GEOLOGICAL REPORT

ON

THOR(EAST) MINERAL CLAIM GROUP,

TUSTLES LAKE AREA,

WATSON LAKE MINING DIVISION,

YUKON TERRITORY.

June 10th - July 15th, 1968.

Longitude 129° 5' West. Latitude 61° 46' North.

Map Sheet 105-H-14.

by

Clyde L. Smith,
Exploration Manager.

SPARTAN EXPLORATIONS LTD. (N.P.L.).

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LIST OF CLAIMS

Claim No.	Grant Numbers	Date Recorded
THOR 457-496	Y19627-Y19666	Sept. 18, 1967
THOR 589-628	Y19695-Y19734	" " "
THOR 721-760	Y19735-Y19774	" " "
THOR 853-892	Y19775-Y19814	" " "
THOR 985-1024	Y19815-Y19854	" " "
THOR 1117-1156	Y19855-Y19894	" " "
THOR 1249-1288	Y19895-Y19934	" " "
THOR 1357-1396	Y19935-Y19974	" " "

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INTRODUCTION

The Thor(East) group was staked in early September, 1967, to cover a number of widely scattered molybdenite and scheelite occurrences discovered by primary prospecting in a broad area around Tustles Lake. Upon discovery of some occurrences of molybdenite, an airborne reconnaissance survey indicated that the showings occurred in an area related to a younger, pyritic-altered granitic intrusive cutting the granodiorite of the Logan batholith. Ground follow-up indicated that, indeed, a granitic stock existed in this area and a number of the features commonly associated with major molybdenite deposits were found in and around this granitic stock. At a later date scheelite was also discovered in the area and the decision was finally made to stake the entire granitic stock complex.

LOCATION AND ACCESS

The Thor(East) group is centred, roughly, at longitude 129° 5'W., latitude 62° 46'N. The claims lie in the heart of the rugged Logan Mountains, about 5 miles northeast of the northeast end of Tustles Lake. Relief in the area is greater than 3,000 feet and maximum elevations are in excess of 7,000 feet. Small glaciers occur in the area of the claims.

Access is either by foot from Tustles Lake or Broten Lake, both of which accommodate either float or ski-equipped aircraft, or by helicopter from any one of the number of lakes in the western Logan Mountain region.

TABLE OF GEOLOGIC FORMATION

Cretaceous(?)	4.	Biotite granite.
	3.	Quartz monzonite.
	2.	Granodiorite.
Proterozoic	1.	Metasediments - biotite hornfels, skarn, quartzite, schist.

GEOLOGY

The Thor(East) group lies in the northwestern part of the Logan Mountains in an extensive, northwesterly-trending granodioritic batholith. This batholith is believed of Cretaceous age and intrudes metasediments of Proterozoic age which occur to the northeast and southwest. The greater part of the Thor(East) group lies within the batholith; however, along the northern edge of the claim group a sequence of metasediments was mapped. A description of the rock units in the claim group area is as follows:

Unit No. 1

Unit No. 1 consists of a complex sequence of biotite hornfels, schists, quartzite, limestone and skarn. These rocks crop out along the northern edge of the claim group, where they are in sharp contact with granodiorite. This contact dips 40° to 60° to the north.

Unit No. 2

Unit No. 2, the oldest of the Cretaceous(?) granitic intrusives mapped. This rock is a grey to white-weathering, white coloured, medium grained biotite granodiorite. Approximate composition is 25% quartz, 50% plagioclase, 10% white orthoclase and 10% to 15% biotite. The rock is generally fresh, except near shears and younger intrusives where chloritic, argillic and sericitic alteration occurs locally.

Unit No. 3

Unit No. 3 is a coarse-grained, buff-weathering, pink biotite quartz monzonite which intrudes granodiorite. The quartz monzonite crops out in an arcuate pattern within the centre of the claim group. Approximate composition of the rock is 30% quartz, 33% plagioclase, 33% pink orthoclase and 5% biotite. granite The quartz monzonite does not appear to have been chilled against granodiorite. Granodiorite at the quartz monzonite contact is commonly altered by chlorite at up to 40 feet from the contact. Further from the contact and up to 200 feet distance, alteration in the granodiorite is characterized by chlorite and pink orthoclase.

