

822789

(PRELIMINARY DRAFT)

GEOLOGICAL REPORT
ON THE
HAILSTORM CROWN GRANTS

SLOCAN MINING DIVISION
82F/13E

$117^{\circ}40'45''\text{W}$, $49^{\circ}54'30''\text{N}$

OWNERS: SUNCOAST PETROLEUM CORP.
ROXWELL GOLD MINES LTD.

BY

T. R. STOKES
(UNDER THE DIRECTION
OF F. M. SMITH, P.E.W.)

AUGUST 1983

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INTRODUCTION

THE WRITER (T.R. STOKES) UNDER THE DIRECTION OF F.M. SMITH:
EXAMINED THE HAILSTORM CROWN GRANTS AT THE REQUEST OF
SUNCOAST PETROLEUM CORPORATION AND ROXWELL UOLMINES LTD.

BASED OUT OF NAKUSP B.C (MAP 1)

THE TWO MONTH PROGRAM, INCLUDED DETAILED GEOLOGICAL MAPPING,
TRENCHING, ROCK CHIP GEOCHEMISTRY AND SOIL GEOCHEMISTRY.
THE OBJECT OF THE PROGRAM BEING TO DELINEATE AS MUCH
AS POSSIBLE THE MINERALIZED ZONES INDICATED BY F.M. SMITH
(1983) AND DISCOVER ANY FURTHER FAVOURABLE MINERALIZATION
WITHIN THE CROWN GRANTS.

SUMMARY

LOCATION AND ACCESS

THE HAILSTORM CROWN GRANTS LIE APPROXIMATELY 250M SOUTH OF THE HAILSTORM PEAK. THE PEAK IS LOCATED AT ABOUT $117^{\circ}45'45''$ W LONGITUDE AND $49^{\circ}59'30''$ N LATITUDE, AT AN ELEVATION OF 2342M AND IS LOCATED ON THE EDLTON NTS MAP 82F/13. TILLYCOM MTN. LIES 2500M E.S.E. OF THE HAILSTORM PEAK, WITH THE HEADWATERS OF LONDONDERRY CREEK TO THE WEST AND THE HEADWATERS OF THE WEST FORK OF CARIBOU TO THE EAST.

THE CROWN GRANTS EXTEND SOUTH FROM THE PEAK ALONG THE HAILSTORM RIDGE FOR 1200M, WEST DOWN TOWARDS LONDONDERRY CREEK FOR 400-500M, AND EAST TOWARDS THE WEST FORK OF CARIBOU CREEK FOR 50-100M.

THERE ARE NO ROADS UP TO HAILSTORM RIDGE BUT THE WEST FORK OF CARIBOU CREEK HAS A GOOD QUALITY LOGGING ROAD ON THE EAST SIDE OF THE VALLEY UP TO AN ELEVATION OF 1840M. THIS ROAD CONNECTS WITH THE SHANNON CREEK ROAD ABOUT 7km TO THE N.E. ON THE EAST FLANK OF CARIBOU CREEK. THE SHANNON CREEK ROAD THEN CONTINUES FOR 27km UNTIL IT JOINS HIGHWAY 6 AT THE SOUTH END OF THE TOWN OF HILLS. THE TURN OFF IS 20km NORTH OF NEW DENVER AND 30km SOUTH-EAST OF NAKUSP.

DUE TO THE TIME TRAVEL INVOLVED IN DRIVING AND CLIMBING UP THE RIDGE, MOST OF THE WORK DONE WAS BY HELICOPTER BASED OUT OF NAKUSP.

ZONE C IS LESS DEFINED COMPARED TO A AND B. GRAB SAMPLE 14230 AND CHIP SAMPLE HS19 GAVE ASSAYS AS FOLLOWS 0.602/TON Au AND 1260 02/TON Ag, 0.052 02/TON Au RESPECTIVELY. T-5 POSSIBLY CUT THIS ZONE AND ON CHIP SAMPLING OVER ZIM GAVE AN ASSAY OF 0.09 02/TON Ag AND 0.052 02/TON Au

FROM THIS INFORMATION IN RESULTS IT CAN BE SUGGESTED THAT THE ZONE IS MADE UP OF ONE OR POSSIBLY TWO HIGH GRADE LENSES OR LAYERS.

