

### TULSEQUAH CHIEF DEPOSIT

The Tulsequah Chief is a kuroko type volcanogenic massive sulphide deposit. The minesite is located in the Tulsequah River valley in northwestern British Columbia about 45 miles northeast of the deep sea port of Juneau, Alaska at an elevation of 400 feet. Cominco mined between the 1900 and 400 foot elevations in the period 1951 to 1957. The property remained dormant until 1987 when a joint venture of Redfern (40% interest) and Cominco (60%) began exploration below the 400 foot elevation.

Drilling since 1987 has indicated a reserve of 8.6 million tons of 1.6% copper, 1.2% lead, 6.5% zinc, 0.08 oz/ton gold and 3.2 oz/ton silver.

Mineralization is contained in two lenses, the lower AB lens and the stratigraphically higher H lens. The mine stratigraphy, which is comprised mainly of felsic volcanoclastics, is folded into a syncline which plunges north-northwest at about 60°. Massive sulphides are structurally thickened along the fold axis and attenuated on the limbs. True thicknesses range from 5 to 25 feet in the AB lens and from 5 to 126 feet in the H lens. About 85% of the reserve is contained in the H lens.

The deposit is wide open to expansion and the potential is in the order of 12-15 million tons. The area potential is much larger as there are a number of promising targets on the property which have not yet been explored in detail.

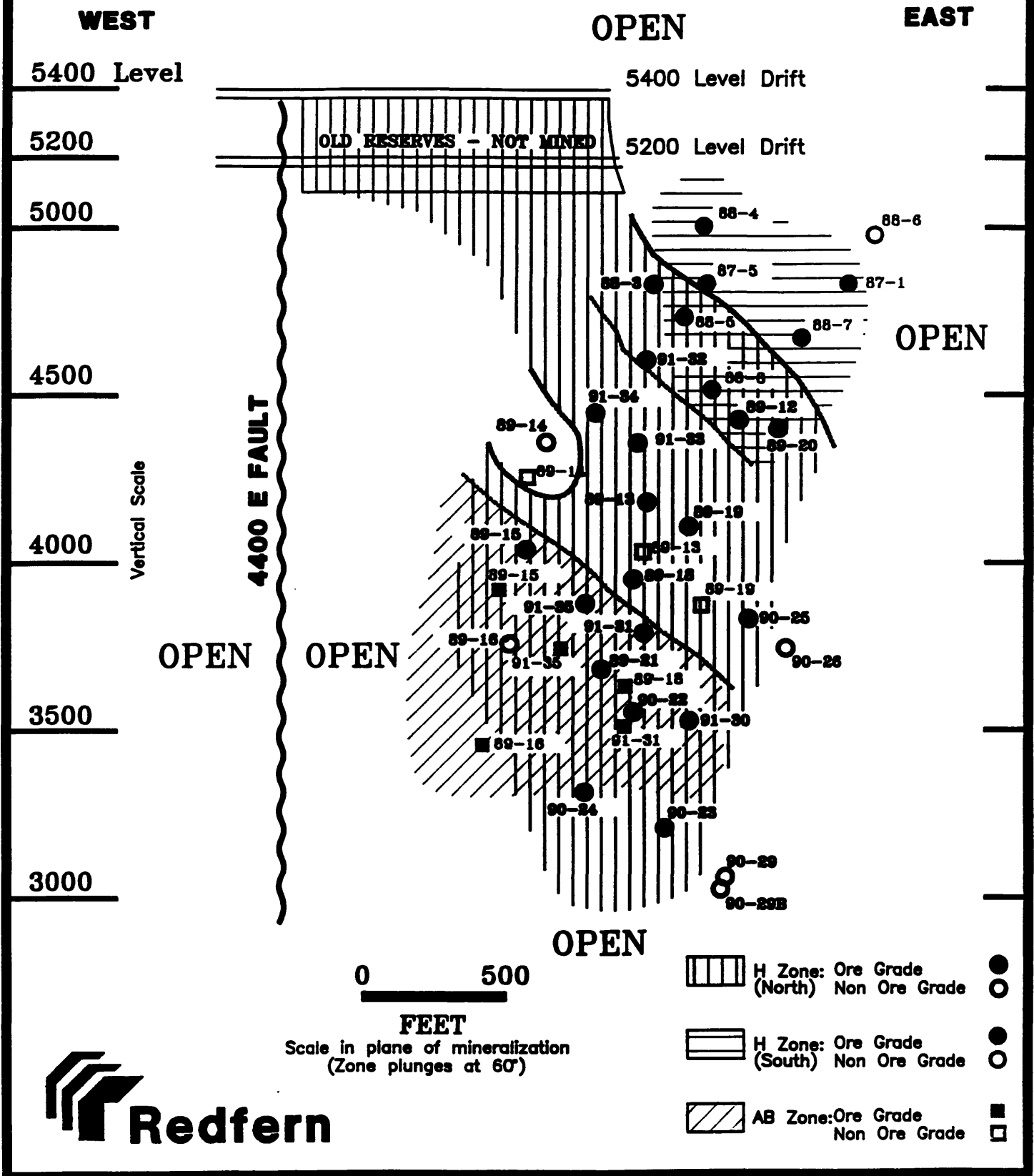
Preliminary mineralogical studies, integrated with previous milling experience, suggest good recoveries and concentrate grades. The steep dip and competent wall rocks imply excellent underground mining conditions.

The Tulsequah Chief ranks as one of the more important undeveloped mineral reserves in Canada.

