TULSEQUAH CHIEF MINE, NORTHWESTERN B.C.

1992 EXPLORATION PROGRAM:

DIAMOND DRILLING, GEOLOGY

and

RESERVE ESTIMATION

Marcie 3 (203388), Ross (203796), River Fr. (L5669),
Tulsequah Bonanza (L5668), Tulsequah Chief (L5670),
Tulsequah Elva Fr. (L5679), Birds (203794),
Tulsequah Bald Eagle (L5676),
Pat (203795)

ATLIN Mining Division

NTS 104K/12
Latitude: 58°43' N, Longitude: 133°35' W

Owner and Operator:

REDFERN RESOURCES LTD.
205-10711 Cambie Road
Richmond, British Columbia
V6X 3G5

Consultants:

CAMBRIA GEOLOGICAL LTD.
1531 West Pender Street
Vancouver, British Columbia
V6G 2T1

By

PART 2 OF 6

P.J. M^c^Guigan
G.L. Dawson
W.D. Melnyk

June 2, 1993

VOLUME 1

Frontispiece: **Tulsequah Chief Mine on lower slopes of Mount Eaton. Underground workings accessible from surface include the 6500, 6300, 5900, 5400 and 5200 Level. Camp is located on the flat bench at the 5400 Level (+115m elevation) above the Tulsequah River. Photograph taken looking east.**

SUMMARY

The Tulsequah Chief property, situated in northwestern British Columbia, is located 100 km south of Atlin, B.C. and 64 km northeast of Juneau, Alaska.

The Tulsequah Chief deposit was discovered in 1923 and the nearby Big Bull deposit in 1929. Cominco Ltd. acquired the properties in 1948. Mining began in 1951 and continued until 1957 at which time low metal prices forced its closure. Production during that period totalled 933,520 tonnes grading 1.59% copper, 1.54% lead, 7.0% zinc, 3.84 grams/tonne gold, and 126.51 grams/tonne silver. Of that total, 622,136 tonnes were mined from the Tulsequah Chief and the remainder from the Big Bull.

The Tulsequah Chief property lay dormant from 1957 to 1971. In 1971, the deposits were interpreted as volcanogenic massive sulphide (VMS) deposits similar to the "Kuroko" deposits in Japan. A similar deposit in British Columbia is the Myra Falls deposit (Westmin Resources Ltd.) on Vancouver Island. Total production (January, 1993) from the Myra deposits is 13.5 million tonnes grading 1.8% copper, 0.6% lead, 5.9% zinc. 2.3 grams/tonne gold and 63 grams/tonne silver. Geological reserves now total 12.9 million tonnes grading 2.1% copper, 0.4% lead, 6.3% zinc, 2.1 grams/tonne gold and 43 grams/tonne silver.

Using the VMS model, significant new tonnage was defined by diamond drilling (44 holes totalling 21,666m) at the Tulsequah Chief deposit between 1978 and 1991 by Cominco Ltd. and Redfern Resources Ltd. In June, 1992, Redfern Resources Ltd. purchased Cominco's interest (60%) in the Tulsequah Chief property.

The 1992 Exploration Program commenced in the field late July and ended November 1, 1992. The program consisted of surface and underground geological mapping, core re-logging (1987-1991) and underground diamond drilling (4579m in 13 holes). Mapping and core re-logging during the 1992 program has revised the Mount Eaton stratigraphy in the Tulsequah Chief Mine area.

The Tulsequah Chief deposits are precious metal-rich massive sulphide deposits hosted within Mississippian (or older) to Early Permian Mount Eaton Group. The Mount Eaton Group is a bimodal volcanic suite that is mainly subalkalic and calc-alkaline in composition typical of an island-arc setting. It has been subdivided into three major series -- Footwall Series (unit 1), Mine Series (unit 2-4), and Hanging Wall Series (unit 5). Within the Mine Series, the H-AB and I massive sulphides and exhalitic chemical sediments are spatially and genetically related to two cycles of felsic volcanism--Lower Felsic Volcanic Horizon (unit 2) and Upper Felsic Volcanic Horizon (unit 4), respectively. The deposits consist of thinly bedded chert, barite, gypsum and massive sulphides. Debris flow facies containing altered volcanics with clasts of massive sulphide, chert and barite indicates deposition in an unstable slope environment. The sulphides in order of abundance are pyrite, sphalerite, chalcopyrite, galena and tetrahedrite. Native gold is a common accessory.

The Mount Eaton Group is folded into northwesterly plunging anticlinal-synclinal fold pairs in the vicinity of the Tulsequah Chief Mine. These upright to steeply overturned parasitic folds are on the western limb of a regional anticline--Mount Eaton Anticline. Faulting sub-parallel to the axial plane of these folds has offset stratigraphy right laterally across the 4400E and 5300E Faults by a small amount. These faults divide the mine area into three mine blocks--Western Mine Block (west of 4400E Fault), Central Mine Block (between 4400E and 5300E Fault) and Eastern Mine Block (east of 5300E Fault).

The Lower Felsic Volcanic Horizon (unit 2) is the principle host to massive sulphide mineralization. It contains the H, AB_2, AB_1, F and G Horizons. The Lower Deposits of the 1950's operation correlate with the AB_2 Horizon. This interpretation differs from previous work in separating the AB Horizon into two distinct stratigraphic horizons. The lower AB_1 Horizon passes from pyrite and chert into polymetallic base metal sulphides below the 200m below sea level elevation. The H and AB_2 Horizons are now recognized to merge near section E2640i. East of that section, the horizons have little or no stratigraphic separation and are collectively termed the H Horizon. To the west, a thickening wedge of dacite volcanics separates the H and AB_2 Horizons.

G Horizon is located in the Eastern Mine Block and is correlated with the deposits of the H/AB_2 and AB_1 Horizons. It is interpreted to lie along the eastern fringe of a basin containing unit 2 volcanics.

F Horizon is located in the Western Mine Block and is correlated with the deposits of the AB_2 Horizon. Above the 50m elevation, it consists mainly of chert and pyrite, however, some intersections contain significant base metal sulphides. Below the 50m elevation the F Horizon is untested.

The Upper Felsic Volcanic Horizon (unit 4) hosts the mined-out Upper Deposits or I Horizon massive sulphide mineralization. Mapping and cross-sectional interpretation demonstrates the unit 4 volcanics are stratigraphically distinct from unit 2. Surface mapping has correlated unit 4 stratigraphy with the altered and sulphide-bearing felsic volcanics near the 5200 portal.

Drilling in 1992 has extended the H and AB_2 deposits to depth and westward. The extensions were made in sulphides similar in grade and thickness to the deposit average. The G-Zone deposit was extended eastward and to depth with new drilling, however, the tenor of mineralization was less than previously encountered.

Polygonal reserve estimates were made for the H, AB_2, AB_1 and G Horizons. Inferred reserves for these horizons are 4,536,577 tonnes, grading 1.42% copper, 1.11% lead, 6.69% zinc, 2.50 grams/tonne gold and 100.29 grams/tonne silver. Indicated reserves are 3,256,399 tonnes grading 1.60% copper, 1.16% lead, 6.81% zinc, 2.68 grams/tonne gold and 104.92 grams/tonne silver. In addition to the reserves calculated in this report, the measured and indicated reserves remaining above the 5000 Level from the 1950's mining operation total 707,616 tonnes grading 1.30% copper, 1.60% lead, 8.00% zinc, 2.40 grams/tonne gold and 116.6 grams/tonne silver. The total reserve for the Tulsequah Chief deposit (all horizons and classes of reserve) is 8,500,592 tonnes grading 1.48% copper, 1.17% lead, 6.85% zinc, 2.56 grams/tonne gold and 103.42 grams/tonne silver.

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A. INTRODUCTION

A.1 Scope of the Work

Cambria Geological Ltd. was retained to manage the 1992 Exploration Program by Redfern Resources Ltd. The 1992 program was the first year Redfern Resources Ltd. was the sole operator and 100% owner of the Tulsequah Chief Property. The 1992 Exploration Program was designed to implement 1991 Phase One Recommendations (M[c]Guigan, 1992) and position critical materials and equipment for the Phase Two Program. The program began in mid-July and ended November 1, 1992. The core objectives of the 1992 program were:

* Re-build and upgrade the two Redfern-owned electric-hydraulic underground amond drills to increase their drilling depth capacity.

* Mobilize equipment for the Phase One and part of the Phase Two Program.

* Diamond drill test the eastern, western and down-plunge extension of the main H/AB massive sulphide horizons.

* Re-log the archived 1987-1991 diamond drill core and map the surface and underground geology.

* Convert the 1950 to 1992 surveying, mine geology and diamond drilling data to a common metric mine grid system.

* Interpret the stratigraphy and structural geology of the deposit and prepare recommendations for further exploration.

* Estimate the in-situ, geological reserves.

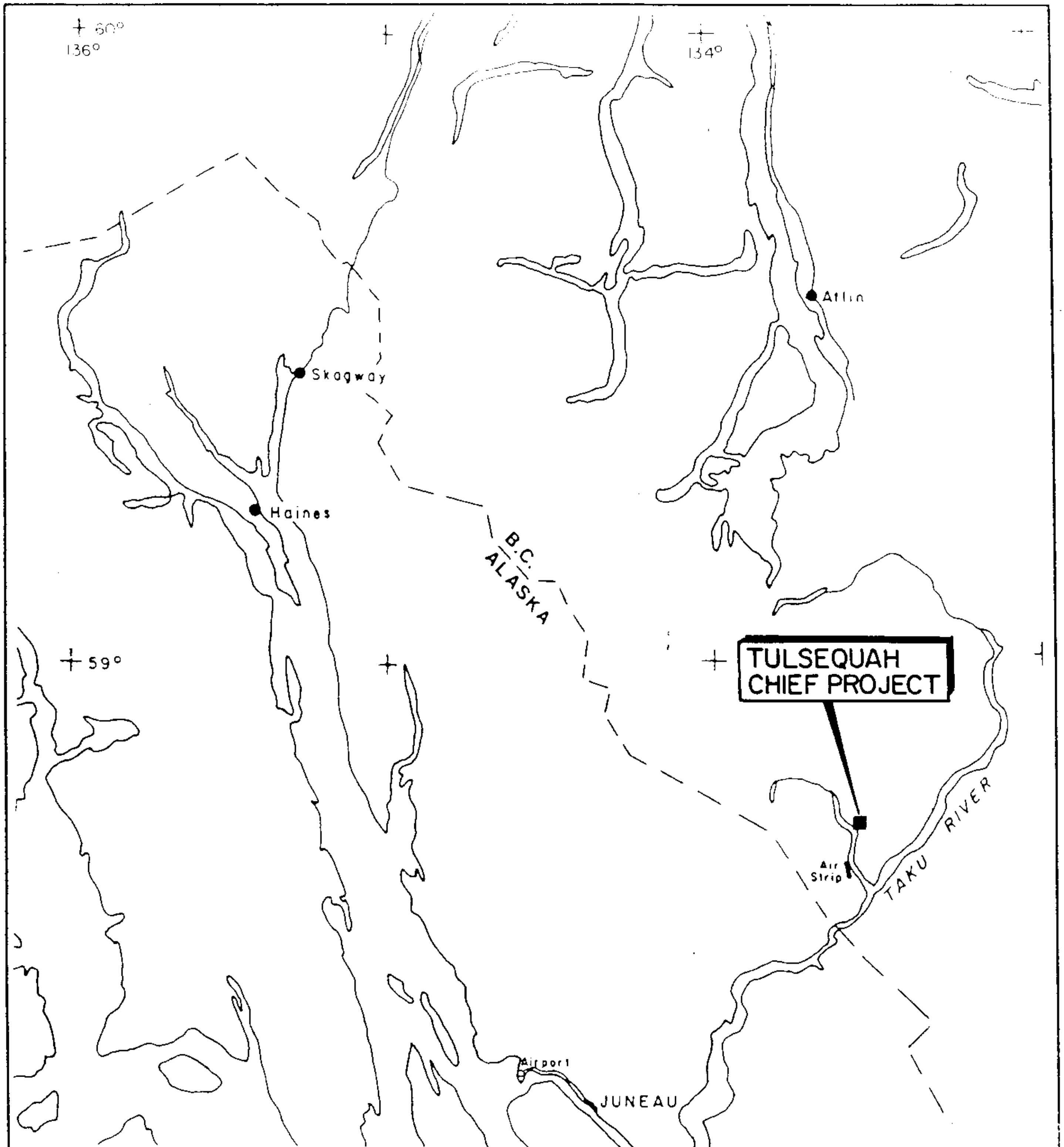
A.2 Location and Access

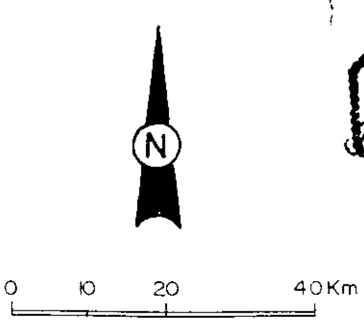
The Tulsequah Chief property is situated along the Tulsequah River in northwestern B.C. (Fig. 1). It is centred on latitude 58°43'N and longitude 133°35'W (NTS 104K/12). Access is by air from Atlin, B.C. 100 km to the north, or by air from Juneau, Alaska 64 km to the southwest. The exploration base camp is situated on the east bank of the Tulsequah River at an elevation of 108m above sea level. A gravel airstrip beside the Tulsequah River 7 km south of the Tulsequah Chief Mine site is suitable for aircraft up to a Bristol Freighter in size.

A.3 History of Exploration

The Tulsequah Chief deposit was discovered in 1923 by W. Kirkham of Juneau. He located high-grade barite, pyrite, sphalerite, galena, and chalcopyrite mineralization outcropping in a gully above the 6500 Level adit. Development of this showing between 1923 and 1929 attracted about 40 prospectors to the area. In 1929, V. Manville discovered the Big Bull massive sulphide deposit. Other discoveries that year included the Potlatch (Sparling), Banker and the Whitewater (Polaris Taku) vein deposits. The Erickson-Ashby massive sulphide deposit was discovered later in 1930.

Cominco Ltd. acquired the Tulsequah Chief and Big Bull deposits in 1946. Production started in 1951 and continued to 1957 when low metal prices closed the mine. Production averaged 530 tons per day. Total production was 1,029,089 tons with 625,781 tons from the Tulsequah Chief and 403,308 tons from the Big Bull deposit. Average grade of ore was 1.59% Cu, 1.54% Pb, 7.0% Zn, 0.112 oz/t Au, and 3.69 oz/t Ag. The mines produced 14,756 tons Cu, 11,439 tons Pb, 54,910 tons Zn, 95,340 oz Au, and 3,329,938 oz Ag at a recovery of about 88% Cu, 94% Pb, 87% Zn, 77% Au, and 89% Ag. At shutdown, ore reserves at the Tulsequah Chief were 780,000 tons grading 1.3% Cu, 1.6% Pb, 8.0% Zn, 0.07 oz/t Au, and 2.9 oz/t Ag, and at the Big Bull were 50,000 tons grading 0.5% Cu, 1.3% Pb, 5.6% Zn, 0.07 oz/t Au, and 1.8 oz/t





PROFESSIONAL GEOSCIENTIST
PROVINCE OF BRITISH COLUMBIA
P. J. McGUIGAN

REDFERN RESOURCES LTD.

Report by P.J. McGuigan, P.Geo.	**TULSEQUAH CHIEF PROJECT**
Date: Feb. 23, 1993	**LOCATION MAP**
NTS 104K	
Mining Division Atlin	Cambria Data Services Ltd.
Ref # B49-11X17TB	Fig. 1

Ag. Tulsequah Chief reserves consisted of 80,000 tons in the Upper Deposits and 700,000 tons in the Lower Deposits. In the Lower Deposits, 340,000 tons were above, and 360,000 tons were below the 5200 Level.

The Tulsequah Chief and Big Bull deposits lay dormant until 1971. At this time the deposits were interpreted as volcanogenic massive sulphides, rather than hydrothermal veins as originally described. Geological mapping (1:2500) over the Tulsequah Chief and Big Bull deposits was completed in 1981. The property was flown by Dighem and Input EM/Mag in 1982, however, these surveys failed to define any significant conductors. A joint venture between Cominco Ltd. and Redfern Resources Ltd. led to extensive exploration programs from 1987 to 1991.

The 1987 Exploration Program (Casselman, 1988) was funded by Redfern Resources Ltd. (100%). Surface mapping was completed over the property and five surface diamond drill holes (3524m) tested the down dip extension of the Tulsequah Chief deposit. The mineralized horizon was intersected on approximately 90m spacings, 450 to 600m below surface, and 40-240m below previous drilling.

The 1988 Exploration Program (Casselman, 1989) was funded by Redfern Resources Ltd. (100%). Outside the Tulsequah Chief Mine area, mapping, prospecting, and soil sampling were completed over areas of felsic volcanic units. Inside the mine area, 900 metres of underground workings were rehabilitated on the 5400 Level and 3530m of underground and surface diamond drilling were completed. Nine drill holes tested areas below the old workings, of which, eight holes intersected significant base and precious metal mineralization. Four holes tested other targets on the property.

The 1989 Exploration Program (Casselman, 1990) was jointly funded by Redfern Resources Ltd. (40%) and Cominco Ltd. (60%). The program consisted of re-ballasting track, 175m of drifting in the 5400 Level crosscut, and 4890m of underground drilling. Ten drill holes from the extended 5400 Level crosscut tested the down dip extension of the A, B, C, E, and G sulphide bodies. Eight holes intersected significant base and precious metals. Specific gravity measurements were made on all 1987, 1988, and 1989 mineralized drill intersections. Redfern calculated a possible resource including previous reserves above the 5200 Level of 5.8 million tons grading 1.6 % Cu, 1.3% Pb, 7.0% Zn, 0.08 oz/t Au, and 2.9 oz/t Ag.

The 1990 Exploration Program (Aulis, 1991) jointly funded by Redfern Resources Ltd.(40%) and Cominco Ltd. (60%) consisted of underground rehabilitation, 180m of drifting, slashing two drill stations on the 5400 Level and 5,908m of underground drilling. Seven drill holes tested the down-dip extension of the A and B sulphide bodies. An eighth drill hole was abandoned due to ground problems. A resource estimate by Cominco Ltd. totalled 6.9 million tons grading 1.58% Cu, 1.33% Pb, 7.59% Zn, 0.08 oz/t Au, and 3.35 oz/t Ag; this figure included the 1957 reserve. Redfern prepared their own estimate; it totalled 8.0 million tons grading 1.55% Cu, 1.23% Pb, 6.81% Zn, 0.08 oz/t Au, and 3.19 oz/t Ag.

The 1991 Exploration Program was operated and funded by Redfern Resources Ltd. (100%). The program was restricted by agreement with Cominco to infill drilling on the H and AB lenses between the 3400 and 4900 Levels. Six drill holes (3090m) were collared from the 5400 Level crosscut. All holes intersected the targeted massive sulphide horizon. Cambria Data Services Ltd. (McGuigan et al., 1991 and 1992) prepared a probable and possible reserve estimate of 8,363,718 tons grading 1.62% copper, 1.19% lead, 6.51% zinc, 0.084 oz/t Au and 3.4 oz/t Ag; this figure includes Cominco's 1957 reserve.

Redfern Resources Ltd. purchased Cominco's interest (60%) in the Tulsequah Chief property in June, 1992. Consequently, Redfern Resources is now 100% owner of the Tulsequah Chief and Big Bull deposits and adjacent ground.

A.4 Land

Redfern Resources Ltd. holds title to 56 mineral claims, reverted crown granted claims, and crown granted claims encompassing the Tulsequah Chief and Big Bull massive sulphide deposits (Fig. 2). The property consists of 19 four-post mineral claims (319 claim units), 10 reverted crown granted claims and 25 crown granted claims.

The claims encompass an area approximately 14 km long by 5 km wide comprising 5896 hectares. A list of claim names, tenure numbers and expiry dates is attached as Appendix 1.

A.5 Methods and Work Accomplished in the 1992 Exploration Program

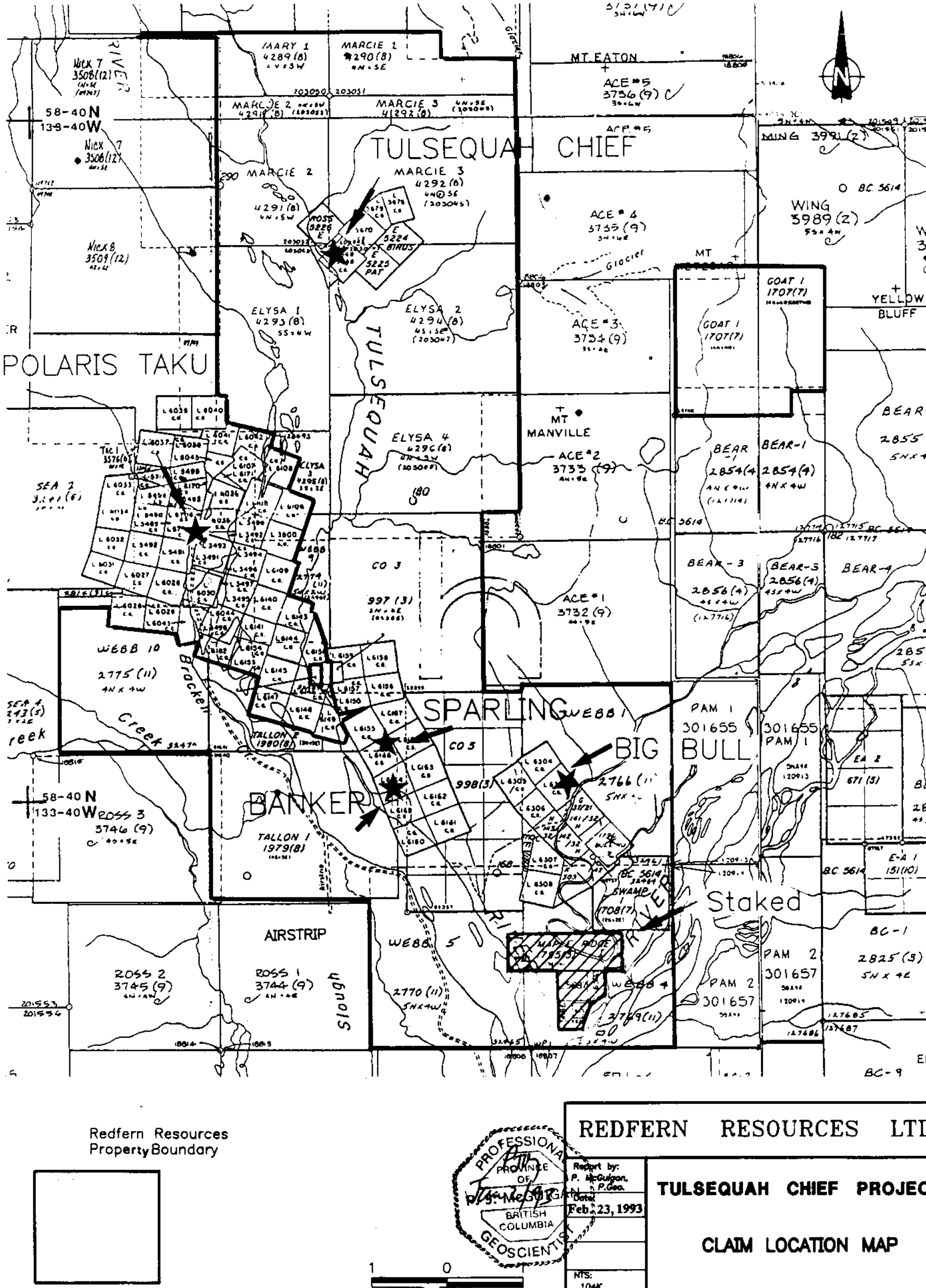
Cambria Geological Ltd. was retained by Redfern Resources Ltd. to manage the 1992 Exploration Program on the Tulsequah Chief property. The program commenced in late July and consisted of surface and underground geological mapping, core re-logging (1987-1991), and underground diamond drilling. Drilling totalled 4579m in 13 drill holes.

Surveying and Base Map Preparation

In order to integrate the results of past mining and exploration, a new survey grid was established over the Tulsequah Chief Mine site (Fig. 3). Government Monuments (STUMP #7952 and TAK #7953) were occupied to establish the orientation and location of the new grid. The new grid is metric, grid north is true north and the origin is Tak which is assigned 15,000N, 10,000E and 108.204m elevation. The following historic surveys were located and tied-into the new metric grid.

* Parts of the Legal Claim Survey for the crown granted claims.

* The 1950-1957 Tulsequah Chief Mine survey. Surface and underground monuments were located and re-surveyed. Diamond drill collars were re-surveyed as checks.



REDFERN RESOURCES LTD.

TULSEQUAH CHIEF PROJECT

CLAIM LOCATION MAP

Report by: P. McGuigan, P.Geo.

Date: Feb. 23, 1993

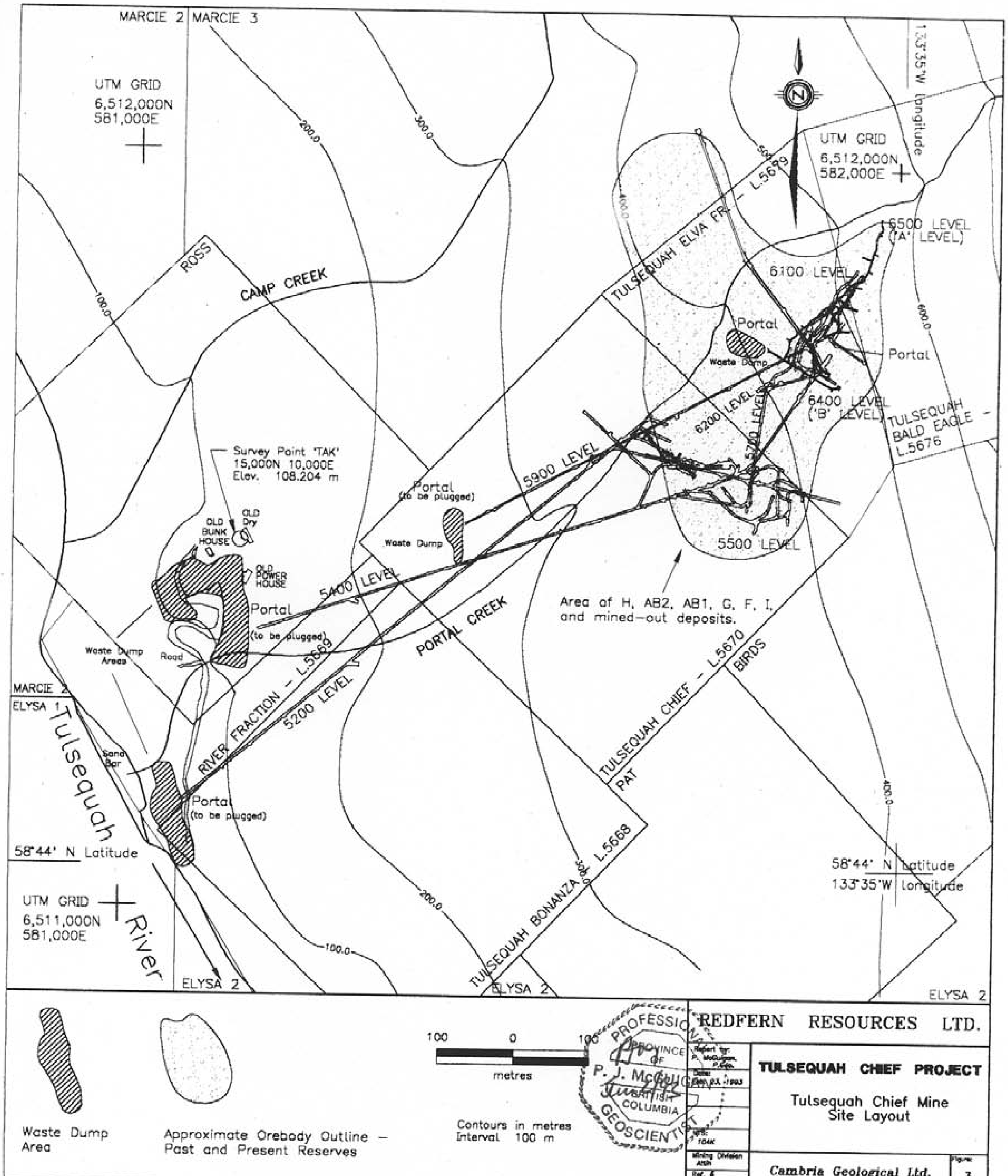
NTS: 104K

Mining Division: Atlin

Ref. # 80108

Cambria Geological Ltd.