SOIL GEOCHEMISTRY ALONG THE WESTERN SIDE OF THE RIDGE AND ROCK CHIP GEOCHEMISTRY ALONG THE LINE T-1 HAS OUTLINED ANOTHER INTERESTING Ag/Au MINERALIZED AREA (LOCATED AT 10400S ON THE BASE LINE). A ROCK CHIP SAMPLE HS8 OVER 40M GRADED 0.29 02/TON Ag AND 0.048 02/TON Au (AS COMPARED TO HS15 0.41 02/TON Ag AND 0.010 02/TON Au - 20M CHIP SAMPLE NEXT TO T-2)

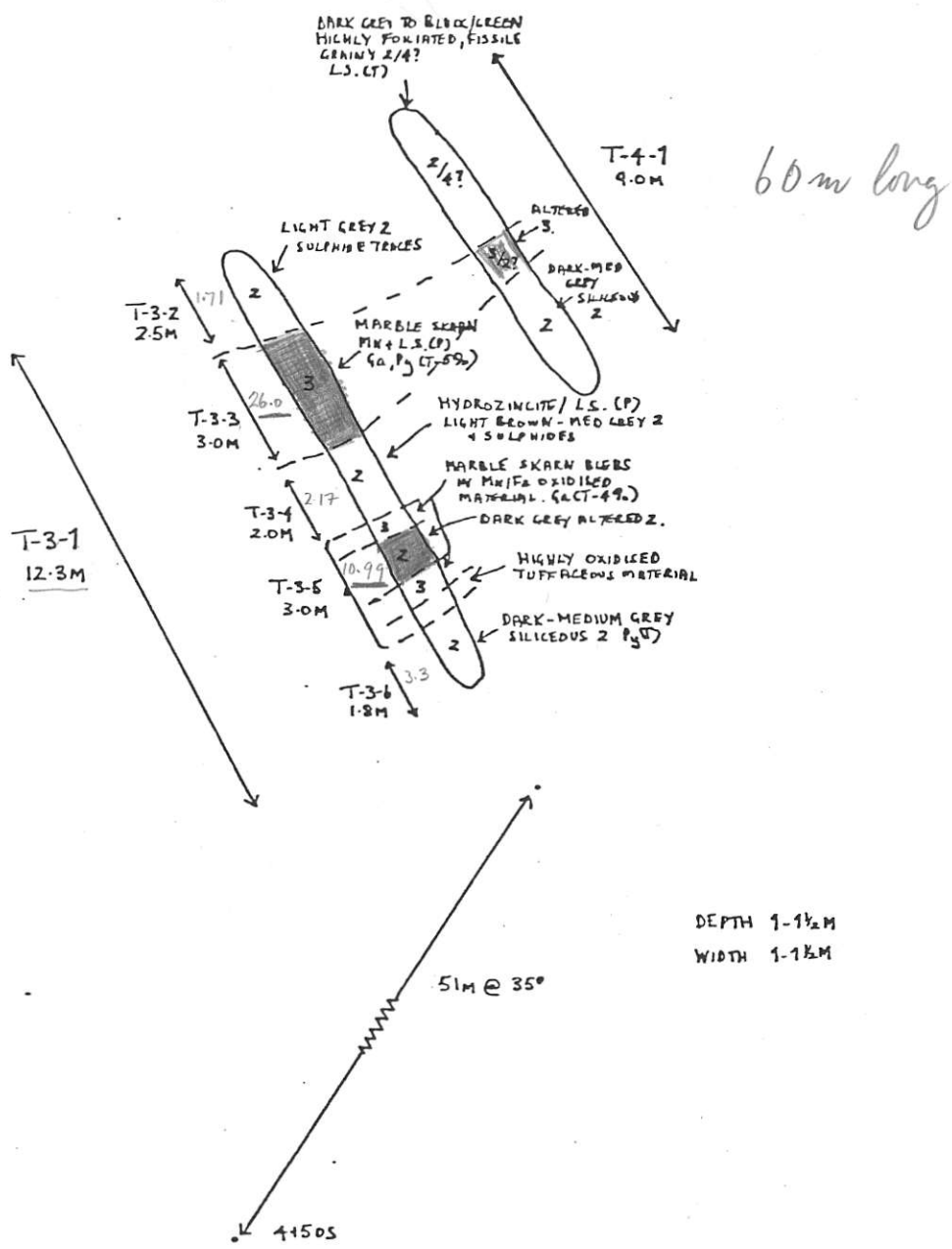
ALSO SUPPORTING THIS ROCK CHIP ANOMALY ARE TWO SOIL SAMPLE ANOMALIES H6031 AND H3209 WITH 1.9 ppm Ag, 203 ppb Au AND 3.6 ppm Ag, 35 ppb Au RESPECTIVELY. THE CAUSE OF THE ANOMALY HAS YET TO BE DETERMINED.

A SOIL GEOCHEMISTRY ANOMALY H6011 WITH VALUES 1.9 ppm Ag AND 203 ppb Au WAS ALSO LOCATED ON THE PEAK OF HAILSTON. THIS SHOULD BE INVESTIGATED FURTHER.