December 1991

# TULSEQUAH CHIEF PROJECT

## LONGITUDINAL PROJECTION LOOKING NNW



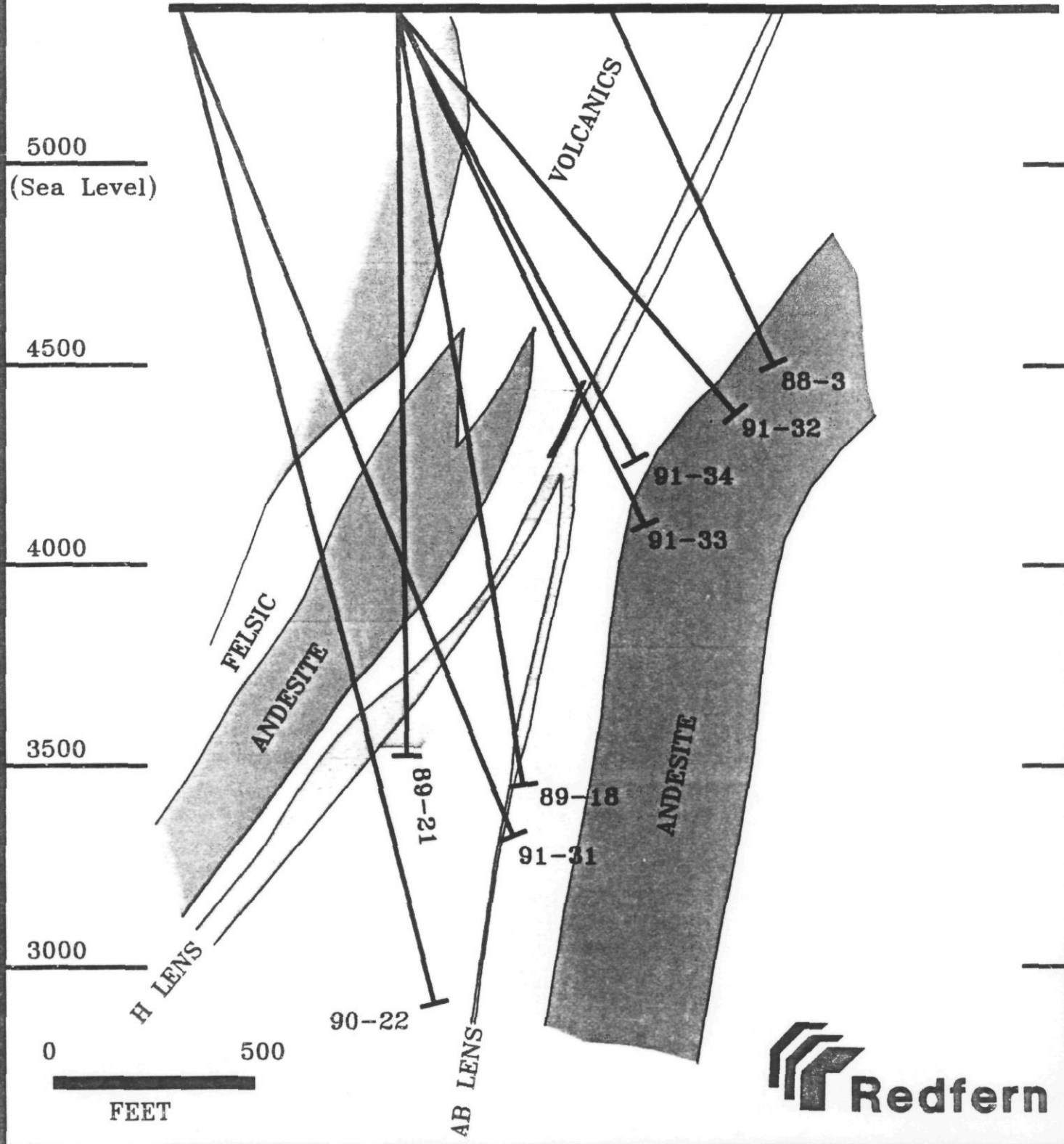
# TULSEQUAH CHIEF PROJECT

VERTICAL SECTION LOOKING TOWARDS NORTHEAST

NORTH

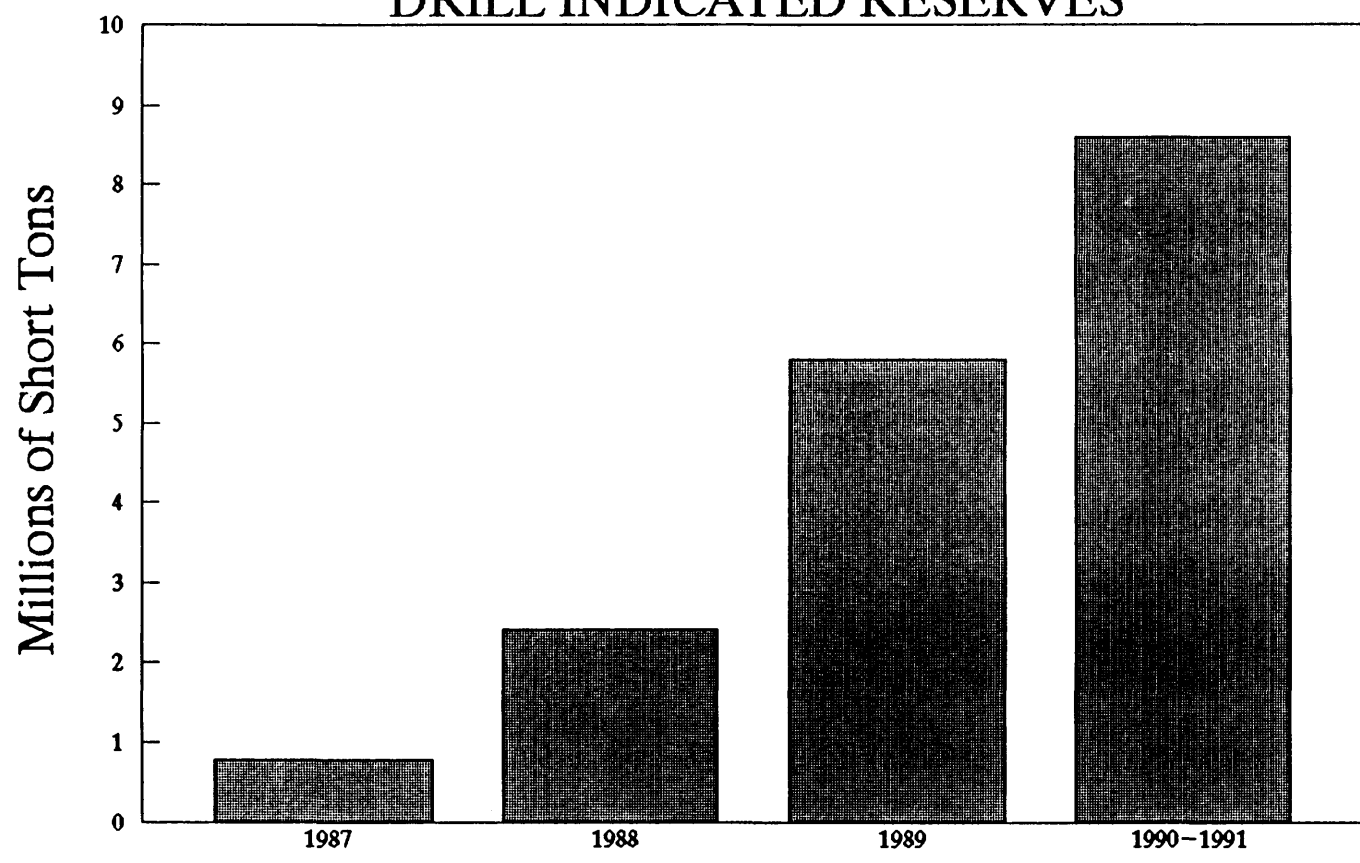
SOUTH

5400 LEVEL DRIFT

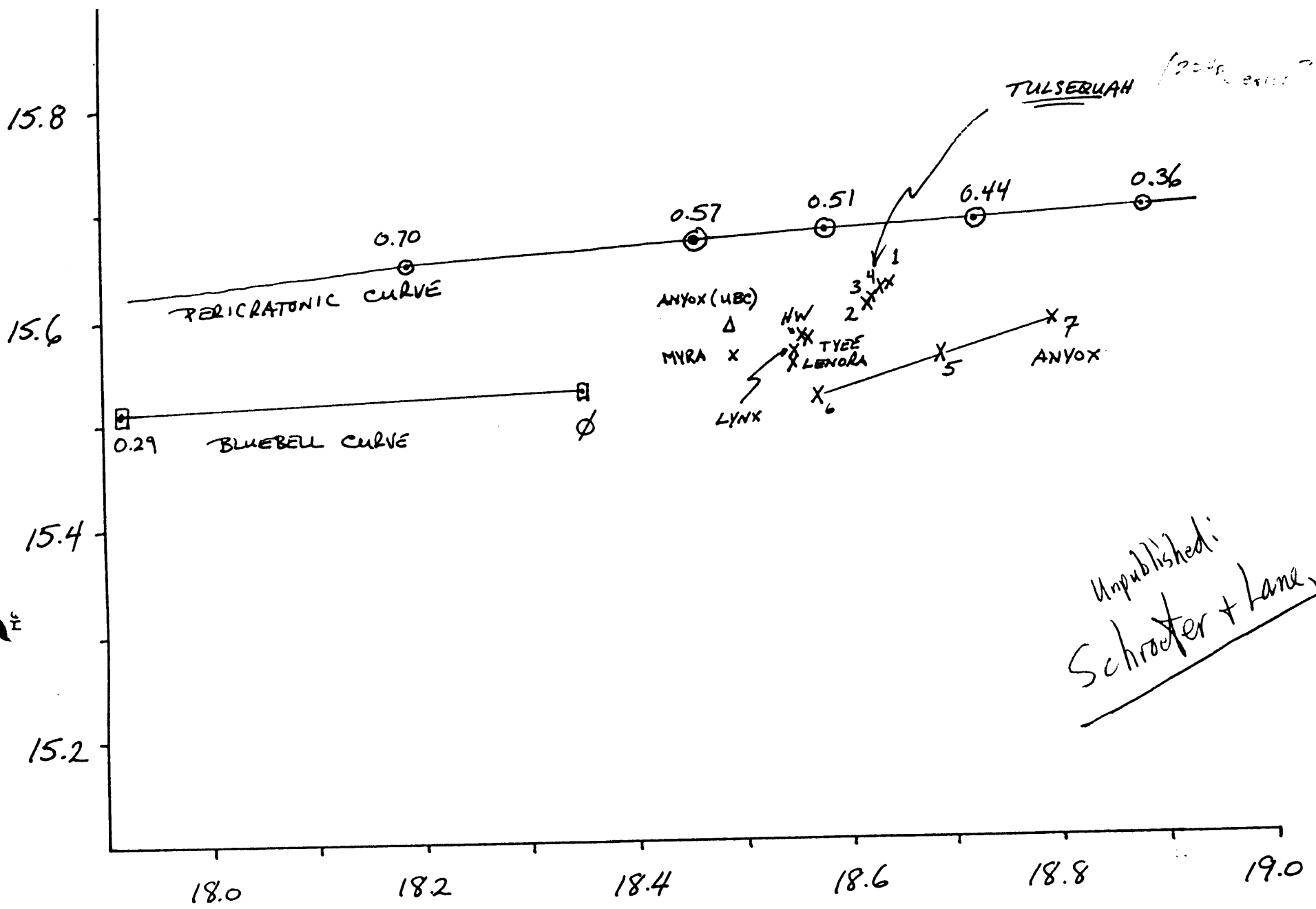


# TULSEQUAH CHIEF

## DRILL INDICATED RESERVES



8/4/07/1911/17



Unpublished:  
Schroeter + Lane, 1990

206 Pb / 204 Pb

COMINCO-REDFERN TULSEQUAH CHIEF MASSIVE SULPHIDE DEPOSIT

NORTHWEST BRITISH COLUMBIA

M.J. CASSELMAN

COMINCO LTD.

Feb. '89  
Cordilleran  
Round Up  
Core-Shack.

Schmidt

The Tulsequah Chief property is located near the confluence of the Tulsequah and Taku Rivers in the Coast Range Mountains of B.C., 95 km south of Atlin B.C. and 70 km northeast of Juneau, Alaska. The property was first staked in 1923 following the discovery of a high grade lens of barite, sphalerite, galena and chalcopryrite. Cominco Ltd. acquired the deposit in 1946 and placed it and the adjacent Big Bull deposit into production in 1951 at a rate of 530 tons/day. The mine was closed in 1957 due to low metal prices. Production was 625,781 tons from the Chief and 403,308 tons from the Bull at a combined average grade of 0.11 oz/t Au, 3.69 oz/t Ag, 1.59% Cu, 1.54% Pb and 7.0% Zn. At shutdown, ore reserves in the Chief were estimated at 780,000 tons at 0.07 oz/t Au, 2.9 oz/t Ag, 1.3% Cu, 1.6% Pb and 8.0% Zn.

The Tulsequah Chief deposit occurs in a northeasterly striking, west dipping sequence of Pre-Permian, submarine deposited rocks located on the west limb of a north plunging anticline. The rocks consist primarily of andesite volcanics with lesser dacite-rhyolite pyroclastics, clastics, limestone and chert. All rocks are intruded by Paleozoic, diorite and dacite, and Tertiary, rhyolite plugs, sills and dykes. The anticline is delineated by a mixed limestone, chert, clastic sequence containing Pennsylvanian-Permian fossils. This sequence occurs stratigraphically above the deposit. A major regional fault partially cuts off the west extension of the Tulsequah Chief stratigraphy.