Figure: 2


MARCIE 2
MARCIE 3
UTM GRID
6,512,000N
581,000E
133°35'W Longitude
UTM GRID
6,512,000N
582,000E
200.0
300.0
400.0
500
600.0
100.0
ROSS
CAMP CREEK
TULSEQUAH ELVA FR. - L.5679
6500 LEVEL
('A' LEVEL)
6100 LEVEL
Portal
Waste Dump
Portal
6400 LEVEL
('B' LEVEL)
6200 LEVEL
5700 LEVEL
TULSEQUAH
BALD EAGLE -
L.5676
5900 LEVEL
5500 LEVEL
Survey Point 'TAK'
15,000N 10,000E
Elev. 108.204 m
Portal
(to be plugged)
Waste Dump
OLD BUNK HOUSE
OLD Dry
OLD POWER HOUSE
5400 LEVEL
Portal
(to be plugged)
PORTAL CREEK
Area of H, AB2, AB1, G, F, I,
and mined-out deposits.
Waste Dump Areas
Road
MARCIE 2
ELYSA 1
Tulsequah
RIVER FRACTION - L.5669
5200 LEVEL
TULSEQUAH CHIEF - L.5670
BIRDS
PAT
Sand Bar
Portal
(to be plugged)
58°44' N Latitude
TULSEQUAH BONANZA - L.5668
58°44' N Latitude
133°35'W Longitude
UTM GRID
6,511,000N
581,000E
River
ELYSA 2
ELYSA 2
ELYSA 2
Waste Dump Area
Approximate Orebody Outline -
Past and Present Reserves
100 0 100
metres
Contours in metres
Interval 100 m
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TULSEQUAH CHIEF PROJECT
Tulsequah Chief Mine
Site Layout
Cambria Geological Ltd.
Figure
3

* The Thomson and Aucoin (1989-1991) and Underhill surveys (1988) were located and corrected for azimuth and elevation errors.

Using the data from the survey ties between each generation of surveying, a grid transform was derived between each of the past surveys and the new metric grid. All claim locations, underground development drawings, and drill hole location data from both 1957 and more recent work were converted to the new grid system.

Where possible, the collars of drill holes were exhumed and re-surveyed. Otherwise, hole orientations were adjusted using the calculated transform between surveys.

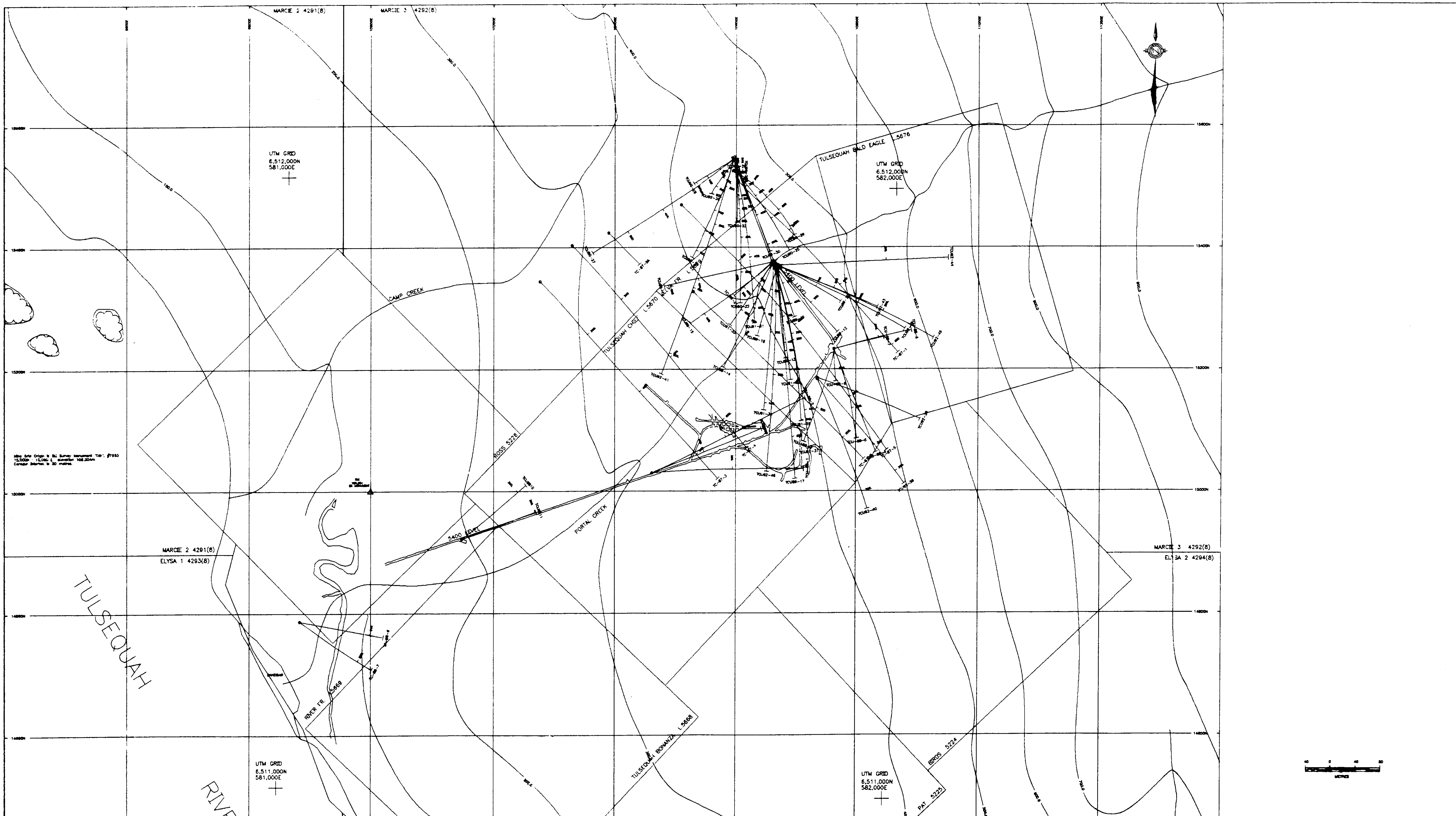
Base map preparation included the following work:

* The topographic base map prepared by McElhaney (1981) at 1:5000 scale was scanned into digital format. AutoCAD files were prepared and new topographic bases at 1:20,000, 1:2000, and 1:1000 were produced.

* 1957 level plans were digitized in AutoCAD. These files were converted into the new mind grid using the calculated survey transform. Level plan outlines were checked for accuracy using the transformed 1957 diamond drill collar information.

Core Re-Logging

Surface and underground drill core (21,665m in 44 drill holes) representing exploration programs from 1987 to 1991 was systematically re-logged (Fig. 4, Map 1, Appendix 2, 6 and 7). Re-logging was necessary to standardize rock unit nomenclature and to prepare lithologic correlations between drill holes. Marker horizons within the Mine Series stratigraphy were used to define fold structures. Combined with surface and underground mapping, the re-logging enabled a deposit stratigraphy to be defined. All assay and geochemical determinations were merged into new core log records.



REDFERN RESOURCES LTD.

Report by: PJM et al

Date: Feb. 23, 1993

TULSEQUAH CHIEF PROJECT

DRILL HOLE PLAN

NTS: 104K

Mining Division: Atlin

Ref. # B110F3

Cambria Geological Ltd.

Map: 4

1992 Drill Program

Drilling in 1992 was accomplished with two diamond drills owned by Redfern Resources Ltd. At the start of the 1992 Exploration Program, both drills (Connors and Boyles 37A) were modified to increase their drilling capabilities.

Boisvenu Drilling Ltd. was retained as contractor to operate the company owned drills. A total of 4579m of underground diamond drilling from the 5400 Level crosscut was completed between August 7 and October 25, 1992. This drilling represents eleven new holes and the extension of two existing holes (Fig. 4, Map 1, Appendix 2 and 8).

Three of these new drill holes were collared from a new drill station slashed-out on the 5400 Level crosscut near the shaft. The remaining holes were drilled from 1989 and 1990 cut-outs on the 5400 Level. Drill hole collars were surveyed and down-hole deviation was measured using the Techdel Light-log survey system. Sperry-Sun down-hole surveys were attempted in each hole but were unreliable because some rock units are strongly magnetic.

Mineralized drill intersections were submitted to Acme Analytical Laboratories, 852 East Hastings Street, Vancouver, B.C. for geochemical analysis. Samples were analyzed by ICP for 30 elements. Samples with Cu, Pb, Zn, As determinations greater than 1%, Ag greater than 30 ppm or Au greater than 1000 ppb were assayed.

Geotechnical Data

Rock Quality Designations (RQD) were measured on all 1992 drill core (Appendix 8). Once logged, each hole was photographed, and mineralized sections were sampled. Specific gravity was measured on half split core for all samples containing significant base metal sulphides.

Surface Geological Mapping

A 15 km cut grid was established by Courier de Bois Linecutting Ltd. over the old Tulsequah Chief Mine workings. Geological mapping at a scale of 1:2000 was completed from September 1 to 20, 1992.

Underground Geological Mapping

Accessible underground workings on the 5400 Level were mapped at a scale of 1:1000. Contacts and structural measurements were recorded at shoulder height by measuring "offsets" from a survey tape suspended between two survey stations.

5200 Level Rehabilitation

The 5200 Level portal entrance was cleared of rock fall and re-timbered.

Environmental Monitoring

Water and weather monitoring programs supervised by Steffen Robertson and Kirsten (Canada) Ltd. continued between May 15 and November 15, 1992. Water monitoring involved the daily recording of: Ph, total dissolved solids (TDS), temperature and flow rate at six sample sites. Water samples were collected once a week from four of the six sites and shipped to ASL Laboratories in Vancouver, B.C. for analysis.

Weather monitoring involved recording daily temperature (maximum and minimum) and total precipitation.

Plan and Section Preparation

Data processing tasks outlined below were used to prepare plans and section maps.

* All Cominco assay files (1987-1991) supplied by the Cominco Lab in digital form were checked against original certificates and imported into a relational data base (Dbase III).

* Specific gravity measurements on assayed core (1987 to 1989) were checked by weighing the half split core. Specific gravity measurements were completed for each assay interval on the 1990 to 1992 drill core.
* Whole-rock chemical analyses (Cominco Lab) were compiled into one database file. The sampled core intervals were examined to determine their lithology, degree of alteration and stratigraphic position. Samples were sorted by stratigraphic position and then lithology; altered samples were eliminated from the database. Results are discussed in the text and tabulated in Appendix 4.
* Geological logs, drill hole coordinates, down-hole surveys, assay data and specific gravity measurements were imported into LOG II. A total of 589 diamond drill holes are presented representing 56,600m of drilling (1951-1957: 534 holes representing 30,322m, 1987-1992: 55 holes representing 26,273m).
* Level plans and inclined sections at 1:1000 scale were prepared using LOG II and AutoCAD.
* Anticlinal-synclinal fold closures between the 4400E and 5300E Faults (Central Mine Block) were defined by modelling geological contacts using the following methods: (i) three-point solutions of fold limbs, (ii) stereonet analysis to determine the fold plunge, axial plane and interlimb angles, (iii) stereonet analysis of AC-joints, and (iv) modelling in 3D using AutoCAD. Sections prepared perpendicular to the fold axis (55.5°/AZ329°) and parallel to the axial plane (AZ 165.7°/78.8°) allowed further definition of the fold geometry.
* Underground workings were digitized using AutoCAD, converted into the new mine grid and projected to the nearest level plan.
* Significant geological contacts on the 1950-57 underground maps and sections were compiled.
* Surface geology was hand plotted at 1:2000 scale.

A.6 Acknowledgements

The 1992 Exploration Program was a team effort between personnel from several companies. Cambria Geological Ltd. managed the program with technical and

administrative support from Redfern Resources Ltd. Labourers and surveyors were directly hired by Redfern Resources Ltd. Boisvenu Drilling Ltd. contracted diamond drilling, underground mining and shiftboss services. Kawdy Ventures Ltd. supplied cooking and expediting services.

The geoscientist-of-record for this project is P. M[c]Guigan, P.Geo. Field operations were supervised by W. Melnyk, P.Eng. The report is co-authored by G. Dawson, P.Geo., D. Harrison, P.Geo., P. M[c]Guigan, P.Geo., W. Melnyk, P.Eng and M. Pond, P.Geo. N. Agnew, M.Sc. of Redfern Resources Ltd. provided administrative support and liaison. D. Cardy directed the underground operations. J. Reid of Kawdy Ventures Ltd. expedited equipment and supplies to the camp site.

The conclusions in this report are based largely on new data collected during the 1992 program. Surface geological mapping incorporates work by Payne (1987) and Casselman (1987-1989) in areas not traversed in 1992.

B. PROPERTY GEOLOGY

The Tulsequah region is located within the Stikine Terrane and lies near the contact with gneissic and plutonic bodies of the Coast Belt. In this area, the Stikine Terrane contains the Middle to Upper Paleozoic Mount Eaton and Tulsequah Groups. Cretaceous to Tertiary age intrusions locally intrude these rocks. Volcanogenic massive sulphide deposits are associated with felsic volcanic sequences within the dominantly intermediate to mafic Mount Eaton Group.

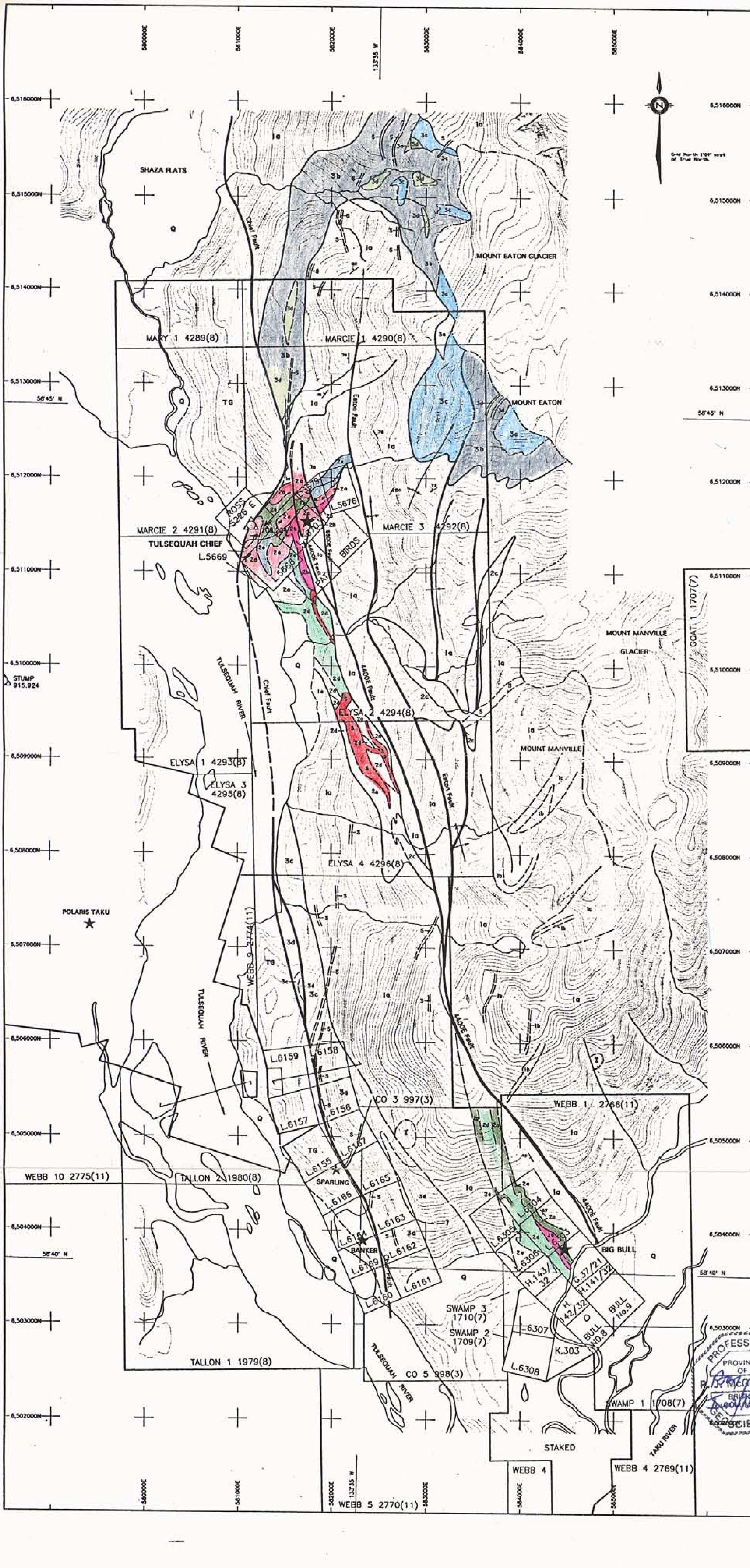
B.1 Lithologies

B.1.a Mount Eaton Group

The pre-Mississippian to Permian Mount Eaton Group forms a northerly trending sequence which is bounded on the east by Cretaceous quartz monzonite intrusions and on the west by the Chief Fault. Mount Eaton Group stratigraphy was mapped at 1:10,000 scale by Payne (1987). Mapping over the Tulsequah Chief and Big Bull Mines in the 1992 Exploration Program was incorporated into work by Payne (1987). Re-interpretation of the stratigraphy indicates two discrete time-stratigraphic felsic volcanic-sedimentary sequences within a dominantly mafic volcanic succession (Fig. 5, Map 2). On the property-scale map, mafic volcanics of several stratigraphic levels are termed unit 1. They consist mostly of massive and pillowed basalt and basaltic andesite flows, flow breccias and hyaloclastic tuffs. Minor volcanic sediments are present.

The lower felsic volcanic-sedimentary sequence (unit 2) is spatially and genetically related to volcanogenic massive sulphide at the Tulsequah Chief and Big Bull Mines. It consists primarily of dacite flows, flow breccias and lapilli tuff in the vicinity of the Tulsequah Chief Mine. Eastward the unit grades into mainly clastic sediment and chert. Southward, the unit consists of bedded dacite ash and lapilli tuff at the Big Bull Mine.

The upper felsic volcanic - sedimentary sequence (unit 3) consists mainly of dacite flows and tuffs in the southern area of the map. In the central and northern area of the map, unit 3 is dominated by limestone with minor interbeds of chert, clastic sediment and dacite tuff.



LEGEND

QUATERNARY

Q – Alluvium

INTRUSIVE ROCKS

5 SLOKO SUITE – Tertiary

Flow-banded rhyolite dykes, mafic quartz-feldspar porphyry dykes, fine-grained andesite – diorite dykes and/or sills.

I COAST PLUTONIC COMPLEX (?) – Mesozoic (?)

Diorite to granodiorite

PALEOZOIC ROCKS

MOUNT EATON GROUP– Mississipian (or older) to Permian (Lower Greenschist to Amphibolite Metamorphic Facies)

3 Upper Felsic volcanic – Sedimentary Belt
- 3a dacite flows, breccia, tuff
- 3b chert, mudstone, siltstone, wacke
- 3c limestone with interbedded chert, siltstone
- 3d basalt to andesite tuff, flows

2 Lower Felsic Volcanic – Sedimentary Belt
- 2a dacite flows, breccia, tuff
- 2b massive sulphide horizons, sulphate exhalite horizons, sericite-quartz-pyrite alteration
- 2c chert, mudstone, siltstone, wacke
- 2d basalt to andesite tuff, flows.
- 2e undifferentiated basaltic flows and/or sub-volcanic intrusions

1 Dominantly Mafic Volcanics – present at several stratigraphic levels.
- 1a basalt, andesite, dacitic andesite; flows, flow breccia, ash – lapilli – breccia tuff
- 1b dacitic tuffs, flows
- 1c chert, clastic sediments

TULSEQUAH GROUP– Upper Paleozoic (or older) Metamorphic Rocks (Upper Greenschist Metamorphic Facies)

TG –felsic schist, sub-gneiss: cataclastically deformed quartz diorite, granodiorite.
–andesite flow, tuff: massive to schistose augite and/or plagioclase porphyritic.
–tuffaceous sediments, mudstone, greywacke, limestone

SYMBOLS

- geological contact (defined, inferred)
- limit of stratigraphic belt (defined, inferred)
- bedding
- fault (defined, inferred)
- axis of syncline (indicating direction of plunge)
- axis of anticline (indicating direction of plunge)
- Mineral Claim boundaries
- Perimeter of REDFERN RESOURCES LTD Mineral Claim holdings
- ★ Massive Sulphide deposits
- ★ Mineral occurrences

UTM Grid based on North American Datum 1927 (NAD 27)

Mine Survey Grid Origin is BC Survey Monument "TAK" (#7933)

Origin established as: N 15,000 – E 10,000 .

NAD 27 Latitude 58°44'15.79080" N
Longitude 133°35'53.67550" E
UTM 6,511,486.871 N
Zone 8 581,145.128 E
Elevation: 108.204 m

Horizontal Control derived from BC Survey Monument "STUMP" (#7932)

NAD 27 Latitude 58°43'23.32980" N
Longitude 133°38'40.31090" E
UTM 6,509,809.346 N
Zone 8 578,498.670 E
Elevation: 915.924 m

Claim Boundary locations based on B.C.M.E.M.P.R. Mineral Title maps for map-sheets 104 K/11,12,13 as of November, 1992.

Geology after Payne and Sisson, (1987), B.C.M.E.M.P.R. Assessment Report 17054.

Geology in the vicinity of Tulsequah Chief and Big Bull deposits based on mapping by Cambria Geological Ltd. during 1992.

Topography base scanned from 1:10000 base maps Produced by: Triathelon Mapping Corporation (File: COM106), 1987

Contour Interval : 20 metres

400 0 400 800 1200 1600
METRES

REDFERN RESOURCES LTD.

TULSEQUAH CHIEF PROJECT

PROPERTY GEOLOGY

Report by: Date: Feb. 23, 1993

NTS: 104K

Mining Division: Atlin

Ref. #: 8110-M1

Cambria Geological Ltd.

Map: 5

Regional metamorphism has altered these rocks to Lower Greenschist and locally to Lower Amphibolite facies mineral assemblages.

B.1.b Tulsequah Group

Tulsequah Group (unit 6) crops out north of the Chief Fault in the northwest area of the map (Fig. 5, Map 2). It consists of strongly deformed, metamorphosed intermediate to mafic volcanics, tuffaceous sediment and limestone that are now schists, phyllites and marble. Chlorite-carbonate schists consist of altered feldspar phyric intermediate to mafic volcanic and carbonate. Some schists have well developed kink bands. Less deformed rocks consist of moderately foliated, dark green to black, chloritic, fine grained mafic flows and tuffs. Limestone is laminated to bedded, grey to white, fine to medium grained, and mostly recrystallized to marble.

B.1.c Intrusive Rocks

The Coast Belt is a belt of plutonic and metamorphic rocks which form the Boundary Ranges west of the Tulsequah River area. In the Tulsequah River area, scattered, small Mesozoic or younger intrusions are granodiorite to pyroxenite in composition. Tertiary quartz monzonite underlies a large area east of Mount Eaton. Narrow rhyolite and quartz and feldspar porphyritic dacite dykes of the Tertiary Sloko Suite are emplaced along fault structures. Payne (1987) mapped Sloko basalt intrusions within unit 2 felsic volcanics 2 km south of the Tulsequah Chief Mine. This area was not mapped during the 1992 program, however, the authors of this report suspect the basalts are Mount Eaton Group flows or high-level sills, similar to the Mafic Volcanic Horizon (unit 3) of the detailed Tulsequah Chief Legend (Fig. 6).

B.2 Structure

The Chief Fault is a major north-south striking, strike-slip fault which separates the Mount Eaton and Tulsequah Groups. West of the fault, Tulsequah Group rocks exhibit up to four phases of deformation (Payne, 1987). East of the fault, Mount Eaton Group rocks are folded into open to tight mostly north-plunging fold sets. Payne (1987) reports the major fold structure to be the Mount Eaton Anticline and positioned its axial plane trace east of Mount Eaton peak. Re-interpretation of the structure and stratigraphy in 1992 suggests the trace of the Mount Eaton Anticline is near and parallel to the Eaton Fault which lies on the western slope of Mount Eaton. Its axial plane is upright to steeply westward dipping and strikes north-northwest. The fold axis plunges moderately to the north-northwest (plunge of 56° in the direction of AZ329 at the Tulsequah Chief Mine).

Rocks of the economically important lower felsic volcanic-sedimentary sequence (unit 2) lie on both limbs of the Mount Eaton Anticline. However, felsic rocks hosting the Tulsequah Chief and Big Bull Mines lie on the western limb. In both areas, massive sulphide horizons are deformed into subsidiary folds which verge eastward to the axis of the Mount Eaton Anticline.

Other major bedrock lineaments on the Tulsequah Chief Property include the 4400E, 5300E and Eaton Faults; all are sub-parallel and north trending. The Eaton Fault is sub-parallel to the axial plane of the Mount Eaton Anticline; displacement of the lower felsic volcanic-sedimentary belt (unit 2) indicates right-lateral movement. The 4400E and 5300E Faults are discussed in Section C.5.b.

Payne (1987) mapped a younger phase of folds with north-northeasterly plunges. Mapping in 1992 did not extend into areas exhibiting these folds and their relationship to the early stage Mount Eaton Anticline has not been verified.

B.3 Mineralization and Alteration

Volcanogenic massive sulphide mineralization at the Tulsequah Chief and Big Bull Mines is economically the most significant mineralization in the camp. The similarity of massive sulphide mineralization, alteration and associated felsic volcanics to a general 'Kuroko" deposit model was first recognized in 1971. Sulphide consists of heavily disseminated to massive pyrite, sphalerite, chalcopyrite, galena and tetrahedrite.

Significant amounts of native gold occur as visible grains. Massive sulphides occur in bands associated with exhalitive chert, barite and gypsum and felsic tuffs. Locally, massive sulphides interfinger with a debris flow facies containing fragments of altered volcanic rocks, chert, barite and massive sulphides. The debris flow facies is similar to the 'ore-clast breccia' unit of the HW/Myra Formation in the Buttle Lake Camp.

At both the Tulsequah Chief and Big Bull Mines, footwall alteration is characterized by an assemblage of silica, sericite, chlorite and pyrite. In strongly altered footwall zones, regional metamorphism of Lower Amphibolite grade has overprinted these assemblages with cordierite and biotite. Hanging wall alteration is a weak propylitic assemblage consisting of fracture controlled albite, epidote, chlorite, silica and magnetite (± hematite).

Compilation work and limited field traverses during the 1992 Exploration Program identified a number of prospective areas on the Tulsequah Chief Property. In the upper felsic volcanic-sedimentary sequence (unit 3), an area of sericite-pyrite alteration forms rusty weathering cliffs. It is located east of the Banker/Sparling occurrences. In the lower felsic volcanic sequence (unit 2), Casselman (1987) mapped a sequence of felsic flows and intercalated tuffs and sediments 2 km south of the Tulsequah Chief Mine. Associated with these rocks are zones of intense sericite + pyrite alteration similar to the footwall alteration at the Tulsequah Chief Mine. Both the upper and lower felsic volcanic sequences are prospective for the discovery of additional massive sulphide deposits. Mapping at the Big Bull Mine is described in a separate report (Harrison and Dawson, 1993).

West of the Chief Fault, the Banker and Sparling deposits lie within Tulsequah Group rocks. Both occurrences were acquired in 1992 by Redfern Resources Ltd. and are targets for mineralization similar to the nearby Polaris-Taku Mine. In 1992, Canarc Resources Ltd. diamond drilled the Polaris-Taku gold-arsenopyrite-quartz veins and stockworks.