TRENCH 3 AND 4



Min. Zone? A



CHIP SAMPLES

	Pg OZ/TON	Pn OZ/TON	LENGTH
T-3-1	11.02	0.022	12.3 M
T-4-1	0.57	0.002	9.0

CHANNEL SAMPLES

	Pg OZ/TON	Pn OZ/TON	LENGTH
T-3-2	1.71	0.004	2.5
T-3-3	26.00	0.030	3.0
T-3-4	2.17	0.072	2.0
T-3-5	10.99	0.022	3.0
T-3-6	3.30	0.019	1.8

DEPTH 1-1 1/2 M
WIDTH 1-1 1/2 M

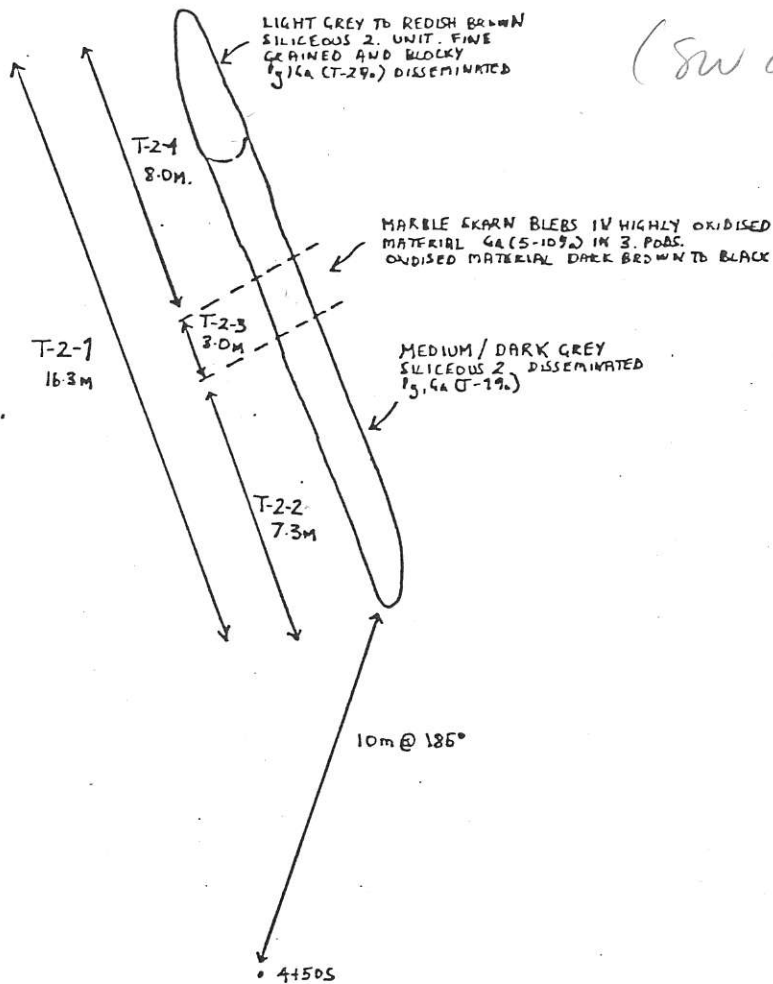
SCALE 1:200

FIG 3

TRENCH 2.



Which Zone?
(sw d A)



CHANNEL SAMPLES

	Ag OZ/TON	Pu OZ/TON	LENGTH(M)
T-2-1	2.88	0.019	16.3
T-2-2	0.71	0.012	7.3M
T-2-3	9.93	0.031	3.0M
T-2-4	1.62	0.015	8.0M

DEPTH 1-2M
WIDTH 1-1 1/2 M.

PHYSIOGRAPHY AND VEGETATION

THE CLAIMS STRADDLE THE NORTH-SOUTH TRENDING HAILSTORM RIDGE, WITH 80% OF THE CLAIMS ON THE WESTERN SIDE.

THE EASTERN SIDE IS RELATIVELY STEEP WITH A FEW NEAR VERTICAL ROCK LEDGES NEAR THE RIDGE CREST. THE SIDE RIDGES ARE HEAVILY TIMBERED WITH FIR, PALSOM, SPROUCE AND MINKIE SOFT WOODS WITH THE GULLIES GRAZE AND SLIDE BRUSH COVERED. IN SOME PLACES THE GULLIES HAVE CONSIDERABLE OUTCROPS OF SNOWING, WHEREAS THE RIDGES ARE QUITE HEAVILY COVERED BY OVERBURDEN, TALUS AND GLACIAL MATERIAL.

