

BERG.
(KENNCO EXPLORATIONS (WESTERN)
LIMITED)

($53^{\circ}12' NE$)($93E14\frac{1}{2}$). THIS
PROPERTY IS ^{IN} THE TAHTSA RANGE
6 MILES NORTH OF TAHTSA LAKE

9 MILES WEST OF SIBOLA PEAK. IT CONSISTS OF ~~62~~¹⁰⁸ RECORDED
CLAIMS HELD BY KENNCO EXPLORATIONS (WESTERN) LIMITED, 1030 WEST
GEORGIA STREET, VANCOUVER 1, BC, ^{GEORGE} MANAGER OF EXPLORATION J.A. GOWDER,
~~GEOLOGIST ON THE PROPERTY, O.M. STEWART.~~ THE PROPERTY IS SERVICED
BY A ^{26 MILE} CAT ROAD FROM TWINKLE LAKE ON THE ROAD FROM HOUSTON TO
TAHTSA LAKE.

THE BERG WAS STAKED IN THE AUTUMN OF 1961 ~~AS A RESULT~~
OF AFTER DISCOVERY BY ~~SELT~~ & WATER RECONNAISSANCE SURVEYS.
EXPLORATION HAS BEEN CONTINUOUS SINCE 1962 & HAS INCLUDED
DETAILED GEOCHEMISTRY, GEOLOGICAL MAPPING, MAGNETOMETER SURVEYS &
SINCE 1964 SOME 13000 FEET OF ~~CORE~~ DRILLING OF ALL TYPES.
IN 1966 ABOUT NX-WL. HOLES WERE CORED TOTALLING
ABOUT 6000 FEET. GEORGE O.M. STEWART WAS GEOLOGIST IN CHARGE.

93E046(14E)
PROPERTY FILE

MINERAL COMPOSITION, INTRUSIVE ROCKS
AT BERG COPPER-MOLYBDENUM DEPOSIT
VOLUME PERCENT

	PHENOCRYSTS						MATRIX	TOTAL						
	QUARTZ	PLAGIOCLASE	ORTHOCLASE	HORNBLEND	BIOTITE	OPAQUES		QUARTZ	PLAGIOCLASE	ORTHOCLASE	HORNBLEND	BIOTITE	OPAQUES	AVERAGE OF
① QUARTZ DIORITE ①								10.8	57.6	8.0	16.6	4.6	3.9	51
② Qtz Monz Porphyry ②	4.1	27.2	2.4	2.1	3.5	1	58.9	20.3	38.8	30.0	3.0	6.1	1.4	4
LATITE MONZONITE PORPHYRY ④	3.0	20	/	7.5	3.7	1.5	64.5	4.2	49.0	23.0	13.5	5.0	3.0	2
QUARTZ ANDESITE ⑤								6.5	68.0	/	18.5	1.5	5.5	2

~~STRUCTURES~~ GEOLOGY.

THE TAHITSA & SIBOLA RANGES ARE CHIEFLY UNDERLAIN BY MASSIVE & CLASTIC VOLCANIC ROCKS OF THE HAZELTON GROUP OF MIDDLE JURASSIC AGE. THESE ARE ^{MODERATELY} FOLDED WITH NORTH TRENDING AXES. ~~THE BERG DEPOSIT~~. THE VOLCANIC ROCKS ARE ^{INTRUSION} BY A SERIES OF ^{SMALL} ~~GRANITOID~~ ^{PLUTONS}, TWO OF WHICH OCCUR IN THE VICINITY OF THE BERG ^{COPPER-MOLYBDENUM} DEPOSIT. ONE IS A QUARTZ DIORITE WITH AN ^{SURFACE} ~~OUTCROP~~ AREA OF 4 OR 5 SQUARE MILES, THE OTHER IS A SUB CIRCULAR PLUG OF QUARTZ MONZONITE PORPHYRY ABOUT 2400' IN DIAMETER. BOTH ARE IMPORTANT HOSTS OF THE ORE DEPOSIT & THE PORPHYRY APPEARS TO HAVE A GENETIC RELATION TO IT. THESE CUT THE HAZELTON ~~ROCKS~~ ON THE WEST FLANK OF A NORTH TRENDING ANTICLINE. ~~THE~~ ^{IN THE VICINITY OF THE DEPOSIT} ~~ARE~~ DIPS OF 20 TO 35 TO THE EAST ^{ARE CHARACTERISTIC} ~~THROUGHOUT~~.