C. TULSEQUAH CHIEF MINE - GEOLOGY

C.1 Introduction

The Tulsequah Chief Mine is a precious metal-rich massive sulphide deposit hosted by Mississippian (or older) to Early Permian Mount Eaton Group (Figs. 6 and 7, Map 3). The Mount Eaton Group is a bimodal volcanic suite that is primarily sub-alkaline and calc-alkaline in composition. Mapping and core re-logging during the 1992 Exploration Program has revised the Mount Eaton stratigraphy in the area of the Tulsequah Chief Mine area. It is sub-divided into three major series: the Footwall Series (unit 1), the Mine Series (units 2-4) and the Hanging wall Series (unit 5). The Tulsequah Chief Mine Series stratigraphy spans the lower felsic volcanic-sedimentary sequence (unit 2) delineated on the Property Map (Fig. 5, Map 2).

Footwall Series (unit 1) forms the lowest stratigraphic unit in the Tulsequah Chief Mine area. It consists primarily of amygdaloidal basalt to andesitic basalt flows with minor interflow ash tuff and volcanic sediment. Mine Series (units 2-4) forms a laterally extensive unit that stratigraphically overlies unit 1. The Mine Series contains two cycles of felsic volcanism and massive sulphide deposition that are separated by a cycle of mafic volcanism. The base of the Mine Series (units 2-4) is the Lower Felsic Volcanic/H-AB Horizon (unit 2). The unit is host to the Lower Deposits which were mined from 1951 to 1957 between the 5200 and 5700 Level (+50 to 200m elevation). Additional discoveries made since 1987 have identified the H, AB_2 (extension of the Lower Deposits) and AB_1 massive sulphide horizons. Mafic Volcanic Horizon (unit 3) overlies Lower Felsic Volcanic/H-AB Horizon (unit 2). It forms a marker unit of variable thickness between the Lower and Upper Felsic Volcanic Horizons, units 2 and 4 respectively.

The Upper Volcanic/I Horizon (unit 4) is host to the Upper Deposits which were mined from 1951 to 1957 between the 6100 and 6500 Levels (+300 to +500m elevation). Aside from the 1950's mining, unit 4 is poorly drill tested.

LEGEND

GEOLOGICAL UNITS

INTRUSIONS – TERTIARY (UNIT 7)

7b	Quartz and feldspar porphyritic dacite dyke.
7a	Sloko rhyolite dyke.

----------------------Intrusive contact----------------------

TULSEQUAH GROUP – UPPER PALEOZOIC OR OLDER (UNIT 6)
(may be metamorphic equivalent of Mount Eaton Group).

6	Undifferentiated Tulsequah Group.
6b	Foliated to schistose chlorite +/– carbonate altered intermediate to mafic volcanic rocks.
6a	Laminated to bedded limestone and/or marble.

----------------------Chief Fault----------------------

MOUNT EATON GROUP – MISSISSIPPIAN OR OLDER TO EARLY PERMIAN (UNITS 1–5)

<u>Hanging Wall Series (unit 5)</u>

5	Undifferentiated Hanging Wall Series; in part biotite +/– cordierite altered.
5c	Fine grained to aphanitic basalt dykes (feeder dykes to unit 5a).
5b	Laminated tuffaceous argillite, siltstone, basalt ash tuff, and minor chert.
5a	Fine grained to aphanitic basalt flows; minor interflow tuff and tuffaceous sediment.

<u>Mine Series (units 2–4)</u>

Upper Felsic Volcanic/I Horizon (unit 4)
(Upper Deposits)

4	Undifferentiated Upper Felsic Volcanic – I Horizon.
4k	Fine grained to aphanitic basalt flows; minor interflow tuff and tuffaceous sediment.
4j	Silica +/– sericite +/– pyrite altered tuff and/or flows.
4i	Dacite flow and flow breccia; locally hematitic.
4h	Layered dacite ash to lapilli tuff and minor laminated tuffaceous sediment; in part hematite altered.
4g	Thinly laminated tuffaceous sediment and argillite; lesser jasper and chert.
4f	Pyrite facies: Banded to massive pyrite .
4e	Copper facies: Banded to massive pyrite and chalcopyrite ; minor chert, sphalerite and galena.
4d	Zinc facies: Banded to massive sphalerite, galena, and barite ; minor chert, pyrite, chalcopyrite, and tetrahedrite.
4c	Banded to massive exhalitive chert.
4b	Banded exhalitive gypsum + chert + pyrite.
4a	Mixed altered fragmental volcanic and debris flow with significant bedded exhalite (chert, barite, gypsum and sulphides). Sulphides are mainly pyrite with minor sphalerite, galena and chalcopyrite.

Mafic Volcanic Horizon (unit 3)

3	Undifferentiated Mafic Volcanic Horizon.
3d	Bleached, silica +/– sericite and pyrite altered undifferentiated feldspar phyric basalt flows and subvolcanic sills; in part biotite +/– cordierite altered.
3c	Undifferentiated feldspar phyric basalt flows and subvolcanic sills.
3b	Basalt ash to lapilli tuff; minor tuffaceous sediments.
3a	Fine grained to aphanitic basalt flow and flow breccia.

Lower Felsic Volcanic/H-AB Horizon (unit 2)
(Lower Deposits: Includes historic A–, B–, C–, D–, E–, F– and G–deposits)

2	Undifferentiated Lower Felsic Volcanic – H-AB Horizon.
2j	Feldspar phyric dacite flow and flow breccia; in part hematite +/– sericite +/– albite altered.
2i	Feldspar phyric dacite ash and lapilli tuff; in part hematite +/– sericite +/– albite altered.
2h	Basalt tuff, tuffaceous siltstone and minor flows; possibly equivalent to 2g.
2g	Basalt pillowed flows and minor lapilli tuffs (Present at surface south of 5900 Portal)
2f	Pyrite facies: Banded to massive pyrite .
2e	Copper facies: Banded to massive pyrite and chalcopyrite ; minor chert, sphalerite and galena.
2d	Zinc facies: Banded to massive sphalerite, galena, and barite ; minor chert, pyrite, chalcopyrite, and tetrahedrite.
2c	Banded to massive exhalitive chert, locally contains debris flow with chert fragments.
2b	Banded exhalitve gypsum + chert + pyrite.
2a	Mixed altered fragmental volcanic and debris flow with significant bedded exhalite (chert, barite, gypsum and sulphides). Sulphides are mainly pyrite with minor sphalerite, galena and chalcopyrite.

<u>Footwall Series (unit 1)</u>

1	Undifferentiated Footwall Series.
1d	Bleached, silica +/– sericite +/– pyrite altered, quartz amygdaloidal basalt flow, flow breccia and lapilli tuff; in part biotite +/– cordierite altered.
1c	Quartz amygdaloidal basalt flow; minor flow breccia and tuff. In part biotite +/– cordierite altered.
1b	Laminated tuffaceous sediment and ash tuff.
1a	Basaltic ash and lapilli tuff; minor chert.

LITHOLOGIES

ABBREVIATIONS (1992)
LITHOLOGY (CODE 1)

- SRD – Sloko rhyolite dyke
- QFP – Quartz feldspar porphyry dyke
- BDY – Basalt dyke
- DDY – Dacite dyke
- BTF – Basalt tuff
- BAT – Basalt ash tuff
- BLT – Basalt lapilli tuff
- BFL – Basalt flow
- BFX – Basalt flow breccia
- BAU – Basalt undifferentiated
- DTF – Dacite tuff
- DAT – Dacite ash tuff
- DLT – Dacite lapilli tuff
- DFL – Dacite flow
- DFX – Dacite flow breccia
- DIN – Dacite intrusion
- VSD – Volcanic sediments
- CHT – Chert
- SCH – Chlorite +/– carbonate schist
- LST – Limestone or marble
- EXT – Exhalitic tuff
- PYF – Pyrite facies
- CUF – Copper facies
- ZNF – Zinc facies

ABBREVIATIONS (PRE – 1957)
LITHOLOGY (CODE 1)

- MADK – Mafic dykes
- FEDK – Felsic dyke
- DUM – No geology logged
- NOCO – No core
- ANFR – Andesite fragmental
- AND – Andesite: generally massive
- FEVL – Felsic volcanics
- AGGL – Agglomerate
- SH – Shale
- ORSC – Sericite +/– quartz +/– chlorite schist
- ORPY – Massive pyrite
- ORDS – Disseminated sulphides
- ORSU – Massive sulphides

ABBREVIATIONS USED

SULPHIDES (CODE 3)

- DPY – Disseminated pyrite
- BPY – Banded pyrite
- MPY – Massive pyrite
- SPY – Stringer pyrite
- DSL – Disseminated sphalerite
- BSL – Banded sphalerite
- MSL – Massive sphalerite
- DGN – Disseminated galena
- BGN – Banded galena
- MGN – Massive galena
- DCP – Disseminated chalcopyite
- BCP – Banded chalcopyrite
- MCP – Massive chalcopyrite
- SCP – Stringer chalcopyrite

ALTERATION (CODE 2)

- HEM – Hematitic
- PRO – Propylitic
- CHL – Chloritic
- SER – Sericitic
- SIL – Silicified
- BIO – Biotitic
- COR – Cordierite

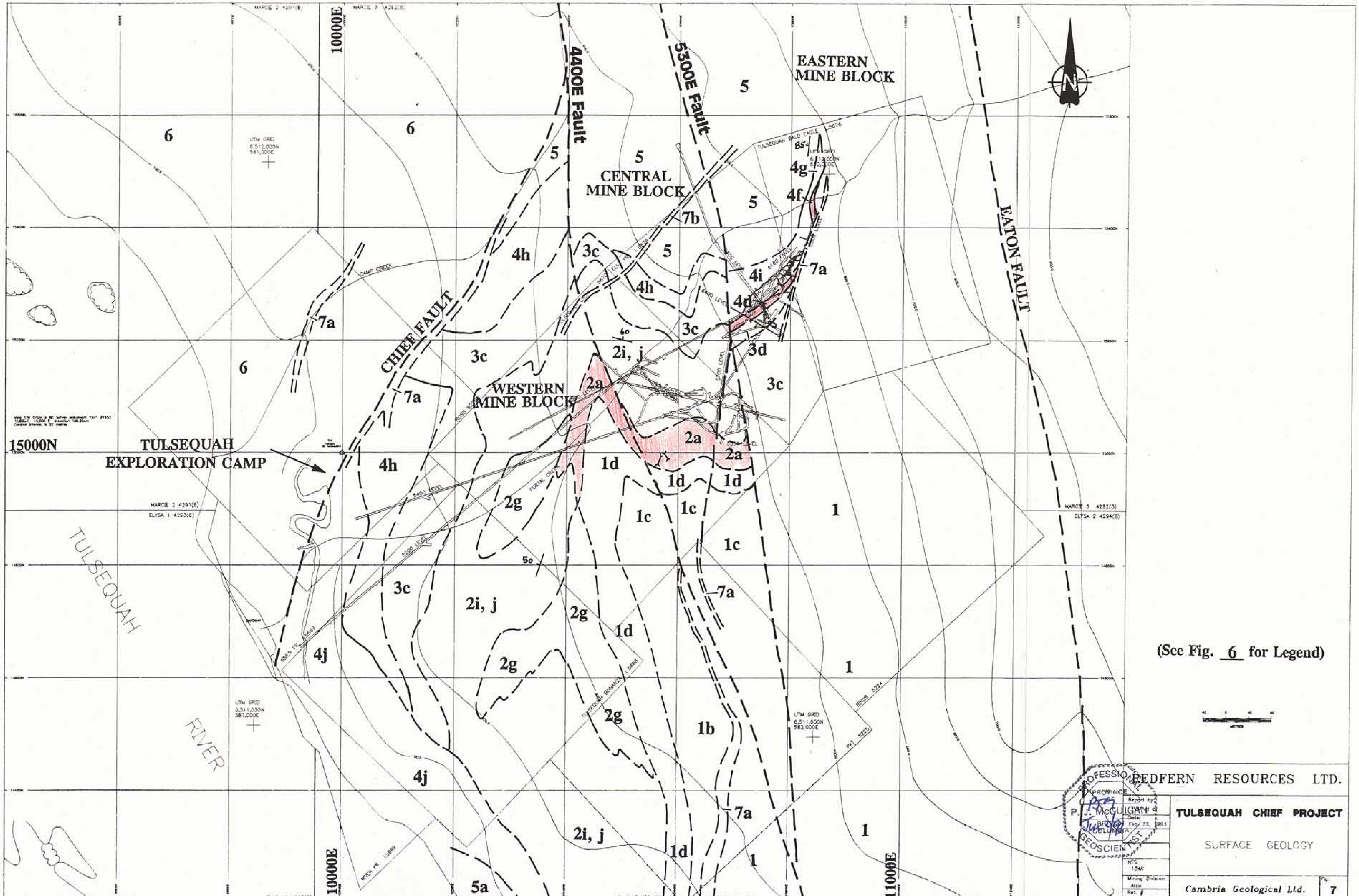
OTHER CODES

- FALT – FALT or F – Fault
- CASE – CASE – Diamond drill hole casing
- EOH – EOH – End of Hole

PROFESSIONAL GEOSCIENTIST
P. J. McGUIGAN
BRITISH COLUMBIA

REDFERN RESOURCES LTD.

Report by: PJM et al	**TULSEQUAH CHIEF PROJECT**
Date: Feb. 23, 1993	1992 LEGEND AND ABBREVIATIONS
NTS: 104K	
Mining Division Atlin	*Cambria Geological Ltd.*
Ref. # B110FLEG	Fig.: 6


EASTERN MINE BLOCK
CENTRAL MINE BLOCK
WESTERN MINE BLOCK
4400E Fault
5300E Fault
CHIEF FAULT
EATON FAULT
TULSEQUAH EXPLORATION CAMP
TULSEQUAH RIVER
15000N
10000E
11000E
6
5
5a
4h
4g
4f
4i
4d
4j
3c
3d
2i, j
2a
2g
1d
1c
1b
1
7a
7b
(See Fig. 6 for Legend)
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The Hanging wall Series (unit 5) is the highest unit recognized in the Tulsequah Chief Mine area. It consists of basalt to andesite basalt flows and minor interflow volcanic sediment.

Tertiary Sloko intrusions (unit 7) form narrow dykes emplaced along faults in the Tulsequah Chief Mine area. They consist of flow banded rhyolite and quartz-feldspar porphyritic dacite.

Mesozoic or older deformation folded the Mount Eaton Group into northwesterly plunging anticlinal-synclinal fold pairs in the vicinity of the Tulsequah Chief Mine. These upright to steeply overturned parasitic folds are on the western limb of the regional Mount Eaton Anticline. Faulting sub-parallel to the axial plane of these folds has offset stratigraphy right laterally along the 4400E and the 5300E Faults by a small amount. These faults divide the Tulsequah Chief Mine into three Mine Blocks--Western Mine Block (west of 4400E Fault), Central Mine Block (between 4400E and 5300E Fault) and Eastern Mine Block (east of 5300E Fault).

C.2 Mount Eaton Group (units 1-5)

C.2.a Footwall Series (unit 1)

The Footwall Series (unit 1) forms a thick, laterally extensive unit of basalt flows, flow breccias, tuffs (hyaloclastites), and minor volcanic sediments and chert. The unit crops out in the eastern half of the map area (Fig. 7, Map 3). It is bounded by the Mine Series (unit 2) along its upper contact; its lower contact is beyond the eastern limit of present mapping.

The basalt flows are generally massive with minor intervals of flow breccia. They are dark green, fine grained to aphanitic and rarely feldspar and/or pyroxene phyric. Quartz amygdaloidal (<1cm) flows (Plate 1) occur near the top of the unit where they are spatially associated with hyaloclastic fragmental units. The hyaloclastic deposits consist of fine ash to lapilli tuff (aquagene tuff). Lapilli are aphanitic, <1 cm in diameter,

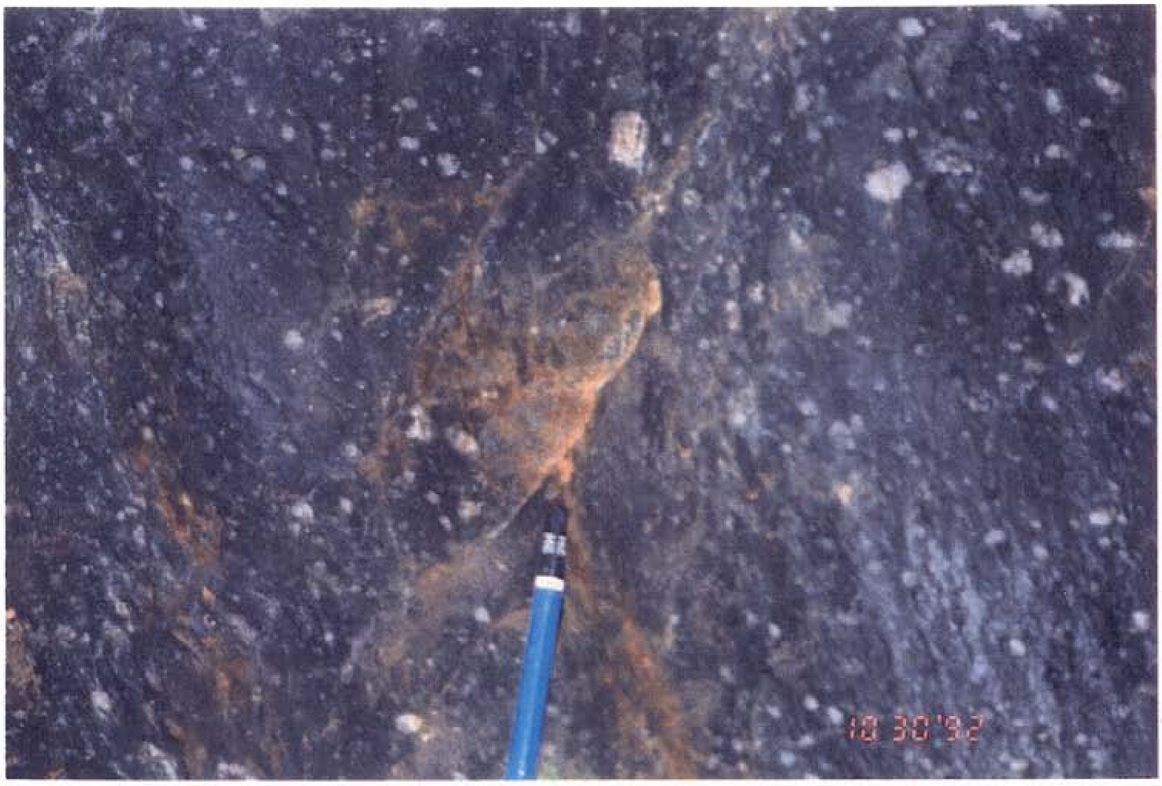


Plate 1: **Basalt flows (unit 1c) with quartz amygdules (<1cm). Photograph taken in 5400 Level crosscut.**

cuspate in outline and clast supported. Matrix consists of fine ash, chert and disseminated pyrite. Whole rock analysis of samples from this unit plot in the alkalic and sub-alkalic field on a alkali versus silica diagram (Fig. 10a, Appendix 4). The subalkalic samples plot in the calc-alkaline field on a AFM diagram (Fig. 10b) and were basalt to basaltic andesite on a diagram by Cox et al., 1979 (Fig. 10c). Quartz amygdaloidal or visibly altered samples were removed from the database; they plot in the dacite to rhyolite field as a result of secondary silica.

Interflow sediments consist of thinly laminated, brownish green to beige tuffaceous argillite, siltstone, tuff and minor chert. They form discontinuous, lens shaped units that are generally less than 50m thick. The tuffaceous sediments are turbiditic in origin and, along with chert, represents periods of quiescence between deposition of individual flows.

C.2.b Mine Series - Lower Felsic Volcanic/H-AB Horizon (unit 2)

The H-AB Horizon (unit 2) forms a single, poorly exposed, recessive unit on surface that stratigraphically overlies altered amygdaloidal basalt flows and lapilli tuffs of unit 1 (Fig. 7, Map 3). It is delineated by rare surface exposures, in underground workings and by diamond drilling over a strike length of 700m and from an elevation of +500 to -650m (Central Mine Block). Its greatest thickness is along the H-synclinal axis where it is up to 100m in true thickness.

Historically (before 1957), individual sulphide bodies within the H-AB Horizon above the 5200 Level were referred to as the A-, B-, C-, D-, and E-orebodies or collectively the Lower Deposits (Table 1, Fig. 8). Drilling completed during the 1987 to 1992 Exploration Programs mainly focused on delineating the H-AB Horizon below the 5200 Level.

East of the 5300E Fault (Eastern Mine Block), mineralization historically referred to as G-Horizon is interpreted to be stratigraphically equivalent to H-AB Horizon (Central Mine Block). The horizon tapers in thickness from 25 to <5m approximately 300m east

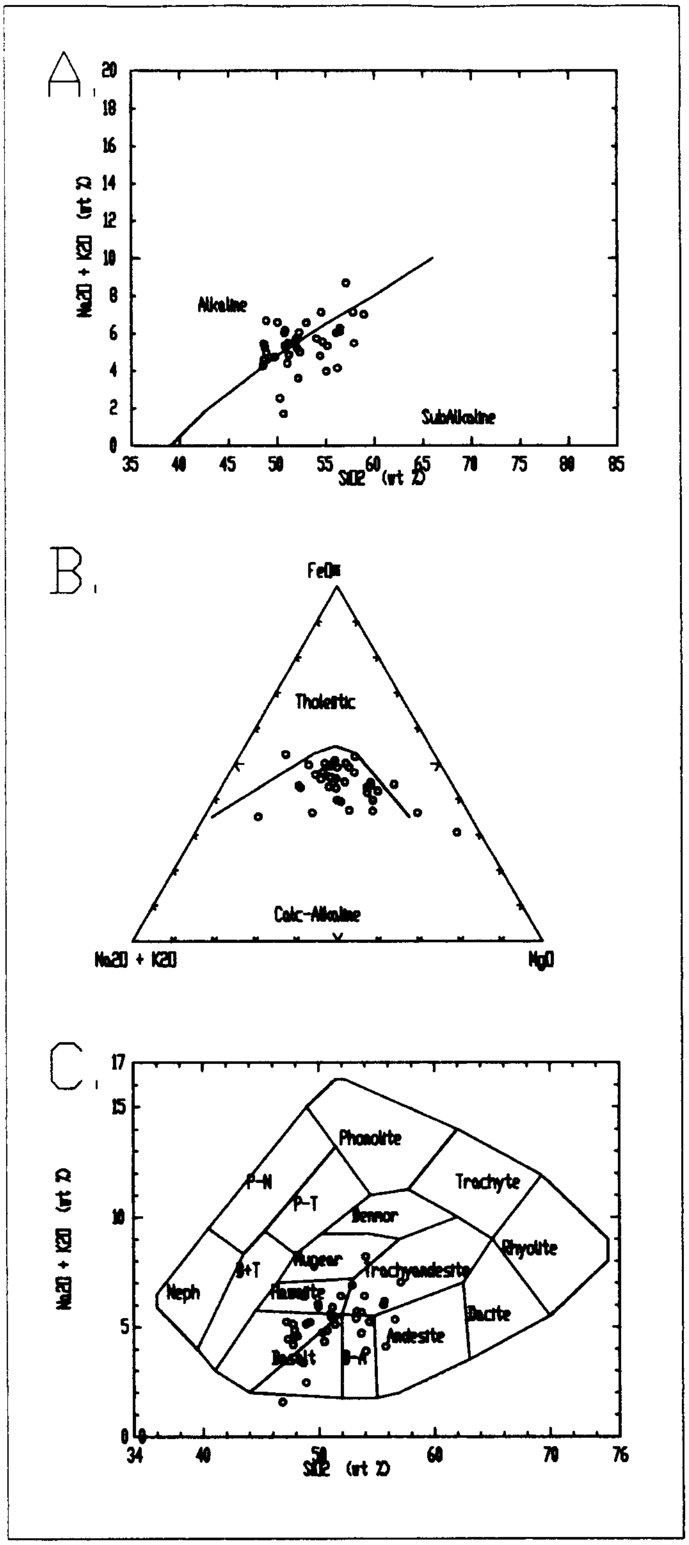
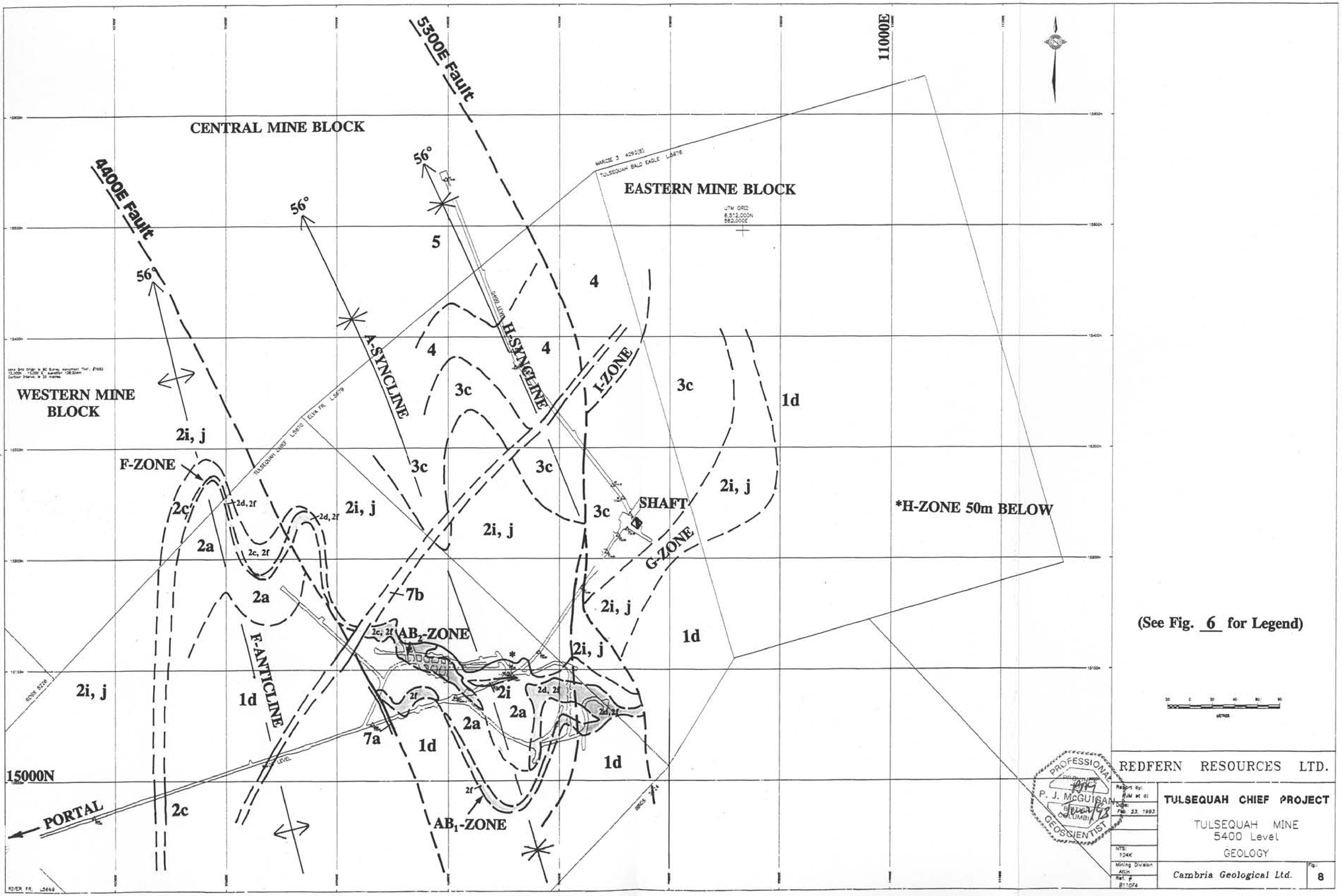


FIGURE 10 (10a) Total Alkali vs. Silica (TAS: Irvine and Baragar, 1971), (10b) Total Alkali, Iron and Magnesium (AFM: Irvine and Baragar, 1971), and (10c) Total Alkali vs. Silica (Compositional Fields by Cox et al., 1979) Diagrams for Footwall Series (unit 1) rocks.