Unit No. 4

Unit No. 4 is the youngest intrusive type and is a distinctive white-weathering, pink coloured, fine to medium-grained glomeroporphyritic textured granite. Approximate composition is 40% porphyritic to glomeroporphyritic quartz, 50% pink orthoclase, 10% white orthoclase, 1% to 2% biotite, and less than 1% magnetite. This intrusive commonly exhibits a chill zone of from 10 to 300 feet wide. Within this zone the rock is essentially pink aplite. Contacts are sharp, with chloritization extending from 10 to 50 feet into the intruded rocks.

Reference to Figure 1 indicates that Unit 4, the younger granitic mass, occurs as two irregular bodies in the centre of the claim group. Surrounding Unit 4 on most sides is Unit No. 3, which appears to bear an arcuate, peripheral relationship to the younger granite. It is believed that Unit 3 represents an earlier intrusive stage which has been domed and cut through by Unit 4; both rock types were probably intruded from the same magma chamber and appear to exist as representatives of a separate and later magmatic event within the Logan bathlolith terrain.

Faulting in the area is common, but major displacements were not noted. Several major faults trend generally east-west, but numerous other orientations have been mapped. It is believed that the fault pattern most likely represents radial and/or concentric fracturing associated with the doming intrusive episode during which Units 3 and 4 were implaced.

ECONOMIC GEOLOGY

Alteration

In addition to chloritization and K-feldspar alteration near contacts, three zones of alteration, in or near granite, were mapped. One of these, shown as location No. 15 on Figure 1 and entitled the Art showing, is an area 200 feet by 1,500 feet within which pervasive argillic alteration of feldspars occurs in association with a strong, northerly-trending shear zone which cuts granodiorite, quartz monzonite and granite. The shear zone is occupied by a 2 to 4 foot wide barren quartz vein. The argillic alteration zone is surrounded by an extensive halo of chloritization. Within the argillic zone less than 1% pyrite and very sparse scheelite mineralization is disseminated. Figure 2 is a detailed sketch map of the Art showing, showing sample locations which were taken to test scheelite grade. Assay results have not yet been returned.

The two other alteration zones, as shown on Figure 1, occur east of the Art showing, and occurrences numbers 1 through 18 occur in association with these zones. These alteration zones occur within granite, where strong development of coarse sericite, accompanies by about 1% pyrite, and extremely sparse scheelite mineralization occurs related to steeply dipping fractures. A few narrow, molybdenite-bearing quartz veins occur peripheral to these sericite zones.

Mineralization

All molybdenite mineralization discovered occurs in quartz veins varying in width from 1 inch to 3 feet. All except one vein are probably less than 100 feet long. Mineral occurrences numbers 5 and 6 occur within a shear zone of about 1,000 feet in length which is from 6 inches to 2 feet wide throughout. A 100 foot wide erratic muscovite altered zone surrounds this shear. Only minor and sporadic molybdenite-pyrite mineralization were noted within this zone.

Scheelite occurs as sparse and erratic disseminations in all three of the alteration zones noted above, as well as in some quartz veins. In all cases grade appears to be very low. A visual estimate at the Art showing is less than 0.1% WO_3. Figure 2 is a detailed sketch map of the Art showing. Minor amounts of molybdenite in narrow quartz veins occur peripheral to the above mentioned scheelite-bearing alteration zones.

Minor showings of molybdenite, chalcopyrite and scheelite were noted in extremely small skarns along the northern contact ofthe intrusive terrain, and a minor amount of sphalerite and galena were noted in a north-trending shear near the western limit of mapping.

In conclusion, the only areas within the claim group which appear to demonstrate any possibilities for economic development are the above mentioned alteration zones; however, careful examination of the zones indicates that tungsten mineralization is erratic and of definitely low grade. Only minor molybdenite appears to accompany these zones. All molybdenite mineralization noted occurs in narrow and widely scattered quartz veins and no mineralization observed has any economic potential.