GEOLOGY CLOSE TO THE QUARTZ MONZONITE PORPHYRY PLUG IS SHOWN ON FIG. ASB IIIa. IN THIS AREA THE HAZELTON ROCKS ARE CUT BY A SERIES OF 5 INTRUSIVE BODIES WHICH IN THE PROBABLY ORDER OF INTRUSION FROM OLDEST (1) TO YOUNGEST (5) ARE:

- (1) QUARTZ DIORITE & DIORITE STOCK
- (2) QUARTZ MONZONITE ^{PORPHYRY} PLUG.
- (3) " " PORPHYRY BRECCIA PIPE.
- (4) MONZONITE PORPHYRY DIKES.
- (5) SMALL ANDESITE ^{MONZONITE} DIKES.

THE ORDER OF BRECCIA PIPE & ^{MONZONITE} PORPHYRY DIKES MAY BE REVERSED BUT BOTH SEEM TO POST-DATE THE MAIN SULFIDE MINERALIZATION.

~~THE PETROLOGY OF THESE ROCKS AND THE HAZELTON~~ IS DISCUSSED IN THE ACCOMPANYING TABLE LIST THE AVERAGE MINERAL COMPOSITION OF THE MAIN INTRUSIVE PHASES. PERCENTAGES WERE ESTIMATED USING CHARTS FOR ALL SPECIMENS & SOME WERE CHECKED BY POINT COUNT. THE PETROLOGY OF ALL INTRUSIVE ^{& THE WALL ROCKS} PHASES IS DISCUSSED IN SEQUENCE.

①

GEOLOGY.

~~THE BERG DEPOSIT OCCURS IN AND ADJACENT TO A SUBCIRCULAR PLUG~~

THE AREA SURROUND THE BERG, THE TANTSA RANG, & SIBOLA RANGES, IS CHIEFLY UNDERLAIN BY MASSIVE & CLASTIC VOLCANIC ~~AND CLASTIC~~ ROCKS OF THE HAZELTON GROUP OF MIDDLE JURASSIC AGE. THESE ROCKS ARE MODERATELY FOLDED AND CUT BY SERIES OF SMALL GRANITOID INTRUSIVE BODIES. IN THE IMMEDIATE VICINITY OF THE BERG THERE ARE TWO INTRUSIVE BODIES OF IMPORTANCE: A QUARTZ DIORITE ~~THE~~ WITH AN OUTCROP AREA OF 4 OR 5 SQUARE MILES. & A QUARTZ MONZONITE PORPHYRY PLUG ~~OF~~ WITH DIAMETER OF ABOUT 2400 FEET. THESE ROCKS ARE BOTH IMPORTANT HOSTS FOR THE ~~SULFIDE~~ ^{SULFIDE} ORE & THE LATTER APPEARS TO HAVE A GENETIC RELATION TO ~~THE~~ ^{IT} ORE. FIGURE ~~ACB~~ ^{IS A PLAN} ~~SHOWING THE~~ AREA (IMMEDIATELY ~~SO~~) CLOSE TO THE QUARTZ MONZONITE PLUG.

THE HAZELTON ROCKS ~~IN~~ THE IMMEDIATE VICINITY ARE DOMINATED BY ~~AND~~ ANDESITIC TUFFS, LAPILLI TUFFS, & VOLCANIC SANDSTONES. MINOR MARINE SHALES OCCUR. THE ANDESITE LAPILLI TUFFS WERE ~~ONLY SLIGHTLY~~ ^{ONLY SLIGHTLY} METAMORPHOSSED ARE (GREEN TO DARK) PURPLE ROCKS COMPOSED OF IRREGULAR FRAGMENTS MOST OF WHICH ARE OF IDENTICAL MINERALOGY IF DIFFERING GRAIN SIZE. THESE ARE ~~LATHY~~ MICRO PORPHYRIC ROCKS ^{OR} FELTED TO TRACHYTIC TEXTURE COMPOSED OF ~~THE~~ ANDESINE & HORNBLAND IN A CRYPTOCRYSTALLINE MATRIX. THE MATRIX ~~FRAGMENTS~~ LAPILLI ARE CONTAINED IN A FINE DUST OF SIMILAR COMPOSITION PLUS MUCH ^{NON-SULPHIDE} OPAQUE MATTER. SUCH ROCKS IN THE HORN FELSIC AUREOLE MAY BE CONVERTED INTO ~~ROCKS~~ ^{SKARN} IN WHICH THE ORIGINAL TEXTURE IS SCARCELY VISIBLE IF AT ALL. ^{THE MOST COMMON SKARN IS} COMPOSED OF A MOSAIC OF FINE ^{SILICUM} QUARTZ, BIONITE & POTASH FELDSPAR WITH PALIMPSEST REMNANTS OF ORIGINAL GRAINS SHOWN BY VARYING PROPORTIONS ^{PLAGIOCLASE} OF THESE MINERALS & EARLIER CHLORITE & KAOLINITE. LOCALLY MOTTL'D, GREEN-LIKE ROCKS ARE PRODUCED BY THE METASOMATISM.