TABLE 1: NOMENCLATURE OF MASSIVE SULPHIDE HORIZONS 1957 - 1992

1992 Host Stratigraphy	1992	1987-1991	1957
Unit 4	I Horizon (Eastern Mine Block)	Upper Deposits	Upper Deposits
Unit 2	H Horizon (Central & Western Mine Blocks)	H	Not mined; Upper eastern fringe of H merges with the E Reserve Block
Unit 2	AB_2 Horizon (Central & Western Mine Blocks)	AB	Lower Deposits: A, B & C stopes. D & E Reserve Blocks
Unit 2	AB_1 Horizon (Central & Western Mine Blocks)	AB	Identified as a footwall pyrite lense
Unit 2	G Horizon (Eastern Mine Block)	G	Not discovered
	F Horizon (Western Mine Block)	F	F Reserve Block



CENTRAL MINE BLOCK
EASTERN MINE BLOCK
WESTERN MINE BLOCK
5300E Fault
4400E Fault
11000E
15000N
A-SYNCLINE
H-SYNCLINE
F-ANTICLINE
I-ZONE
G-ZONE
F-ZONE
AB2-ZONE
AB1-ZONE
SHAFT
PORTAL
*H-ZONE 50m BELOW
56°
2i, j
3c
1d
2a
2c
4
5
7a
7b
(See Fig. 6 for Legend)
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TULSEQUAH MINE
5400 Level
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of the 5300E Fault. Vertically, it pinches out at the +50m elevation; it is not exposed on surface. Below the +50m elevation, mineralization has been intersected to -150m elevation by drill hole TCU90-43.

West of the 4400E Fault (Western Mine Block), mineralization discovered above the 5200 Level in drilling before 1957 was referred to as the F Horizon. It is stratigraphically equivalent to H-AB Horizon (Central Mine Block), however it has been displaced less than 50m right laterally across the 4400E Fault where it passes through the F-Anticlinal closure. West of the fault, the horizon strikes north-south and dips moderately west; its southern extent is unknown.

The H-AB Horizons are primarily thinly laminated chert, gypsum, pyrite and sericitically altered tuff which contain a number of discrete precious metal-rich polymetallic massive sulphide bodies. Sulphide bodies were likely deposited in paleotopographic lows at a number of stratigraphic intervals. Locally, the horizon is brecciated (debris flow) indicating deposition in an unstable slope environment. Deformation has mobilized and thickened the sulphide horizons along parasitic fold axis and attenuated them along fold limbs.

The sulphide bodies consist of thinly banded to massive pyrite, sphalerite, galena, and chalcopyrite. Accessory minerals include tetrahedrite-tennantite and native gold. Gangue consists of barite (averaging 6%), chert, and gypsum (Plate 2). Visually the sulphides can be divided into three distinct sulphide facies--copper facies (CUF), zinc facies (ZNF) and pyrite facies (PYF). CUF-mineralization is characterized by massive to banded pyrite (30-80%) and chalcopyrite (1-10%) with lesser sphalerite and galena. ZNF-mineralization has lower total sulphides (<60%) and contains more sphalerite, galena and barite than the copper facies. PYF-mineralization consists of massive pyrite with little economic sulphides.

Plate 2: **Laminated, exhalitive gypsum, pyrite and chert (unit 2b). Photograph taken in 5400 Level crosscut.**

Comparisons of assays and specific gravity concur with visual groupings of sulphide facies. Based on 367 selected assays to 1991, the mean grade (weighted for core length and specific gravity) of each facies (ZNF and CUF) is as follows:

Facies (# of samples)	%Cu	%Pb	%Zn	Au oz/ton	Ag oz/ton	S.G.
All (367)	1.63	1.11	6.09	.076	3.02	3.75
ZN Rich (284)	0.99	1.36	7.22	.068	2.96	3.61
CU Rich (83)	3.87	.192	2.06	.107	3.23	4.20

Significantly, the CUF is 60% richer in gold and shows a lower Pb/Zn ratio. The mean density of the CUF is 4.20 g/cm^3, compared to the ZNF which is 3.61 g/cm^3. The difference in mean density is consistent with geological observations which note the zinc-rich intervals are lower in pyrite and contain more chert, barite and altered tuff than the copper-rich intervals.

Re-interpretation of the structure and the stratigraphy indicates three economically significant exhalitive massive sulphide horizons within unit 2. The lowest horizon is termed the AB_1 Horizon. Above the +200m elevation, it consists mostly of massive pyrite (1 to 10m thick) and exhalitive chert. Below the -200m elevation, the AB_1 Horizon passes into zinc-rich and copper-rich facies massive sulphides. Dacite flows and pyroclastics (units 2i and j) and minor volcanic sediments (unit 2h) separate the AB_1 and AB_2 Horizons. Locally, altered fragmentals and altered debris flow facies deposits (collectively unit 2a) interfinger with these unaltered rocks.

The AB_2 Horizon and its equivalents in F and G Horizons is intersected in most drill holes in the Central, Eastern and Western Mine Blocks. It was mined in part from the A, B, and C stopes of the Lower Deposits and comprises the 1957 D and E Reserve Blocks. The horizon was first discovered on the 5700 Level (+200m elevation). It extends down dip to the -700m elevation, the deepest areas tested by drilling (TCU92-36). On the E2580i section and westward, the AB_2 Horizon is separated from the overlying H Horizon by altered debris flow and, locally, by unaltered dacite and basalt flows. East of section E2580i the intercalated volcanics thin and the AB_2 and H Horizons merge. The thickest massive sulphide drill intersections are within areas of merged H and AB_2 Horizons; in the merged areas the entire zone is termed H Horizon.

The volcanic stratigraphy between the H and AB_2 Horizons is critical to the deposit geology. The volcanics form a westward thickening, wedge shaped unit that consists mostly of dacite flow and lapilli tuff (units 2i and j) that are locally strongly altered (unit 2a). From section E2650i to E2700i, the wedge is narrow (5-10m) in drill holes TCU89-13, TCU91-33, TCU92-36 and TCU92-37 and absent in TCU88-3, TCU90-21, TCU90-22 and TCU90-23. West of section E2650i, the wedge progressively thickens to 50 to 80m on section E2550i. In detail, the distribution of this wedge is poorly understood. However, the available data indicates the presence of a felsic volcanic centre west of section E2500i.

The H Horizon is stratigraphically the highest massive sulphide mineralization recognized in unit 2. It overlies felsic volcanics above the AB_2 Horizon, however, near drill holes TCU90-21, -22, -23 and -30 it rests directly on altered Footwall Series basalts (unit 1).

Overlying the H Horizon is a section of dacite flows, flow breccias and tuffs (units 2i and j). Contact between them is well exposed in the A-stope on the 5400 Level (Plate 3) and in drill core. On surface, it tapers from >300 m thick in the southwest to <10 metres in the northeast area of the map (Fig. 7, Map 3). In the Central Mine Block, drilling indicates the unit tapers from 200 m at +100 m elevation (5400 Level) to 20 metres in thickness at -650 m elevation, the present depth of drilling. The unit is primarily greyish green, feldspar (1-3 mm) phyric, fine grained dacite flows, flow breccias and homolithic lapilli tuffs. Tops of individual flows are maroon in colour from finely disseminated hematite. Chemically the Lower Felsic Volcanic Horizon (units 2i and j) is sub-alkalic, calc-alkaline and plots in the dacite field (Figs. 11a-c, Appendix 4). Some samples plot to the right of the dacite field and below the rhyolite field from

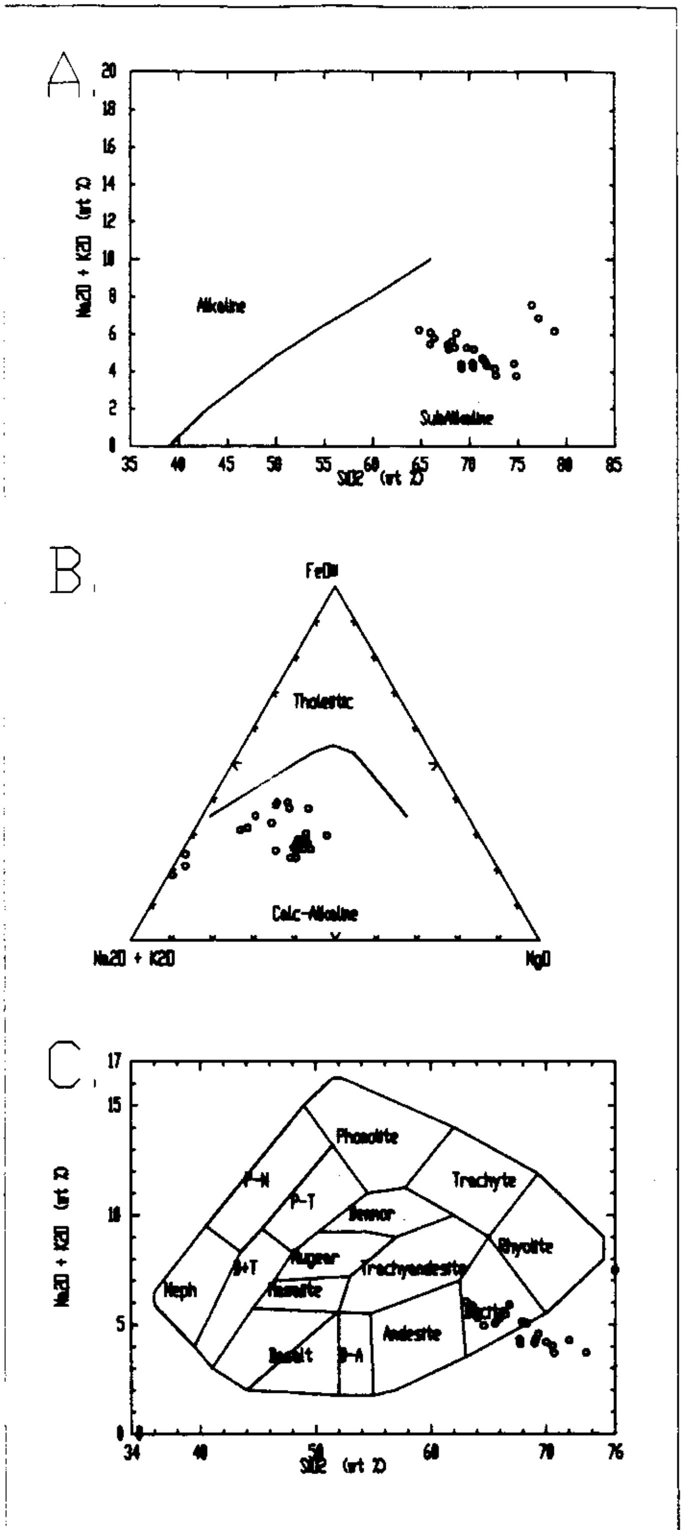


FIGURE 11 (11a) Total Alkali vs. Silica (TAS: Irvine and Baragar, 1971), (11b) Total Alkali, Iron and Magnesium (AFM: Irvine and Baragar, 1971) and (11c) Total Alkali vs. Silica (Compositional Fields by Cox et al., 1979) Diagrams for Lower Felsic Volcanic Horizon (unit 2) rocks.

Plate 3: **Contact between chert + pyrite + sphalerite exhalite (unit 2a) and dacite tuff (unit 2i). Photograph taken in A-stope, 5400 Level.**

silicification associated with the H-AB mineralizing event. Radiometric (U-Pb zircon) dating of this unit gave an age of 353 ± 1 Ma (J. Mortenson, personal communication, 1993).

Basalt volcanics (unit 2g) form a minor unit (<100 m thick) in the south-central area of the map (Fig. 7, Map 3) separating dacitic volcanics (units 2i and j) and altered Footwall Series (unit 1) basalt. Northward the unit facies out near the southwestern surface extent of the H-AB Horizon. The unit consists of basalt flows, pillowed flows, pillow breccia, and lesser tuff. Flows are dark green to black, fine grained to aphanitic, feldspar phyric in part and vesicular. Pillows are up to 50 cm in their long dimension (Plate 4). Dark green to black, aphanitic chilled pillow margins (<3 cm) are separated by cream to maroon (hematitic) chert. Pillow breccias contain pillow-like clasts (<30 cm) that are clast supported within an ash to lapilli tuff matrix.

C.2.c Mine Series - Mafic Volcanic Horizon (unit 3)

Mafic Volcanic Horizon (unit 3) forms mostly conformable bodies which separate units 2 and 4 (Fig. 7, Map 3). The unit is massive, medium to dark green, feldspar (2-3 mm) ± amphibole (2 mm) phyric, and fine to medium grained basalt to basaltic andesite. Chemically they are sub-alkalic, calc-alkaline and plot in the basalt to basaltic andesite field (Figs. 12a-c, Appendix 4). In the Central Mine Block, the lower contact of the Mafic Volcanic Horizon maintains a conformable contact with the underlying dacite flows and lapilli tuffs (units 2i and j). Its total thickness varies considerably, suggesting deposition in a basin with high local relief. On surface, the main conformable unit is up to 150m thick. A dyke-like protrusion north-west of the 5900 Level portal indicates the unit is locally intrusive, or at least, disconformable.

C.2.d Mine Series - Upper Felsic Volcanic/I Horizon (unit 4)

Upper Felsic Volcanic Horizon (unit 4) is a laterally extensive ash flow tuff unit that is >250 m thick in the southwest corner of the map and pinches out approximately 1200 metres to the northeast (Fig. 7, Map 3). Its eastern contact is with undifferentiated basalt

Plate 4: **Basalt pillow flow (unit 2g). Individual pillows (50 cm in their long dimension) are separated by cream to maroon (hematitic) chert. Photograph taken on surface at L2+00S, 1+00E (Southern Grid).**

of unit 3. To the west, the unit is separated from Tulsequah Group rocks by the north to northeast striking, moderate west dipping Chief Fault. The horizon consists of layered, greyish green to maroon, heterolithic dacite ash to lapilli tuff (Plate 5) and flows which facies out into thinly laminated tuffaceous sediments, argillite and hematitic chert to the northeast. Lapilli are generally $<$3cm long, subangular, and parallel aligned; compositionally the clasts include: (i) cream coloured, aphanitic felsic volcanic, (ii) glass shards and (iii) flattened pumiceous clasts (fiamme). South of the 5400 Level portal, extensive silica $\pm$ sericite + pyrite alteration near the top of this unit (unit 4j) has formed rusty cliffs.

East of the 5300E Fault, I Horizon (unit 4) separates thinly laminated tuffaceous sediments (unit 4g) from underlying Mafic Volcanic Horizon (unit 3). I Horizon was the focus of historic mining (Upper Deposits) between 1951 and 1957. It is delineated between surface and +100 m elevation by underground workings and definition drilling. It tapers from 10 m near the 5300E Fault to $<$1 metre where it pinches out approximately 300 m to the northeast. Mineralization grades from thinly banded sphalerite, galena, chalcopyrite, barite and chert near the 6500 Level portal, to mainly weakly laminated to massive pyrite where it pinches out in a creek bed exposure to the northeast.

C.2.e Hanging Wall Series (unit 5)

Hanging Wall Series (unit 5) is a thick, laterally extensive unit that conformably overlies unit 4 in the northern area of the map (Fig. 7, Map 3). The unit consists mainly of basalt flows with lesser interflow tuffaceous sediment. The flows are dark green to black, fine grained to aphanitic basalt. Narrow dark green basalt dykes (unit 5c) are feeders to the flows. They are most easily identified within felsic volcanic or exhalite units. Interflow sediments are thinly laminated, brownish green to grey, tuffaceous argillite, siltstone, ash tuff and chert.

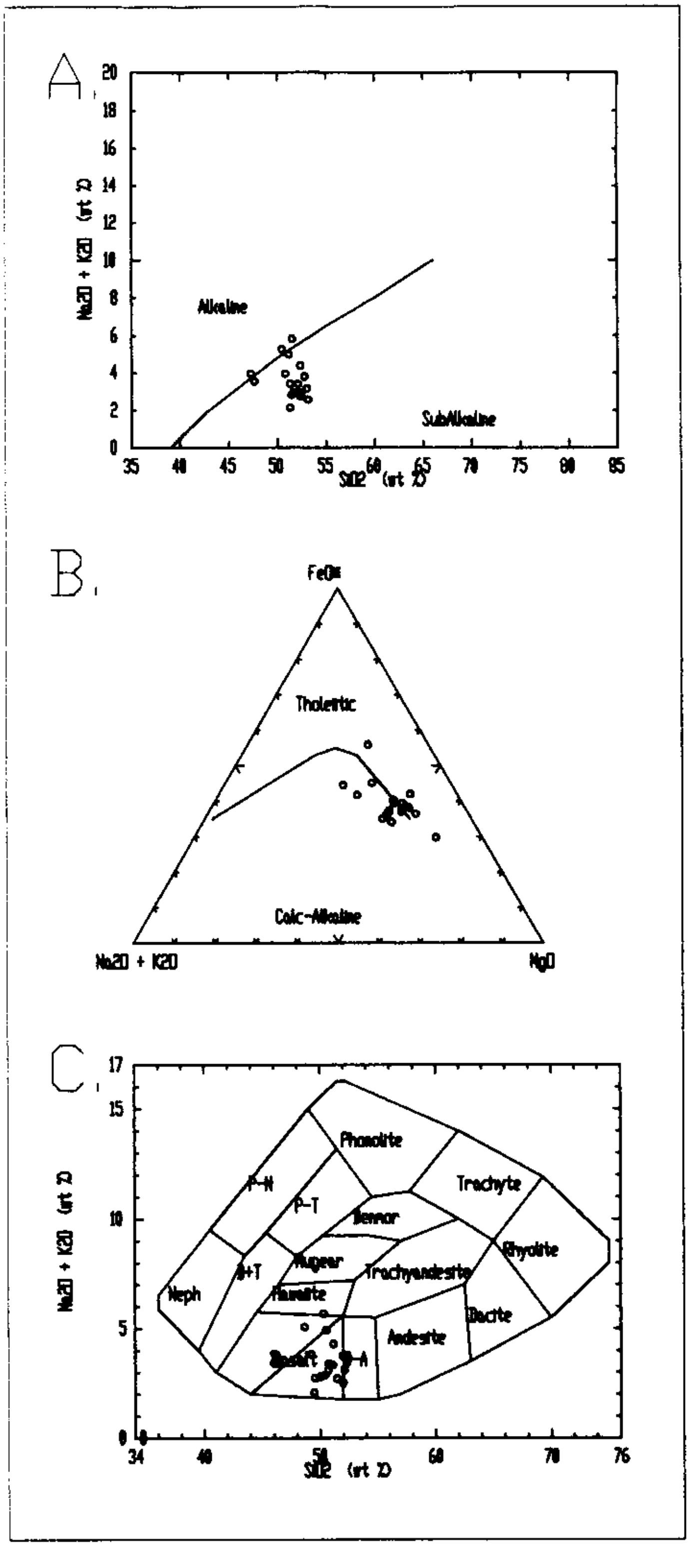


FIGURE 12 (12a) Total Alkali vs. Silica (TAS: Irvine and Baragar, 1971), (12b) Total Alkali, Iron and Magnesium (AFM: Irvine and Baragar, 1971), and (12c) Total Alkali vs. Silica (Compositional Fields by Cox et al., 1979) Diagrams for Mafic Volcanic Horizon (unit 3) rocks.

Plate 5: **Dacite lapilli tuff (unit 4h). Photograph taken on surface at 0+40N, 2+00W (Middle Grid).**

C.3 Tulsequah Group (unit 6)

Tulsequah Group (unit 6) crops out north of the Chief Fault in the northwest area of the map (Fig. 7, Map 3). It consists of strongly deformed, metamorphosed intermediate to mafic volcanics, tuffaceous sediment and limestone that are now schists, phyllites and marble. Chlorite-carbonate schists consist of altered feldspar phyric intermediate to mafic volcanic and carbonate. Some schists have well developed kink bands. Less deformed rocks consist of moderately foliated, dark green to black, chloritic, fine grained mafic flows and tuffs. Limestone is laminated to bedded, grey to white, fine to medium grained, and recrystallized to marble.

C.4 Intrusive Rocks (unit 7)

Sloko rhyolite dykes (unit 7a) form narrow (<10 m) dykes emplaced along north-northeast striking, moderately west dipping faults and north-northwest striking, steeply east dipping faults (Fig. 7, Map 3). On surface, they form resistive, strongly jointed outcrops (Plate 6). They are cream coloured, quartz (<1mm) phyric, fine grained to aphanitic rhyolite; locally they are flow banded (Plate 7).

Quartz and feldspar porphyritic dacite (unit 7b) forms a single dyke up to 15 m thick which cross-cuts the 4400E and 5300E Fault with little or no displacement (Fig. 7, Map 3). It strikes AZ 048° and dips 56° to the southeast. It consists of medium green, quartz (<1mm) and feldspar (<1cm, euhedral, zoned plagioclase) phyric, fine grained dacite (Plate 8).

C.5 Structure

C.5.a Folding

Mount Eaton Group rocks are deformed into anticlinal-synclinal fold pairs (Figs. 7 and 8, Maps 3, 4 and 5). These folds are easterly verging, parasitic folds on the western limb of the regional Mount Eaton Anticline. The Mount Eaton Anticline axial plane lies east of the map area along the western flank of Mount Eaton and Mount Manville (Fig. 5, Map 2).

Plate 6: **Sloko Rhyolite dyke (unit 7a) forms resistive, strongly jointed outcrop. Photograph taken on surface at L1+00S, 4+50E (Southern Grid).**

Plate 7: **Sloko Rhyolite dyke (unit 7a) emplaced along 4400 E Fault splay. Note well developed flow banding. Photograph taken in 5400 Level crosscut.**

Plate 8: **Quartz and feldspar porphyritic dacite dyke (unit 7b). Photograph taken in 5400 Level crosscut.**

In detail, parasitic folds between the 4400E and 5300E Fault (Central Mine Block) are upright to overturned and have moderate interlimb angles. Axial planes strike AZ166° and dips 79°W; the fold axis plunges 56° in the direction of AZ 329°. These small-scale fold structures have an amplitude of 30-50m and a frequency of 50m. Weak foliation and small scale folds are locally observed within the H-AB Horizon (unit 2) in drill core and in underground exposures. West of the 4400E Fault, bedding strikes north-northeast and dips moderately to the west. East of the 5300E Fault, bedding strikes northeast and dips vertically to steeply westward.

C.5.b Faulting

Two major periods of faulting are identified in the Tulsequah Chief Map area. The first period of faulting is Mesozoic or older and related to deformation that produced the Mount Eaton Anticline. These faults include the 4400E and 5300E Faults.

The 4400E Fault has a prominent surface expression; it is traceable from the Tulsequah Chief area to the Big Bull property, 8km to the south. Underground the fault is identified on the 5200, 5400 and 5900 Level crosscuts by 1m of clay gouge. It strikes AZ 155° and dips vertically to 85° east. Stratigraphy is displaced less than 50m right laterally across this fault. Sloko rhyolite dykes are emplaced along part of this fault.

The 5300E Fault has a faint surface expression that is traceable to the south where it intersects the 4400E Fault 3.5 km south of the Tulsequah Chief Mine (Fig. 7, Map 3). The fault has a number of sub-parallel subsidiary splays that are identified in drilling and in underground workings. Underground the main fault splay is identified in the 5200, 5400, 5500, 5700, 5900 and 6200 Level crosscuts by 1m of clay gouge; locally it is intruded by Sloko Rhyolite dykes. It strikes north-northwesterly and dips nearly vertically; apparent displacement across this fault is less than 70m in a right lateral sense.

A second younger period of faulting is displayed by the Chief Fault which juxtaposes strongly deformed rocks of the Tulsequah Group against less deformed rocks of the

Mount Eaton Group. Within the Tulsequah Mine area, the fault strikes north-northeast and dips moderately to steeply west. Slickensides on associated parallel fractures are shallow which indicates mainly strike-slip displacement.

C.6 Alteration

Alteration associated with the H-AB Horizon (unit 2) is mainly confined to the top of the Footwall Series (unit 1). Between the 4400E and 5300E Fault, basalt flows and tuffs are altered up to 100 m below unit 2. The alteration is characterized by an assemblage of silica ± sericite ± chlorite ± pyrite. Silica occurs as thin fracture envelopes to pervasive zones of silica flooding which causes the basalts (unit 1d) to have a bleached grey to white colour (Plate 9). These zones are often crosscut by white quartz ± pyrite, chalcopyrite and chlorite veins ($<$30 cm).

West of the 4400E Fault, footwall alteration on surface persists but decreases in intensity as the H-AB Horizon pinches out to the south. It grades from an assemblage of pervasive silica ± sericite, chlorite and pyrite directly below unit 2 mineralization to chlorite and disseminated pyrite up to 500 m south of the last exposure of chert and massive sulphides in unit 2.

East of the 5300E Fault, footwall alteration rapidly decreases in intensity and thickness as the G Horizon pinches out to the north and above the 0m elevation.

Hanging wall alteration is poorly developed and is confined to dacite flows and tuffs within and directly above the H-AB Horizon (unit 2). It characterized by an assemblage of albite, epidote, chlorite, silica and magnetite (± hematite). Albite occurs as thin, white to grey fracture envelopes. Where fracture density is higher or alteration more intense, albite forms irregular pervasive zones, and primary textures are often obscured.

Plate 9: **Quartz veined, silica ± pyrite altered quartz amygdaloidal basalt flow (unit 1d). Photograph taken in 5400 Level crosscut.**

Alteration related to the I Horizon (unit 4) is similar to that associated with the H-AB Horizon. It is best developed directly east of the 5300E Fault where the I-Horizon crops out on surface. At the northern-most exposure of massive sulphides, footwall alteration is weak to absent.

C.7 Metamorphism

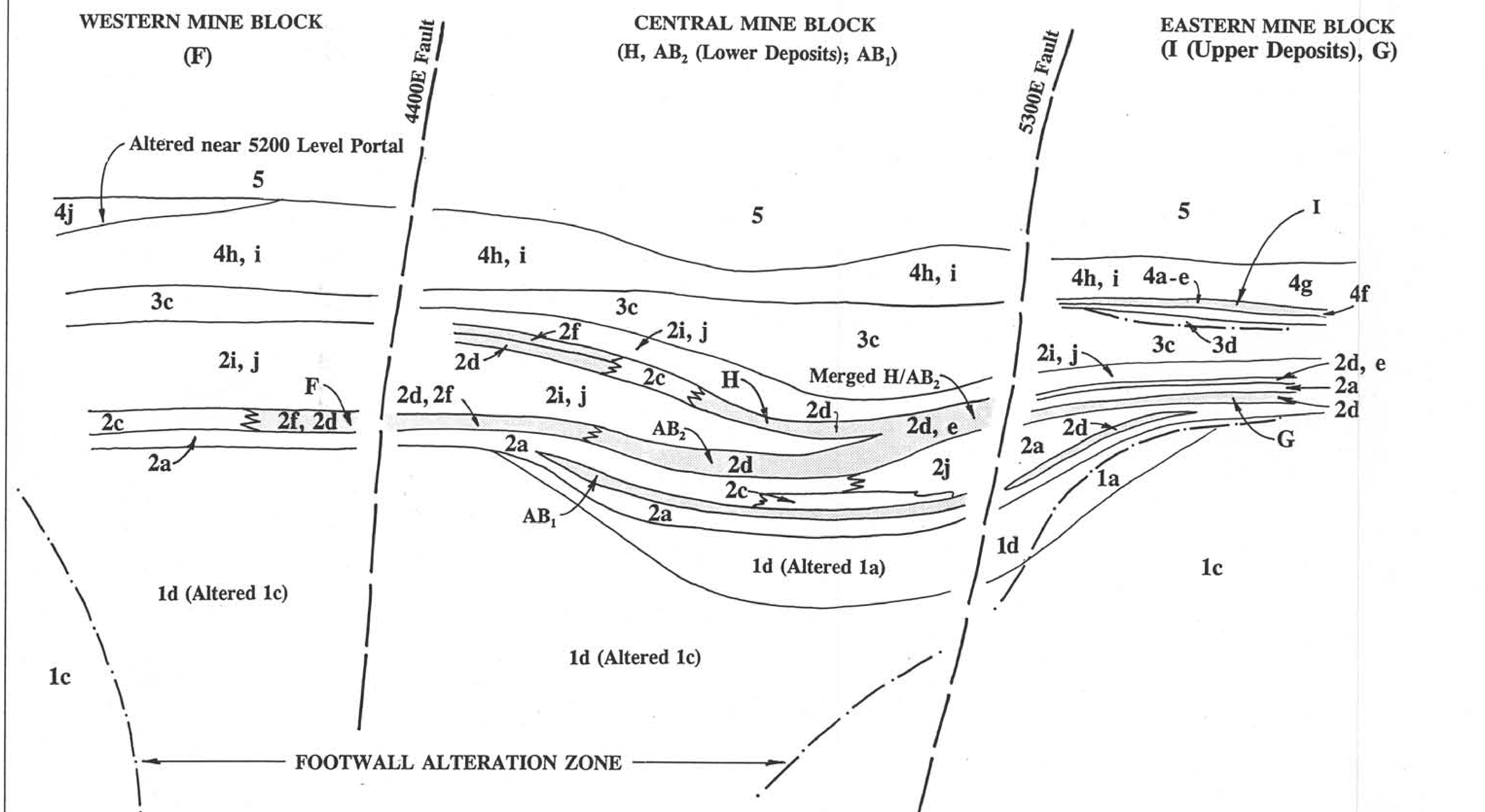
Mount Eaton Group is a non-foliated sequence that is overprinted by mostly Lower Greenschist facies metamorphism. It is characterized by the breakdown of pyroxene and amphibole to chlorite and epidote, and potassium feldspar to sericite. Locally, the Mount Eaton Group has undergone higher grade Upper Greenschist - Lower Amphibolite facies metamorphism. It is characterized by quartz $\pm$ epidote, chlorite, actinolite, magnetite and garnet veinlets which crosscut pervasive biotite and cordierite. Biotite is fine grained to aphanitic and phlogopitic in composition (Raudsepp, 1992). Cordierite forms subhedral to euhedral porphyroblasts (< 1 cm) and often appears to be replacing quartz amygdules within basalt flows of unit 1.