RECOMMENDATIONS

Detailed geologic mapping in areas of extremely good exposure in the centre of the Thor(East) group has shown that all molybdenite-scheelite occurrences discovered in late 1967 are of small size and/or very low grade. It is recommended, however, that a small number of claims be retained to cover the three prominent alteration zones should, sometime in the future, it be recommended that these zones be revaluated.

Respectfully submitted,

Clyde L. Smith,
Exploration Manager.

James S. Dodge, P.Eng.,
Vice-President - Exploration.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
J. S. DODGE

Expiry Date: August 4, 1969

APPENDIX I

SUMMARY OF COSTS

1. Preliminary Studies		
Wages, salaries, bonuses	$ 915.00	
Travel & accommodation	97.00	
Rental of equipment	39.00	
Ross River base camp	512.00	
Sub-Total		$ 1,563.00
2. Prospecting		
Wages, salaries, bonuses	$ 75.00	
Supplies & miscellaneous equipment	128.00	
Helicopter support	126.00	
Fuel	40.00	
Ross River base camp	54.00	
Super-Cub support	50.00	
Sub-Total		473.00
3. Geological Surveys & Mapping		
Wages, salaries, bonuses	$ 956.00	
Supplies & miscellaneous equipment	118.00	
Travel & accommodation	72.00	
Petrographic studies	325.00	
Helicopter support	507.00	
Fuel	54.00	
Ross River base camp	116.00	
Super-Cub support	37.00	
Camp support	292.00	
Sub-Total		2,477.00
4. Expediting, Consultants Fees & Management	$ 116.00	
Ross River base camp	85.00	
Super-Cub support	18.00	
Sub-Total		219.00
5. General Supervision		
Wages, salaries, bonuses	$ 406.00	
Ross River base camp	138.00	
Super-Cub support	58.00	
Camp support	126.00	
Sub-Total		728.00
6. Exploration Planning		
Wages, salaries, bonuses	$ 500.00	
Consultants fees & management	600.00	
Travel & accommodation	99.00	
Ross River base camp	800.00	
Camp support	200.00	
Sub-Total		2,199.00
GRAND TOTAL		$ 7,659.00

AFFIDAVIT
SUPPORTING STATEMENT OF COSTS

I, C.L. Smith, Exploration Manager, Spartan Explorations Ltd., of Vancouver, British Columbia, do hereby state that to the best of my knowledge and belief the STATEMENT OF COSTS, as presented on Appendix I of this report entitled "GEOLOGICAL REPORT ON THOR(EAST) MINERAL CLAIM GROUP", is both true and correct.

Dated at the City of Vancouver in the Province of British Columbia this 3rd day of September, A.D., 1968.

SWORN BEFORE ME in the City of Vancouver in the Province of British Columbia this 3rd day of September, A.D., 1968.

A Commissioner for taking Affidavits in the Yukon Territory.

Clyde L. Smith.

PERSONNEL

The following were personnel engaged in the geological survey on the Thor(East) mineral claims:

M. Wolfhard	Geologist	Vancouver, B.C.
W. Roberts	Geologist	Vancouver, B.C.
D. Goodbrand	Geologist	Vancouver, B.C.
A. John	Prospector	Ross River, Y.T.
A. MacKillop	Prospector	North Vancouver, B.C.
C.L. Smith	Project Manager	West Vancouver, B.C.
J.S. Dodge	Prof. Engineer	Vancouver, B.C.

