AN ASSESSMENT REPORT DETAILING THE 1981 PROGRAMME OF ROAD PREPARATION, GRID CONTROL AND GEOLOGICAL SURVEY ON THE CRUS 1 and 2 CLAIMS, TOBIN CREEK, LOCATED IN THE SLOCAN MINING DIVISION, NTS 82F/14W

> CRUS 1 and 2 CLAIMS (40 UNITS) WHOLLY-OWNED BY BP MINERALS LIMITED



R.H. Wong (Geologist, BP Minerals Limited)

BPVR 81-7 September 11, 1981

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1. INTRODUCTION AND SUMMARY

Work completed on the CRUS 1 and 2 claims by BP Minerals Limited this year includes preparation of an orthophoto, upgrading of 5 kilometres of access road, completion of 35.5 kilometres of cut grid line, and completion of geologic mapping at a scale of 1:10,000.

Previous reconnaissance by BP Minerals in the area had delineated a zone of overburden slightly anomalous in molybdenum and discovered molybdenite within quartz stockwork hosted by altered, late-stage aplitic rock. The programme of geologic mapping this year was intended to determine if the claim area is underlain by a buried porphyry molybdenumtungsten system.

Results of mapping indicate that a centre of either hydrothermal or intrusive activity does not exist within the claim area. At this time, no further work is recommended on the property.

A total of \$12,000.00 has been applied as assessment on the claims, thereby keeping them in good standing until July 11, 1984.

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2. LOCATION AND ACCESS

The CRUS 1 and 2 claims are located 8 kilometres east of Slocan, B.C. at the headwaters of Tobin Creek, a tributary of Springer Creek. The claims are in the Slocan Mining Division and are centred at 49° 46' north latitude and 117° 21' west longitude.

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Access to the western portion of the claim area is by way of 9 kilometres of two-wheel drive logging road which leads easterly from Highway 6 along the south side of Springer Creek. From here, 5 kilometres of four-wheel drive road, following the Tobin Creek tributary, lead to the central portion of the property. Access to the eastern side of the claim area is via the Lemon Creek logging road for a distance of 20 kilometres.

3. TOPOGRAPHY AND VEGETATION

The property is located in the Selkirk Mountains. The area is mountainous and elevations range from 1400 to 2230m above sea level.

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The claim area is divisible into three biogeoclimatic sub-zones, the boreal forest, the subalpine and the alpine. The boreal forest thrives in the vicinity of the Crusader Creek valley floor and consists predominantly of cedar and hemlock. Much of the boreal forest has been logged and burned and is now overgrown with fire weed. The subalpine forest covers approximately 80 per cent of the claim area and consists of subalpine fir, spruce and slide alder. Alpine vegetation consists of flowers, mosses and stunted subalpine fir. . HISTORY

Located near the centre of the claim area is the METEOR silver-bearing quartz vein. This vein is similar to many in the Slocan mining camp and has been worked since before the turn of the century. Cairnes (1934) reports:

- 5 -

"The Meteor Crown-granted claim was staked in 1895. Initial shipments, amounting to 75 tons were made in 1897, and provided 38 ounces of gold and 15,000 ounces of silver. The largest shipments amounting to 90 tons, were made in 1919. This ore yielded over 100 ounces of silver to the ton and a total of 32 ounces in gold. Records show that this property has produced 431 tons of ore containing 236 ounces in gold and an average of 238 ounces in silver to the ton."

The METEOR vein is covered by three Crown Grants which have been optioned by their owners to Native Secret Resource, a small Vancouver-based company. Native Secret Resource is currently evaluating the vein mineralization for the purpose of resuming production.

Reports of scheelite occurring locally within the vein prompted BP geologists to examine the area for porphyry molybdenum-tungsten potential in 1979 and 1980. Quartz stockwork, locally containing traces of molybdenite was found to occur in hydrothermally-altered aplite at the METEOR dump. Thus, 40 claim units were staked by BP around the METEOR Crown Grants on July 6, 1980.