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RUSTY WEATHERING PURPLE BROWN
INTO BOTTLIC FRAGMENTS
OR INTO
A SKARN

MOTTL'D,

INTRUSIONS OCCURRED IN THE FOLLOWING SEQUENCE,

- ① QUARTZ DIORITE & DIORITE STOCK.
- ② QUARTZ MONZONITE PORPHYRY. PLUG.
- ③ " " " BRECCIA PIPE?
- ④ QUARTZ BEARING MONZONITE PORPHYRY DYKES ETC.
- ⑤ ^{SMALL} ANDSITTE DIKES.

SOME UNCERTAINTY EXISTS ~~AS TO~~ ^{ORDER OF INTRODUCTION OF} THE MONZONITE PORPHYRY & THE BRECCIA PIPE MAY BE REVERSED. BOTH SEEM TO POST DATE THE MAIN SULFIDE MINERALIZATION. THE ^{AVERAGE} MINERAL COMPOSITION OF

OF ~~THE~~ ^{THE} ROCK SPECIMON STUDIED IS SHOWN ON THE ① QUARTZ DIORITE ACCOMPANYING TABLE. ~~SOME SPECIMONS~~ ^{FOR SOME SPECIMONS} PERCENTAGES WERE ESTIMATED USING CHARTS BUT ~~OTHERS~~ WERE COUNTED IN OTHERS.

① QUARTZ DIORITE. SPECIMONS RANGE EITHER SIDE OF 10% QUARTZ SO THAT SOME ARE DIORITES OTHERS QUARTZ DIORITES BUT THE AVERAGE IS THE LATTER. ~~THESE ARE~~ THE FRESH QUARTZ DIORITE IS A FINE MEDIUM GRAINED LIGHT GREY ROCK THAT CONTAINS SCATTERED ^{HORNBLANDS} PHENOCRYSTS. THE AVERAGE GRAIN IS SLIGHTLY ^{COARSER} ~~GREATER~~ THAN 1 MM. IN DIAMETER. THE HORNBLANDS PHENOCRYSTS ARE UP TO 8 MM LONG & ARE ^{COMMONLY} ALIGNED IN A LINEATION & VAGUE FOLIATION NOT EVIDENT IN THE OTHER MINERALS. PREDOMINANT SLIGHTLY ROUNDED LATHS OF ~~UNIFORMLY ZONED~~ LABRADORITE OCCUR SURROUNDED BY CUSPATE & POIKILITIC HORNBLANDS. WITH RANDOM MINOR BIOTITE & OPAQUE MINERALS. PLAGIOCLASE IS UNIFORMLY ZONED FROM AN₆₀ TO AN₅₀ & CARLSBAD-ALBITE TWINS ARE COMMON. QUARTZ & ^{SLIGHTLY PERITITIC} ORTHOCLASE OCCUR IN BOTH INTERSTITIAL ~~HOLES~~ ACCUMULATIONS & IN SMALL ^{ANISOBAL} DISPERSED GRAINS. ^{MOST} FELDSPAR IS FRESH BUT HORNBLANDS & BIOTITE MAY BE ALTERED TO CHLORITE. ~~THE~~