The Tulsequah Chief deposit is located near the base of a large lenticular mass of dacite-rhyolite pyroclastics at the transition with an underlying thick sequence of andesite pyroclastics and flows. The deposit is broken into four blocks by north-south striking, steeply dipping faults, some of which may have been in part synvolcanic growth faults.

Mineralization occurs in seven separate, conformable lenses. The lenses consist of pyrite (15-80%) with varying concentrations of sphalerite, galena, chalcopryrite, gold, silver, barite and gypsum. These lenses occur within several stratigraphic intervals along a 500 m strike length in a lithologic package known as the mineral horizon. The mineral horizon consists of altered, intercalated dacite-rhyolite tuffs, muds, cherty tuffites, and cherts intermixed with altered dacite dacite-rhyolite lapilli tuffs.

2.

Alteration in the mineral horizon consists primarily of sericite-pyrite and locally, anastomosing zones of silica veins and pervasive silicification. The alteration extends for distances up to 30 metres into the overlying dacite-rhyolite pyroclastic package, indicating hydrothermal activity continued after the main phase of sulphide deposition. The mineral horizon is underlain by a discordant alteration pipe which can be traced on surface for 1 km and occurs primarily in andesite volcanics. The pipe contains pyrite (5-25%), sericite and phlogopite zoned outward from a sericite-pyrite core through a transition zone of phlogopite-pyrite to an outer zone of pyrite. An adjacent, separate alteration pipe 400 m to the west formed slightly later at a higher stratigraphic level. No mineralization of significance has been found to date associated with this pipe.