Lower grade Zeolite to Prehnite-Pumpellyite facies metamorphism overprints the older higher grade Greenschist facies metamorphism. It occurs as white, fibrous to platy, soft minerals in fractures. X-Ray diffraction work (Appendix 3) determined the minerals to be a mixture of prehnite and laumontite (Raudsepp, 1992).

Tulsequah Group is a moderately to strongly foliated sequence that is overprinted by Upper Greenschist facies metamorphism (Payne and Sisson, 1987).

C.8 Geological Interpretation

The Mount Eaton Group in the Tulsequah Chief Mine area is characterized by two cycles of felsic volcanism that are spatially and genetically related to precious metal-rich massive sulphide mineralization. The postulate geology of the Mount Eaton Group is outlined below and diagrammatically in Figure 9.



See Fig. 6 for Legend

Not to Scale

REDFERN RESOURCES LTD.

TULSEQUAH CHIEF PROJECT

STRATIGRAPHY SCHEMATIC DIAGRAM

Report by:	
Date: Feb. 23, 1993	
NTS: 104K	
Mining Division: Atlin	
Ref. #	

Cambria Geological Ltd.

Map: 9

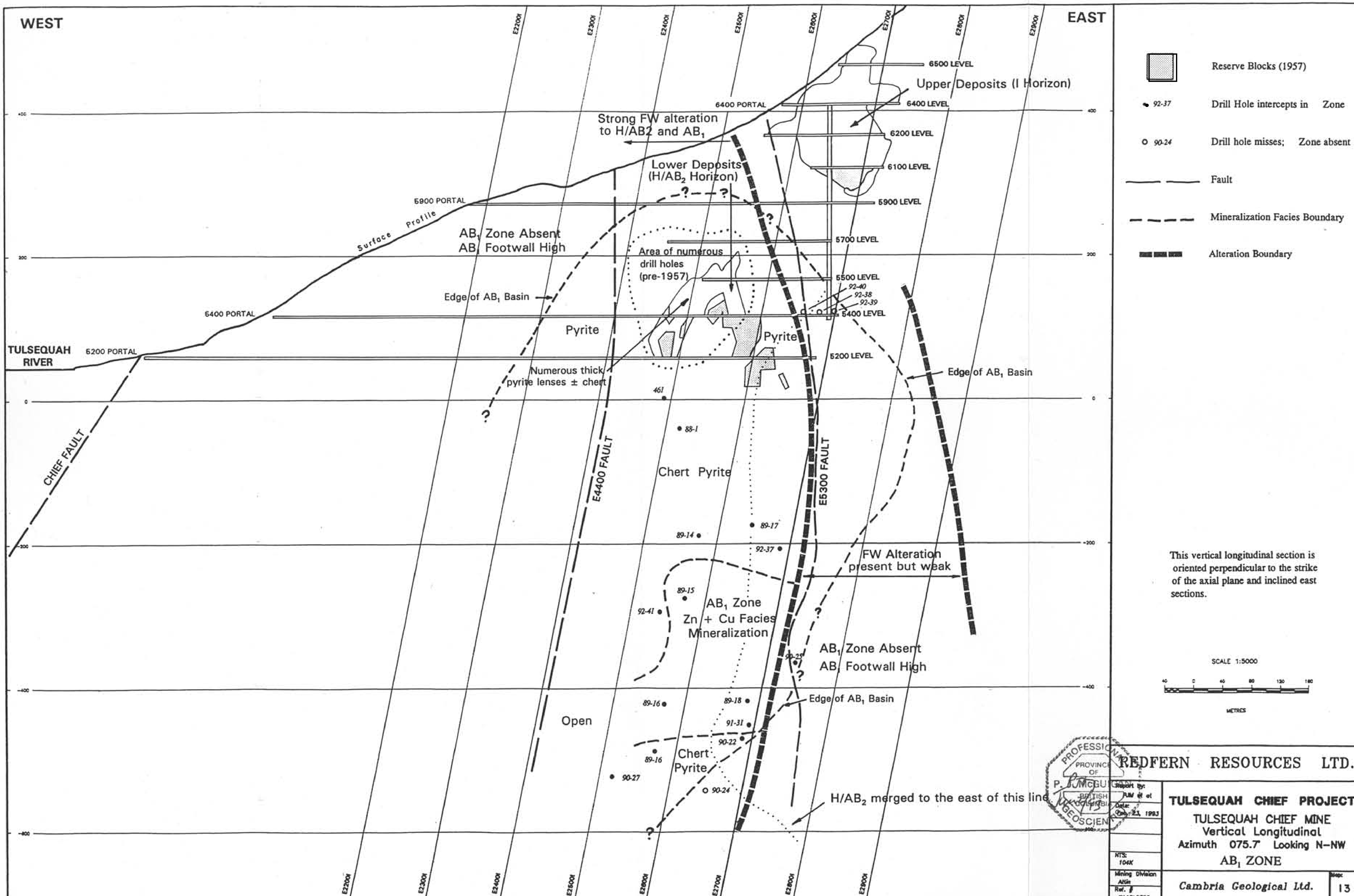
Footwall Series (unit 1) is the lowest unit recognized in the map area. It is a thick succession of basalt flows with tuffaceous sediment and minor chert infilling small basins on top and between individual flows during periods of waning volcanic activity. Graded beds within the turbiditic tuffaceous sediments indicate the unit is right way up.

Amygdaloidal flows and aquagene tuffs near the top of unit 1 suggest a rising seafloor and/or a drop in sea level. These deposits form where the overlying seawater is <1000m (Wohletz, 1986).

Lower Felsic Volcanic Horizon (units 2g-j) marks the change from mafic to mainly felsic volcanism and associated exhalitive activity. The unit is dominated by dacite flows, flow breccias and homolithic lapilli tuff (units 2i and j). It forms an extensive unit that tapers from proximal flows and minor tuff (>300m) in the southwest to more distal tuffs (<10m) in the northeast area of the map. In the vicinity of the Tulsequah Chief Mine, the unit interfingers with the H-AB Horizon. U-Pb radiometric dating of zircon from this unit gave an age of 353 ± 1 Ma. (J. Mortenson, personal communication, 1993).

Sulphides and chemical sediments were deposited at a number of stratigraphic intervals within unit 2, however, the H, AB_1 and AB_2 sulphide lens (units 2a-f) are the most extensive and economically important. The laminated nature of the deposits suggests quiescent conditions during deposition of most of the massive sulphides. However, debris flow containing clasts of altered volcanics and accessory clasts of sulphide, chert and barite are present locally. The debris flow indicates deposition in an unstable slope environment. These units are similar to the 'ore clast breccias' present in the HW/Myra Formation at the Buttle Lake Deposit on Vancouver Island, B.C.

AB_1 Horizon was deposited in a restricted basin (Fig. 13). The margins of the basin are defined by unit 1c footwall basalts. Within the basin, the AB_1 cherts and massive sulphides are deposited on a section of hyaloclastic basalt tuffs (unit 1a). Locally, AB_1 mineralization infills voids in hyaloclastic basalt breccia. Except in the Eastern Mine



WEST
EAST
E2200
E2300
E2400
E2500
E2600
E2700
E2800
E2900
6500 LEVEL
6400 LEVEL
6200 LEVEL
6100 LEVEL
5900 LEVEL
5700 LEVEL
5500 LEVEL
5400 LEVEL
5200 LEVEL
6400 PORTAL
5900 PORTAL
6400 PORTAL
5200 PORTAL
Upper Deposits (I Horizon)
Strong FW alteration to H/AB2 and AB1
Lower Deposits (H/AB2 Horizon)
Surface Profile
AB1 Zone Absent
AB1 Footwall High
Area of numerous drill holes (pre-1957)
Edge of AB1 Basin
Pyrite
Pyrite
TULSEQUAH RIVER
Numerous thick pyrite lenses ± chert
CHIEF FAULT
E4400 FAULT
E5300 FAULT
Chert Pyrite
FW Alteration present but weak
AB1 Zone
Zn + Cu Facies Mineralization
AB1 Zone Absent
AB1 Footwall High
Edge of AB1 Basin
Open
Chert Pyrite
H/AB2 merged to the east of this line
461
88-1
89-17
89-14
92-37
89-15
92-41
90-25
89-18
89-16
91-31
90-22
89-16
90-27
90-24
92-40
92-38
92-39
Reserve Blocks (1957)
92-37 Drill Hole intercepts in Zone
90-24 Drill hole misses; Zone absent
Fault
Mineralization Facies Boundary
Alteration Boundary
This vertical longitudinal section is oriented perpendicular to the strike of the axial plane and inclined east sections.
SCALE 1:5000
METRES
REDFERN RESOURCES LTD.
TULSEQUAH CHIEF PROJECT
TULSEQUAH CHIEF MINE
Vertical Longitudinal
Azimuth 075.7° Looking N-NW
AB1 ZONE
Cambria Geological Ltd.
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NTS: 104K

Block, the hyaloclastic breccias are strongly altered and difficult to distinguish from altered unit 2a rocks. AB_1 Horizon demonstrates a distinct mineralogical zoning. From the +200m (5700 Level) to the -200m elevation, the horizon is massive pyrite (up to 10m thick) and chert. Below the -200m elevation it facies into high grade zinc-rich facies massive sulphides.

AB_1 Horizon is overlain by mostly dacite flows and pyroclastics (units 2i and 2j) and lesser amounts of altered volcanics and debris flow (unit 2a). Locally present are basalt flows and volcanic sediments (units 2h and 2g). These volcanics and sediments mostly infilled the AB_1 basin, as indicated by the wider distribution of AB_2 Horizon on the bounding AB_1 footwall high areas.

The AB_2 Horizon is the most extensive and economically important horizon (Fig. 14). It consists of discontinuous pyrite lenses above +200m elevation (5700 Level). Below the +200m elevation it passes into zinc-rich and copper-rich facies massive sulphides. The deepest intersection on the property is AB_2 Horizon in hole TCU92-36 at -650m elevation. The AB_2 Horizon consists of multiple sub-intervals of polymetallic base metal sulphides, chert and massive pyrite. Locally, the horizon contains a chert-breccia dominated debris flow. In aggregate, the AB_2 Horizon varies between 5 and 60m in true thickness.

The lateral extent of the AB_2 Horizon is poorly known; the horizon is open down-dip and to the west. The greatest thicknesses occur along section E2650i. Eastward, the horizon is cut by the 5300E Fault. In the Eastern Mine Block, the AB_2 Horizon correlates with the G Horizon. G Horizon thins and pinches out above the +100m elevation (5400 Level) and along strike to the northeast; mineralization is weak in hole TCU92-44. Westward, the AB_2 Horizon is a mixture of chert and pyrite with some sections of polymetallic base-metal massive sulphides. In areas tested, the footwall basalts to AB_2 and AB_1 are strongly altered.


WEST
EAST
Reserve Blocks (1957)
92-36 Drill Hole intercepts in Zone
90-27 Drill hole misses; Zone absent
Fault
Mineralization Facies Boundary
Alteration Boundary
6500 LEVEL
6400 PORTAL
6400 LEVEL
6200 LEVEL
6100 LEVEL
5900 PORTAL
5900 LEVEL
5700 LEVEL
5500 LEVEL
5400 PORTAL
5400 LEVEL
5200 LEVEL
TULSEQUAH RIVER
5200 PORTAL
Strong FW alteration to H/AB₂ and AB₁
Upper Deposits (I Horizon)
Surface Profile
Lower Deposits (H/AB₂ Horizon)
Area of numerous drill holes (pre-1957)
Chert Pyrite
CHIEF FAULT
E4400 FAULT
E5300 FAULT
AB₂ Zone Zn + Cu Facies Mineralization
G Zone Zn + Cu Facies Mineralization
Chert Pyrite
Open
FW Alteration present but weak
AB₂ Zone Zn + Cu Facies Mineralization
H/AB₂ merged to the east of this line
Open
Open
This vertical longitudinal section is oriented perpendicular to the strike of the axial plane and inclined east sections.
SCALE 1:5000
METRES
REDFERN RESOURCES LTD.
TULSEQUAH CHIEF PROJECT
TULSEQUAH CHIEF MINE
Vertical Longitudinal
Azimuth 075.7° Looking N-NW
AB₂ Zone
Feb. 23, 1993
NTS: 104K
Mining Division Atlin
Cambria Geological Ltd.
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West of the 4400E Fault, the F Horizon is correlated with the AB_2 Horizon. The F Horizon (near section E2350i and +100m elevation) is mainly chert and pyrite, however, some intersections contained significant base metals; hole 530 intersected 5.94m of 0.70% Cu, 5.67% Pb, 18.11% Zn, 0.049 oz/t Au, and 2.51 oz/t Ag. Below +50m elevation, the F Horizon is poorly tested. Holes TCU88-10 and -11 did not intersect F Horizon (AB_2); the holes ended in unaltered basalt. These holes might have stopped in unit 2g basalts, which are hanging wall to F Horizon (AB_2). In general, the westward projections of the F Horizon (AB_2) are prospective due to the increase in alteration and felsic volcanism in that direction.

The H Horizon is first recognized at the +50m elevation on section E2600i (Fig.15). Detailed interpretation of sections indicates the H-Horizon is separated from AB_2 by an interval of dacite flows and tuffs. Eastward, the separating volcanics thin. At section E2650i and eastward, the H-Horizon is separated by less than 5-10m of dacite volcanics from AB_2. Locally, no separation is seen. In order to preserve the historic nomenclature, merged H and AB_2 are collectively termed H.

West of section E2650i, the wedge of dacite flows and pyroclastics between H and AB_2 thickens. Similarly, down-plunge, hole TCU92-36 has a thick wedge of dacites at the same stratigraphic position. Massive pyrite and zinc-rich facies mineralization intersected in hole TCU90-27 with sub-economic mineralization in hole TCU89-16 and chert in TCU92-41 are interpreted as H Horizon which rest on top of the dacite wedge.

In almost all intersections of H Horizon, the interval above the massive sulphides is a debris flow which contains chlorite or sericite-pyrite altered dacite clasts and lesser massive pyrite, massive sphalerite, chert and barite clasts. The presence of debris flow indicates H Horizon was deposited within a basin that locally contained moderate to high topographic relief. Except in hole TCU92-36, debris flow facies does not contain economic mineralization.

WEST
EAST
E2200E
E2300E
E2400E
E2500E
E2600E
E2700E
E2800E
E2900E
6500 LEVEL
STOPED AREA
6400 PORTAL
6400 LEVEL
Strong FW alteration to H/AB$_2$ and AB$_1$
Upper Deposits (I Horizon)
6200 LEVEL
6100 LEVEL
5900 PORTAL
5900 LEVEL
Surface Profile
H Horizon Absent
5700 LEVEL
5500 LEVEL
STOPED AREA
Chert Pyrite
92-40
92-38
92-39
5400 LEVEL
5400 PORTAL
TULSEQUAH RIVER
5200 PORTAL
5200 LEVEL
H Horizon Absent
88-6
460
88-4
87-1
92-46
88-11
88-10
88-7
92-44
88-3
87-5
92-42
CHIEF FAULT
E4400 FAULT
E5300 FAULT
88-5
G Zone
Zn + Cu Facies Mineralization
91-32
88-8
91-34
89-14
89-20
92-43
92-37
89-12
Chert
Pyrite
89-15
91-33
92-41
89-16
FW Alteration present but weak
89-13
89-19
90-27
90-26
H Zone
Zn + Cu Facies Mineralization.
89-18
90-25
91-31
89-21
90-22
91-30
90-24
90-23
Open
H/AB$_2$ merged to the east of this line
92-36
Open
Reserve Blocks (1957)
90-22 Drill Hole intercepts in H Zone
88-11 Drill hole misses; H Zone absent
Fault
Mineralization Facies Boundary
Alteration Boundary
This vertical longitudinal section is oriented perpendicular to the strike of the axial plane and inclined east sections.
SCALE 1:5000
METRES
REDFERN RESOURCES LTD.
Report by: PJM et al
Date: Feb. 23, 1993
NTS: 104K
Mining Division Atlin
Ref. # 8110L2000
TULSEQUAH CHIEF PROJECT
TULSEQUAH CHIEF MINE
Vertical Longitudinal
Azimuth 075.7° Looking N-NW
H Zone
Cambria Geological Ltd.
Map: 15

The revised structural and stratigraphic interpretation has significant implications for exploration within unit 2. Three discrete mineralized horizons are recognized that contain a mixture of copper-rich facies, zinc-rich facies and massive pyrite facies mineralization. Most intersections contain intervals of all three massive sulphide facies. However, the dominance of zinc-rich facies (sphalerite-pyrite-chalcopyrite-galena-tetrahedrite-barite-chert-tuff) and fringing pyrite-chert indicate most known horizons are distal to a source. The thickness of Unit 2 stratigraphy, and the strength of footwall alteration, decreases eastward, and upwards in the Central and Eastern Mine Blocks. Westward, and downwards, the volcanics thicken and alteration increases. These trends indicate F (AB_2) targets below the -100m elevation on the F-Anticline (Western Mine Block) between sections E2200i and E2450i.

Mafic volcanic Horizon (unit 3) forms a semi-conformable unit (< 150 m) which separates the Lower Felsic Volcanic/H-AB Horizon (unit 2) from the Upper Felsic Volcanic/I Horizon (unit 4). It consists of feldspar phyric basalt flows and/or sills with minor interflow tuffaceous sediment.

Upper Felsic Volcanic/I Horizon (unit 4) forms an extensive subaqueous deposited ash flow unit. The Upper Felsic Volcanic Horizon grades from dacite ash flow tuff and flow (> 250m) in the southwest corner of the map to thinly laminated tuffaceous sediments, argillite and hematitic chert (< 10m) approximately 1200m to the northeast. South of the 5400 Level portal, the Upper Felsic Volcanic Horizon is extensively silica ± sericite ± pyrite altered (unit 4j) and may represent hydrothermal alteration associated with massive sulphide mineralization.

I horizon mineralization (units 4a-f) is best defined east of the 5300E Fault (Eastern Mine Block) where it underlies thinly laminated tuffaceous sediments and dacitic volcanics (unit 4g-i). The mineralization grades from thinly laminated sphalerite, galena, chalcopyrite, chert and barite (< 10 m) near the 5300E Fault to thinly banded pyrite (< 1 metre) where it pinches out in a creek bed located approximately 300 m to the northeast. This mineralization from surface to +100 m elevation forms the Upper Deposits that were largely mined out between 1951 and 1957. West of the 5300E Fault, the Upper Felsic Volcanic/I Horizon (unit 4) has been drill tested over a limited strike length and remains relatively untested.

Hanging wall Series (unit 5) is the highest unit in the Mount Eaton Group recognized in the Tulsequah Chief Mine area. It consists primarily of basalt flows and tuff, tuffaceous sediment, argillite, and minor chert and dacitic tuff. Contact with the underlying Upper Felsic Volcanic Horizon (unit 4) is gradational and is chosen where the mafic volcanics predominate over the underlying felsic volcanics.

D. TULSEQUAH CHIEF MINE - RESERVE ESTIMATION

D.1 Methods

A polygonal reserve method was used to estimate the in-situ reserves of the Tulsequah Chief Deposit. Drill indicated and drill inferred reserves are reported for the H-AB_2 and AB_1 deposits in the Central Mine Block and the G deposit in the Eastern Mine Block (Appendix 5). Previous reserves above the 5000 Level (Central and Eastern Mine Blocks) reported by Cominco Ltd. at closing (1957) are also included (Appendix 5).

H-AB_2 and AB_1 reserve estimates for the recent drilling are based on diamond drill holes (1987- 1992) which pierce the mineralized horizon at 50 to 150m spacings; in general, holes are spaced at 70m centres in areas of higher grade and thickness. Old reserves (1957) above the 5200 Level are based on closely spaced definition drill holes. Individual massive sulphide intersections have good correlations from hole to hole; they are usually well laminated or crudely bedded. A minor number of intersections consist of heavily disseminated sulphides in brecciated debris flow material. No sulphide intersections used in the reserve have been obtained from feeder-zone type mineralization. Potential mining methods have not been evaluated, therefore a minimum width of 3m was arbitrarily chosen.

D.1.a Tonnage Calculation

Fundamental to volume calculation is the adoption of reliable section orientations. Sections prepared along the principle directions of the fold geometry include:

* Inclined north sections (AZ059°/34.5°S), oriented perpendicular to the fold axis and spaced 20m apart were used for interpretation of fold structures. These sections portray the true thickness and shape of geological units.
* Inclined east sections (AZ165.69°/78.83°W) parallel to the axial plane were spaced at 10m intervals.

* A longitudinal section (AZ082.83/57.84N), oriented parallel to the fold axis and perpendicular to the axial plane was used to plot the area of influence for each drill hole intersection. Since intersections can be projected a greater distance down the plunge of the folds than laterally across the limbs, an ellipse was used to model the area of influence. Drill indicated reserves have ellipses with a long dimension of 40m and a width of 25m; drill inferred reserves have ellipses with a long dimension of 80m and a width of 50m.

Tonnage for the H, AB_1 and AB_2 reserve (Central Mine Block) is obtained by summing the product of the sectional thickness (m), specific gravity (SG) and area of influence (m^2) for the indicated and inferred polygons of each drill hole. The sectional thickness of massive sulphide intersections is measured on the inclined north sections, parallel to the trace of inclined east sections. This method was used in the Central Mine Block because of small-scale fold structures (amplitude: 30-50m, frequency: 50m).

In the G Zone, the deposit is planar and a conventional true thickness polygonal calculation was used. Tonnage for the G reserve (Eastern Mine Block) is obtained by summing the product of the true thickness (m), the specific gravity (SG), and the area of influence (m^2) for the indicated and inferred polygons of each drill hole. The true thickness is measured perpendicular to the contacts of each intersection on the inclined north sections.

For reserves in the Central and Eastern Mine Blocks, the polygons were trimmed by the 5300E Fault; reserves were not projected across the fault.

D.1.b Net Smelter Return Calculation

A Net Smelter Return formula was derived in order to place realistic bounds to the selection of sulphide intervals for the reserve estimate. In most cases, the boundary between massive sulphide and the enclosing host rocks is quite sharp. Therefore, the selection of the minimum threshold value in the range of $40 to $50 (US) is expected to have a small impact on the total metal content of the reserve estimate. It is beyond the scope of this report to present multiple mining methods, price or smelter contract scenarios. In preparation of the metallurgical estimates, the preliminary metallurgical work of Beattie (1992) was used. Deposit grades are based on the 1992 reserve estimate (M[c]Guigan, 1992). The calculation of NSR 1 is based on the following assumptions:

Metallurgical Recoveries (NRS 1 Scenario)

Copper

Ore grade	1.65%
% Recovery to Cu Concentrate	88%
% Recovery to Pb Concentrate	3%

Lead

Ore grade	1.15%
% Recovery to Pb Concentrate	88%

Zinc

Ore grade	6.36%
% Recovery to Pb Concentrate	3.0%
% Recovery to Zn Concentrate	88%

Gold

Ore grade (oz/short ton)	.085 oz/ton
% Recovery to Gravity Circuit	25%
% Recovery to Cu Concentrate	62%
% Recovery to Pb Concentrate	5%
% Recovery to Zn Concentrate	5%

Silver

Ore grade (oz/short ton)	3.4 oz/ton
% Recovery to Cu Concentrate	66%
% Recovery to Pb Concentrate	15%
% Recovery to Zn Concentrate	5%

<u>Transportation Costs and Smelter Terms (NSR 1 Scenario)</u>

Lead Concentrate - Payments

Lead	- Pay 95% after deduction of 4 units
Gold	- Pay 95% after deduction of 1 gm/DMT
Silver	- Pay 95% after deduction of 40gm/DMT

Lead Concentrate - Deductions

Treatment	- $140 US/DMT
Refining	- $6.00 US/oz gold
Penalties	- For As at .5%, $12 US/DMT
Freight	- $27 US/WMT

Zinc Concentrate - Payments

Zinc	- Pay 85% after deduction of 0 units
Gold	- Pay 80% after deduction of 1 gm/DMT

Zinc Concentrate - Deductions

Treatment	- $190 US/DMT
Refining	- $6.00 US/oz of payable gold
Freight	- $27 US/WMT

Copper Concentrate - Payments

Copper	- Pay 97% after deduction of 1.06 units/DMT
Gold	- Deduct 1.0 gm/DMT, Pay 95%
Silver	- Deduct 31 gm/DMT, Pay 95%

Copper Concentrate - Deductions

Treatment	- $90 US/DMT
Refining	- $.10 US/lb of payable Cu
	- $.40 US/oz of payable Ag
	- $5.50 US/oz of payable Au
Penalties	- For As, Sb in concentrate: when shipping to Asian smelters, expect relief due to high precious metal content. Allow a total of $10 US/DMT
Freight	- $27 US/DMT

<u>Commodity Prices</u> (US $)

Copper	$ 1.00/lb.
Lead	.35/lb.
Zinc	.60/lb.
Gold	375.00/oz.
Silver	4.20/oz.

Based on the preceding assumptions, the following Net Smelter Formula (NSR 1) was derived:

NSR 1 ($ US) per tonne = 12.39 x Cu% + 3.36 x Pb% + 6.42 x Zn% + 375.5 x Au oz/ton + 3.07 x Ag oz/ton.

The NSR 1 value was calculated for each mineralized intersection in Dbase III and imported to LogII.