5. CLAIM STATUS

The CRUS 1 and 2 claims, comprising 20 units each, were staked July 6, 1980 and are wholly-owned by BP Minerals Limited. All work detailed in this report was performed and paid for by BP Minerals Limited. The CRUS 1 and 2 claims were grouped according to the Mineral Act and a summary of the claims status follows:

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CLAIM	RECORD #	RECORD MONTH	# UNITS	APPLIED ASSESSMENT	NEW EXPIRY DATE	
CRUS 1	2068	July 11	20	\$12 000	July 11,	1984
CRUS 2	2069	July 11	20	ψ12,000	July 11,	1984

Crown Grants encompassed by the claims include:

CROWN GRANT	#	OWNER
L5503	* .	Dennis Tyer
L3576		Terence Schorn
L3578		Guy Allen
L2891 7		
L2892 🖌		Winston Storgard
L2893		



6. ROAD PREPARATION

The five kilometres of road leading up Tobin Creek to the centre of the claim area required considerable upgrading in order to make it passable for four-wheel drive vehicles. Road preparation took place from June 17 -25. George Perriere from Slocan was contracted to handle the work. The lower portion of the road had been washed out and required resurfacing, ditching and installation of two wooden culverts. The work involved the use of a D-5 cat (27 machine hours), a backhoe (13 machine hours) and a dumptruck (13 machine hours). The upper portion of the road lay under up to 1.5 metres of snow and 30 machine hours with the D-5 cat was needed to plough this clear.



7. TOPOGRAPHIC BASE AND GRID CONTROL

A composite orthophoto at a scale of 1:10,000, with a contour interval of 50 feet, was produced by Burnett Resource Surveys Limited for the claim area. This orthophoto served as a base map for the gridding and geologic mapping.

The 4 kilometre long baseline of the grid, designated 100N, runs east-west and was surveyed by transit and slope-corrected. Station 112E on the baseline was used as a topographic control point, being exactly 50 metres from the main METEOR adit at a bearing of 325^O. Nine crosslines, spaced at 500m intervals and extending for 1.75 kilometres north and south of the baseline, were turned off the baseline by transit. These lines were thereafter compassed, topofiled (non-slope corrected), and cut to I.P. standard. Stations marked by pickets, flagging and inscribed plastic tags were located every 100 metres along the crosslines.

Excessive snow remaining at higher elevations of the claim area hampered the linecutting early in the field season and necessitated postponing some of the work until later in the summer.

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8. REGIONAL GEOLOGY

The area around Slocan Lake is dominated by granitic rocks of the Nelson and Valhalla plutons. Within the plutons are pendants of metavolcanic and metasedimentary rocks of Early to Middle Mesozoic age.

The oldest rocks (unit A) are exposed along the southern shores of Slocan Lake and consist of augen gneiss and hornblende-biotite-feldspar gneiss with minor limestone and skarn. These gneissic rocks are considered by Little (1960) to have been derived from argillaceous and arenaceous sedimentary rocks by metasomatism and granitization related to emplacement of the Nelson pluton.

Rocks of the Slocan Group (unit 13) consist of predominantly slate and argillite with minor limestone, quartzite, conglomerate and tuffaceous beds. These rocks are considered to be of Triassic to Lower Jurassic age. The main contact between the Slocan Group and the plutonic rocks occurs in the north of the map-area and strikes roughly east-west with a moderate northerly dip. Small pendants of the Slocan Group occur as outliers as far south as the south end of Slocan Lake. Deformation probably related to emplacement of the plutons has resulted in development of northwest-trending recumbent folds.

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Andesitic to basaltic flows and tuffs of the Lower Jurassic Rossland Group (unit 16) form small roof pendants within the Nelson pluton extending in a general north-south line from Nelson.

The Nelson pluton (unit 19) consists of rocks ranging in composition from granite to syenite. Contacts between the various phases are usually gradational so that the pluton is regarded as representing one period of intrusion. Age of the pluton is thought to be Upper Jurassic to Lower Cretaceous. The most prominent lithology in the area of Slocan Lake is a megacrystic k-feldspar porphyry granite.

Valhalla plutonic rocks (unit 20) are in part contemporaneous with, and in part slightly younger than the Nelson (Lower Cretaceous ?). The rocks range from granite to grandiorite in composition and are generally equigranular in nature. They are most prominent west of Slocan Lake where they underlie the rugged Valhalla Range.

On high-level air-photos, numerous lineaments of local extent and various orientations are evident in the vicinity of Slocan Lake. The southern portion of Slocan Lake comprises a north-trending feature with several smaller, and possibly parasitic structures, evident to the east. Distinct west to northwest-trending lineaments are represented by Enterprise Creek, Silverton Creek and the Kaslo River.

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Two distinct northeast-trending structures are represented

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by Springer Creek and the valley from New Denver to Bear Lake (Carperter Creek - Seaton Creek).