THE WESTERN SIDE OF THE HAILSTORM RIDGE SLOPES DOWN TOWARDS THE HEADWATERS OF THE LONDSWICKY CREEK AND IS NOT AS STEEP AS THE EASTERN SIDE. THIS SIDE HAS LESS VEGETATION WITH FEWER TREES AND SLIDE BRUSH.

THE CREST OF THE RIDGE HAS NO TREE OR BRUSH COVER WITH OUTCROP OCCURRING ALMOST CONTINUALLY ALONG THE ENTIRE RIDGE EXCEPT FOR THE SOUTHERN END.

PROPERTY IDENTIFICATION

THE HAILSTORM CROWN GRANTS CONSIST OF THREE UNITS:

NAME	RECORD NO.	DATE OF RECORD
GOLD RODD	L5788	1901
HAILSTORM	L5275	1901
LONDONBERRY	L5276	1901

NO ORIGINAL CROWN GRANTS POSTS WERE LOCATED AND THEREFORE THE EXACT LOCATION OF THE CLAIMS WAS NOT KNOWN AT THE TIME OF MAPPING. A SURVEY IS TO BE CARRIED OUT BY UNDERHILL AND UNDERHILL TO LOCATE THE BOUNDRIES OF THE CLAIMS EXACTLY.

HISTORY

The earliest recorded work on Hailstorm Ridge ~~immediately to the west of Caribou claims~~ lists a small shipment of "ore" (without assay) in 1899 (BCMM:P601). In 1901, Walter Scott, Mining Recorder for Arrow Lake Mining Division reported work on the Hailstorm and 3 other claims.

"Work done consists of stripping the vein, which has a width of 8 feet and assays 286 oz. silver per ton and 1.20 oz. gold per ton."

Major work on the ridge was undertaken in 1929 by Consolidated Mining and Smelting Company (now Cominco) as detailed below (Pg. C342:BCMM 1929).

"This property, comprising three Crown-granted claims and four staked by the company, is situated on the divide between the headwaters of Canyon and Caribou Creeks at an elevation of between 6,000 and 7,300 feet above sea level. The claims are reached by road to Dusty's camp, 10 miles up Caribou creek from Burton City in a north-easterly direction, and thence by an 8-mile trail up Canyon Creek to the camp at 6,700 feet elevation. Early in 1929 the Consolidated Mining and Smelting Company of Canada took the property under option and worked throughout the summer and fall months in exploring the showings that have been developed in a small way by past owners on the summit of the ridge. The work was discontinued in December, due to winter conditions, and it is expected that further exploration work will be done by the company in the spring of 1930.

The country-rocks are granites and quartzites and on the summit of the ridge an outcrop of oxidized calcite has been opened up by trenching. On the Caribou Creek slope a short tunnel driven in westerly direction has penetrated the mineralized calcite at a depth of 25 to 30 feet and channel samples across a width of 25 feet gave returns varying between 15 and 50 oz./ton silver, with an average for the entire wide of approximately 20 oz. in silver.

To further explore this surface showing opened by the short tunnel (35 feet) it was decided to drive a crosscut from the Canyon Creek side of the ridge to gain a depth of 300 feet showing, and during 1929 a total of 899 feet of crosscutting and drifting was done by the twelve to fifteen men employed. The results in the lower crosscut at 7,000 feet elevation are not yet conclusive and the exploration work is to be resumed in the spring."

The continuation in 1930 is described on BCMM 1930, pg. A263 as below:

"Development work at this group of seven claims, situated on the divide between Canyon and Caribou Creeks was resumed early in the year by the Consolidated Mining and Smelting Company of Canada, Limited, and continued until the late fall, when the crew with all equipment was withdrawn.

An appreciable footage of underground crosscutting, drifting, and raising from the 7,000-foot level described in the 1929 Annual Report met with discouraging results. The downward extension of the favourable oxidized calcite-silver-bearing mineralization exposed on the surface working was not found and the option on the property has been dropped as a consequence."

There is no further work recorded for the area on or near the Caribou claims. Alex Strebchuck has completed minor hand trenching in the western portion of Caribou 4 in a zone of skarn rich in sulfides. There are no known mineral occurrences on the eastern side of Caribou 4. There are a few very old trenches on the lower north end of the Hailstorm Ridge that may be related to mineralization near Hailstorm peak but until the claims are surveyed in the area, it is not clear as to which claims control the trenched areas.