D.2 Polygonal Reserves

The in-situ reserves of the Tulsequah Chief Mine derived using the assumptions in Section D.1., are as follows:

Zone	Cu%	Pb%	Zn%	Au (g/tonne)	Ag (g/tonne)	Drill Indicated (tonnes)	Drill Inferred (tonnes)
H+AB_2	1.82	1.14	7.16	2.81	106.46	2,514,225	
	1.67	1.07	7.11	2.64	98.77		3,152,707
AB_1	0.71	1.72	9.34	2.17	144.37	206,269	
	0.71	1.76	9.57	2.28	156.09		441,078
G	0.92	0.99	4.20	2.24	82.52	535,905	
	0.88	0.95	3.97	2.14	79.23		942,792
Total Indicated	1.60	1.16	6.81	2.68	104.92	3,256,399	
Total Inferred	1.42	1.11	6.69	2.50	100.29		4,536,577
Total (H,AB_2,G,AB_1)	**1.49**	**1.13**	**6.74**	**2.57**	**102.22**	**7,792,976**	

The upper boundary of the polygonal reserve estimation was set at the lower boundary of blocks laid out in the 1957 Cominco reserve. The Cominco reserves are in the measured and indicated category. For comparative purposes with past tabulations, the total reserves, including 1957 Reserves, are as follows:

Zone	Cu%	Pb%	Zn%	Au (g/tonne)	Ag (g/tonne)	Drill Indicated (tonnes)	Drill Inferred (tonnes)
H,AB_2,AB_1,G:							
Total Indicated	1.60	1.16	6.81	2.68	104.92	3,256,399	
Total Inferred	1.42	1.11	6.69	2.50	100.29		4,536,577
1957 Reserves At Closure:							
Total Measured & Indicated	1.30	1.60	8.00	2.40	116.57	707,616	
Total All Zones:							
Indicated	1.55	1.23	7.02	2.63	107.00	3,964,015	
Inferred	1.42	1.11	6.69	2.50	100.29		4,536,577
Grand Total (Indicated & Inferred)	**1.48**	**1.17**	**6.85**	**2.56**	**103.42**	**8,500,592**	

E. CONCLUSIONS and RECOMMENDATIONS

E.1 Conclusions

The 1992 Tulsequah Chief Exploration Program was completed over a three month period from August to October. The program consisted of surveying, underground and surface geological mapping, core re-logging (21,655m in 44 holes) and diamond drilling (4579m in 13 holes). During and after the field program, drilling and underground data from the 1957 mining operation was compiled and sectioned with the newly collected data.

The Tulsequah Chief and Big Bull deposits are hosted by the pre-Mississippian to Permian Mount Eaton Group. Mapping in 1992 and re-interpretation of data from Payne (1987) has identified two felsic volcanic sequences within the dominantly mafic Mount Eaton Group. The lower felsic volcanic sequence hosts the Tulsequah Chief and Big Bull deposits, plus extensive areas of altered volcanic rocks. Stratigraphically higher is the upper felsic volcanic sequence which contains felsic volcanics, volcanic sediments and limestone. Massive sulphides have not been found in the upper sequence, however, felsic volcanics near the Banker/Sparling form rusty cliffs. Both the upper and lower felsic volcanic sequence are prospective for additional volcanogenic massive sulphide discoveries.

In the Tulsequah Chief Mine area, the 1992 geological work defined a detailed stratigraphy within the Mount Eaton Group. The Tulsequah Chief deposits are hosted within the lower felsic volcanic sequence; on the detailed legend (Fig. 6) the lower felsic volcanic sequence is termed the Mine Series (units 2-4). It is sub-divided into two stratigraphic units of massive sulphide-bearing felsic volcanics which are separated by a marker unit of massive basalt (unit 3). The Lower Felsic Volcanic Horizon (unit 2) was dated at 353 ± 1 Ma by radiometric (U-Pb) dating of zircons (J. Mortensen, personal communication, 1993).

Mesozoic or older deformation has folded the Mount Eaton Group into a large anticline--Mount Eaton Anticline. Parasitic folds on the western limb of this regional fold pass through the Tulsequah Chief Mine area. The folds plunge 56° in the direction of AZ329° and are overturned to the east: the axial plane strikes AZ 166° and dips 79° west. Faulting parallel to axial planes has divided the mine into three blocks--Western Mine Block (west of the 4400E Fault), Central Mine Block (between the 4400E and 5300E Faults) and the Eastern Mine Block (east of the 5300E Fault); displacement is less than 70m and right lateral.

The Lower Felsic Volcanic Horizon (unit 2) is the principle host to massive sulphide mineralization. It contains the H, AB_2, AB_1, F and G Horizons (Fig. 13-15). This interpretation differs from previous work in separating the AB Horizon into two distinct stratigraphic horizons. The lower AB_1 Horizon passes from pyrite and chert into polymetallic base metal sulphides below the -200m elevation. The H and AB_2 Horizons are now recognized to merge near section E2640i. East of that section, the horizons have little or no stratigraphic separation and are collectively termed H Horizon. To the west, a thickening wedge of dacite volcanics separates the H and AB_2 Horizons.

G Horizon is located in the Eastern Mine Block and is correlated with the deposits of the H/AB_2 and AB_1 Horizons. It is interpreted to lie along the eastern fringe of a basin containing unit 2 volcanics.

F Horizon is located in the Western Mine Block and is correlated with the deposits of the AB_2 Horizon. It consists mainly of chert and pyrite, however, some intersections contain significant base metal sulphides.

A second host to massive sulphide mineralization is the Upper Felsic Volcanic Horizon (unit 4) which contains the mined-out Upper Deposits or I Horizon. Mapping and cross-sectional interpretation has demonstrated the unit 4 volcanics are stratigraphically distinct from unit 2. Surface mapping has correlated unit 4 stratigraphy with the altered and sulphide-bearing felsic volcanics near the 5200 portal.

Drilling in 1992 has extended the H and AB_2 deposits to depth and westward. The extensions were made in sulphides similar in grade and thickness to the deposit average. The G-Zone deposit was extended eastward and to depth with new drilling, however, the tenor of mineralization was less than previously encountered in that zone. Polygonal reserves for the H, AB_2, AB_1 and G Horizons in the central and Eastern Mine Blocks are:

Zone	**Cu%**	**Pb%**	**Zn%**	**Au (g/tonne)**	**Ag (g/tonne)**	**Drill Indicated (tonnes)**	**Drill Inferred (tonnes)**
H,AB_2,AB_1,G:							
Total Indicated	1.60	1.16	6.81	2.68	104.92	3,256,399	
Total Inferred	1.42	1.11	6.69	2.50	100.29		4,536,577
Total (H,AB_2,G,AB_1)	**1.49**	**1.13**	**6.74**	**2.57**	**102.22**	**7,792,976**	

Measured and indicated reserves remaining at mine closure in 1957 are mostly below the 5400 Level (+100m) and contiguous with the AB_2 Horizon. The 1957 reserves are 707,616 tonnes of 1.30% Cu, 1.60% Pb, 8.00% Zn, 2.40 grams/tonne Au and 116.6 grams/tonne Ag. Including the 1957 reserves for comparative purposes, the total reserves of the Tulsequah Chief Mine are:

Zone	**Cu%**	**Pb%**	**Zn%**	**Au (g/tonne)**	**Ag (g/tonne)**	**Drill Indicated (tonnes)**	**Drill Inferred (tonnes)**
Total All Zones:							
Indicated	1.55	1.23	7.02	2.63	[illegible]7.00	3,964,015	
Inferred	1.42	1.11	6.69	2.50	100.29		4,536,577
Grand Total (Indicated & Inferred)	**1.48**	**1.17**	**6.85**	**2.56**	**103.42**	**8,500,592**	

Exploration work during the period 1987 to 1992 has focused mostly on following-up the G Zone discovery and on delineating the H/AB Zone to depth. The 1991 and 1992 programs have benefited from the recognition of the H syncline and subsequent infill and step-out drilling along the plunge of the fold-axis. Continuity and correlations of the massive sulphide horizons and the hosting volcanic stratigraphy has improved from this work. New information indicates exploration targets in several areas, in addition to the clearly demonstrated down-plunge potential of the H syncline. In summary, these volcanogenic massive sulphides targets are:

* H, AB_2, and AB_1 targets are identified down-plunge from hole TCU92-36. Drilling targets lie below the -650m elevation, in the Central Mine Block.

* H and AB_2 targets are identified down-dip within the F Zone, on the axis and both limbs of the F-Anticline. These targets lie below the -200m elevation, in the Western and Central Mine Blocks.

* I Zone targets are located within altered unit 4 felsic volcanics. The highest priority I target is the altered volcanics and heavily disseminated sulphides above the 5200 Level portal. These form a broad, steeply-dipping, north-south trending belt which has been tested by only two diamond drill holes.

* Outside the Tulsequah Chief Mine area, a number of targets are identified in the lower felsic volcanic-sedimentary sequence; this sequence is equivalent to the Mine Series at the Tulsequah Chief Mine. Altered unit 2 and 4 of the Mine Series extends 2 km to the south into an area mapped by Payne (1987) and Casselman (1988). Other lower sequence targets include the eastern flank of the Mount Eaton Anticline approximately 500m southeast of the Upper Workings, and the Big Bull Mine area (see report by Dawson and Harrison, 1993).

* The upper felsic volcanic-sedimentary sequence also has potential to host massive sulphide deposits. Felsic volcanics east of the Chief Fault near the Banker/Sparling occurrences form rusty cliffs.

E.2 Recommendations

E.2.a General Statement

The 1992 Exploration Program has better defined the stratigraphy and structure of the Mount Eaton Group. This work has identified exploration targets, as described in Section E.1. For purposes of evaluating exploration risk and expenditures, the targets can be described in three groups:

* Deep drilling targets: down-plunge of H/AB_2 Horizons in the Central Mine Block, below the -650m elevation.

* Shallow to moderately deep drilling targets: lateral extensions of the H/AB_2 Horizons in the Central and Western Mine Blocks, on the flanks of the F-Anticline. I Zone in the 5200 Level area (Target 1, Map 66).

* Surface exploration targets: lower and upper felsic volcanic sequence, in areas of altered felsic volcanic rocks (Targets 1-4, in Map 66).

Completion of the Phase Two portion of the 1992 Exploration Program would accomplish the deep drilling objectives. The probability of success with that program is high, particularly given the results of hole TCU92-36. Notwithstanding the high potential success of the deep drilling program, greater emphasis is recommended on identifying and testing shallower drilling targets in the Western and Central Mine Blocks, (H/Ab and I Horizons) and the Big Bull Mine area. Near surface tonnage discovered in those areas could be developed earlier in a mining plan and therefore have greater impact on mine feasibility.

Pre-feasibility studies are being conducted concurrently with the writing of this report. It is recommended that the final layout of 1993 diamond drilling be made after information on the cost of vertical development is estimated. This will allow a better weighting of the merits of a deep diamond drilling program vs. a shallow diamond drilling program.

E.2.b Recommended Exploration 1993

Part I - Surface Exploration

A surface exploration program to evaluate the massive sulphide potential of three areas underlain by lower and upper felsic volcanic-sedimentary sequence rocks of the Mount Eaton Group is outlined below (Map 66).

Target 1 area is located adjacent to and south of the Tulsequah Chief Mine. It is a belt 0.8 km wide by 4.5 km long area consisting in part of lower felsic volcanic-sedimentary sequence rocks. The proposed exploration program consists of linecutting, geochemical sampling, geological mapping and geophysical surveying.

Target 2 area is located 0.75 km southeast of the Tulsequah Chief Mine. The area, 0.5 km wide by 3.3 km long, encompasses a sequence of felsic tuff, chert and fine grained clastic sediments similar to rocks encountered in the Mine Series (units 2-4). The proposed exploration program consists of geological mapping and prospecting aimed at correlating the stratigraphic sequence with rocks at the Tulsequah Chief Mine.

Target 3 area is located east of the Banker and Sparling prospects. A 3 km by 1 km belt of upper felsic volcanic-sedimentary sequence rocks (unit 3a) should be examined for massive sulphide potential. Previous work by Silver Talon Mines Ltd. should be compiled and evaluated. The field program will consist of linecutting, geological mapping, geochemical sampling and geophysical surveying.

Following completion of the surface exploration programs sufficient data will be available to target anomalous zones for drill testing.

Part II - Shallow to Moderately Deep Drilling Targets

It is recommended that the more readily accessible diamond drill targets in the I and H/AB_2 Horizon (Western and Central Mine Blocks), and the Big Bull Mine be tested prior to engaging in a deep diamond drilling program in the Central Mine Block. The Big Bull Mine is the subject of a separate report and recommendations (Harrison and Dawson, 1993). Drilling targets at the Tulsequah Chief are mostly identified along the western extension of the H/AB_2 Horizons, on the limbs and axis of the F-Anticline. The following work is recommended, contingent on exploration priorities to be set after results of the mine pre-feasibility study are complete.

* Diamond drill test the H/AB_2 Horizons at 150 to 200m spacing from -100m and -500m elevation, and between sections E2400i and E2600i. Four diamond drill holes are required to test this area at the -200m elevation, totalling 2400m of drilling. Five additional holes would be required to test the -400m elevation, totalling 4200m of drilling.

* Down-hole geophysical surveys are recommended for each new exploration hole, in order to detect off-hole conductors. These surveys would be necessary, due to the wide spacing of the drilling.

* Conduct surface geophysical surveys over the existing Tulsequah Chief grid. Magnetic and VLF surveys are recommended for geological mapping purposes. A time-domain EM survey is also recommended, especially over the I Zone targets at the 5200 Level portal and the unit 2 felsic volcanics extending southward from the F Zone.

Part III - Deep Drilling Targets

Drill hole TCU92-36 intersected three massive sulphide intervals of good grade which correspond to the H and AB_2 Horizons. Both horizons are open to depth and to the west. It is recommended that the Phase Two Program of 1992 be carried out. This program should be contingent on discussions of economic strategies for developing additional tonnage below the -700m elevation. The following work program is recommended:

* Conduct surface and down-hole Pulse-EM surveys with emphasis on TCU90-27, TCU92-36, TCU90-24 and TCU90-29 (if open).

* Extend the 5400 Level drift 200m north-northwest along the axis of inclined section E2580i. Establish a drill station suitable for deep drilling.

* Conduct a diamond drilling program targeted at the H and AB_2 Horizon down-dip of drill hole TCU90-36 (-700 to -1000m) elevation in the H syncline keel area (sections E2600i to E2800i).

Drilling, geophysics and underground drilling for this program would entail expenditures of approximately $1.8 million. It is recommended that the detailed budgeting and planning for this work be done after pre-feasibility studies have been completed and economic parameters have been set for developing reserves below the -700m elevation.

Respectfully submitted,

CAMBRIA GEOLOGICAL LTD.

PROFESSIONAL PROVINCE OF P. J. McGUIGAN BRITISH COLUMBIA GEOSCIENTIST

Paul J. M^c^Guigan, P.Geo.

February 23, 1993

PROPOSED 1993 EXPLORATION BUDGET

TARGET 1 - SURFACE EXPLORATION SOUTH of TULSEQUAH CHIEF MINE

Linecutting - 35 km	$35,000.00	
Geochemical Surveys (1000 samples)	40,000.00	
Geological Mapping (100 days)	50,000.00	
EM Survey - 45 km	45,000.00	
Magnetic-VLF Survey (45 km)	18,000.00	
Camb Mobilization	30,000.00	
Total Target 1	218,000.00	$218,000.00

TARGET 2 - SURFACE EXPLORATION EAST of TULSEQUAH CHIEF MINE

Geological Mapping (30 days)	15,000.00	
Prospecting (15 days)	6,000.00	
Sampling (15 days)	6,000.00	
Lithogeochemistry (100 samples)	5,000.00	
Mobilization, etc.	5,000.00	
Total Target 2	37,000.00	37,000.00

TARGET 3 - SURFACE EXPLORATION EAST OF SPARLING-BANKER

Linecutting - 35 km	35,000.00	
Geochemical Surveys (1000 samples)	40,000.00	
Geological Mapping (100 days)	50,000.00	
EM Survey - 35 km	35,000.00	
Magnetic-VLF Survey (35 km)	14,000.00	
Camb Mobilization	20,000.00	
Total Target 3	194,000.00	194,000.00
Total 1993 Surface Exploration Program		415,700.00
Drill testing targets - 1000m @ $90/m	90,000.00	90,000.00
TOTAL 1993 SURFACE EXPLORATION PROGRAM		$505,700.00

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APPENDIX 1

TULSEQUAH CHIEF PROPERTY

LIST OF MINERAL CLAIMS and CROWN GRANTED CLAIMS

APPENDIX 1

TULSEQUAH CHIEF PROPERTY - MINERAL CLAIMS

Claim Name	No. of Units	Tenure No.	Expiry Date
CO #3	20	201802	Mar. 04, 2000
CO #5	18	201803	Mar. 04, 2000
GOAT 1	16	201925	July 23, 1994
SWAMP #1	4	201926	July 23, 2000
SWAMP #2	1	201927	July 23, 2000
SWAMP #3	1	201928	July 23, 2000
TALLON #1	20	202030	Aug. 02, 1993
TALLON #2	9	202031	Aug. 02, 1993
WEBB 1	20	202279	Nov. 27, 2000
WEBB 4	20	202282	Nov. 27, 2000
WEBB 5	20	202283	Nov. 27, 2000
WEBB 9	10	202284	Nov. 27, 2000
WEBB 10	16	202285	Nov. 27, 2000
MARY 1	20	203385	Aug. 05, 2001
MARCIE 1	20	203386	Aug. 05, 2001
MARCIE 2	20	203387	Aug. 05, 2001
MARCIE 3	20	203388	Aug. 05, 2001
ELYSA 1	20	203389	Aug. 05, 2001
ELYSA 2	20	203390	Aug. 05, 2001
ELYSA 3	6	203391	Aug. 03, 2001
ELYSA 4	20	203392	Aug. 05, 2001
BULL NO. 8	1	203779	July 16, 2000
BULL NO. 9	1	203780	Apr. 25, 2000
BRUCE FR.	1	203781	Aug. 17, 2000
BIRDS	1	203794	May 30, 2001
PAT	1	203795	May 30, 2001
ROSS	1	203796	May 30, 2001
BIG BULL EXTENS	1	203965	July 18, 2000
BULL #2	1	203966	July 19, 2000
BULL NO. 3	1	203967	July 19, 2000
BULL #4	1	203968	July 19, 2000

APPENDIX 1 (continued)

TULSEQUAH CHIEF PROPERTY - CROWN GRANTED CLAIMS

Name	Lot No.	Area (Ha)
RIVER FR.	5669	7.99
TULSEQUAH BONANZA	5668	20.90
TULSEQUAH BALD EAGLE	5676	14.16
TULSEQUAH CHIEF	5670	20.90
TULSEQUAH ELVA FR.	5679	9.70
BIG BULL	6303	20.65
BULL NO. 1	6304	16.95
BULL NO. 5	6306	14.57
BULL NO. 6	6305	17.22
HUGH	6308	20.71
JEAN	6307	17.02
VEGA NO. 1	6155	20.90
VEGA NO. 2	6156	17.62
VEGA NO. 3	6157	18.97
VEGA NO. 4	6158	19.85
VEGA NO. 5	6159	14.94
JANET W. NO. 1	6160	18.95
JANET W. NO. 2	6161	18.75
JANET W. NO. 3	6162	16.60
JANET W. NO. 4	6163	20.76
JANET W. NO. 5	6164	18.20
JANET W. NO. 6	6165	19.02
JANET W. NO. 7	6166	18.78
JANET W. NO. 8	6167	17.99
JOKER	6169	16.60

APPENDIX 2

DIAMOND DRILL COLLAR SUMMARY (1987-1992)

DIAMOND DRILL COLLAR SUMMARY (1987 - 1992)

Hole	North	East	Elev (m)	Depth (m)	Azi	Dip	Min North	Max North	Min East	Max East	Min Elev	Max Elev
TC-87-1	15508	10603	460	623	135	-55	15227	15508	10603	10868	-28	460
TC-87-2	15327	10529	393	680	135	-55	15053	15327	10529	10812	-161	393
TC-87-3	15344	10276	266	673	135	-55	15021	15344	10276	10570	-242	266
TC-87-4	15403	10329	291	688	135	-55	15070	15403	10329	10618	-235	291
TC-87-5	15469	10509	406	736	135	-50	15067	15469	10509	10850	-102	406
TC-87-5A	15423	10389	332	126	135	-55	15372	15423	10389	10440	229	332
TC-88-6	14787	9884	61	237	102	-55	14761	14787	9884	10020	-130	61
TC-88-7	14787	9884	61	249	127	-55	14708	14787	9884	10001	-143	61
TCU-88-1	15029	10461	110	354	84	-49	15029	15037	10461	10713	-136	110
TCU-88-2	15029	10461	110	389	65	-50	15029	15152	10461	10715	-155	110
TCU-88-3	15233	10763	111	307	185	-60	15081	15233	10713	10763	-151	111
TCU-88-4	15233	10763	111	214	157	-35	15064	15233	10763	10832	0	111
TCU-88-5	15233	10763	111	291	157	-64	15086	15233	10763	10801	-136	111
TCU-88-6	15233	10763	111	134	76	-15	15233	15263	10763	10890	84	111
TCU-88-7	15233	10763	111	220	76	-68	15233	15252	10763	10845	-92	111
TCU-88-8	15233	10763	111	337	185	-80	15180	15233	10763	10766	-221	111
TCU8809	15029	10461	110	369	67	-68	15029	15102	10461	10642	-201	110
TCU8810	14922	10148	108	228	54	-55	14922	15010	10148	10253	-72	108
TCU8811	14922	10148	108	202	72	-54	14922	14966	10148	10269	-45	108
TCU89-12	15370	10670	112	360	143	-65	15261	15370	10670	10768	-215	112
TCU89-13	15370	10670	112	475	178	-70	15218	15370	10670	10683	-337	112
TCU89-14	15375	10662	112	375	202	-60	15203	15375	10580	10662	-209	112
TCU89-15	15375	10662	112	480	227	-70	15275	15375	10525	10662	-336	112
TCU89-16	15375	10662	112	663	256	-70	15336	15375	10481	10662	-522	112
TCU89-17	15370	10670	112	498	176	-45	15020	15370	10670	10699	-240	112
TCU89-18	15370	10670	112	597	199	-75	15254	15370	10635	10670	-471	112
TCU89-19	15375	10665	112	515	160	-80	15286	15375	10665	10697	-392	112
TCU89-20	15370	10670	112	329	120	-70	15311	15370	10670	10774	-193	112
TCU89-21	15376	10662	112	599	227	-80	15320	15376	10597	10662	-479	112
TCU90-22	15544	10597	113	786	172	-69	15308	15544	10597	10608	-636	113
TCU90-23	15544	10597	113	823	171	-80	15439	15544	10597	10602	-720	113
TCU90-24	15544	10596	113	892	196	-76	15383	15544	10527	10596	-760	113
TCU90-25	15523	10601	113	667	140	-75	15394	15523	10601	10688	-535	113
TCU90-26	15523	10601	113	897	124	-81	15420	15523	10601	10697	-772	113
TCU90-27	15544	10595	113	799	231	-67	15391	15544	10363	10595	-635	113
TCU90-28	15544	10596	113	641	236	-82	15505	15544	10530	10596	-523	113
TCU90-29	15523	10601	113	685	0	-90	15523	15526	10601	10601	-571	113
TCU90-29B	15523	10601	113	801	0	-90	15523	15523	10601	10611	-687	113
TCU91-30	15544	10596	113	646	159	-76	15393	15544	10596	10657	-511	113
TCU91-31	15544	10596	113	655	167	-66	15275	15544	10596	10631	-482	113
TCU91-32	15375	10663	112	402	164	-48	15115	15375	10663	10709	-190	112
TCU91-33	15375	10662	112	436	168	-63	15182	15375	10662	10691	-276	112
TCU91-34	15375	10662	112	420	181	-54	15132	15375	10647	10662	-229	112
TCU91-35	15375	10662	112	529	213	-76	15272	15375	10590	10662	-401	112
TCU92-36	15544	10596	113	814	207	-84	15487	15544	10559	10596	-696	113
TCU92-37	15375	10663	112	493	163	-54	15070	15375	10663	10722	-270	112
TCU92-38	15185	10735	112	225	137	0	15012	15185	10735	10879	112	122
TCU92-39	15185	10735	112	183	108	0	15118	15185	10735	10905	112	121
TCU92-40	15184	10735	112	229	155	0	14971	15184	10735	10818	112	126
TCU92-41	15543	10596	113	663	196	-56	15192	15543	10476	10596	-435	113
TCU92-42	15369	10670	112	312	112	-46	15266	15369	10670	10879	-93	112
TCU92-43	15369	10669	112	350	110	-61	15302	15369	10669	10834	-188	112
TCU92-44	15370	10669	113	313	87	-26	15370	15382	10669	10950	-25	113
TCU92-45	15369	10670	114	301	109	15	15251	15369	10670	10926	114	219
TCU92-46	15367	10667	112	368	179	-32	15032	15367	10652	10667	-35	112

Total DDHs	57
Total Metres	26298

COORDINATES ARE IN THE 1992 METRIC MINE GRID.
THE GRID ORIGIN IS BC SURVEY MONUMENT 'TAK' AT 15000N,10000E.
ELEVATION DATUM IS SEA LEVEL

DIAMOND DRILL COLLAR SUMMARY (1987 - 1992)

Hole	North	East	Elev (m)	Depth (m)	Azi	Dip	Min North	Max North	Min East	Max East	Min Elev	Max Elev
TC-87-1	15508	10603	460	623	135	-55	15227	15508	10603	10868	-28	460
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TC-87-3	15344	10276	266	673	135	-55	15021	15344	10276	10570	-242	266
TC-87-4	15403	10329	291	688	135	-55	15070	15403	10329	10618	-235	291
TC-87-5	15469	10509	406	736	135	-50	15067	15469	10509	10850	-102	406
TC-87-5A	15423	10389	332	126	135	-55	15372	15423	10389	10440	229	332
TC-88-6	14787	9884	61	237	102	-55	14761	14787	9884	10020	-130	61
TC-88-7	14787	9884	61	249	127	-55	14708	14787	9884	10001	-143	61
TCU-88-1	15029	10461	110	354	84	-49	15029	15037	10461	10713	-136	110
TCU-88-2	15029	10461	110	389	65	-50	15029	15152	10461	10715	-155	110
TCU-88-3	15233	10763	111	307	185	-60	15081	15233	10713	10763	-151	111
TCU-88-4	15233	10763	111	214	157	-35	15064	15233	10763	10832	0	111
TCU-88-5	15233	10763	111	291	157	-64	15086	15233	10763	10801	-136	111
TCU-88-6	15233	10763	111	134	76	-15	15233	15263	10763	10890	84	111
TCU-88-7	15233	10763	111	220	76	-68	15233	15252	10763	10845	-92	111
TCU-88-8	15233	10763	111	337	185	-80	15180	15233	10763	10766	-221	111
TCU8809	15029	10461	110	369	67	-68	15029	15102	10461	10642	-201	110
TCU8810	14922	10148	108	228	54	-55	14922	15010	10148	10253	-72	108
TCU8811	14922	10148	108	202	72	-54	14922	14966	10148	10269	-45	108
TCU89-12	15370	10670	112	360	143	-65	15261	15370	10670	10768	-215	112
TCU89-13	15370	10670	112	475	178	-70	15218	15370	10670	10683	-337	112
TCU89-14	15375	10662	112	375	202	-60	15203	15375	10580	10662	-209	112
TCU89-15	15375	10662	112	480	227	-70	15275	15375	10525	10662	-336	112
TCU89-16	15375	10662	112	663	256	-70	15336	15375	10481	10662	-522	112
TCU89-17	15370	10670	112	498	176	-45	15020	15370	10670	10699	-240	112
TCU89-18	15370	10670	112	597	199	-75	15254	15370	10635	10670	-471	112
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TCU89-21	15376	10662	112	599	227	-80	15320	15376	10597	10662	-479	112
TCU90-22	15544	10597	113	786	172	-69	15308	15544	10597	10608	-636	113
TCU90-23	15544	10597	113	823	171	-80	15439	15544	10597	10602	-720	113
TCU90-24	15544	10596	113	892	196	-76	15383	15544	10527	10596	-760	113
TCU90-25	15523	10601	113	667	140	-75	15394	15523	10601	10688	-535	113
TCU90-26	15523	10601	113	897	124	-81	15420	15523	10601	10697	-772	113
TCU90-27	15544	10595	113	799	231	-67	15391	15544	10363	10595	-635	113
TCU90-28	15544	10596	113	641	236	-82	15505	15544	10530	10596	-523	113
TCU90-29	15523	10601	113	685	0	-90	15523	15526	10601	10601	-571	113
TCU90-29B	15523	10601	113	801	0	-90	15523	15523	10601	10611	-687	113
TCU91-30	15544	10596	113	646	159	-76	15393	15544	10596	10657	-511	113
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TCU91-33	15375	10662	112	436	168	-63	15182	15375	10662	10691	-276	112
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TCU91-35	15375	10662	112	529	213	-76	15272	15375	10590	10662	-401	112
TCU92-36	15544	10596	113	814	207	-84	15487	15544	10559	10596	-696	113
TCU92-37	15375	10663	112	493	163	-54	15070	15375	10663	10722	-270	112
TCU92-38	15185	10735	112	225	137	0	15012	15185	10735	10879	112	122
TCU92-39	15185	10735	112	183	108	0	15118	15185	10735	10905	112	121
TCU92-40	15184	10735	112	229	155	0	14971	15184	10735	10818	112	126
TCU92-41	15543	10596	113	663	196	-56	15192	15543	10476	10596	-435	113
TCU92-42	15369	10670	112	312	112	-46	15266	15369	10670	10879	-93	112
TCU92-43	15369	10669	112	350	110	-61	15302	15369	10669	10834	-188	112
TCU92-44	15370	10669	113	313	87	-26	15370	15382	10669	10950	-25	113
TCU92-45	15369	10670	114	301	109	15	15251	15369	10670	10926	114	219
TCU92-46	15367	10667	112	368	179	-32	15032	15367	10652	10667	-35	112

Total DDHs	57
Total Metres	26298

COORDINATES ARE IN THE 1992 METRIC MINE GRID.
THE GRID ORIGIN IS BC SURVEY MONUMENT 'TAK' AT 15000N,10000E.
ELEVATION DATUM IS SEA LEVEL

APPENDIX 3

IDENTIFICATION OF UNKNOWN METAMORPHIC MINERALS BY X-RAY DIFFRACTION, TULSEQUAH CHIEF PROPERTY

BY M. RAUDSEPP

IDENTIFICATION OF UNKNOWN METAMORPHIC MINERALS BY X-RAY POWDER DIFFRACTION, TULSEQUAH CHIEF PROPERTY

Report to Redfern Resources Ltd.
207-10711 Cambie Road
Richmond, B.C. V6X 3G5

Mati Raudsepp, Ph.D.
Mineralogical Consultant
807-5775 Toronto Road
Vancouver, BC V6T 1Z4

EXPERIMENTAL METHOD

Selected portions of six drill core samples from the Tulsequah Chief property were split into small pieces, and sufficient material for X-ray powder diffractometer mounts was extracted from previously marked locations of unknown metamorphic minerals. The samples were ground into fine powder in an alumina mortar under acetone, and smeared on glass slides using a metal probe and methanol. X-ray powder diffraction data were collected at a scan speed of 1.50° 2Θ/min. on a Siemens D5000 diffractometer over a range of 3 -60° 2Θ. The normal-focus Cu X-ray tube was operated at 40 *KV* and 30 *mA*.