The intimate spatial relationship of the mineralized lenses with volcanic rocks indicates that sulphide formation was an integral part of, and related to volcanism.

Dec. 8/89  
NWMA

TULSEQUOIA  
CHIEF

## TULSEQUOIA CHIEF

- Casselman
  - 1923 - disc.  $\sim 750,000$  yrs from 1 m tons total  
Hot Rx = Pre-Pennsylvanian-Permian pool from TC (+ Big Bull)
  - dacite-rhyolite pyroclastics = felsic centre  
(Big Bull one closer to TC)
  - Mineral horizons occur at transition from Fw andesite  
+ Hw rhyolite (at base of rhyolite).
  - Fw alt'n pipe in ands. volcs. = ore zones
  - younger alt'n pipe (to west)  $\rightarrow$  no min.
  - major growth faults or graben on sea floor  
with subsequent reactivation = thickening on min. horizons
  - Rocks - 50 to 80° dip to north
  - Later Tertiary rhy dykes (Stoko op) occupy faults
  - 'AB' lens - coalescing of 'older' 'A' & 'B' lenses  
at depth = very exciting!
  - 'G' lens is down dip extension of original disc. zone.
  - Great E-W composite vertical x-sec. - slide!!
  - Rhyolite 'capped' fumarolic process with some  
'leakage' of veinlets  $\pm$  min. up into Hw dac-rhy.
  - locally fragmented ore = growth along faults + soft-sed defn.
  - Westmin analogue!!
- $\rightarrow$  excellent talk!! - Needs age dating!



Feb. 23/88 - Mike Casselman & Han.



- Diorite bodies (ies) <sup>(creval?)</sup> tend to push apart (separate) the stratigraphy
- Mineralization occurs at base of felsic (rhyodacite) unit at contact with footwall andesite (cf. top)
- Distinct feeder stringer (pipe) footwall zone with ab. dissem. & frac. filled pyrite.
- Mike C. believes the A & B 'Shear' zones are all part of one 'horizon' which has been disrupted by faulting (pulling apart) - a la graben

Ted Muraro mapped Big Bull

- Mine Fault near Tulsequah P. could have significance - however, seismic surveys by Cominco show no bedrock to at least 200 ft.
- 'Lower' volcs. & 'upper' volcs.
- Dacite plug is real - subvolcanic
- Chemistry of volcs. shows andesite (tholeiitic) to rhyodacite (calc-alkaline)  
note Cominco (mc) has good recent data.
- looks like strat. dips steeply NW with plunge to N (note dist'n of 1st.)
- Anticlinal structure indicated

CONFIDENTIAL: Target is 5 m tons @ previous grade.

1987 Program: 5 deep dth located two intenses.  
in footwall and at east portion

Proposed 1988: Further drilling - surface & u/c

'Mine Fault' appears to separate a western & eastern package of rocks.

660-2653

### MINERALIZATION IN THE TULSEQUAH-TAKU RIVER AREA,

Northwestern British Columbia

by: Tom Schroeter and Bob Lane

British Columbia Ministry of Energy, Mines & Petroleum Resources

Geological Survey Branch

Vancouver, B.C.

The Tulsequah-Taku River area in northwestern British Columbia has been the scene of prospecting and mining periodically since the discovery of gold along the Taku River as early as 1875 and during the Klondike Rush of 1897-1898. Despite mining operations at the Polaris-Taku, Tulsequah Chief, and Big Bull mines between 1937 and 1957, no road access has ever been established into the area. When mining ceased, due primarily to low metal prices, reserves remained which have recently become the attraction for a 'modern' search for both precious and base metals. Also, rapidly receding glaciers

have left new exposures leading the discovery of new showings eg. Maple Leaf.

apparently hosted stuff like Mt Stapler, which may be Deramb-Mts.

The area is underlain by rocks of the Stikine Alexander Terrane where it abuts against gneisses of the Tracy

Arm Terrane to the south and the Nelling Terrane to the northwest, and plutonic rocks of the Coast

Plutonic complex. Stikine Alexander Terrane rocks are dominantly proximal facies andesitic island arc

volcanics and are believed to be age equivalent to the late Paleozoic tuffaceous and argillaceous

sedimentary rocks near Tatsamenie Lake. The Paleozoic volcanic-sedimentary packages near the

Tulsequah-Taku River confluence are exposed in four distinct fault-bounded blocks, each which

contains a discrete lithological suite. The Mount Eaton-Mount Ericksen blocks comprise the Tulsequah

sequence, which hosts the volcanogenic massive sulphide deposits, and is dominated by massive and

pyroclastic andesitic rocks with interbedded rhyolitic rocks in a section at least 5 km thick. About ten

per cent of the sequence consists of interbedded, characteristically discontinuous, sedimentary units.

During periods of quiescence in andesitic volcanism, several sedimentary basins, reefs, and rhyolite

eruptive centres developed in several stratigraphic levels, in part controlled by synvolcanic growth

facets. Volcanogenic massive sulphide deposits of the Kuroko-type formed on the sea floor near the

if you look at map, ab 500' thick 500' of suites

middle Paleozoic?

transition from andesitic to rhyolitic volcanism. Fusulinids from limestone units intercalated with massive andesite in the Tulsequah sequence stratigraphically <sup>below</sup> above the massive sulphide deposits are



Middle Pennsylvanian in age. Recent galena lead isotope interpretation of data from the Tulsequah

Chief deposits suggests a Devonian age for the volcanogenic massive sulphide deposits in the area. An analogy further analogy is made to the Myra Falls deposits on Vancouver Island. If analogies across terranes and age boundaries, why not Britannia?

Upper Triassic, including the regional Sinwa Formation limestone marker horizon, and younger strata

in the Taku embayment to the east reflect folding and thrusting tectonically related over a moderately long time interval. During the latter stages of deformation of rocks in the Taku embayment, the Slicko

Group of Late Cretaceous to Early Tertiary age formed, in part related to intrusion of medium to high level plutons and stocks, eg. Mt. Ogden. Plutonic rocks of Early Triassic to Early Tertiary age intrude

the Tulsequah sequence.

Rocks in the Tulsequah sequence have been affected by lower green schist metamorphism with cleavage and bedding trending predominantly north-northwesterly with dips to the west. Tight

folding occurs with north-northwest trending axes. Late stage faulting has produced moderate right lateral displacements. The Chief Fault is postulated to have offset what was once a composite volcanic

centre which hosted the Big Bull and Tulsequah Chief massive sulphide deposits.

Previous mining in the area, from the Polarie-Taku, Tulsequah Chief and Big Bull mines, is valued at approximately \$240 million; current mineral inventories add an additional \$1,160 million (in 1990

dollars). Broad regional alteration and mineralization zoning patterns, both vertically and laterally, exist from the deeper level porphyry setting to peripheral and overlying mesothermal vein systems and volcanogenic massive sulphide environments.