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9. PROPERTY GEOLOGY

a) Introduction:

The claim area was geologically mapped at a scale of 1:10,000 along all cut grid lines and along compass/topofil lines run intermediate to the cut grid lines (Figure 6, in pocket). Outcrop on the property varies from approximately 75% on steep slopes above treeline to approximately 5% below treeline.

b) Lithologies:

The dominant lithology is granite to granodiorite of the Nelson pluton. This rock is generally white to pink coloured, megacrystic k-feldspar prophyry granite containing 10 - 25% phenocrysts of k-feldspar ranging from 1 - 4cm in length. The groundmass consists of a medium-grained mixture of approximately 5 - 10% biotite, 20% quartz, 20% k-feldspar and 30% plagioclase. The percentage of phenocrysts is locally variable and in places the rock is gradational to equigranular granodiorite. Where mafic (metavolcanic ?) xenoliths occur, the rock is locally hornblende and/or biotite-rich and may approximate a diorite in composition.

The granite is commonly cut by aplite-pegmatite dykes ranging from 10cm to 3m in width. The dykes are often of a zoned nature with pegmatitic margins and aplitic cores. Compositionally, the dykes are quartz monzonite to granite. Biotite is present as fine-grained disseminations comprising 1 - 3% in some of the aplitic dykes. The most prominent orientations of dyking are north to north-northeast and north-northwest. Both sets display moderate to steep dips. Contacts with the granite country rock are sharp and shearing is common along these zones.

Strongly magnetic diabase occurs as north-trending dykes near the eastern edge of the claim area and as rare float in the western portion. Near the centre of the property is a small, plug-like knob of fine-grained gabbro which may represent a feeder for the diabase dykes. The gabbro contains subangular inclusions of the granitic country rock.

c) Structure:

Faults, shear zones and joints are oriented predominantly in north and north-northeast directions with generally near-vertical dips. North-trending faults and shears commonly display strike-slip displacements, while north-northeast-trending structures commonly display dipslip displacements. Locally, the mafic-rich granitic rocks exhibit a moderately well-developed north-south foliation.

d) Economic Geology:

The most significant feature of economic interest is the density of mineralized quartz veins in the area.

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The METEOR Ag-Au-Zn-Pb-W occurrence, the ELK Au-Ag occurence and the KING JACK/HOWARD FRACTION Ag-Au occurrence are located within the claim area, while the TAILHOLT Au occurrence, the MARMION/MARYLAND Au-Ag occurrence, the ALICE S Ag-Pb occurrence, the SLOCAN PRINCE/TWO FRIENDS Ag-Pb-Zn occurrence and the LILY B Ag-Pb-Au occurrence are located adjacent to the claim area (Figure 7).

The METEOR vein system which occurs near the centre of the claim area is described by Cairnes (1934):

"The Meteor Crown-granted claim was staked in 1895. Initial shipments amounting to 75 tons, were made in 1897, and provided 38 ounces of gold and 15,000 ounces of silver. The largest shipments amounting to 90 tons, were made in 1919. This ore yielded over 100 ounces of silver to the ton and a total of 32 ounces in gold. Records show that this property has produced 431 tons of ore containing 236 ounces in gold and an average of 238 ounces in silver to the ton.

The underlying rocks are the coarse-grained porphyritic granite of the Nelson batholith, intersected here and there by acid and basic dykes. The granite is sheared and altered near the mine workings.

Workings comprise six adits, only two of which were accessible at the time of examination. The adits explore a vein that strikes about north 75 degrees west and dips about 35 degrees north. The vein has proved somewhat difficult to follow as it is dislocated by a series of nearly parallel vertical faults, the throw being, in each case, down and towards the south. The vein is largely of quartz carrying a little zinc blende and galena, grey copper, stephanite, argentite, and native silver. Pyrite and chalcopyrite are present and with them may be associated the important gold content. Scheelite was discovered in the Meteor vein. It is stated to have formed a mass of about 500 pounds on No. 2 level where it occurred as a wedge-shaped body about 12 feet long and 4 inches thick at the base. A small kidney of scheelite, amounting to about 25 pounds, was also found on No. 4 level."

The occurrence of tungsten in the METEOR vein, together with the mention of acid dykes and alteration, was considered to be of possible significance with respect to a porphyry molybdenum-tungsten system. Upon examination of material from the METEOR dump in 1980, molybdenite was found to occur locally within quartz stockwork hosted by pervasively sericitized, fine to medium-grained leucoquartz monzonite. Geologic investigation of the accessible workings was completed this year. Only the two lowermost adits (No. 6 Level and No. 5 Level) were considered safe for entry. Figure 8 (in pocket) is a combined cross-section and plan of the METEOR workings taken largely from a 1963 report on the property by Franklin L.C. Price, a consultant mining engineer.