RESULTS

Mineral identification was done by automated search/match software supplied by Siemens. The results of each computer search were confirmed manually against standard reference patterns, and are summarized in Table 1. Diffractograms of each sample are given in Figures 1-6. On these figures, bar graphs for each mineral diffraction pattern are colour-coded to their Powder Diffraction File reference pattern.

At the resolution of routine diffractometer scans of mineral mixtures, small compositional differences in similar minerals generally cannot be distinguished. For example, biotite and phlogopite reference patterns may be fitted to the data equally well (Fig. 3 and 5). Also, individual species of chlorite and plagioclase are not well resolved (e.g. Fig. 3 and 6). In order to derive more precise parameters to make such distinctions, slow scans with an internal mineral standard would be necessary.

TABLE 1

SAMPLE	DESCRIPTION	RESULTS
TCU89-14 (331.71 m)	grey to buff, anhedral to subhedral porphyroblasts, hard, 3-10 mm	cordierite
TCU89-14 (339.90 m)	brown, anhedral porphyroblasts, hard, <10 mm, dark green matrix	cordierite
TCU89-15 (404.72 m)	brown, soft, fine grained alteration mineral in matrix	plagioclase+quartz+chlorite +biotite
TCU89-19 (24.38 m)	white, very soft fibrous mineral infilling fractures	prehnite+laumontite? (zeolite)
TCU90-22 (693.72 m)	grey, anhedral to subhedral porphyroblasts, <5 mm	cordierite+quartz+phlogopite (biotite)
TCU90-24 (653 m)	brown, anhedral porphyroblasts, <3 mm	phlogopite (biotite)+chorite +quartz+plagioclase?

DISCUSSION AND CONCLUSIONS

In general, the identification of these minerals was straightforward and unambiguous, except as noted below.

TCU89-14 (331.71 m): The porphyroblasts are cordierite. Minor peaks are the result of not being able to completely isolate the porphyroblast from matrix during extraction from the sample.

TCU89-14 (339.90 m): The porphyroblasts are cordierite. Minor peaks are the result of not being able to completely isolate the porphyroblast from matrix during extraction from the sample.

TCU89-15 (404.72 m): These soft, brown patches are aggregates of plagioclase, chlorite, biotite, and quartz. Their irregular outline and variable size suggest that they are not altered phenocrysts or porphyroblasts, but metamorphosed quartzo-feldspathic material of uncertain origin.

TCU89-19 (24.38 m): This vein material is predominantly prehnite ($Ca_2Al_2Si_3O_{10}(OH)_2$). This conclusion is supported by qualitative energy-dispersive analysis of the material with a scanning electron microscope; only Ca, Al and Si with very minor Fe were detected.

A second phase is present, probably laumontite ($CaAl_2Si_4O_{12}\cdot 4H_2O$), a zeolite group mineral commonly associated with prehnite. However, the second peak from the left on Fig. 4, which is accounted for by laumontite, could also be fitted to the reference pattern of nobleite ($CaB_6O_9(OH)_3\cdot 3H_2O$). The paragenesis of nobleite, a weathering product in desert regions, makes its occurrence here unlikely. However, if other boron-rich phases are found, this possibilty should be considered.

TCU90-22 (693.72 m): These porphyroblasts are cordierite. The other minerals reflected in the diffractogram are from matrix material which could not be cleanly separated from the porphyroblasts. In addition, some of the extraneous minerals are inclusions in the porphyroblasts (visible under the microscope).

TCU90-24 (653 m): These dark patches are aggregates of biotite (phlogopite pattern), chlorite and quartz, with possibly minor plagioclase. The roughly prismatic morphology suggests that these are pseudomorphs after a primary mafic mineral, perhaps pyroxene or amphibole.

Mati Raudsepp

Mati Raudsepp, Ph.D., August 22, 1992

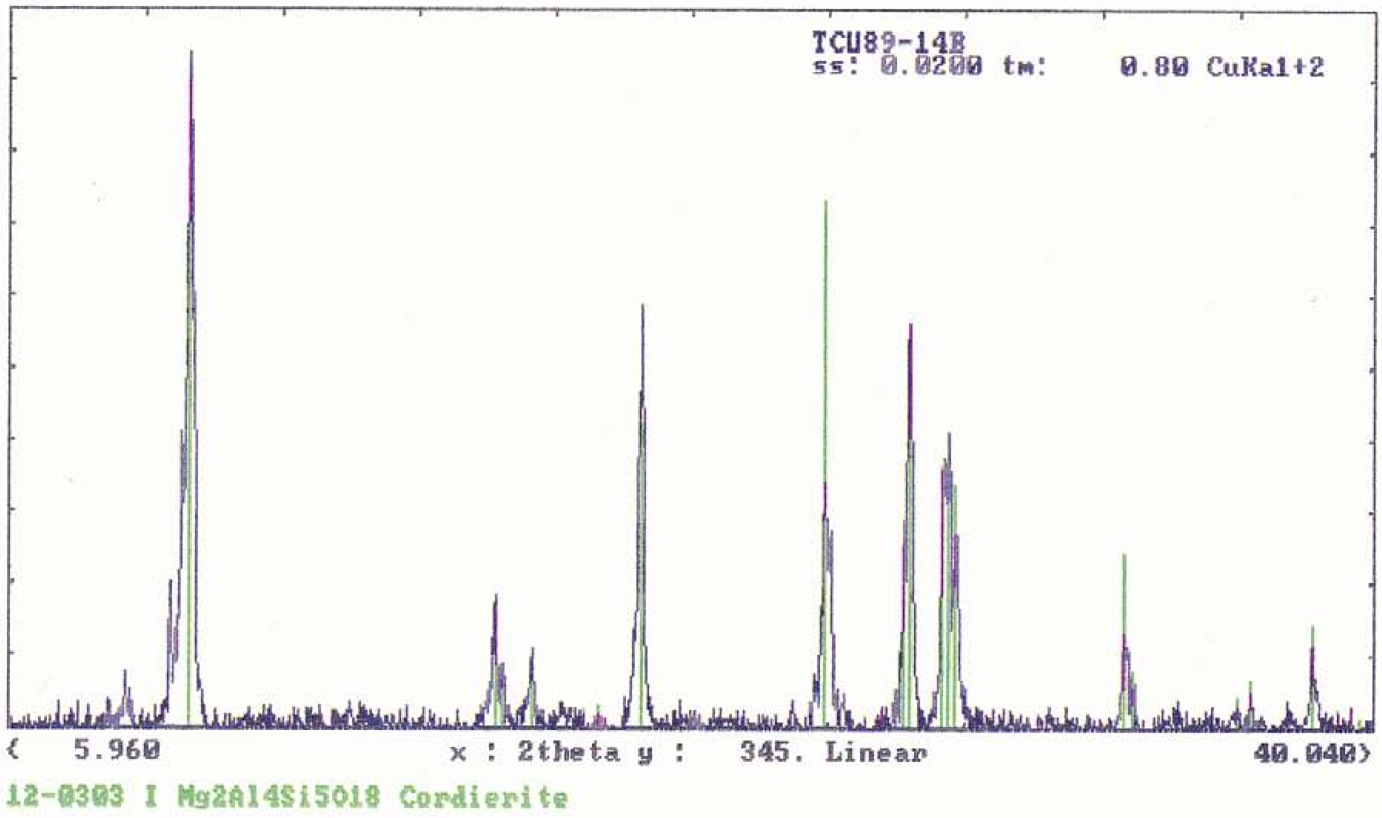

Figure 1: TCU89-14 (331.71 metres).

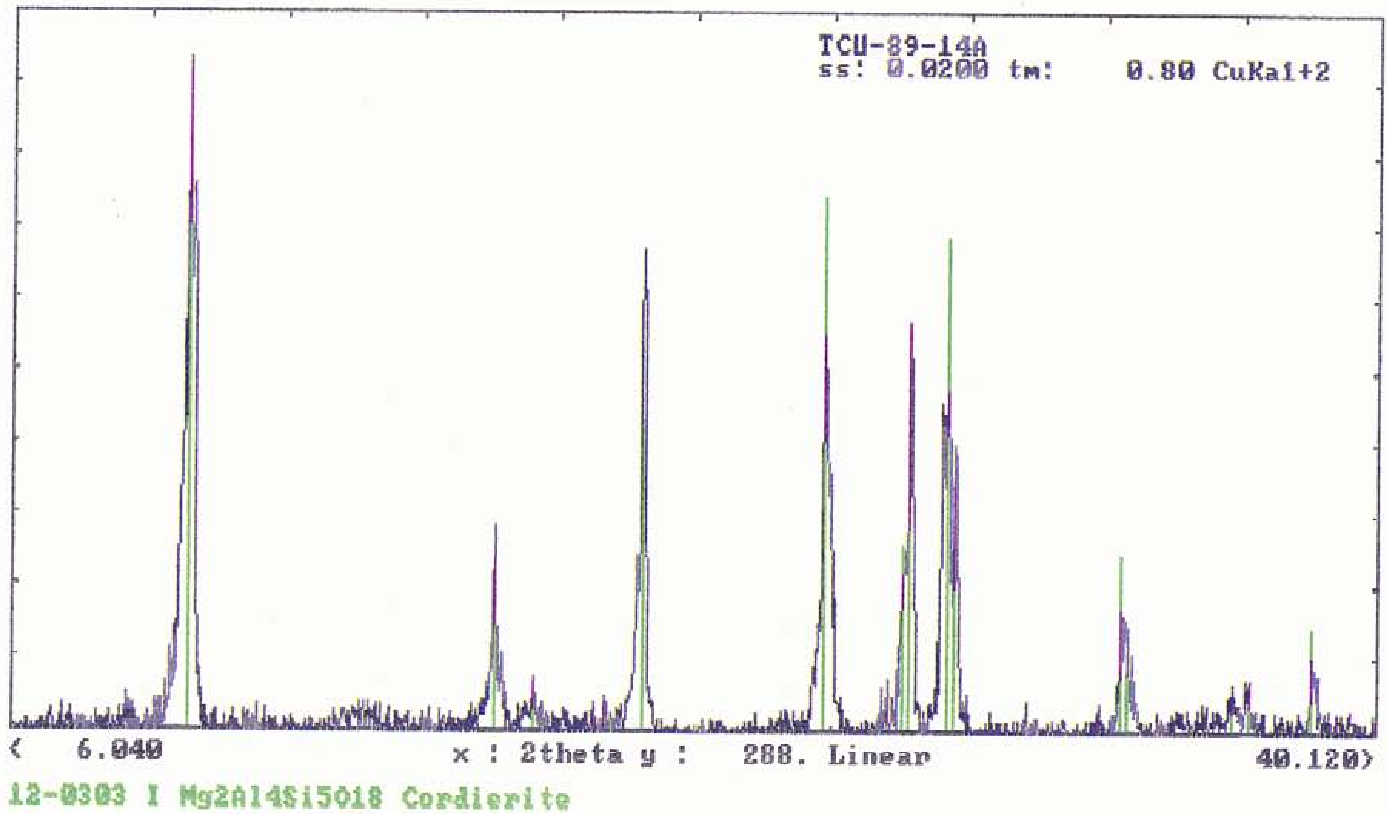

Figure 2: TCU89-14 (339.90 metres).

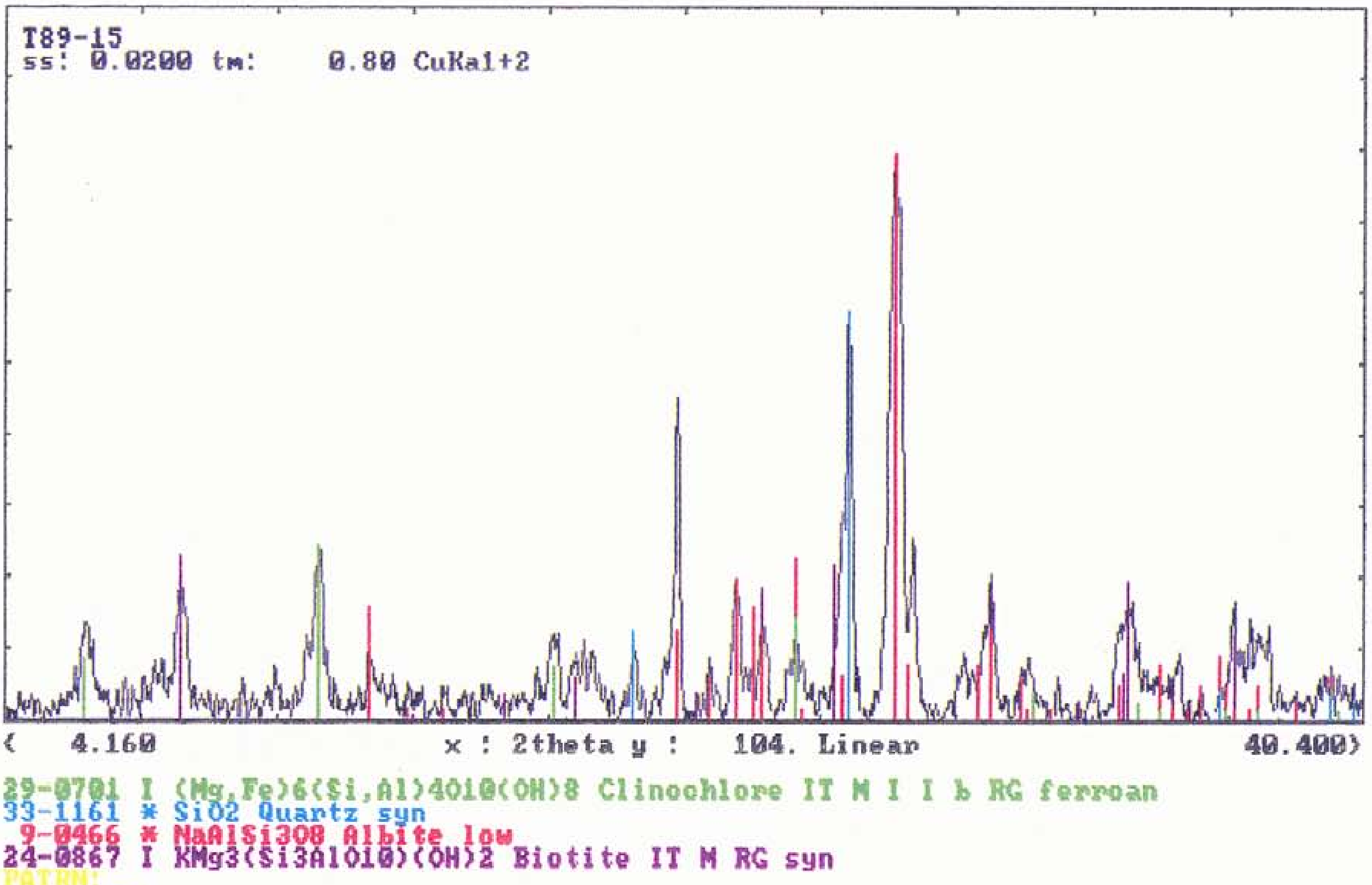

Figure 3: TCU89-15 (404.72 metres).

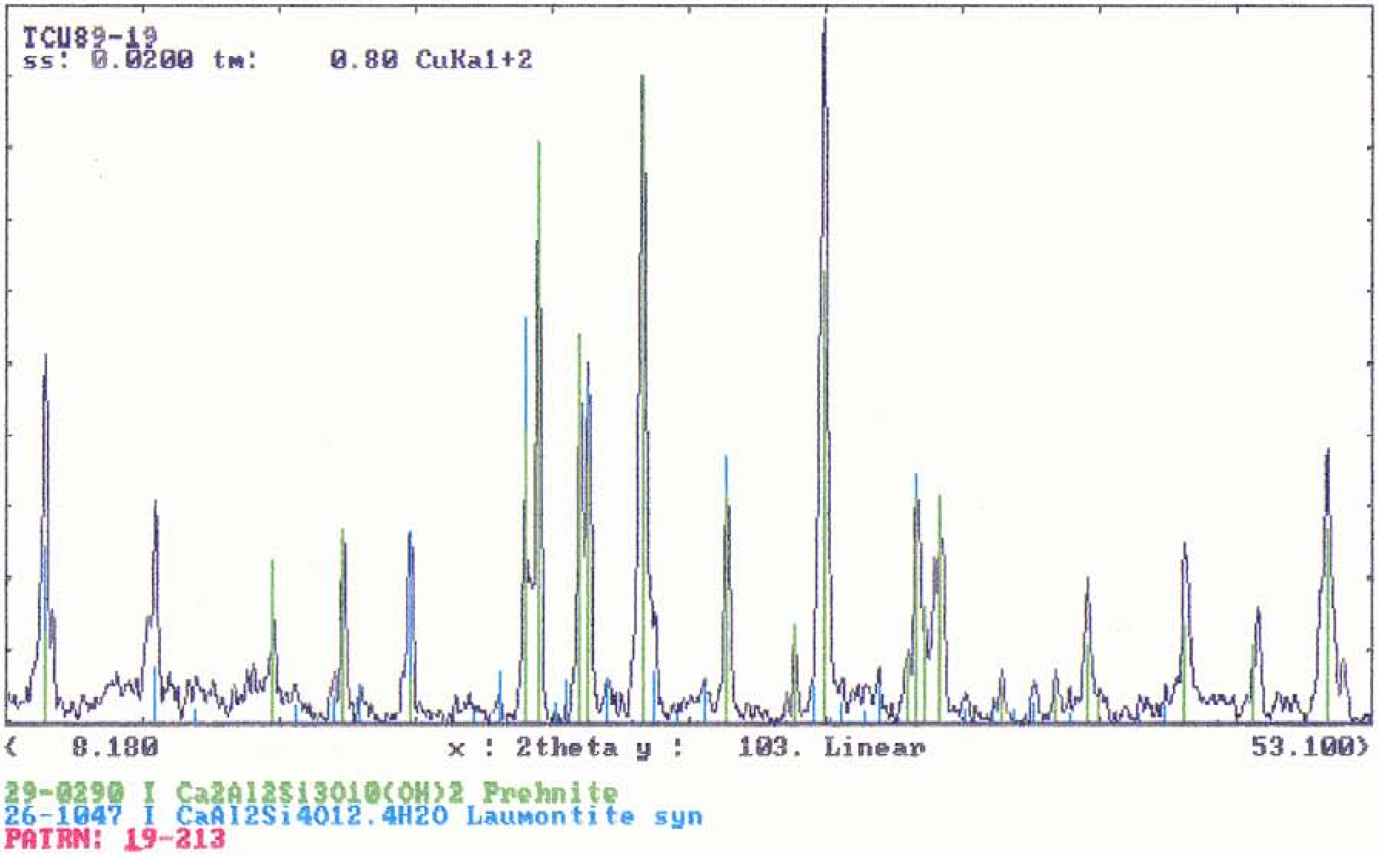

Figure 4: TCU89-19 (24.38 metres).

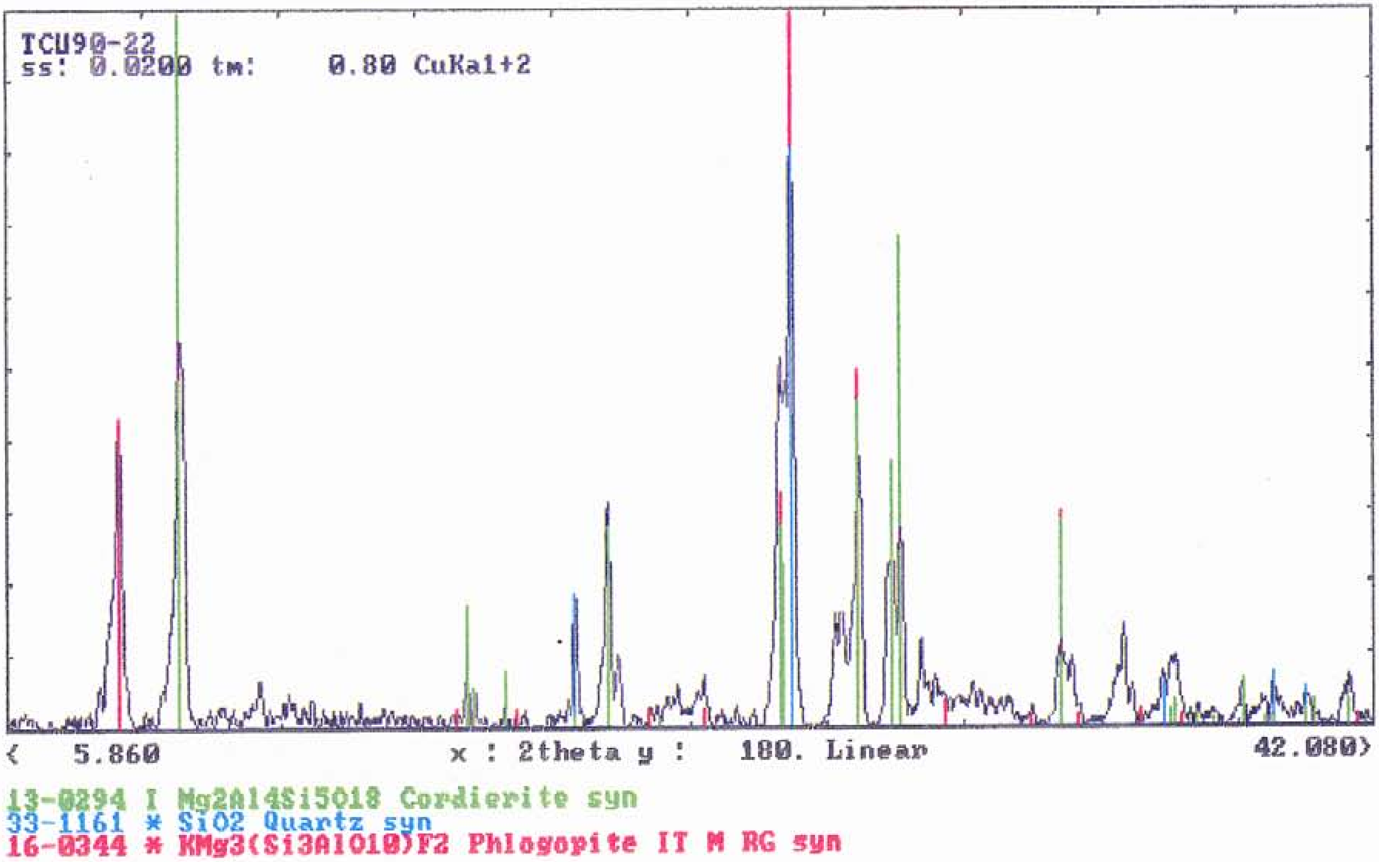

Figure 5: TCU90-22 (693.72 metres).

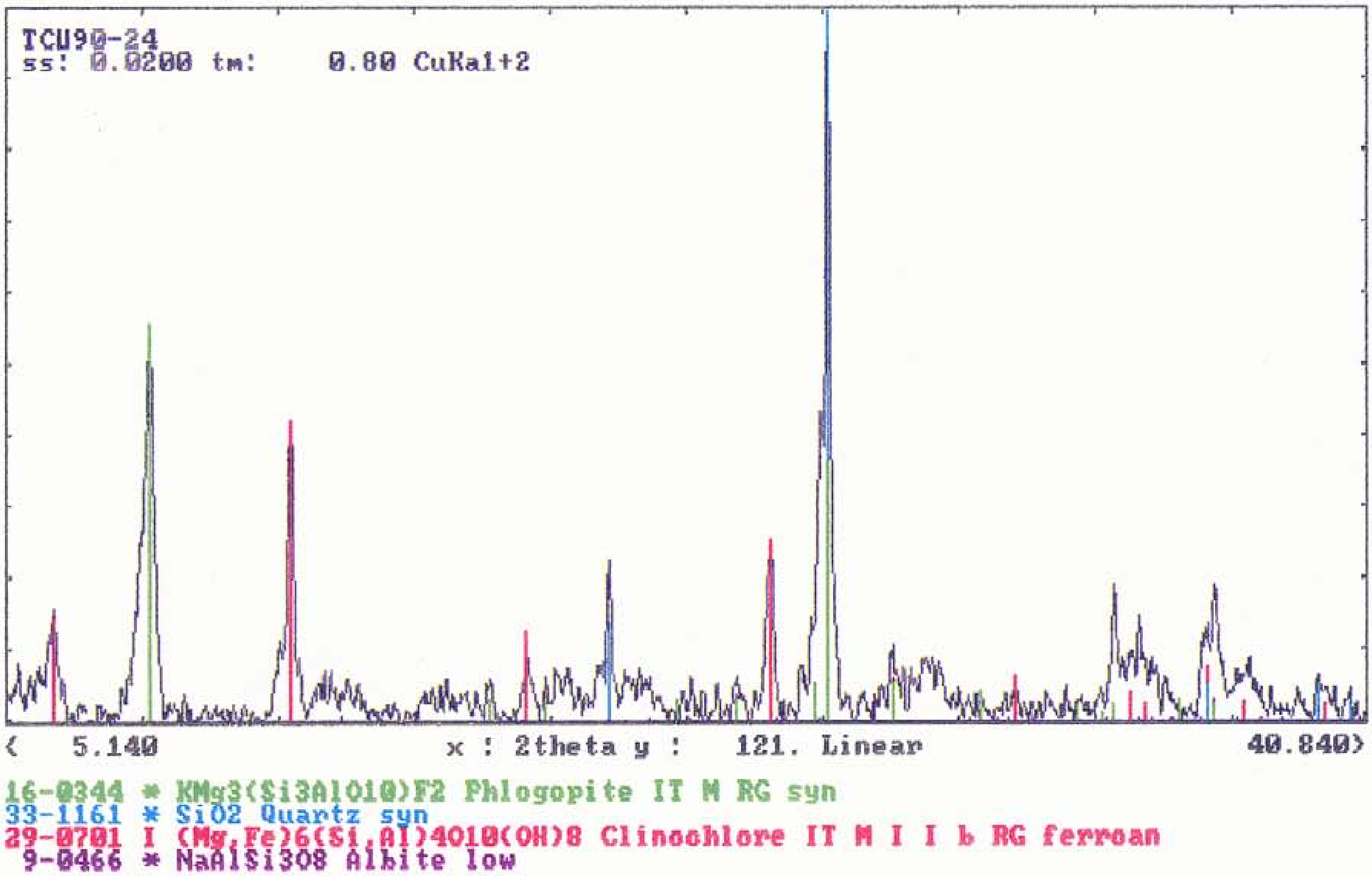

Figure 6: TCU90-24 (653 metres).