The Tulsequah Chief (and Big Bull) deposits produced, between 1951 and 1957, approximately 1 million tons of ore yielding 44,254 ounces gold, 3.4 million ounces silver, 13,603 tons copper,

13,463 tons lead, 62,346 tons zinc, and 227 tons cadmium. At least seven separate, conformable lenses of massive, zoned py-cp-sp-gn-tet in a q-sc-be-ah and minor carbonate gangue occur over a strike length of

500 metres in the 'Mineral Horizon', a transition zone consisting of dacitic and rhyolitic pyroclastics with fine cherty tuff and mud between footwall andesitic and hangingwall acidic pyroclastic rocks. This

as you state below

Devonian highly unlikely given their stratigraphic position!

really interesting? Part I didn't have this. Is it a growth fault??

this is awful

I don't see a connect between Tuls. Chief and andesite or porphyry veins

\*Somebody from Cominco started this myth which isn't true. They're below; the orebodies are next to massive

sequence has been intruded by diorites and dacites of unknown age and by Tertiary rhyolites.

Historically, ore shoots average 40 feet in thickness. DDH-90-22 intersected a possible new 'H' lens which assayed 2.98% Cu, 1.8% Pb, 9.1% Zn, 0.11 opt Au, and 5 opt Ag over 164 feet. Current geological reserves for the AS Lens are estimated at 5.8 million tons grading 1.6% Cu, 1.31% Pb, 7.03% Zn, 0.08 opt Au and 2.93 opt Ag.

The Polarie-Taku gold mine produced, between 1937 and 1951, 750,255 tons of ore yielding 231,604 ounces of gold at grades between 0.25 and 0.6 opt gold. Ore shoots, occurring in shear zones in veins, associated with Sloko Group (Tertiary) dykes, range from 1 to 15 feet in width. Gold occurs in arsenopyrite ± associated stibnite in andesite and silicified tuffs. Gangue minerals include fuchsite and carbonate. Current reserves are estimated at 1.13 million tons grading 0.44 ounces gold per ton.

A belt of several small intrusions (Lester Jones intrusions) cut rocks of the Taku embayment.

Associated with these are broad zones of alteration, dominated by pyrite and carbonate with veins containing quartz, carbonate, and a wide variety of sulphides, suggestive of a porphyry to mesothermal vein 'transitional' setting. The Red Cap prospect is an example of a potential large polymetallic porphyry system.

The Mt. Ogden porphyry molybdenum-tungsten deposit is hosted by a Cretaceous to Tertiary age, high-level, Na-rich alaskite which intrudes schists and gneisses. Between 1978 and 1981, some 2.2 million dollars were spent exploring this deposit which yielded surface grades of 0.2 to 0.3% MoS<sub>2</sub>. One high grade vein is estimated to contain 30,000 tons of 1.85% MoS<sub>2</sub>.

TS:JB

NWBC.DOC

Tom: Summary of comments. Jan 15 1991

Generally a worthwhile contribution on an exciting ~~and~~ area that deserves to be better known.

A few comments. (Please ignore uncircled comments on abstract I was "on my high horse" which I do do if not restrained!)

1. Stikine not Alexander. Our proximal facies correlates with Stikine Assemblage in Jimma Derek's country.
2. "includes" not "is dominated by": see our map. Proximal facies Late Paleozoic is restricted to the Mt Eaton - Mt Ericksen structural block.
3. Age of the Tulsequah Chief deposit: I realize that in our 1974 John & I were not explicit about this, although it is implied in the map. The Middle Pennsylvanian fossils are from the core of a major, upright, northerly-trending anticline. The Tulsequah Chief and Big Bull deposits are on its western limb, below a major limestone unit that we inferred to be Early Permian on the basis of comparison with thick limestones farther south in the Stikine Assemblage, from which Jack Senter got E Permian faunas. Therefore the VMS deposits are post Middle P, pre-Early Permian.

4. Lead isotopes. I talked with Dani A. after our phone conversation. Your lead isotopic data is very exciting in that for the first time it allows the development of a local lead growth curve for Stikinia when combined with Dani's Jurassic and Eocene data. This would provide a powerful tool for interpreting other deposits in the terrane. For instance, the Erickson deposit was thought to be epigenetic, a skarn, until John Payne interpreted it as syngenetic: a local lead growth curve could aid in discriminating which of these models is right. Also Hatcho Creek. I seem to remember it started off Paleozoic, before it became Late Triassic. Again, lead might help.

Still  
controversial

So I'm glad to hear you have more isotopes in the works. Why not aim at a joint paper with Dani, Colin, and myself to present a Stikinian lead growth curve? See what Colin thinks.

Needs  
Follow  
Up.

P.S. Dani showed me the lead data from Tulsequah you sent him. I couldn't resist plotting it up. It makes a lovely growth curve with his stuff!

Can I  
see a  
copy?