The geologic relationships between quartz veining, sulphide mineralization, alteration, acid dykes and faulting within the METEOR system is best seen along the No. 6 Level adit where it drifts along the ore-bearing vein. The vein, which is variable in width from 5 - 50cm, follows along the sheared upper contact between a 3m wide aplitic dyke and megacrystic granite porphyry. The dyke is relatively uniform in both composition and texture, relatively well-fractured, and is oriented 110/35N. Quartz veining is localized mainly at the sheared dyke contact but also occurs as narrow (1 -2cm wide) veinlets adjacent to the main vein. These veinlets constitute stockwork mineralization in the dyke up to 1m from the main vein. The dyke rock is pervasively sericitized in the zones of quartz veining and contains up to 2% disseminated crystalline pyrite. Both the dyke and the hosted quartz veining have been terminated near the end of the adit by a steeply-dipping fault which strikes $035 \oplus 0$. Displacement along this fault is of a dip-slip nature with the southeastern side of the fault having been down-dropped. Similar faulting is repeated to the southeast and has offset the vein so that it outcrops progressively further up the hillside, judging from the positions of the No. 4, No. 3, No. 2 and No. 1 Level adits.

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10. CONCLUSIONS

The relationship between mineralization and acid dyking at the METEOR mine is most probably a structual one rather than a genetic one. Shearing is localized at the dyke contacts and the stronger fracturing within the dyke appears to have acted as a partial conduit for the mineralizing solutions.

Scheelite was not recognized in any of the quartz veining examined. It was, however, found to occur in the No. 6 Level adit as disseminated grains along a moderatelywell-developed dry fracture oriented 140/80NE in the megacrystic granite porphyry.

Molybdenite was not observed in any of the workings visited and probably constitutes only a minor accessory mineral associated with the silver-bearing sulphides.

Geologic mapping of the remainder of the property and examination of the other ore-bearing quartz veins in the area provided little encouragement with respect to porphyry potential. The predominant megacrystic granite porphyry is generally unmineralized and unaltered. The only young intrusive phases recognized consist of the aplite-pegmatite dykes, which are considered to be closely related to the granite, and the basic dykes. Sulphides, on the whole, are absent except in the immediate area of the quartz-filled fissures.

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Orientations of aplite-pegmatite dykes and/or quartz veins do not suggest that a centre of either intrusive" or hydrothermal activity exists within the claim area.

11. RECOMMENDATIONS

In that no evidence was found for a centre of either intrusive or hydrothermal activity within the claims, no further work is recommended to test for a buried porphyry system.

APPENDIX 1 STATEMENT OF QUALIFICATIONS

STATEMENT OF QUALIFICATIONS

I, Russell H. Wong of #1007 - 1111 West Hastings Street, in Vancouver, in the Province of British Columbia, Do Hereby State:

- That I am a graduate of the University of British Columbia, Vancouver, B.C., where I obtained a B.Sc. in Geology in 1975.
- 2. That I am currently completing an M.Sc. degree in Geology at the Univeristy of British Columbia, Vancouver, B.C.
- 3. That I have been active in mineral exploration since 1973.
- 4. That I have practiced my profession continuously as a staff geologist for BP Minerals Limited, since 1979.

September 11, 1981 Vancouver, B.C. Russell H. Wong BP Geologist

APPENDIX 2

STATEMENT OF COSTS

STATEMENT OF COSTS

For CRUS 1 and 2 Claim Group (40 Units)

1. Road Upgrading:

- Installation of two Culverts:

- 9 machine hours @ \$45/hr.

- 20 hours for assistant @ \$10/hr. \$605.00

- Ditching and road repair:

- 18 machine hours @ \$45/hr. 810.00

- Hauling gravel:

- Backhoe (13 hours) @ \$40/hr.

- Dumptruck (13 hours) @ \$30/hr. 910.00

- Snow removal:

-	30	machine	hours	6	\$45/hr.	1350.00

TOTAL COST \$3675.00

2. Orthophoto Mapping:

Provision or orthophoto mapping of some 4,500 acres to the scale of 1:10,000 with a 50 foot contour interval, including one cronaflex positive with the contours superimposed and a clear contour overlay.