NEAR THEIR MARGINS THESE ROCKS ARE CHANGED TO ~~THE~~ FINE NEARLY APHANITIC ROCKS THAT ARE GENERALLY QUARTZ POOR. ~~THESE~~ ^{THERMALLY METAMORPHOSIS} ~~WHERE~~ ^{THESE} ~~ARE~~ ^{THESE} ~~RESEMBLE~~ ^{RESEMBLE} HORNFELS ^{DERIVED} RESULTING FROM VOLCANIC ROCKS SO THAT THE CONTACT APPEARS GRADATIONAL. THE MAIN METAMORPHIC CHANGE IN THE QUARTZ DIORITE WITHIN THE HORNFELSIC AUREOLE OF THE Q.M.P. IS THAT HORNBLANDS HAS ENTIRELY BEEN CONVERTED TO NEW BROWN BIOTITE.

$$10^6 \mu = 1 \text{ m}$$

$$10^3 \mu = 1 \text{ mm}$$

$$10^0 \mu = 1 \text{ mm}$$

$$1 \mu = 0.001$$

$$.1 \text{ mm} = 100 \mu$$

Q

QUARTZ MONZONITE PORPHYRY (2) IS A COARSELY PORPHYRITIC ROCK

THAT IS GREEN WHERE FRESH BUT IN NATURAL OUTCROPS IS ~~ROSY~~ COATED WITH GEOTHITE & ON BROKEN SURFACES THE FELDSPARS ARE STAINED BROWN. ~~BOOKS OF BIOTITE FORM A~~ CHARACTERISTIC FEATURES INCLUDE ABUNDANT FELDSPAR TABLETS, PROMINENT BIOTITE BOOKS & IRREGULARLY SCATTERED CORRODED QUARTZ. MAXIMUM GRAIN SIZE OF PHENOCRYSTS APPROACHES 1 CM. LONG. BIOTITE BOOKS MAY BE 3-4 MM IN SECTION & UP TO 7 MM IN THE Z CRYSTALLOGRAPHIC AXIS. PHENOCRYSTS FORM 35 TO 50 PERCENT OF THE ROCK. PLAGIOCLASE ~~PHENOCRYSTS~~ ARE STUBBY CRYSTALS COMMONLY SHOWING COMBINED FORM & COMPLEX TWINNING. CARLSBAD-AURIFER TWINS HOWEVER ARE ABSENT. MOST CRYSTALS SHOW MANY OSCILLATORY ZONES 7 TO 9 BEING COMMON. AVERAGE COMPOSITION IS ABOUT AN₃₀. MOST ~~PLAGIOCLASE~~ IS PARTIALLY SERICITIZED & SOME IN ADDITION IS ALTERED PARTLY TO KAOLINITE & CALCITE. ~~HORNBL~~ BIOTITE ^{FOLIA} MAY BE ^{BENT & MAY BE} INTERLACED WITH CHLORITE. HORNBLANDS IS COMPLETELY ALTERED TO CHLORITE PLUS OPAQUE MINERALS. ^{THE} MATRIX HAS AN AVERAGE GRAIN SIZE OF 0.02 - 0.04 MM. ~~IS~~ IS CHIEFLY A MOSAIC OF ~~PLAGIOCLASE~~ & EITHER SUBEQUAL AMOUNTS OF PLAGIOCLASE & ORTHOCLASE WITH LESS QUARTZ OR OF PECTINITE WITH QUARTZ. CHLORITE & OPAQUE MINERALS ARE MINOR.

THE BIOTITE BOOKS ARE SLIGHTLY PERITIC OR METACLASTIC

ON THE SURFACE THE QMP. IS NOT IN CONTACT WITH THE Q DIORITE BUT ~~ITS~~ ITS RELATIVE AGE IS SHOWN BY ^{ACTUAL} SMALL INCLUSIONS OF THE Q₁.

THE BRECCIA (3) IS COMPOSED DOMINANTLY OF FRAGMENT OF QUARTZ MONZONITE PORPHYRY WITH MINOR OTHER TYPES SUCH AS SILTSTONE AND ANDESITE. ~~THE BRECCIA IS A CREAM~~ ^{TO FAINTLY GREEN} COLOURED ROCK

~~COMPOSED~~ MOST FRAGMENTS ARE IRREGULAR TO SUBANGULAR & OF 15MM OR LESS IN AN ABUNDANT ^{SIMILAR} FINELY COMMINUTED MATRIX. ~~FRAGMENTS ARE LARGER~~ LARGE FRAGMENTS ARE VERY RARE.