REGIONAL GEOLOGY

Mapping by D.W. Hyndman in 1961 and 62 at 1" to 1 mi (map 1234A, GSC Bull 161) has the ~~Caribou mineral claims~~ ^{HAILSTORM RIDGE} within a belt of rocks described as Milford Group of pre Jurassic age with major intrusions to the east through to the southeast (Snowslide Creek Stock) and to the north and northwest (Goat Canyon Creek Stock). The Milford Group designation, according to Hyndman, is based more on the degree of metamorphic alteration than any dating by marker beds, gross composition or lithology, fossil or radio-metric dating. This group of rocks are described as predominantly pelitic schists and calc-silicate bearing metasedimentary rocks with "limestone" in less altered terrains. The unit forms a large arcuate outcrop from Shannon Lake in the northeast, southwest to Snow Creek and north to Tillicum Mountain on the west.

The Milford group of mixed sedimentary and apparently volcanic rocks appears to be much richer in volcanic flows, tuffs and subaqueous volcano-clastic rocks than proposed by Hyndman. Volcanic sediments and flows have been located on the east side of Caribou Creek south of the Shannon Lake Stock, on Hailstorm Ridge, at Tillicum Mountain and in the lower portion of the west fork of Caribou Creek.

Some of the volcanic rocks (dacites?) appear to carry gold and/or silver values at Tillicum Mountain, on the west side of the ridge parallel and immediately east of Hailstorm Ridge and on Hailstorm Ridge.

The geological series in the district appears to be from oldest to youngest (within the sedimentary and volcanic rocks) with Hyndman's units in brackets.

1. 'Kaslo' (unit 9) andesites and basalts as flows with "Milford" sedimentary rocks conformable at the contact.
2. 'Milford' (7, 6A, 6B) as Unit 7s principally black argillite with pyrite and pyrrhotite with varying amounts of calcareous argillites and siliceous limestone all relatively graphitic.

Units 7vs mixed simple sedimentary members or lentils within volcano-sedimentary wackestone, tuffs, argillaceous tuffs and limy tuffs.

Unit 7v principally lenticular porphyritic flows ranging in composition from syenite (foliated) to glassy grey porphyritic albite dacite, to grey to black andesites and occasionally sheets of porphyritic grey quartz latite. Related to the sheets are a rare lenticular rubble tuff unit with similar composition to Unit 7v, but lacking the 7vs and the sedimentary (tuffaceous) version of 7v.

3. Intrusives: (Units 19 and 18) Unit 19a commonly has dykes in its walls and ceiling with weakly chilled walls but intense local amphibolization of sediments or volcanic flows. Unit 18 makes tight high temperature skarns and has a few dykes in its ceiling with significantly less altered wall rocks than Unit 19a dykes.

LOCAL GEOLOGY

HAILSTORM RIDGE WAS GEOLOGICALLY MAPPED IN DETAIL AT A SCALE OF 1:1000 (MAPS 2 AND 3). MAPPING CONTROL WAS OBTAINED BY A NORTH-SOUTH BASELINE STARTING AT HAILSTORM PEAK AND EXTENDING FOR 1500M SOUTH AT AN AZIMUTH OF 102° . AN EAST-WEST BASELINE WAS ALSO SURVEYED IN, EXTENDING FROM 41555 ON THE NORTH-SOUTH BASELINE WESTWARDS FOR 300M WEST AT AN AZIMUTH OF 258° .

THE GEOLOGY OF THE RIDGE BASICALLY CONSISTS OF THE METAMORPHOSED (UP TO AMPHIBOLITE GRADE) MILFORD SERIES. THE MILFORD SERIES IS SPLIT INTO THREE MAJOR UNITS, VOLCANIC FLOWS (7v), VOLCANO-SEDIMENTS (7vs) AND SEDIMENTS (7s); ALL TRENDING IN A N.E TO S.E DIRECTION. AT THE NORTHERN END OF THE BASE LINE CLOSE TO THE PEAK A MAJOR CRETACEOUS INTRODUCTION OCCURS. THIS IS THE GOAT CANYON CREEK STOCK WHICH IS A MEDIUM-COARSE GRAINED, HORNBLende-BIOTITE, QUARTZ-MONZONITE. THERE IS NO EXTENSIVE CONTACTS WITH THE MILFORD SERIES ONLY MINOR ALTERATION, ZONES OF FINE GRAINED INTRUSIVE AND PEGMATITE ZONES.

THE 7v UNIT CAN BE SUB-DIVIDED INTO THREE PORPHYRY FLOW TYPES:

1 - A DARK GREEN ANDESITIC PORPHYRY FLOW (EASILY MISTAKEN FOR A LAMPROPHIRE DYKE EXCEPT THAT IT IS CONCORDANT WITH THE BEDDING). THE ROCK HAS A FINE GRAINED MAFIC MATRIX AND MEDIUM TO COARSE PHENOCRYSTS OF PLAGIOCLASE FELDSPAR. IN SOME AREAS NO PHENOCRYSTS ARE PRESENT.