TOTAL COST \$1582.00

3. Grid Preparation:

Labour Accomodations Truck Rental Transit Rental \$8500.00 682.71 570.00 95.00 TOTAL COST \$9847.71

GRAND TOTAL ASSESSMENT COST \$15,104.71

July 28, 1981

Project 525 AFE 80089

INVOICE # 28/7/81

George Perriere Box 188 Slocan, B.C.

Road Upgrading:

- Installation of two Culverts:

- 9 machine hours @ \$45/hr.

- 20 hours for assistant @\$10/hr. \$695.00

- Ditching and road repair:

- 18 machine hours @ \$45/hr.

- Hauling gravel:

- Backhoe(13 hours)@\$40/hr.

- Dumptruck(13 hours) @ \$30/hr.

- Snow removal:

- 30 machine hours @ \$45/hr.

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CHARGE 60089-3612- \$3675.00 DATEJUL 2 9 1931 INTI

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-30-Resource Surveys Ltd. BURNETT PHOTOGRAMMETRISTS . SURVEYORS ENGINEERS DATE: July 6, 1981 BP Minerals Suite 1007, 1111 W. Hastings St. RECEIVED Vancouver, B.C. V6E 3N5 JUL 9 1931 Attention: Mr. M.D. Bradley B P MINERALS LIMITED Vancouver, B.C. OUR FILE NO .: 81-1035

For providing:

(CRUS 1 and 2 Claims)

* 1.) Orthophoto mapping of Tobin Creek area.

....\$1582.00

2.) Orthophoto mapping of Kwadacha River area

\$1300.00 \$2882.00 0.9% F.S.T. 25.94

\$2907.94

APPROVED FOR PAYMENT

10

H9 STATELENT ISSUED Please pay of invoice

CHARGE _____ DATEJUL 21 1951 INTLS AND

E. & O. E.

HEAD OFFICE: 2973 LAKE CITY WAY, BURNABY, B.C. V5A 3A1 (604) 420-2600 TELEX 043-54643 BRANCH OFFICE: 207 - 14TH STREET, N.W. CALGARY, ALTA. T2N 1Z6 (403) 283-0731 TELEX 033-24774 TERMS: NET 30 DAYS. 2% PER MONTH 60TH DAY AFTER DATE OF INVOICE.

Statement Folio. July 17 1981 MRP. Minerale Itd Friends St. Jun W. Hastings St. Vancourer BC. Jn Acc't With RENEGADE MINERAL EXPLORATION SERVICES LUD SERVICES LTD. BOX 3192, KAMLOOPS, B.C. Jerms TCIBIN (REEK PROCEANY2C 688 (604) 372-1323 JUNE 22 - JULY 6 19Bi Labour 8500 00 Accomodations 68271 Truck renta 57000 Transit renta 9500 Total 9847 71 Brin Date 139847.PT FOR PAY 5336 22 DATE WIRE FLINDS Kamboops, B.C. To: Renegade fact A. A # 348.8.02

APPENDIX 3 REFERENCES

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REFERENCES

Cairnes, C.E. (1935) : Description of Properties, Slocan Mining Camp, British Columbia, Geol. Survey of Canada, Memoir 184

Little, H.W. (1960) : Nelson Map-Area, West Half, British Columbia (82F W¹₂), Geol. Survey of Canada, Memoir 308.

Price, F.L.C. (1963) : Report on Meteor Group of Mineral Claims near Slocan City, B.C., Private Report.





SLOCAN, B.C. B.P. Canada ORTHOPHOTO MAP TOBIN CREEK AREA

DATE OF PHOTOGRAPHY JUNE, 1981

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OCTOBER, 1980 JOB No 81-1035

NTS 82 F/14

FIG. 4



CREEK

FLOAT

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SMALL OUTCROPPING

INFERRED GEOLOGICAL CONTACT TREND AND ATTITUDE OF SHEAR ZONE FREND AND ATTITUDE OF DYKE OR VEIN

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	ABBREVI	ATIONS		
RMITTENT	py – pyrite	HE – hematite	kspar – potassic feldspar	
	th – tetrahedrite	sp — sphalerite		
	ser - sericite	si - silica		
	Chi - Chiorite	ciays - ciays		
ROAD				
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CRUS I AND 2 CLAIMS PROPERTY GEOLOGY SLOCAN, B.C.

B.P. Canada ORTHOPHOTO MAP TOBIN CREEK AREA OCTOBER, 1980

DATE OF PHOTOGRAPHY JUNE, 1981

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SEPTEMBER 1981

JOB No 81-1035