THE BRECCIA IS ALTERED BY INTENSE KAOLINIZATION OF FELDSPAR & ^{COMPLETE CHANGE OF BIOTITE TO MUSCOVITE} WIDELY DISSEMINATED WELL-CRYSTALLINE PYRITE, ON WHICH OCTAHEDRAL ^{IS COMMON BUT} FACES ARE PROMINENT. SOME FRAGMENTS CONTAIN ^{QUARTZ} ~~SEM~~ VEINLETS.
 (CHALCOPYRITE IS VERY RARE)

UNMETAMORPHOSSED

* MINOR CARBONIZATION.

THE QUARTZ BEARING MONZONITE PORPHYRY (4) IS SUPERFICIALLY VERY SIMILAR TO THE QUARTZ MONZONITE ^{BECAUSE ITS PHENOCRYST MINERALOGY & CONTENT IS VERY SIMILAR.} ~~SO THAT IT~~ IT IS, HOWEVER, DISTINGUISHED IN THIN SECTION BY THE RELATIVE ABSENCE OF QUARTZ IN THE MATRIX & BY THE ABUNDANCE OF HORNBLANDS BOTH IN THE MATRIX & AS MIDDLE SIZED GRAINS. THE FRESH ROCK IS GREY & CONTAINS ABOUT 30-40% PHENOCRYSTS. CHILLED M.P. IS DARK GREY & SLIGHTLY FOLIATED. QUARTZ PHENOCRYSTS ARE NEARLY AS COMMON AS IN THE Q.M.P. BUT ARE VERY DEEPLY EMBAYED & ^{SKELETAL} ~~CORRODED~~. PLAGIOCLASE IS ALSO SIMILAR, ABOUT AN₃₅, BUT SEEMINGLY NOT AS HIGHLY ZONED. IT MAY BE FRESH, OR SERICITIZED. BIOTITE OCCURS CHIEFLY IN BOOKS ELONGATED IN Z DIRECTION. BENT PLATES ARE COMMON. HORNBLANDS IS MUCH COMMONER THAN IN THE Q.M.P. & OCCURS IN LONG PRISMS OR DIAMOND SHAPED SECTION. SPHERES IS A COMMON ACCESSORY PHENOCRYST. IT IS IN THE MATRIX THAT MOST DIFFERENCE OCCURS BETWEEN THE Q.M.P & M.P. HERE ^{VISIBLE} QUARTZ IS NEARLY ABSENT & A VERY FINE TEXTURED ~~COMBINATION~~ OF PLAGIOCLASE, HORNBLANDS & OPAQUES ~~IS OCCURS SURROUNDED~~ BY SLIGHTLY LARGER PORPHYRIC POTASSIUM FELDSPAR. ~~AVERAGE GRAIN SIZE~~

ALTERATION OF MONZONITE PORPHYRY IS RARELY INTENSE. BUT SOME REPLACEMENT OF PC & HB. BY EPIDOTE & CATORITE IS FAIRLY COMMON.

READILY
By KENNEDY
GEOLOGISTS IF
HAS BEEN CALLED
QUARTZ -
LATTITE PORPHYRY

THE MP CUTS ALL OTHER HABITATIONS, Q DIABASE & Q.M.P. & IS ALSO CHILLED ^{AGAIN} IN THE LATTER. IT OCCURS IN SEGMENTED DYKE. EXTENDING AWAY FROM A SMALL ^{IRREGULAR} ~~CENTRAL~~ ^{POSS.} ~~PLUG~~ ~~CENTRAL~~ THAT IS APPROX COAXIAL WITH THE Q.M. PLUG. MOST DYKES STRIKE N 40 - 80° EAST.

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Z direction

THE ANDESITE DYKES (6) ARE SMALL ^{MIDDLE} GREY DYKES APHANITIC DYKES THAT CONTAIN UP TO 2% FELDSPAR PHENOCRYSTS. THEY HAVE A ~~SOME~~ TEXTURE THAT IS BETWEEN TRACHYTIC & FELTBD. & CONSIST. OF PLAGIOCLASE, ^{CHLORITE AFTER} ~~CHLORITE~~ HORNBLAND, QUARTZ, ^{MINOR} ~~&~~ OPAQUES & MINOR BIOTITE. PLAGIOCLASES ~~MAY BE~~ HIGHLY ALTERED TO KAOLINITE & CALCITE & HORNBLANDS TO CHLORITE & CALCITE. ~~THESE DYKES COULD BE & ARE UNMETAMORPHOSSED, MOST STRIKE ABOUT N60 WEST~~

STRUCTURE

THAT THE WALLS HAVE BEEN DEFORMED IF AT ALL ONLY LOCALLY.