FIG. 1

KEY TO MINERAL OCCURRENCES

1. Quartz vein in 000 shear. Sphalerite, galena. Est. 1% Zn over 1 foot.
2. 2" Quartz vein in 000 shear. Few specks MoS_2, 6" coarse muscovite alteration.
3. Float, similar to 2.
4. 3" Quartz vein, 120/vertical. Minor chalcopyrite, sphalerite, galena.
5. 6" Quartz vein, 080/vertical. Erratic MoS_2. For 50 feet on either side are 080/vertical joints spaced 5-10 feet with coarse muscovite over 2-4" and erratic MoS_2. 200 feet N. is 2 foot Quartz vein with magnetite. Sampled, — oz Au/T, — oz Ag/T over 2.5 feet.
6. Continuation of 5. MoS_2 vein sampled over 2 feet — % MoS_2.
7. 50' x 100' area of irregular quartz, with minor MoS_2.
8. Few specks of MoS_2 in siliceous garnet scarn.
9. 100 feet patch of granitized biotite hornfels. Malachite, minor chalcopyrite erratically distributed.
10. Few grains of $CaWO_4$, MoS_2 in scarn remnant 100' x 200'.
11. 10 feet irregularly silicified fracture zone, est. 5% magnetite — oz Au/T, — oz Ag/T, —% MoS_2
12. 100 feet zone with magnetite on 120 fractures every 1 foot. Every 5-10 feet is 2-4" coarse muscovite alteration on 120/vertical joint, with erratic MoS_2.
13. 100 feet zone of fine muscovite alteration minor $CaWO_4$.
14. 150 feet zone of fine muscovite alteration minor $CaWO_4$. Some narrow quartz vein MoS_2 float at base of hill.
15. Art showing 200' x 1500' argillic altered zone related to 020 shearing. See 200 scale sample plan.
16. Lenticular quartz vein, 3 foot at best related to 130/vertical shear. —% MoS_2, — oz Au/T, — oz Ag/T, — % WO_3 over 3 feet. 2 more 1 foot veins 50 feet and 100 feet N. Minor MoS_2 pyrite.
17. 3 only 3" x 50' quartz veins, 130/steep, over 50 feet. Pyrite, erratic MoS_2. Some barren hairline quartz veins.
18. Fine muscovite over 800' x 200'. Few grains scheelite.
19. Minor scheelite in chlorite alteration related to shear.
20. Quartz vein, 2" x 40', 130/steep, < 1% scheelite, few grains MoS_2.
21. Minor scheelite in chlorite alteration related to 120/vertical and 160/vertical shears.
22. Quartz vein ½ inch thick along joint plane with minor Mo and pyrite. Granite with coarse muscovite alteration for 2-4" in either side of quartz vein. Sampled over 8", — % MoS_2
23. Quartz vein 2" thick in granite with disseminated Mo and pods of pyrite. Coarse muscovite alteration of granite extends up to 1 foot from the vein. Sampled over 1 foot, — % MoS_2.
24. Granite dyke up to 8 feet wide with Mo and pyrite mineralization in central siliceous zone of less than 18" in thickness. Samples over 18" — % MoS_2, — oz/T Au, — oz/T Ag.
25. Shear in granodiorite containing lenses of quartz with disseminated flakes of Mo and pods of pyrite. Maximum thickness of quartz is 20 inches. Sampled over 20 inches — % MoS_2, — oz/T Au, — oz/T Ag.
26. 3 only 1" shears over 5 feet, 135/vertical minor pyrite, MoS_2 in shears.
27. Quartz vein float up to 4" wide, probably from snow covered gullys (shears?) some MoS_2.

LEGEND

- Alteration :- sericitic, argillic.
- 4 — Biotite granite :- 1-2mm, 30-40% quartz occasionally gromeroporphyric to 5mm, 50% pink feldspar, 10% white feldspar, <2% biotite.
- 3 — Quartz monzonite :- 3-4mm, 30% quartz, 36% pink feldspar, 30% plagioclase, 5% biotite, hypidiomorphic granular texture.
- 2 — Granodiorite :- 2-3mm, 25% quartz, 60% feldspar (mainly plagioclase), 15% biotite.
- 1 — Metasediments :- Biotite hornfels, scarn, quartzite, schist.

- Claim Boundary.
- Geological contact, defined, approximate, assumed.
- Limit of outcrop.
- Fault or shear zone, defined, approximate.
- (14) Mineral occurrence.

SPARTAN EXPLORATIONS LTD.