1a - A LIGHT GREY/BROWN SYENITIC (TRACHYTIC) PORPHYRY FLOW

MINERALIZATION

MINERALIZATION WITHIN THE MAIN ZONE IS VERY CLOSELY RELATED TO THE SKARN ZONES WITH THEIR ASSOCIATED PORPHYRY FLOWS. MOST OF THE HIGH GRADE Au AND Ag VALUES ARE CONFINED TO THE SKARN ZONES, WHEREAS THE LOWER GRADE VALUES ARE FOUND IN THE SURROUNDING VOLCANO-SEDIMENTARY AND FLOW UNITS. FROM THE MAPPING AND TRENCHING THREE MINERALIZED WERE OUTLINED (MAP 3) ZONE A, B AND C.

MINERALIZED BY GALENA (2-15%), PYRITE, PYRROTITE, SPHALERITE AND WIRET
ZONE A CONSISTS OF A LENSE OF MARBLE SKARN (3b). THE ZONE TRENCHES IN NE-SW DIRECTION WITH A KNOWN EXTENSION OF 60M. THE ZONE HAS A WIDTH IN THE SW OF 1-2M, SWELLING IN THE MIDDLE UP TO 10-15M AND PINCHING OUT AGAIN IN THE NE WITH TWO NOSES ^{EACH} 1-3M WIDE:

A 12M ADIT WAS PUT INTO THIS ZONE IN THE 1930's. A CAREFUL CHIP SAMPLE (0.2M SPACING) WAS TAKEN AROUND THE WALLS OF THE ADIT (HS 24) AND GAVE ASSAY VALUES OF 18.02 OZ/TON Au AND 0.044 OZ/TON Au. THE TWO NOSES OF THE ZONE IN T-3 (MAP 2) GAVE VALUES OF 26.00 OZ/TON Ag, 0.030 OZ/TON Au OVER 3M AND 10.99 OZ/TON Ag, 0.022 OZ/TON Au ALSO OVER 3M. THE TOTAL GRADE OF T3 OVER 12.3M GAVE A GRADE OF 11.02 OZ/TON Ag AND 0.022 OZ/TON Au. THE SMALL BLEB OF SKARN IN T-3 GAVE A GRADE OF 9.93 OZ/TON Ag AND 0.031 OZ/TON Au OVER 3M.

THIS ZONE RESULTED IN THE WORKINGS OF 1930 WHEN A DRIFT WITH ASSOCIATED CROSSCUTS WAS DRIVEN FROM THE WEST TO LOCATE FURTHER DEPTH EXTENSIONS (MAP 4).

ZONE B CONSISTS OF AN ALTERED SKARN LAYER MINERALIZED BY PYRITE (3-10%), PYRRHOTITE (T-4%), GALENA (T-4%), CHALCOPYRITE AND SPHALERITE. THIS ZONE HAS A KNOWN LENGTH OF 30M EXPLORED BY T-1 AND T-2, WITH A POSSIBLE 30M EXTENSION TO THE SOUTH PARTLY EXPLORED BY T-7. THE WIDTH OF THIS ZONE VARIES FROM 5-10M AND IN THE VICINITY OF T-7 THE SKARN ZONE IS SPLIT BY A 10-15M LONG ANDESITE PORPHYRY BLEB.

ASSAYS FROM T-1 RANGE FROM 0.47 TO 4.51 OZ/TON Ag AND 0.022 TO 0.030 OZ/TON Au OVER A DISTANCE OF 13M. THIS IS QUITE A DISCREPANCY FROM SMITH (1983) WHO HAD VALUES RANGING FROM 15.7 TO 70.1 OZ/TON Ag AND 0.060 TO 0.538 OZ/TON Au IN THE PIT TO THE NORTH OF T-7. THE EXPLANATION FOR THIS DIFFERENCE COULD BE DUE TO EITHER A SMALL LENS OF HIGH GRADE MINERALIZATION OR THAT THE TRENCH DID NOT QUITE CUT THE HIGH GRADE ZONE.

T-6 AND T-7 ASSAYS.