THE QUARTZ DIORITE STOCK & THE Q.M. POR. PLUG
 CUT THE ~~WALL~~ TILTED PLANE OF HAZELTON ROCKS
 WITHOUT VISIBL DISTORTION. ~~THE~~ ^{RELIABLE} ATTITUDES IN THE ^{ARE RARE}
 METAMORPHIC AUREOLE ^{BUT GENERALLY} ~~ARE NOT~~ ^{CONFIRM} ~~THE~~ QUARTZ DIORITE
 WAS INTRODUCED FIRST FOR, ALTHOUGH IT IS NOT IN CONTACT AT THE
 SURFACE WITH THE QMP, IT IS METAMORPHOSED BY THE LATTER. ALSO
 SOME SMALL ~~FRAGMENTS~~ ^{HAVE BEEN} INCLUSIONS IN THE FOUND IN THE Q.M.
 THAT ARE SIMILAR TO THE Q. DIORITE. THE QUARTZ MONZONITE PORPHYRY
 PLUG IS SUBCIRCULAR IN OUTLINE BUT THE MARGINS ARE ^{QUITE} IRREGULAR
 & ~~INTER~~ ^{LARGE} TONGUES WITH THE ~~HORNfels~~ ^{MAIN MASS}. ONE OR MORE TONGUES LIKE MASSES
 EXTEND FROM THE ~~CENTRAL~~ ^{ON THE WHOLE} PLUG. THE ~~OVERALL~~ ^{THE PLUG} RESEMBLES
 A VOLCANIC NECK. CONSIDERING ^{THE ROCKS} SMALL SIZE THE WALL ROCKS HAVE
BEEN ~~SO~~ INTENSIVELY METAMORPHOSED

THE BUTLINGS OF THE BRECCIA PIPE
 ARE NOT ~~KNOWN~~ FOR IT OCCURS OF A ^{PODIFORM} COVERED. IT IS NEAR
 THE SOUTH MARGIN OF THE PLUG IN AN AREA THAT WOULD BE EXPECTED
 TO BE IN THE ORE ZONE BUT IT IS ONLY MINERALIZED WITH ^{MINOR} PYRITE & RARE CHALCOPYRITE
 PROBABLY ORIGINALLY PRESENT IN THE FRAGMENTS. THE MONZONITE PORPHYRY IS ALMOST
 CERTAINLY A ^{LATE PHASE} ~~REMAINS~~ OF THE QMP. EVEN THOUGH IT IS ~~MORE~~ LESS SILICIC.
 IT FORMS A BLOB-LIKE MASS ROUGHLY COAXIAL WITH THE Q.M. PLUG.
 & FROM THIS A GROUP OF SEGMENTED DYKES EXTENT TO NORTH EAST
 & ^{FOURIER} SOUTHWEST (N 40-80° EAST). THE MONZONITE PORPHYRY HAS A CHILLED
~~PERIPHERAL~~ FACIES IN CONTACT WITH THE Q.M. PORPHYRY. ~~THE~~ ~~PLUG~~ DYKES
 CUT MINERALIZATION BUT ~~DO~~ CONTAIN NO SIGNIFICANT MINERALIZATION
 THEMSELVES. THE QUARTZ-BEARING ANDESITE DYKES ARE ~~APPARENTLY~~ NOT
 ONLY ^{YOUNGER THAN THE} ~~POST~~ MINERALIZATION ^{& MONZONITE} BUT ALSO UNRELATED TO THE MONZONITE
 PORPHYRY. MOST ARE SMALL STEEP DYKES STRIKING ABOUT N 60° WEST.

PRIMARY MINERALIZING SULFIDE MINERALS INCLUDE
CHALCOPYRITE, MOLYBDENITE, PYRITE WITH ^{MINOR} LESSER SPHALERITE, GALENA & ARSENOPYRITE.
~~SECONDARY MINERALS INCLUDE CHALCOPI~~ DEEP OXIDATION & LEACHING
& ENRICHMENT HAVE AFFECTED TO DEPOSIT SO THAT CHALCOPITE IS
AN IMPORTANT ORE MINERAL & FERRISULFIDE IS COMMON.

