 100 200 300
Scale in Meters



HATSOFF 1
HATSOFF 2
HATSOFF 3
HATSOFF 4
GLACIER
Rubble of 1 and 4.
Rubble of 5,6 and 7
ICE FIELD
LAKE OF THE HANGING GLACIER
.006% Mo, .03% WO3
% Mo
7500
8000
8500
9000
9500
TO ACCOMPANY GEOLOGICAL AND
GEOCHEMICAL REPORT ON THE
HATSOFF CLAIMS 1 TO 4
LOCATED 50° 117° NW
BY B. BOWEN JULY '78
JULY TO AUGUST '79
legend:
INTRUSIVE ROCKS
7 Aplite
6 Medium grained biotite quartz monzonite
5 Coarse grained granodiorite w/qtz. eyes
SEDIMENTS
4 Conglomerate
3 Argillite
2 Banded calcite silicate
1 Limestone
SYMBOLS:
Topo contour in feet
Ridge
Limit of glacier
Legal corner post
Bedding, metamorphic banding
Joints, fractures
Shear, fault
Geological contact, inferred, doubtful
Rock geochem sample location and sample number. W values less than detection limit of 4 ppm not shown. Sn values not shown - all values background 1-2 ppm
Float, talus rubble.
ALTERATION:
Quartz veins
Phyllic structures (Qtz. - ser - py)
Ser - py - (Qtz.) fract. filling
Skarn: Tr - tremolite, g - garnet diop - diopside, E - epidote
MINERALIZATION:
Mo as molybdenite only unless otherwise shown. m - molybdenum p - powellite
Ferri Molybdite
Scheelite
Denotes Mo sulphide, oxide in float
Plate 1.
PRELIMINARY GEOLOGICAL SKETCH MAP
and
ROCK GEOCHEM SAMPLE LOCATION PLOT
of
HATSOFF PROPERTY
BKB Oct. 6/79
GOLDEN MINING DIVISION
latitude: 50°27' long: 116°34'
NTS: 82 K-7E
0 200 400
scale in meters
7534
Work by: B.K.B. and D.B.C. August, 1978
Drawn by: C.D. Mar 1979