CONCLUSIONS

1. THREE MINERALIZED ZONES HAVE BEEN LOCATED. THE MINERALIZATION BEING VERY CLOSELY RELATED TO THE SKARN BODIES.
2. THE DIAL OF THE MAIN TRENCH DEPOSITARY IS TO THE E.W. AT A DIP OF 50 TO 60°.
3. THE ZONES WERE FIRST LOCATED ON THE NORTHERN SIDE OF THE MOUNTAIN RANGE IN VICINITY OF THE N.W.
4. ZONE A OF VISIBLE LENGTH 60M AND WIDTH VARYING FROM 2M TO 15M HAS AN APPROXIMATE AVERAGE GRADE OF 12-18 OZ/TON Ag AND 0.022 TO 0.020 OZ/TON Au.
5. THE APPROXIMATE GRADES OF ZONES B AND C HAVE YET TO BE DETERMINED.

RECOMMENDATIONS.

1. FURTHER TRENCHING IS SUGGESTED IN THE FOLLOWING AREA:
 - a) TRENCHES OUT OF VISIBLE MINERALIZATION BOTH TO THE NORTH AND SOUTH OF ZONE A, TO LOOK FOR CONTINUATION
 - b) WIDENING IN BOTH E-W DIRECTIONS OF T-7, T-5 AND T-8
 - c) A TRENCH TO THE SOUTH OF T-2 IF FAVOURABLE RESULTS
 - e) A TRENCH TO THE EAST OF T-2 TO FOLLOW NORTHWARD CONTINUATION OF ZONE B.
 - a) A TRENCH 110M. TO THE NORTH OF T-1 TO DETERMINE GRADE DISCREPANCY BETWEEN T-1 AND SMITH (1983)
2. 2 DAYS WORK ON CLEARING AND TIMBERING OVERBURNED IN FRONT OF MAIN PORTAL. FOLLOWED BY AIR BLOWING THEN DETAILED GEOLOGICAL MAPPING, SURVEYING AND CHANNEL/CHIP SAMPLING OF UNDERGROUND WORKINGS.
3. CLOSE SPACE CHIP SAMPLING TO LOCATE HIGH GRADE LENSE/LAYERS IN ZONE B/C (ESPECIALLY IN T-5 AND T-8.)
4. FURTHER GEOLOGICAL MAPPING TO N.E OF GROWN GRANTS ON DISPUTED CLAIMS FOLLOWING UP ROCK CHIP ANOMALIES
5. LOCATION OF ONE OR TWO CENTRALISED DRILL SITES ON THE WESTERN SIDE OF THE PIT, SO THAT A ROW OF HOLES COULD BE DRILLED AT VARIOUS ANTIPODES.

WITH COARSE ALKALIC PHENOCRYSTS. IN MOST PLACES IT IS WELL WEATHERED AND ^{ENTER} FORMS AN UNDOULATED SURFACE ON THE OUTCROPS. WITH THE ALKALIC PHENOCRYSTS BEING MORE RESISTANT TO WEATHERING THAN THE MATRIX, OR IN EXTREME CASES A COARSE CRUMBLY SAND.

1b-A RHYOLITIC TO APPLITIC FLOW BEING WHITE AND FELSIC IN CHARACTER. THE AMOUNT OF MATRIX PRESENT (0-10%) DETERMINES WHETHER THE FLOW IS RHYOLITIC OR APPLITIC. USUALLY NO PHENOCRYSTS ARE PRESENT.

THESE FLOWS ARE CONCORDANT WITH THE BEDDING OF THE 7YS AND 7c UNITS WITH NO EVIDENCE OF INTENSE ALTERATION OR CONTORTIONS ALONG THE CONTACTS. THE ONLY EVIDENCE OF ANY TYPE OF CATACLASTIC EVENT OCCURS NEXT TO THE WESTERN PORTAL WHERE TWO FLOWS 1 AND 1b_i COME INTO CONTACT ABRUPTLY CAUSING BRECCIATION (FRAGMENTS OF 1 IN 1b_i AND LENSING. IN GENERAL THE 1 AND 1a FLOWS ARE THICKER (10-40M) THAN THE 1b FLOWS (1-5M).

THE 7YS UNIT CAN BE SUBDIVIDED INTO TWO TYPES:

TO
Z-A, LIGHT/DARK GREY-GREEN FINE GRAINED MASSIVE TO SLIGHTLY FOLIATED SILICEOUS UNIT. DUE TO METAMORPHISM AND THE FINE GRAINED NATURE OF THE ROCK IT IS DIFFICULT TO DETERMINE THE PRECISION. IT IS ASSUMED TO BE OF A VOLCANO-SEDIMENTARY ORIGIN EITHER A FINE GRAINED FLOW OR TUFF. IN SOME PLACES BANDING IS PRESENT EITHER SEDIMENTARY OR FLOW. DISSEMINATED SULPHIDES ARE PRESENT ESPECIALLY AROUND THE MAIN MINERALIZED ZONE (3450S TO 6400E), MAINLY AS PYRITE AND GALENA.