ONE CAL. GYP. FRAC. IN BRECCIA - NO S. ITHOR VEINS

#1A
MoW/PY/GYP
↑
SPG.?
↓
#13 PY+ST/69°

8

#9 ind. MoW in Q. MoW CP in FRAC.

PRIMARY MINERALIZATION.

THE BERG DEPOSIT CONSISTS OF ~~A~~ BROAD ANNULUS COAXIAL WITH THE Q.M.P. ^{PLUS ~~FRAC.~~ IN THIS BODY AND PERIPHERAL HORNEEDS & DIORITE.} THE PRIMARY MINERALIZATION CONSISTS

OF CHALCOPYRITE AND MOLYBDENITE BUT OXIDATION & LEACHING HAS HAD A MAJOR EFFECT ON THE DEPOSIT SO THAT CHALCOCLITE IS AN IMPORTANT ORE MINERAL.

THE ORE BODY

APPROXIMATE MINERALIZATION EXTENDS FROM WELL WITHIN THE PORPHYRY TO APPROXIMATELY 800 FEET BEYOND. ~~BEST ECONOMIC~~ ^{ECONOMIC} MINERALIZATION IS MOSTLY PERIPHERAL TO THE PLUG. ~~THERE IS A GENERAL GRADIENT FROM MOLYBDEN~~ PRIMARY COPPER & MOLYBDENUM MINERALIZATION OVERLAP BUT

IN GENERAL THE BEST MOLYBDENUM MINERALIZATION IS NEAR THE ^Q MONZONITE CONTACT & MAY BE WITHIN THE PLUG WHEREAS THE ~~TOP~~ BEST PRIMARY COPPER MINERALIZATION IS 200 FEET OR MORE BEYOND THE CONTACT. PRIMARY MINERALIZATION OCCURS PRINCIPALLY IN A ^{FINE TEXTURED} STOCKWORK OF QUARTZ FILLED VEINLETS, BUT ALSO IN SOME MAJOR VEINS & AS DISSEMINATIONS. A FRACTURE STOCKWORK EXTENDS OVER A WIDER ZONE THAN THE QUARTZ VEINING & INCLUDES MOST OF THE Q.M. PLUG & BEYOND THE MINERALIZATION INTO THE WALLS. THIS STOCKWORK DOES NOT HAVE OBVIOUS PREFERRED STRIKING N20W & DIPPING ABOUT 30/15-25 SW) IS COMMON WHERE IT IS INTENSE BUT A FLAT JOINT SET (STRIKING N20W & DIPPING ABOUT 30/15-25 SW) IS COMMON IN THE LESS FRACTURED AREAS. WITH OTHER SETS LESS UNIFORM. QUARTZ VEINING IS THE FRACTURING OCCURRED IN SEVERAL STAGES & THE LATEST

POST DATES MINERALIZATION. FRACTURING OCCURRED IN AT LEAST 3 STAGES. ^{FRACTURE FILLING} & PROBABLY MORE. ~~THESE~~ WELL DEFINED STAGES INCLUDE AN EARLY QUARTZ-MOLY ^{PYRITE CHALCOPYRITE} STAGE, A LATER PYRITE OR PYRITE-GALENA ^(SPHALERITE) STAGE & FINALLY A ^{OR} GYPSUM (ANHYDRITE) STAGE. IT IS LIKELY THAT THE MAIN MINERALIZING STAGE WAS DIVIDED INTO ^{OVERLAPPING} SUB-STAGES. ^{ECONOMIC.} DRY PYRITE FILLED FRACTURES EXTEND WELL BEYOND THE MINERALIZATION & APPEAR TO REPRESENT PRODUCTS OF BOTH THE FIRST & SECOND STAGES. ^{ANHYDRITE} STAGNUM FILLED FRACTURES ARE FOUND CUT THE LATE ANDOSITE DYKES AS WELL AS THE BRECCIA PIPE ALTHOUGH THEY ARE RARE IN THE LATTER.