Thanks much for sharing this with me. Should be an excellent paper. Regards THX

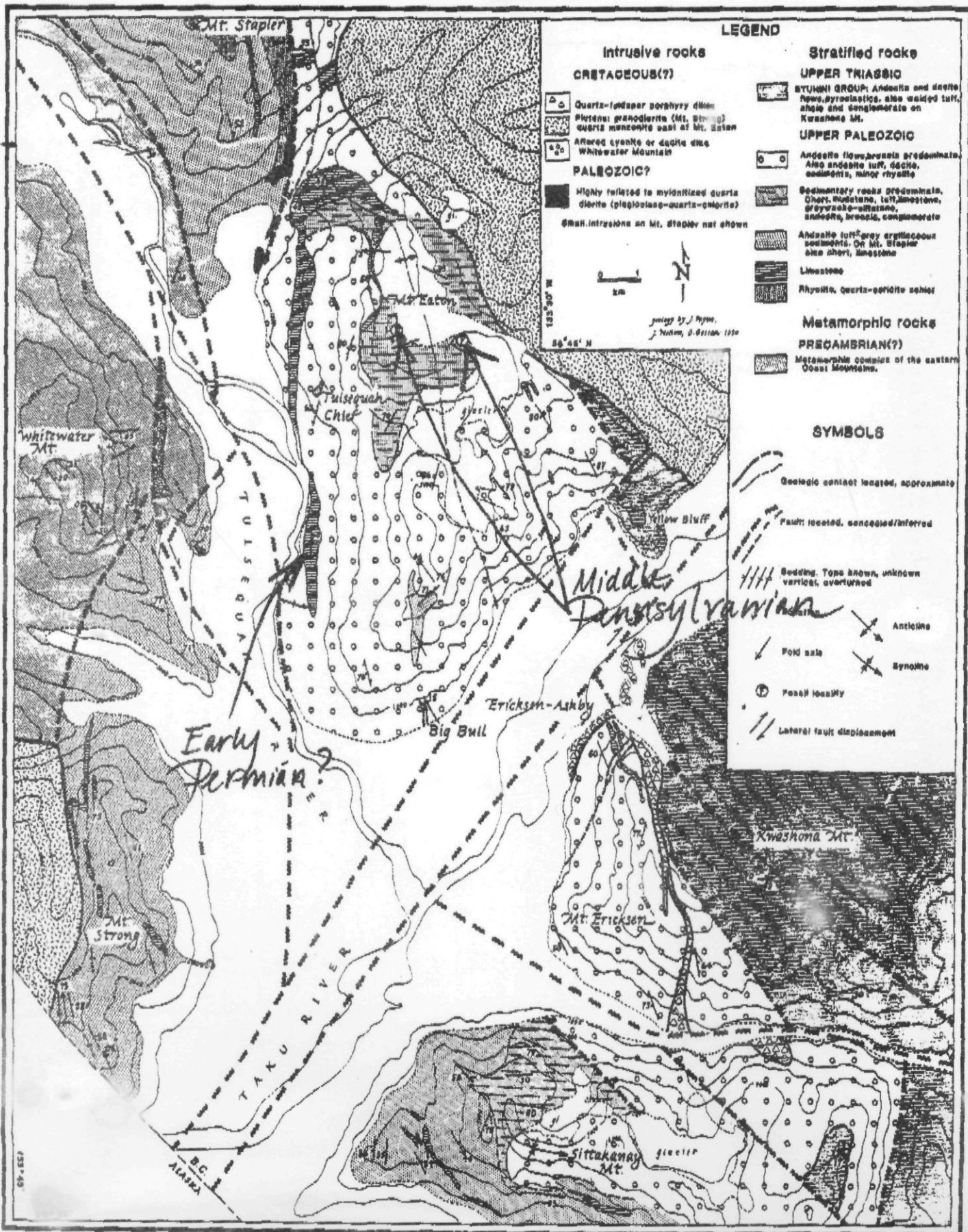


FIG. 1. Regional geology, Tulsequah-Taku area, British Columbia.



1992 "SNAPSHOT" REVIEW FORM

→ Tul. Chief

Property/Project

Authors

Name : Tulsequah Chief-Big Bull Property  
 NTS : 104K  
 Claims : Crown grants and newer claims

John A. Greig

Acreage : 7700 hectares

Commodities : Volcanogenic massive sulphide (Kuroko type) Cu, Pb, Zn, Au, Ag

Agreements

Property is 100% owned by Redfern Resources Ltd. since July 1992.

History

Past Exploration Techniques	By Whom	Amount	Type	Cost
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Past Development (if any)	By Whom	Amount	Type	Cost
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Past Production (if any)	By Whom	Tonnage (s)	Method	Grade
1951-1957				
Tulsequah Chief	Cominco	575,000 tonnes	shrinkage &	1.5% Cu, 1.4% Pb,
Big Bull	Cominco	360,000 tonnes	open stope	6.9% Zn, 4.1 gm/ton.
				Au, 26.7 gm/tonne Ag
			Reasons for shut-down	
			Low metal prices	

Geology

Regional

Folded faulted and tilted basaltic-andesite flows and fragmentals with lesser felsics and sediments. Lower Carboniferous age (350 my).

Local

Massive sulphide host rocks are dacite felsic volcanoclastics tightly folded with fold axes plunging north at 60°.

Alteration/

Ore Forming Minerals

Alteration pipe extends 750 meters into the footwall and is characterized by sericite, pyrite, silicification and minor cordierite - one forming minerals are chalcopyrite, sphalerite and galena.

275 m lbs Cu  
 1113 m lbs Zn

688 k oz Au  
 275 billion oz Ag

\$1.5 billion (at today's prices)

## Current Exploration Results

1987-1992

i ) Geology - Massive sulphides are contained in 2 lenses the AB and H. The stratigraphically higher H lens contains 85% of the reserves. The host rocks, comprised of felsic volcanoclastics are folded into a syncline plunging NNW at 60°. Sulphides are structurally thickened along the fold axis. True thicknesses range from 2 to 8 meters in the AB lens and from 2 to 38 meters in the H. Ore grade mineralization extends over a vertical range of 730 meters and up to 400 meters on strike, and is open to depth and on strike to the west.

Approximately 27,000 meters of drilling has been completed to date. The potential for additional reserves is excellent as there are 3 other separate massive sulphide systems on the property which have yet to be explored.

Preliminary testing suggests excellent metallurgy. Competent wall rocks should result in good underground mining conditions.

Cu conc. 25%  
60% Pb  
55% Zn

25-30% Au by gravity  
pre-feasibility study in progress

- Potential for 20m tons

Reserves: Geological, possible, 7.8 million tonnes 1991  
probable and/or proven est. 8.2 million tonnes 1992 all probable  
Number of ~~zones~~ lenses: 2  
Number of sample points 40 drill hole penetrations  
Average grade 1.6% Cu, 1.2% Pb, 6.5% Zn, 2.75 gm/tonne Au, 109.6 gm/tonne Ag  
Average thickness 10 meters  
~~Cut-off-grade~~

Costs: Recent exploration costs,  
i.e. (relating to above) 1987-1992 \$9 million

Projected exploration costs of  
program to development (if any) \$10-15 million

Projected development costs  
given positive economics \*estimate \$125 million

Projected operating costs  
given positive economics \*estimate \$50/tonne

\* Based on preliminary feasibility studies

# TULSEQUAH CHIEF

CIM District 6

Oct 3/92

- John Greig
- Since 1987 ~ \$8 million spent on expl'n.
- Min. over 2400 ft. vertical
- 1000 to 1500 ft. thickness of (rhyolite) dacite
- faulting is right lateral (eg. 300 ft. movement)
- north-south trending synclines
- \* Cordierite in upper part of breccia, alt'n pipe
- upper greenschist - lower amphibolite facies
- \* \$1.6 billion - gross value in ground

72,500 ft. of ddh drilled to date

90-22 - best hole, 1267 ft. true thickness

91-33 - " " in 1991

- good prelim. metallurgy
- 85-90% for Cu, Pb, Zn
- Cu - 25% Cu
- Pb - 60%
- Zn - 55%

25-30% of Au by gravity

[Barite]

1992 Budget  
\$1.5m

- \$130m Capital cost

Payback - 2 yr

- 3000 jobs - mining

IRR ≈ 25%

- ~~NPV (10%) =~~

- major surface mapping program in progress

TULSEQUAH CHIEF

①

Nov. 26/91

- talk with Paul McGuigan (contract to Kelfern via Cambria Geol.)
- work (reinterpretation) by Paul & Walter Melnyk (based on computer 'manipulation' of all data)
- required proper survey data (not previously avail.)
- Three (3) main sequences (cycles) of felsic domes with interbedded andesitic flows, i.e. no diorite dykes. Each cycle ranges from 200 to 500 ft. in thickness. The vertical range extends from the deepest intersection (below Tulsequah River) to above the Discovery Showing. The thesis that potential exists above the 5400 level is new & exciting (i.e. would double the importance of any new one found due to 'gravity' feed). Paul feels the eastern limb of the synclinal package could extend all the way 'up' to Mt. Eaton.
- General package of volcs. consists of a broad fold structure with more than one internal synclinal structures. Paul believes (has demonstrated) that the most significant one 'hosts' the significant H-Lens (and as yet untested underlying AB Lens). The previous AB Lens is located on a synclinal structure to the west. Synclinal axes plunge @ 60° to NW. It is interesting (significant) to note that the trend of synclinal axes parallels the trend of the faults (e.g. 4400 E, etc.) i.e. faults are result of 'break' in fold hinge.