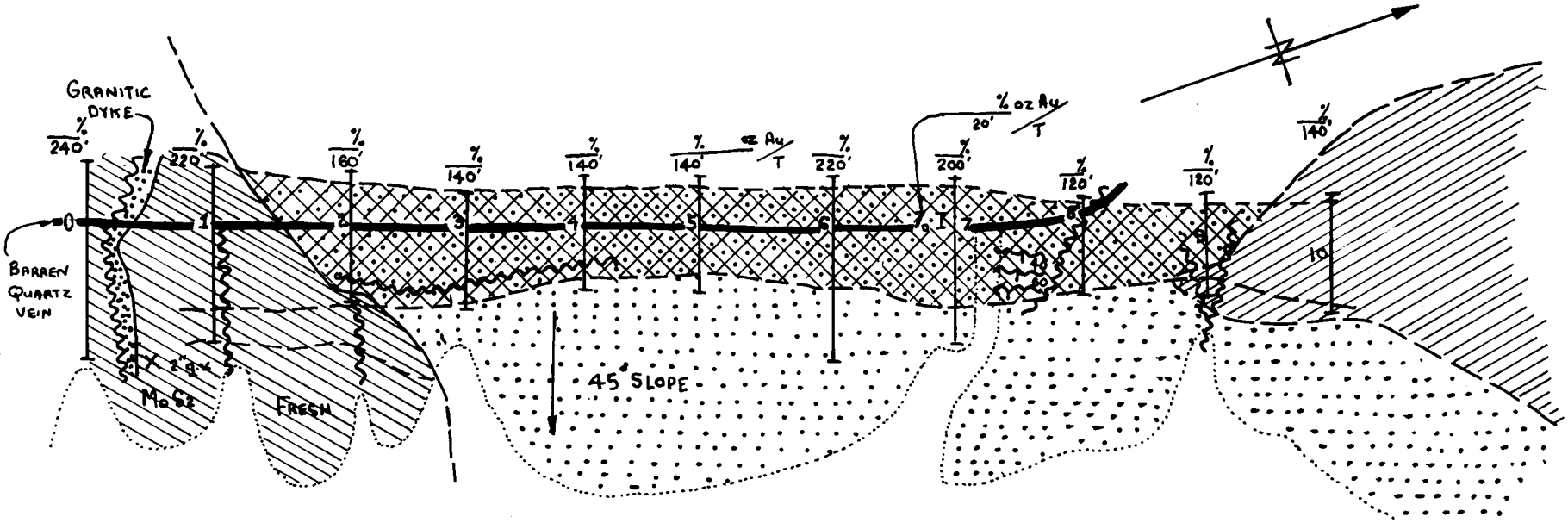
ROSS RIVER YUKON
LOGAN PROJECT
THOR EAST CLAIMS
GEOLOGY & MINERAL OCCURENCES

GEOLOGY: W. ROBERTS.
M. WOLFHARD.

DRAWN BY: N. H. SIMMONS.
DATE: JULY 7, 1968.

1500 0 1500 3000 4500 6000 7500
Scale in feet.

FIG. 2



LEGEND

- LEUCO GRANITE ⊢ $\overline{0.5}$mm GROUNDMASS WITH $\overline{1-2}$ mm ANHEDRAL QUARTZ PHENOCRYSTS NO BIOTITE.
- QUARTZ MONZONITE ⊢ 30-40% QUARTZ, $\overline{2-3}$mm, HYPIDIOMORPHIC GRANULAR TEXTURE, < 5% BIOTITE.
- GRANODIORITE ⊢ $\overline{2}$mm, 20-30% QUARTZ, NO PINK FELDSPAR, 10% BIOTITE.
- BARREN QUARTZ VEIN ⊢ 1' TO 9', FINE CRYSTALLINE, WAXY W.S.
- ARGILIC ALTERATION ⊢ FELDSPARS, PARTICULARLY PLAGIOCLASE, CHALKY.
- CHLORITE ALTERATION.

SPARTAN EXPLORATIONS LTD.
ROSS RIVER YUKON.
THOR EAST PROJECT.
ART SHOWING.
GEOLOGY & SAMPLE SHOWINGS.

GEOLOGY & SAMPLING:
D.W. GOODBRAND.
W. ROBERTS.
M.R. WOLFHARD.

DRAWN BY: N.H. SIMMONS
DATE: JULY 4, 1968.

200 100 0 200
Scale in feet.

KEY MAP

OUTLINE OF
THOR (EAST)
CLAIM GROUP

N

TUSTLES LAKE

BROTEN LAKE

SPARTAN EXPLORATIONS LTD.
THOR (EAST) CLAIM GROUP
TUSTLES LAKE AREA, Y.T.

SCALE: 1" = ½ MI.