APPENDIX 4

WHOLE ROCK ANALYSIS - MOUNT EATON GROUP

WHOLE ROCK ANALYSIS - FOOTWALL SERIES (UNIT 1)

DRILL HOLE	METRE	LITHOLOGY*	ALTERATION*	SiO2	TiO2	Al2O3	Fe2O3	MnO	MgO	CaO	Na2O	K2O	P2O5	Ba	LOI	TOTAL
TCU90-26	580.64	BFL		47.80	0.84	18.82	10.28	0.25	7.58	8.13	2.40	2.12	0.13	0.06	1.08	99.49
TCU90-23	753.77	BFL	SIL	50.46	0.89	17.79	10.59	0.18	5.11	9.70	4.09	0.24	0.16	0.01	0.60	99.82
TCU90-26	566.32	BFL		47.76	0.79	18.24	10.54	0.20	9.22	6.34	2.26	2.87	0.10	0.04	1.27	99.63
TCU90-23	740.05	BFL	SIL	51.01	0.90	17.77	10.81	0.20	6.37	5.63	4.21	1.38	0.19	0.03	0.64	99.14
TCU89-19	461.47	BFL	BIO DPY	48.89	0.60	13.05	7.98	0.23	10.18	13.89	2.14	0.32	0.21	0.03	2.35	99.87
TCU90-26	631.24	BFL		53.67	1.00	19.32	9.22	0.17	4.21	6.09	5.10	0.57	0.22	0.03	0.41	100.01
TCU89-20	280.11	BFL		51.08	0.86	19.11	8.67	0.15	4.69	8.50	2.50	2.94	0.16	0.19	1.10	99.95
TCU89-18	553.21	BAT		54.06	0.72	16.43	11.44	0.11	5.59	6.18	1.60	2.30	0.10	0.04	1.20	99.77
TCU89-18	562.05	BFL		57.10	0.82	18.45	7.44	0.14	4.76	2.97	5.23	1.80	0.28	0.04	0.95	99.98
TCU89-19	457.20	BFL	BIO DPY	54.35	0.88	17.53	10.95	0.18	4.76	4.85	2.46	2.78	0.13	0.05	1.21	100.13
TCU89-20	288.04	BFL		56.56	0.70	17.00	7.91	0.11	5.65	4.52	1.41	3.93	0.11	0.05	1.60	99.55
TCU89-20	291.69	BFL		50.72	0.77	18.37	8.53	0.18	8.42	5.17	1.57	3.25	0.15	0.06	2.77	99.96
TCU90-26	616.92	BFL		49.97	1.40	24.07	10.21	0.09	3.36	3.47	3.35	2.58	0.28	0.08	0.96	99.82
TCU90-26	531.88	BFL		53.21	0.93	18.45	9.67	0.10	4.77	4.81	3.17	2.22	0.28	0.05	1.57	99.23
TCU90-25	550.16	BFL	SIL	51.17	0.88	20.88	8.64	0.07	5.87	4.65	3.83	2.08	0.12	0.05	1.51	99.75
TCU90-25	561.14	BFL	SIL	47.17	1.43	19.27	12.69	0.21	6.60	4.42	4.91	0.34	0.34	0.01	2.24	99.63
TCU90-25	523.65	BFL	SIL	47.95	1.31	20.23	13.12	0.10	5.62	3.46	4.32	2.22	0.19	0.03	1.38	99.93
TCU90-25	534.01	BFL	SIL	55.57	1.01	17.36	9.80	0.12	3.98	4.75	5.63	0.37	0.18	0.01	0.38	99.16
TCU90-25	534.62	BFL	SIL	49.94	1.17	17.93	12.84	0.17	6.02	4.35	5.06	0.98	0.20	0.01	1.15	99.82
TCU90-26	524.87	BFL		48.71	0.89	20.80	9.14	0.11	7.69	3.76	4.13	2.27	0.12	0.09	2.47	100.18
TCU90-25	618.44	BFL	SIL	55.75	0.99	17.95	9.27	0.20	3.91	7.05	3.43	0.68	0.27	0.02	0.27	99.79
TCU90-25	563.27	BFL	SIL	50.30	1.12	19.17	11.34	0.20	5.90	5.48	4.50	0.25	0.29	0.01	1.26	99.82
TCU90-25	604.11	BFL	SIL	51.39	1.09	19.14	10.17	0.21	3.98	7.68	4.84	0.27	0.27	0.01	0.52	99.57
TCU90-25	517.86	BFL	SIL	51.90	1.10	18.05	10.71	0.10	6.26	3.49	5.68	0.74	0.18	0.01	1.63	99.85
TCU90-25	514.20	BFL	SIL	52.88	1.07	20.96	8.87	0.09	3.57	2.57	3.70	3.20	0.37	0.14	2.13	99.55
TCU90-26	544.37	BFL		47.78	0.79	17.66	10.35	0.19	8.50	9.16	2.77	1.42	0.10	0.03	0.80	99.55
TCU90-25	516.64	BFL	SIL	48.87	1.19	18.76	12.24	0.12	7.04	3.05	3.12	2.01	0.21	0.03	2.86	99.50
TCU90-24	811.38	BDY	SIL DPY	46.84	0.57	12.21	9.72	0.28	18.16	3.15	0.42	1.16	0.28	0.27	5.53	98.59
TCU90-26	555.96	BFL		47.87	0.72	17.75	9.91	0.19	8.74	8.06	2.25	2.60	0.10	0.05	1.11	99.35
TCU90-25	501.09	BFL	SIL	47.32	1.13	18.85	11.23	0.12	8.09	6.30	3.14	1.31	0.13	0.02	1.72	99.36
TCU89-12	294.13	BFL		48.14	0.80	17.79	11.12	0.31	8.24	5.98	3.88	0.69	0.16	0.02	2.02	99.15
TCU88-7	214.27	BFL		55.66	1.00	18.69	7.98	0.11	3.07	5.86	5.70	0.47	0.27	0.03	0.70	99.54
TCU89-12	290.47	BFL		49.22	0.82	17.69	11.13	0.33	8.68	3.35	4.10	1.13	0.16	0.09	2.51	99.21
TCU89-13	438.00	BFL	SER DPY	54.06	1.07	21.26	6.20	0.30	2.08	1.32	0.01	8.20	0.40	0.28	4.21	99.39
TCU88-7	208.79	BFL		53.65	0.99	17.92	8.36	0.14	3.59	9.21	4.46	0.25	0.27	0.02	0.44	99.30
TCU88-1	305.10	BLT	BIO DPY	48.66	1.24	17.26	11.73	0.18	9.95	0.74	0.01	3.35	0.52	0.07	6.25	99.96
TCU88-2	361.80	BLT	SIL DPY	53.95	0.89	17.03	10.37	0.06	1.97	0.70	0.01	6.41	0.47	0.16	7.29	99.31
TCU89-14	353.57	BFL	SIL DPY	53.28	0.83	17.98	10.60	0.47	5.55	0.74	0.43	5.29	0.17	0.58	3.97	99.89

Analytical Methods: LOI determined gravimetrically; other elements by lithium borate fusion - XRF; Fe_2O_3 is Fe expressed as Fe_2O_3; all analysis in percent. Analysis completed by Cominco Laboratory.

* See Fig. 6 for description of abbreviations

WHOLE ROCK ANALYSIS - LOWER FELSIC VOLCANIC HORIZON (UNIT 2)

DRILL HOLE	METRE	LITHOLOGY*	ALTERATION*	SiO2	TiO2	Al2O3	Fe2O3	MnO	MgO	CaO	Na2O	K2O	P2O5	Ba	LOI	TOTAL
TC87-1	404.16	DLT		65.94	0.03	15.84	3.97	0.06	1.32	4.91	2.64	2.64	0.11	0.11	1.49	99.06
TCU90-27	393.19	DLT	HEM	65.54	0.38	16.95	3.74	0.07	3.33	0.77	0.52	4.53	0.02	0.47	3.07	99.39
TCU90-27	388.01	DLT	HEM	64.58	0.34	16.70	3.50	0.07	3.39	1.77	0.72	4.23	0.03	0.55	3.36	99.24
TC87-1	364.24	DLT		70.55	0.25	15.02	2.43	0.05	0.78	4.00	1.82	2.22	0.09	0.11	1.61	98.93
TC87-2	265.79	DFL	HEM	75.97	0.24	13.29	1.90	0.04	0.11	0.30	6.35	1.15	0.09	0.03	0.58	100.05
TC87-2	288.65	DFL	HEM	77.68	0.22	11.69	2.21	0.04	0.11	0.54	4.94	1.15	0.08	0.03	1.02	99.71
TC87-2	291.69	DFL	HEM	76.32	0.23	12.62	2.08	0.03	0.26	0.57	5.33	1.47	0.08	0.11	0.90	100.00
TCU90-27	419.10	DLT		63.99	0.41	18.86	2.94	0.07	3.12	1.46	0.83	4.77	0.03	0.36	2.89	99.73
TCU90-27	672.39	DFL		67.75	0.32	15.95	4.00	0.08	1.95	3.85	0.96	3.15	0.04	0.13	1.41	99.59
TCU90-27	666.90	DFL		67.68	0.31	16.18	4.03	0.03	1.55	3.86	0.99	3.33	0.04	0.13	1.60	99.73
TC87-1	359.66	DLT		68.99	0.33	14.78	4.05	0.08	1.52	4.09	3.09	1.07	0.11	0.05	1.67	99.83
TC87-1	361.19	DLT		73.47	0.25	13.06	2.79	0.06	1.36	3.46	1.68	2.03	0.10	0.07	1.64	99.97
TC87-1	362.41	DLT		70.03	0.26	15.22	2.67	0.03	0.96	4.12	1.72	2.48	0.09	0.11	1.69	99.38
TCU90-27	556.26	DLT	HEM	66.50	0.31	17.16	2.95	0.03	3.27	1.92	1.01	4.46	0.02	0.10	2.24	99.97
TCU90-27	431.60	DLT		67.71	0.36	15.00	4.66	0.06	2.81	1.53	0.66	3.63	0.04	0.20	3.02	99.68
TCU90-27	428.24	DLT		69.10	0.34	14.78	4.44	0.05	1.94	1.55	0.72	3.60	0.03	0.20	2.95	99.70
TCU90-27	530.05	DLT	HEM	63.07	0.41	17.76	4.02	0.07	4.37	1.63	2.40	3.66	0.05	0.08	2.01	99.53
TCU89-15	384.66	DLT	HEM	70.69	0.26	14.21	3.25	0.06	3.27	1.84	0.58	3.11	0.02	0.23	2.39	99.91
TCU89-16	271.58	DLT	HEM	63.57	0.29	17.73	3.63	0.04	3.34	1.95	0.31	5.56	0.04	0.10	2.93	99.49
TCU89-14	288.04	DLT		69.33	0.35	15.77	3.65	0.05	3.01	0.48	1.59	2.97	0.06	0.38	2.55	100.19
TCU89-14	282.55	DLT		68.33	0.29	15.56	3.23	0.04	3.29	1.23	2.45	2.59	0.02	0.30	2.31	99.64
TCU89-14	284.99	DLT		64.00	0.40	19.73	3.49	0.06	3.11	1.07	2.11	3.19	0.03	0.50	2.05	99.74
TCU89-14	287.73	DLT		67.90	0.41	16.71	3.62	0.06	3.06	0.50	2.70	2.43	0.12	0.30	2.20	100.01
TCU89-16	488.59	DLT	CHL	66.78	0.31	17.36	3.21	0.04	2.60	1.11	1.89	4.02	0.05	0.14	2.18	99.69
TCU89-16	495.00	DLT	CHL	72.01	0.26	13.78	2.61	0.04	2.56	1.02	1.45	2.84	0.04	0.15	2.00	98.76

Analytical Methods: LOI determined gravimetrically; other elements by lithium borate fusion - XRF; Fe_2O_3 is Fe expressed as Fe_2O_3; all analysis in percent. Analysis completed by Cominco Laboratory.

* See Fig. 6 for description of abbreviations

WHOLE ROCK ANALYSIS - MAFIC VOLCANIC HORIZON (UNIT 3)

DRILL HOLE	METRE	LITHOLOGY*	ALTERATION*	SiO2	TiO2	Al2O3	Fe2O3	MnO	MgO	CaO	Na2O	K2O	P2O5	Ba	LOI	TOTAL
TCU90-29B	750.72	BFL	SIL	50.40	0.52	11.63	8.45	0.17	15.02	8.39	1.61	1.25	0.25	0.08	1.98	99.75
TCU90-29B	646.18	BAU	SIL	50.30	0.85	19.12	10.59	0.13	6.22	4.89	5.37	0.32	0.16	0.01	2.20	100.16
TCU90-29B	768.40	BFL	SIL	52.00	0.95	18.06	10.62	0.21	5.03	8.54	2.33	0.19	0.21	0.01	0.04	98.19
TCU90-24	543.15	BAU	BIO COR	52.08	0.75	16.81	8.18	0.16	8.22	9.01	3.05	0.06	0.12	0.01	1.14	99.59
TCU90-29B	705.61	BLT	PRO	46.01	0.80	17.16	10.83	0.20	13.56	4.75	2.02	1.41	0.11	0.02	3.14	100.01
TCU90-29B	682.45	BLT	PRO	51.06	0.78	16.56	10.47	0.23	11.89	3.91	1.95	1.40	0.09	0.03	1.86	100.23
TCU90-24	557.17	BAU	BIO COR	51.92	0.82	17.49	7.48	0.23	8.13	8.64	3.22	0.54	0.13	0.01	0.96	99.57
TCU90-29B	715.37	BLT	PRO	48.65	0.77	17.00	9.74	0.15	11.83	3.37	1.16	3.92	0.13	0.05	3.04	99.81
TCU89-13	205.13	BAU	COR CHL	49.22	0.78	17.60	8.20	0.14	8.79	8.43	3.67	0.16	0.13	0.01	2.29	99.42
TC87-2	85.04	BAU	PRO	50.02	0.08	17.13	7.70	0.12	7.43	10.19	2.56	0.24	0.22	0.01	3.11	98.81
TC87-2	161.24	BAU	PRO	49.52	0.73	16.74	8.20	0.15	8.58	9.62	2.38	0.35	0.19	0.01	2.72	99.19
TCU89-18	251.16	BAU		51.14	0.75	16.75	7.76	0.15	8.63	8.32	3.57	0.73	0.11	0.03	1.50	99.44
TCU90-29B	800.10	BFL	SIL	50.49	0.76	18.12	9.33	0.02	6.79	8.39	4.73	0.19	0.14	0.01	0.94	99.91
TCU88-8	37.19	BAU	CHL	49.49	0.81	17.42	8.49	0.15	8.46	9.60	2.03	0.05	0.20	0.02	1.82	98.54
TCU88-8	41.15	BAU	CHL	50.66	0.78	16.92	7.96	0.14	9.05	9.30	2.50	0.60	0.19	0.03	1.82	99.95
TCU88-8	21.95	BAU	CHL	51.47	0.80	16.64	8.14	0.14	9.03	9.39	2.51	0.19	0.18	0.03	1.61	100.13
TCU90-27	259.99	BAU	PRO	50.73	0.78	17.78	8.88	0.18	6.32	10.95	3.22	0.17	0.11	0.02	0.73	99.87
TCU90-25	380.70	BAU	BIO COR	46.05	0.63	20.20	8.47	0.17	8.97	9.06	2.62	1.24	0.24	0.04	1.71	99.40

Analytical Methods: LOI determined gravimetrically; other elements by lithium borate fusion - XRF; Fe_2O_3 is Fe expressed as Fe_2O_3; all analysis in percent. Analysis completed by Cominco Laboratory.

- See Fig. 6 for description of abbreviations

APPENDIX 5

POLYGONAL ORE RESERVE SUMMARY

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CAMBRIA GEOLOGICAL LTD.
REDFERN RESOURCES LTD. - Tulsequah Chief Project
Report: POLYRSV.PRN

Polygonal Ore Reserve Zone: H,AB2

Hole Name	from (m)	to (m)	Grade Id	Interval (m)	True Width	Section Width	Width Ratio	SG	Cu %	Pb %	Zn %	Au g/tonne	Ag g/tonne	NSR1 US$/tonne	Indicated Area (m2)	Inferred Area (m2)	Indicated tonnes	Inferred tonnes
TCU-88-3	172.52	194.92	AG	22.40	13.35	17.21	1.678	4.412	4.07	0.23	2.64	3.[illegible]	57.99	106.49	2705.00	3380.00	205392	256645
TCU89-13	374.90	391.67	AP	16.77	12.41	16.54	1.351	3.448	1.00	1.37	5.75	2.29	86.78	86.73	2590.00	1875.00	147707	106931
TCU89-15	391.67	396.12	AQ	4.45	3.21	3.30	1.386	3.495	0.49	0.39	9.85	0.75	39.58	82.41	2828.00	2698.00	32617	31117
TCU89-19	374.90	382.37	AU	7.47	4.67	5.09	1.600	3.817	1.26	1.69	11.43	2.02	110.64	126.69	2812.00	4481.00	54633	87059
TCU89-21	502.01	523.07	AW	21.06	13.06	13.08	1.613	3.800	1.20	1.16	5.99	3.64	117.88	107.65	2348.00	1942.00	116705	96525
TCU90-22	544.22	593.90	AX	49.68	31.52	44.30	1.576	4.083	3.05	1.52	8.90	4.00	172.44	159.31	2869.00	2742.00	518936	495964
TCU90-23	635.51	662.79	AY	27.28	16.43	16.65	1.660	3.361	1.24	1.20	5.65	3.61	147.58	108.37	3141.00	4413.00	175772	246954
TCU90-24	626.06	631.85	AZ	5.79	3.72	3.87	1.556	2.791	0.12	0.97	2.23	2.27	152.53	57.45	3141.00	6913.00	33926	74668
TCU91-30	569.30	576.10	BE	6.80	3.70	4.01	1.838	3.040	0.41	0.73	3.83	1.41	40.73	51.15	3141.00	3508.00	38290	42764
TCU91-31	506.40	513.40	BF	7.00	5.06	7.80	1.383	2.974	0.50	1.22	4.17	2.48	77.75	71.18	2374.00	1737.00	55070	40294
TCU91-31	518.40	523.30	BG	4.90	3.14	4.89	1.561	3.569	1.29	0.24	1.23	2.73	101.09	63.53	2374.00	1737.00	41432	30315
TCU91-33	327.40	331.80	BJ	4.40	3.61	5.14	1.219	3.599	2.57	0.86	4.67	1.85	63.07	90.67	2852.00	2609.00	52759	48264
TCU91-33	337.10	363.00	BK	25.90	16.21	24.40	1.598	3.310	1.35	1.41	7.53	2.52	88.34	105.38	2852.00	2609.00	230339	210713
TCU91-34	308.65	316.25	BL	7.60	5.86	6.97	1.297	4.022	0.67	1.50	9.53	2.02	73.61	103.18	3104.00	3237.00	87015	90744
TCU91-35	459.65	464.97	BM	5.32	3.89	3.90	1.368	3.559	1.60	2.45	14.13	2.90	133.43	162.45	2982.00	2690.00	41390	37337
TCU91-35	479.85	488.60	BN	8.75	5.83	5.86	1.501	3.928	3.65	0.92	7.64	2.07	240.30	141.54	2982.00	2690.00	68640	61919
TCU92-36	701.00	718.35	BP	17.35	11.43	11.83	1.518	3.492	0.81	1.15	8.79	0.84	70.51	85.82	3141.00	6966.00	129756	287768
TCU92-36	743.75	750.00	BQ	6.25	3.60	3.73	1.736	3.101	0.55	0.35	4.58	1.30	66.16	57.58	3141.00	8718.00	36331	100839
TCU92-36	754.00	774.40	BO	20.40	13.14	13.62	1.553	3.317	1.27	0.84	6.00	2.60	60.70	91.06	3141.00	8718.00	141903	393858
TCU92-37	300.43	305.43	BR	5.00	5.00	6.59	1.000	3.174	0.85	1.11	5.31	2.36	71.14	80.52	3105.00	3514.00	64946	73501
TCU92-37	313.77	321.90	BS	8.13	7.12	8.32	1.142	4.153	2.04	1.24	11.82	4.38	74.84	159.86	3105.00	3514.00	107287	121419
TCU92-37	327.45	331.35	BT	3.90	3.37	4.19	1.157	3.046	0.12	1.28	3.52	1.34	45.71	47.07	3105.00	3514.00	39628	44848
TCU92-46	216.95	224.69	BY	7.74	7.70	7.90	1.005	3.882	0.68	0.51	10.92	1.53	47.88	101.20	3057.00	5617.00	93751	172261

Average Grades:

	SG	Cu %	Pb %	Zn %	Au g/tonne	Ag g/tonne	NSR1 US$/tonne	Indicated tonnes	Inferred tonnes
Indicated: -->	3.70	1.82	1.14	7.16	2.81	106.46	112.72	2514225	
Inferred: -->	3.65	1.67	1.07	7.11	2.64	98.77	107.73		3152707

Total tonnes: 5666932.00

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CAMBRIA GEOLOGICAL LTD.
REDFERN RESOURCES LTD. - Tulsequah Chief Project
Report: POLYRSV.PRN

Polygonal Ore Reserve Zone: AB1

Hole Name	from (m)	to (m)	Grade Id	Interval (m)	True Width	Section Width	Width Ratio	SG	Cu %	Pb %	Zn %	Au g/tonne	Ag g/tonne	NSR1 US$/tonne	Indicated Area (m2)	Inferred Area (m2)	Indicated tonnes	Inferred tonnes
TCU89-15	414.22	419.86	AR	5.64	3.86	3.97	1.461	3.931	0.96	1.65	10.35	1.97	35.16	108.59	2851.00	5234.00	44493	81682
TCU89-16	562.57	568.51	AS	5.94	3.54	3.54	1.678	3.865	0.55	1.74	8.49	2.42	246.03	115.66	3141.00	9001.00	42975	123153
TCU89-18	536.45	549.52	AT	13.07	6.70	9.77	1.951	3.576	0.78	1.91	10.71	2.51	154.95	126.19	2614.00	5843.00	91327	204140
TCU91-31	620.80	626.00	BH	5.20	2.41	3.69	2.158	3.001	0.31	1.16	4.51	0.99	127.04	58.91	2481.00	2899.00	27474	32103

Average Grades:

	SG	Cu %	Pb %	Zn %	Au g/tonne	Ag g/tonne	NSR1 US$/tonne	Indicated tonnes	Inferred tonnes
Indicated: --->	3.64	0.71	1.72	9.34	2.17	144.37	111.24	206269	
Inferred: --->	3.68	0.71	1.76	9.57	2.28	156.17	115.09		441078

Total tonnes: 647347.00

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Polygonal Ore Reserve Zone: G

Hole Name	from (m)	to (m)	Grade Id	Interval (m)	True Width	Section Width	Width Ratio	SG	Cu %	Pb %	Zn %	Au g/tonne	Ag g/tonne	NSR1 US$/tonne	Indicated Area (m2)	Inferred Area (m2)	Indicated tonnes	Inferred tonnes
TC-87-1	552.45	560.07	AB	7.62	6.84	10.57	1.114	2.940	0.53	0.54	2.28	1.22	45.14	40.39	3078.00	4387.00	61897	88221
TC-87-1	566.01	572.26	AC	6.25	5.48	8.33	1.141	3.810	1.38	2.77	7.99	6.35	221.07	166.91	3078.00	4387.00	64265	91595
TC-87-5	640.69	644.80	AD	4.11	3.21	7.39	1.280	3.310	1.31	1.08	6.03	2.81	85.10	96.91	2808.00	3756.00	29835	39908
TCU-88-4	166.73	174.35	AH	7.62	5.68	10.07	1.342	3.390	0.61	0.58	3.35	1.96	64.44	58.31	3318.00	7426.00	63889	142989
TCU-88-5	219.15	226.53	AJ	7.38	4.18	9.21	1.766	3.236	0.66	0.46	3.53	0.92	25.12	44.71	2808.00	3779.00	37982	51117
TCU-88-7	143.41	147.83	AK	4.42	3.11	5.96	1.421	3.089	0.70	1.09	3.68	1.12	37.96	51.61	2885.00	3725.00	27716	35785
TCU-88-7	149.47	153.92	AL	4.45	3.25	6.14	1.369	3.270	1.20	0.94	6.44	2.75	146.80	102.68	2885.00	3725.00	30660	39587
TCU-88-7	160.63	165.20	AM	4.57	3.64	7.09	1.255	2.940	0.34	1.43	3.75	1.63	91.74	59.18	2885.00	3725.00	30874	39863
TCU92-42	245.42	250.24	BV	4.82	4.80	7.27	1.004	3.229	1.09	0.60	4.69	0.32	41.43	52.93	3125.00	4854.00	48435	75233
TCU92-42	257.14	260.92	BU	3.78	3.73	5.54	1.013	3.426	1.88	0.34	2.82	2.79	51.90	77.80	3125.00	4854.00	39934	62029
TCU92-43	288.56	294.50	BW	5.94	4.86	13.57	1.222	3.109	0.85	1.01	3.70	2.39	86.84	71.64	3318.00	8555.00	50134	129264
TCU92-44	199.52	204.63	BX	5.11	5.05	50.52	1.012	3.001	0.61	0.76	2.50	1.14	55.61	43.65	3318.00	9713.00	50284	147201
Average Grades:																	----------	----------
Indicated: -->								3.25	0.92	0.99	4.20	2.24	82.52	73.53			535905	
Inferred: -->								3.23	0.88	0.95	3.97	2.14	79.23	70.12				942792
																Total tonnes:	1478697.00	

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Total - (H,AB2,G,AB1)	SG	Cu %	Pb %	Zn %	Au g/tonne	Ag g/tonne	NSR1 US$/tonne		Indicated tonnes	Inferred tonnes
Indicated: -->	3.62	1.60	1.16	6.81	2.68	104.92	106.17		3256399	
Inferred: -->	3.57	1.42	1.11	6.69	2.50	100.29	100.63			4536577
Total (Indicated and Inferred): ----------------------->	3.59	1.49	1.13	6.74	2.57	102.22	102.95	Grand Total tonnes:		7792976

1957 Reserve at Mine Closure.

Hole Name	from (m)	to (m)	Grade Id	Interval (m)	True Width	Section Width	Width Ratio	SG	Cu %	Pb %	Zn %	Au g/tonne	Ag g/tonne	NSR1 US$/tonne	Indicated Area (m2)	Inferred Area (m2)	Indicated tonnes	Inferred tonnes
OLD_RSV	0.00	0.00	OR	0.00	0.00	0.00	0.000	3.751	1.30	1.60	8.00	2.40	116.57	109.56	0.00	0.00	707616	0

Average Grades:

	SG	Cu	Pb	Zn	Au	Ag	NSR1		Indicated tonnes	Inferred tonnes
Indicated: -->	3.75	1.30	1.60	8.00	2.40	116.57	109.56		707616	
Inferred: -->	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0
								Total tonnes:	707616.00	

Total all zones (H,AB2,G,AB1,1957 Reserve)	SG	Cu %	Pb %	Zn %	Au g/tonne	Ag g/tonne	NSR1 US$/tonne		Indicated tonnes	Inferred tonnes
Indicated: -->	3.65	1.55	1.23	7.02	2.63	107.00	106.78		3964015	
Inferred: -->	3.57	1.42	1.11	6.69	2.50	100.29	100.63			4536577
Total (Indicated and Inferred): ----------------------->	3.60	1.48	1.17	6.85	2.56	103.42	103.50	Grand Total tonnes:		8500592