(2)

## TULSEQUAH - CHIEF (cont'd)

- Mineralized horizon in the H-fens can be remarkably traced from drill holes, both vertically & laterally. The base of the horizon appears to be massive 'syngenetic' pyrite, with increasing amts. of  $\text{Cu}$ ,  $\text{Pb}$ , &  $\text{Zn}$ , and chert & barite gangue. Actually can 'delineate' barite in HW.
- Cherts <sup>to cherty-tuffs</sup> are recognizable units in the sequence (distinguished by their overall hardness, relative to 'softer' sericite-silica rich altered rocks).
- sedimentary rocks (shales) also occur in HW.

POTENTIAL: Excellent

- to 'promote' at NWMA 91

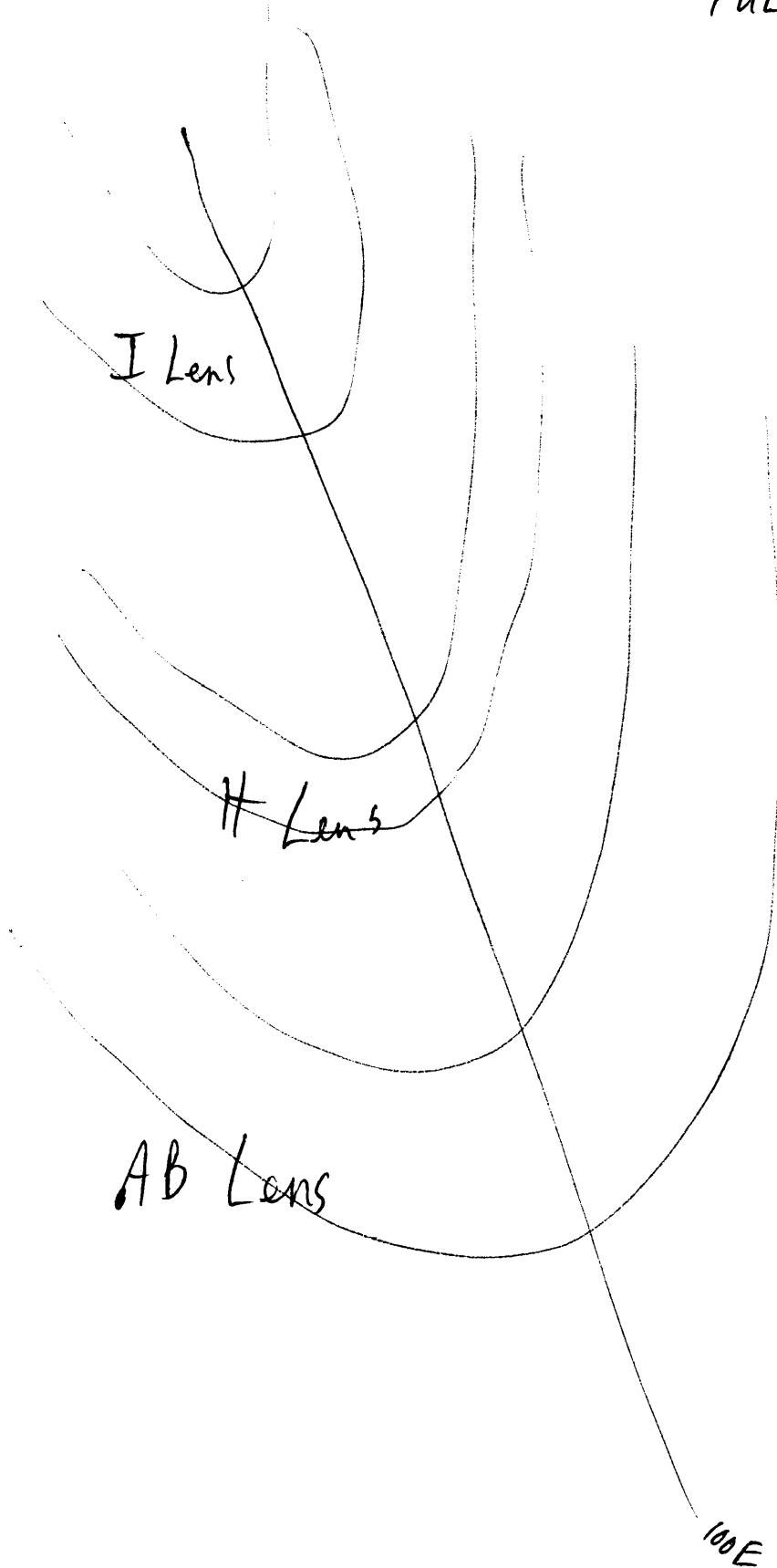
- invitation to view Mine Model

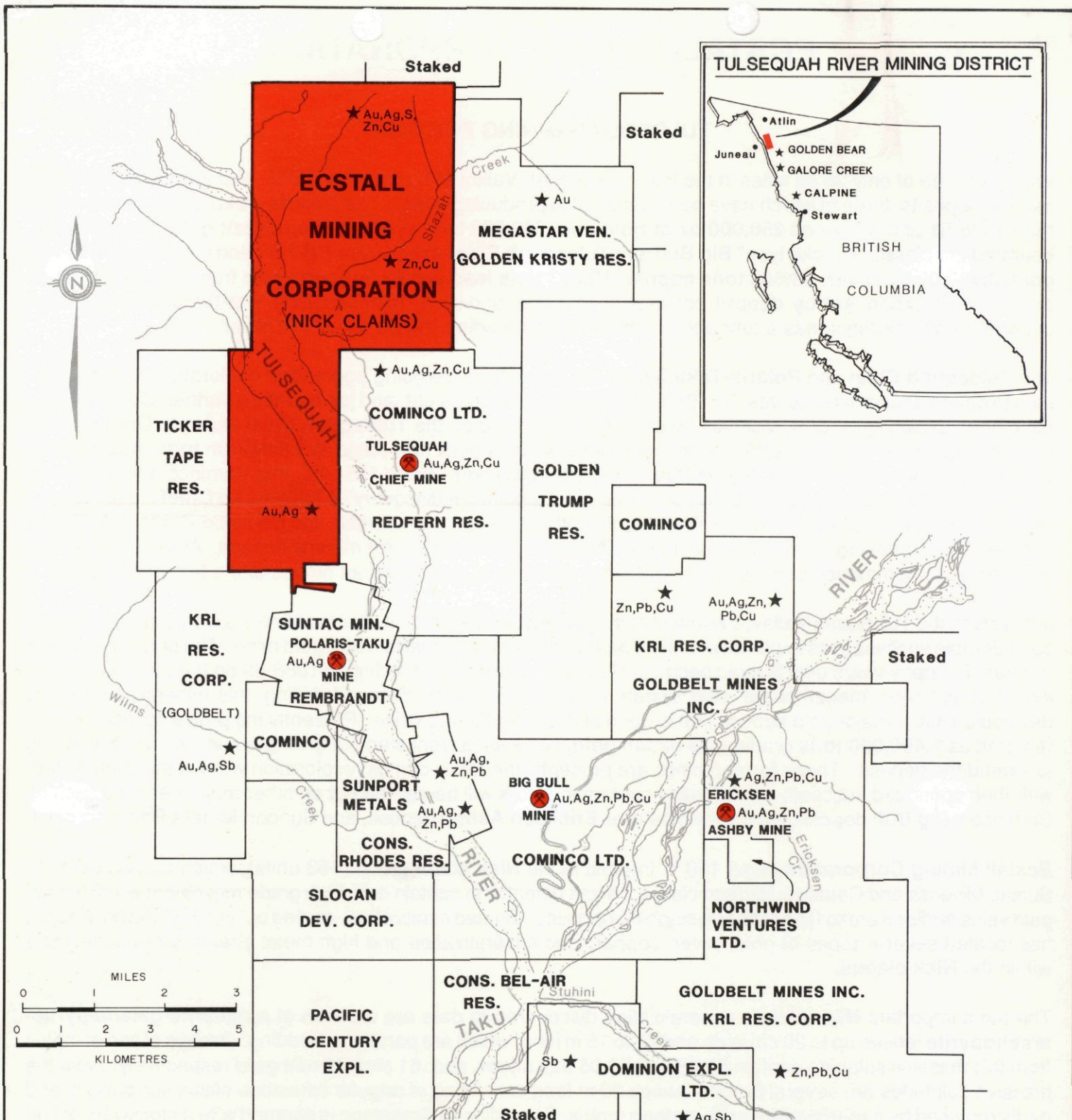
TULSEQUAH CHIEF

Nov. 26/91

N

S





## ECSTALL MINING CORPORATION

V.S.E. SYMBOL: EAM

307 - 475 HOWE STREET, VANCOUVER, B.C. V6C 2B3

TELEPHONE: (604) 681-4402 TELECOPIER: (604) 685-8367

PROPERTY HOLDINGS

## TULSEQUAH RIVER MINING DIVISION

N.W. BRITISH COLUMBIA

# ECSTALL MINING CORPORATION

## TULSEQUAH MINING DISTRICT

Within an area of only 25 sq miles in the lower Tulsequah Valley of northwestern B.C., there are four significant mineral deposits, three of which have been substantial producing mines. The **Polaris-Taku** gold mine operated from 1938-51 and produced **250,000 oz of gold** from 760,000 tons of ore grading **.3 oz/t gold**. Cominco Ltd. operated the classic "Kuroko type" **Big Bull** and **Tulsequah Chief** mines from 1951-57 and produced **94,254 oz gold, 3,400,00 oz silver, 13,603 tons copper, 13,463 tons lead and 62,346 tons zinc** from 1,029,089 tons of ore. The **Ericksen Ashby** deposit consists of massive zinc-silver mineralization that through surface and underground exploration has a tonnage of **1 million tons** grading **7% Zn and 6 oz/t silver**.

The **Tulsequah Chief** and **Polaris-Taku Mines** are currently undergoing aggressive exploration drill programmes to define additional reserves. In 1988-89, Redfern Resources Ltd. and joint-venture partner, Cominco Ltd., have been exploring for new reserves by underground drilling on the **Tulsequah Chief** deposit. Drill indicated ore reserves at this classic "Kuroko type" massive sulphide deposit now stand at **5.8 million tons** grading **1.6% copper, 1.3% lead, 7.0% zinc, .08 oz/t gold and 2.9 oz/t silver**. From 1951-57, this Cominco operated mine produced 750,000 tons of similar grade ore. The most significant discovery at **Tulsequah Chief** is that several separate massive sulphide lenses are merging at depth into one major deposit, and Cominco-Redfern anticipate substantially increasing ore reserves by further deep diamond drilling of the mineral horizon. As well, infill drilling is expected to commence soon to define proven ore reserves, as the project moves to the feasibility stage.