2a - A LIGHT GREY TO WHITE FOILIATED UNIT, BEING FELSIC RATHER THAN SILICIC IN CHARACTER WITH FINE GRAINED MAFIC NEEDLES. IN MOST PLACES IT IS FRIABLE AND SLIGHTLY LIMY. IT IS VOLCANO-SEDIMENTARY IN ORIGIN POSSIBLY A LIMY TOFFACEOUS VERSION OF 2.

THE 7c UNIT IS DIVIDED INTO TWO TYPES:

THE SKARN OR PYROMETASOMATIC LIMESTONE TYPE IS FURTHER DIVISIBLE INTO THREE GROUPS AS FOLLOWS:-

3 - A MASSIVE WHITE TO LIGHT GREEN, FINE TO MEDIUM GRAINED SKARN WITH VISIBLE DIOPHASE AND ALTAOLITE AS ACCESSORY MINERALS. LITTLE TO NO SULPHIDES ARE PRESENT IN THIS UNIT.

3a - THIS SKARN IS A MUCH MORE ALTERED VARIETY OF 3 BEING DARK GREEN TO RED BROWN ^{IN COLOUR} MEDIUM GRAINED AND MASSIVE.

MOST OF THE CARBONATE MATERIAL HAS BEEN REMOVED LEAVING A DIOPHASE - GARNET - ALTAOLITE - EPIDOTE RICH SKARN. IN MOST OCCURRENCES IT IS CLOSELY ASSOCIATED WITH SULPHIDE MINERALIZATION, PYRITE AND GALENA.

3b - A MEDIUM TO COARSE GRAINED MARBLE SKARN, FEW TO NO ACCESSORY MINERALS. CONSIDERABLE SULPHIDE MINERALIZATION IS ^{ALSO} PRESENT ESPECIALLY GALENA.

THESE SKARN ZONES ARE CLOSELY RELATED TO THE 7V FLOWS AND THE 7c UNIT. THIS UNIT IS A SILICEOUS CHERTY ROCK, BEING SIMILAR IN APPEARANCE TO CLEAR MASSIVE QUARTZ. THESE UNITS WILL BE DISCUSSED FURTHER IN THE MINERALIZATION SECTION.

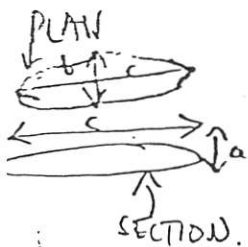
4 - A BLACK TO DARK GREY, FINE GRAINED AND WELL FOLIATED ARGILLITE.

THE GENERAL BEDDING AND CLEAVAGE TREND WITHIN THE MAIN ZONE (MAP 2) VARIES FROM 30° - 50° AZIMUTHAL, WITH A STEEP DIP IN BOTH AN EASTERLY AND WESTERLY DIRECTION OF 60° TO VERTICAL. NO SHEAR ZONES OR LARGE SCALE FOLDING IS APPARENT. SLIGHT BENDING OF THE FLOWS AND SKARNE OCCURS WITHIN THE MAIN ZONE AS SEEN ON MAP 2.

AN IMPORTANT FACTOR IS TO DETERMINE THE RAKE OF THE MAIN ANDESITIC PORPHYRY FLOW ASSOCIATED WITH THE MINERALIZATION (MAP 2 AND 3). THIS CAN ONLY BE DETERMINED BY OUTCROPPING PINCH OUT ZONES, THE POSITION OF THE FLOWS AND THE CONTACT WITH SURROUNDING ROCKS. THE PLUNGE OF THE FLOW IS IN A N.W. DIRECTION, STEEPLY DIPPING FROM 50° - 70° .

THE YOUNGING DIRECTION IS DETERMINED BY THE RELATIONSHIP OF THE SKARN UNIT TO THE PORPHYRY FLOW (THE SKARN BEING ON THE YOUNGER SIDE). IN THE CASE OF THE MAIN ZONE THE YOUNGING DIRECTION IS TO THE N.W.

IT IS DIFFICULT BECAUSE OF THE LACK OF FURTHER PINCH OUT ZONE TO DETERMINE WHETHER THE PLUNGE IS IN THE c OR b DIRECTION OF THE FLOW



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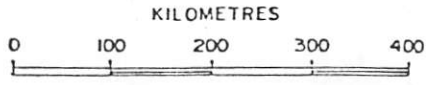


HAILSTORM PROJECT

ESPERANZA RESOURCES LTD.

HAILSTORM PROJECT
 LONDON & TOWER GROUPS
 SLOCAN MD., B.C.

LOCATION MAP



F. MARSHALL SMITH, P. ENG.
 MAP 7