MOLYBDENITE IS CHIEFLY ^{FOUND} ~~CONTAINED~~ IN ^{THE STOCKWORK IN} QUARTZ VEINLETS OR MORE RARELY AS DRY COATINGS. CHALCOPYRITE OCCURS IN THESE MODES BUT ^{ALSO} IN THE HIGHER GRADE AREAS OCCURS AS WIDESPREAD DISSEMINATIONS REPLACING SECONDARY BICHITE IN DIORITE OR HORNEEDS. PYRITE LIKEWISE OCCURS DISSEMINATED & IN VEINLETS.

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ALTERATION.

THE EFFECTS OF HYDROTHERMAL ALTERATION ARE NOT ENTIRELY SEPARABLE ON THE BASIS OF PRESENT STUDY FROM THE THERMAL METAMORPHISM & METASOMATISM & IN FACT PROBABLY WERE CLOSELY RELATED IN TIME. HYDROTHERMAL ALTERATION DID HOWEVER CONTINUE ~~LONG~~ AFTER THE PERIOD OF SIGNIFICANT MINERALIZATION, ^{SULFIDE} (CHARACTERISTIC THERMAL METAMORPHIC MINERAL IS ^{FINE FELT} BIOTITE WHICH REPLACES FORMER MAFIC MINERALS AND ALSO FELDSPARS. ~~THE CHARACTERISTIC METAMORPHIC MINERAL IS QUARTZ & THE SILICIFICATION OF~~ SILICIFICATION IS CHARACTERISTIC OF THE METASOMATISM & THIS GRADES INTO ^{WIDESPREAD} HYDROTHERMAL ALTERATION ~~OF QUARTZ~~, IN WHICH ~~PLAGIOCLASE IS INITIALLY SERICITIZED & FINALLY KAOLINIZED.~~ BIOTITE IS CONVERTED TO MUSCOVITE ^{PLAGIOCLASE} SOME IS MANTLED OR PARTIALLY REPLACED BY ORTHOCLASE). THE ROCKS OF THE BRECCIA PIPE WHICH POST-DATE MINERALIZATION ARE INTENSIVELY KAOLINIZED & BIOTITE ENTIRELY CONVERTED TO MUSCOVITE ^{WIDESPREAD} GYPSUM ANHYDRITE VEINING & ^{LOCAL} MINOR REPLACEMENT ^{IS} A STILL LATER STAGE.

~~WEATHERING~~ SECONDARY MINERALIZATION

THE PRIMARY MINERALIZATION OF THE BERG DEPOSIT HAS BEEN SUBJECTED TO INTENSE ~~WEATHERING~~; OXIDATION, LEACHING & ENRICHMENT. THE DEPTH OF LEACHING IS RELATED TO THE TOPOGRAPHY & TO PRESENT OR PAST WATER TABLES. IN INTERFLUVIAL AREAS ~~IT MAY BE 200' OR MORE~~ & THE BARRON ~~END~~ BARRON LEACHED ROCK MAY ^{EXTEND} TO 200' BELOW THE SURFACE & ENRICHED AREA MAY EXTEND TO 400' OR MORE. IN PRESENT STREAM VALLEYS THE BARRON ZONE MAY BE JUST A FEW FEET OF FEET DEEP. MOLYBDENUM HAS BEEN OXIDIZED TO FERRIMOLYBDATE OVER A LESSER DEPTH THAN CHALCOPYRITE HAS BEEN LEACHED. CHALCOITE FIRST APPEARS AS COATINGS ON DISSEMINATED PYRITE & MAY COMPLETELY REPLACE PYRITE IN AREAS OF MAXIMUM ENRICHMENT. SECONDARY COPPER MINERALIZATION PARTLY OBSCURES THE ORIGINAL ZONATION OF COPPER & MOLYBDENUM.

DISTRIBUTION

THE COMPANY HAS MADE NO STATEMENT REGARDING GRADE OR RESERVES. IT IS EVIDENT THAT THE SOUTHEASTERN HALF OF THE ANNULAR ZONE CONTAINS THE HIGHEST GRADE MATERIAL. ~~IS~~ ~~THIS AREA~~ THIS AREA ^{IS} THE ONE OF GREATEST COMPLEXITY AS A RESULT OF MULTIPLE INTRUSION & HAS THE GREATEST VARIETY OF HOST ROCKS; ~~THE GRADE~~ IS Q.M. POR, VOLCANIC TORN FELS & ^{QUARTZ} DIORITE. ↗

[~~RESERVES~~
REP. ANN. RPT 1965 P. 87.]