Just across the Tulsequah Valley, 5 km west of the **Tulsequah Chief** mine, Suntac Minerals Corporation is having considerable success in its exploration drilling programmes at the **Polaris-Taku** gold mine. The property had lain dormant for many years until Suntac began surface and underground drilling in 1988-89 on the strike and depth extent of its major "mesothermal" vein system (Y Vein). From the diamond drilling, this mineralized zone is developing into a major gold deposit that is open at depth and along strike. Presently the probable reserves are reported as **1,450,000 tons** grading **.38 oz/ton gold**, however current step out drilling is successfully continuing to extend the deposit. These former mines are presently the focus of most exploration work in the district, and, with their continued success, considerable exploration work will be carried out on other major deposits such as Cominco's **Big Bull** deposit, Northwind Ventures **Ericksen Ashby** deposit, and Sunport Metal's Banker project.

**Ecstall Mining Corporation** owns 100 % interest in the **Nick claim group** (163 units), which adjoins both the Suntac Minerals and Cominco-Redfern claims. It has potential to contain both high grade mesothermal/epithermal gold veins and/or Kuroko type massive sulphide deposits. Limited exploration, carried out in 1989 and previously, has located several zones of gold, silver, copper, zinc mineralization and high metal stream silt geochemistry within the **Nick claims**.

The most important **Nick claims** mineralization discovered to date are a series of **sphalerite-galena-pyrite-arsenopyrite** lenses up to 20 cm wide and 10 to 15 m long, which are parallel to bedding. Assays of two samples from this massive sulphide contain **64.19 and 55.05 oz/t silver**, and **.61 and .70 oz/t gold** respectively. Near the massive sulphides are several breccia lenses 30 m long consisting of angular limestone clasts surrounded and partly replaced by a **pyrite-sphalerite-galena** matrix. The adjacent limestone is seamed with a stockwork of fine native **sulphur veins** and scattered copper-stained cherty veins which may represent the feeder system for a sulphide accumulation.

Elsewhere on the **Nick claims**, a massive sulphide zone 50 cm wide occurs in banded and brecciated rhyolite on Shazah Creek. The sulphide is pyrrhotite with scattered patches of chalcopyrite. The presence of coarse rhyolite breccias and minor massive sulphides suggest that a volcanic centre may lie under alluvium in Shazah Creek Valley. Favourable stream sediment and soil geochemical results from this area further indicate the proximity of unexposed massive sulphide bodies.

An aggressive exploration programme will be carried out this year to further explore the **Nick claims** in order to locate mineralization and define diamond drilling targets.