TOS → Tulsequah Chief
NWMA '94
Core Shack.

TULSEQUAH CHIEF PROJECT, NORTHWESTERN B.C.

EXPLORATION AND FEASIBILITY PROGRESS
1994

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SUMMARY

Redfern Resources Ltd. is the 100 percent beneficial owner of the Tulsequah Chief volcanogenic massive sulphide property which is located 100 km south of Atlin, B.C. and 64 km northeast of Juneau, Alaska. Cominco Ltd. mined and milled over 900,000 tonnes from the property in the 1950's, shipping copper concentrates by barge to Tacoma and lead and zinc concentrates to Vancouver and thence to Trail, B.C.

Redfern Resources has delineated a minable reserve of 7 million tonnes to a depth of 700 m, at a mill head grade of 6.4 % zinc, 1.4% copper, 1.1% lead, 2.4 grams per tonne gold and 93.4 grams per tonne silver. Prospectus and environmental protocol documents have been submitted to Government, and a final feasibility is in progress. Production at a milling rate of 2250 tonnes per day is planned to commence in 1998. Pre-feasibility studies estimate capital costs at Canadian $140 million, and operating costs under $50.00 per tonne. Net smelter returns will exceed $100.00 per tonne at current metal prices.

HISTORY

The Tulsequah Chief deposit was discovered in 1923 and the nearby Big Bull deposit in 1929. Cominco acquired the properties in 1948 and leased the nearby Polaris Taku gold mill, converting it to a flotation plant for sulphide ores. Mining began in 1951 and milling at 500 tons per day continued until 1957 at which time low metal prices forced its closure. Production during the period totaled 933,520 tonnes grading 1.59% copper, 1.54% lead, 7.0% zinc, 3.84 grams per tonne gold and 126.51 grams per 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 until 1971, at which time it was recognized that the deposits were volcanogenic massive sulphides (VMS) similar to the "Kuroko" deposits in Japan. Using the VMS model, Redfern and Cominco geologists discovered a new ore horizon at the Tulsequah Chief and expanded reserves dramatically in diamond drilling 57 holes (26,245 m) during the period 1987 through 1992. In June, 1992, Redfern Resources purchased Cominco's remaining 60% interest in the property, giving Redfern 100% of the interests.

TULSEQUAH CHIEF DEPOSIT

The Tulsequah Chief deposits are precious metal-rich massive sulphide deposits hosted within the lowermost (Devono-Mississippian) stratigraphic units of the Devonian to Permian Mount Eaton suite. The Mount Eaton suite is primarily a bimodal volcanic suite that is mainly subalkalic and calc-alkaline in composition typical of an island-arc setting. In the immediate deposit area the Mount Eaton suite is divided into three major series based on relative abundance

of lithologies--Footwall series mafic volcanics (unit 1), Mine series dacites (unit 2) and Hanging Wall series mafic volcanics and sediments (unit 3). Within the Mine series, the I, H, AB_2, AB_1, massive sulphide lenses and their faulted extensions (F- and G-zone) are spatially and genetically related to felsic volcanic rocks. The deposits consist of thinly banded chert, barite, gypsum and massive sulphides. Local debris flow facies indicate 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 suite is folded into a northwesterly plunging anticlinal-synclinal fold pairs in the vicinity of the Tulsequah Chief Deposit. 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 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).

In 1993 Redfern conducted a comprehensive exploration program at the Tulsequah Chief deposit consisting of 6,238 meters of underground drilling and 1,812 meters of surface drilling. Extensions were added to existing grids at the Tulsequah Chief Mine as well as new grids covering prospective stratigraphy within the 9 kilometer strike separation of the Tulsequah Chief and Big Bull Mines. This work generated an additional 76 line kilometers of grid which was geologically mapped and covered by various combinations of gradient array I.P., magnetometer and VLF-EM geophysical surveys.

At the end of 1993 a revised reserve calculation totalled (all horizons and classes of reserve) 8,489,885 tonnes grading 1.41% copper, 1.23% lead, 6.65% zinc, 2.52 grams/tonne gold and 105.66 grams/tonne silver.

1994 EXPLORATION PROGRAM

Underground diamond drilling in 1994 totalled 5940 meters and focussed on extending the northwestern flanks of the H and G deposits with limited infill drilling on both lenses. Surface drilling (1700 meters) concentrated on felsic stratigraphy to the west of the Central Mine block. This drilling extended the main ore horizon a further 300 meters down dip from previous interpretations and outlined an area of significant exploration potential for future drilling.

SUMMARY - 1994 Diamond Drilling

Hole	Ore Lens	From(m)	To (m)	Width	Cu%	Pb%	Zn%	Au g/T	Ag g/T
TCU94061	G	250.50	252.10	1.60	0.47	0.42	2.39	1.16	39.81
TCU94062	H	468.80	471.58	2.78	1.21	0.52	3.52	0.96	58.09
TCU94062	H	514.72	517.94	3.22	0.43	0.73	2.63	1.56	61.28
TCU94063	G	283.30	285.10	1.80	1.81	0.74	4.87	1.36	45.35
TCU94064	G	306.80	308.30	1.50	0.79	0.47	2.66	0.16	21.67
TCU94065	H	407.05	420.60	13.55	2.92	1.15	11.65	3.07	159.02
TCU94065	AB2	430.00	432.25	2.25	0.48	2.36	11.77	3.27	116.86
TCU94065	AB1	451.59	456.00	4.41	0.07	0.49	1.19	0.51	5.95
TCU94066	H	385.34	388.58	3.24	0.74	0.75	2.65	2.77	164.69
TCU94067	G	302.70	303.50	0.80	1.47	0.76	4.97	1.23	85.37
TCU94068	G	353.65	356.55	2.90	0.51	0.88	2.58	2.74	92.91
TCU94069	G	249.00	251.00	2.00	0.33	2.08	5.54	6.17	166.01
TCU94070	G	308.20	309.20	1.00	0.97	0.22	1.68	1.51	49.03
TCU94071	G	227.30	231.40	4.10	0.75	0.72	4.02	1.98	69.43

In conjunction with underground and surface diamond drilling detailed mapping of the 5400 level and the rehabilitated 5200 level was completed in 1994.

FINAL FEASIBILITY

Work has commenced on a Final Feasibility Study and a Pre-Application for a Mine Development Certificate was filed with the B. C. Government in September of 1994.

Mine development plans are being developed by Dynatec Engineering in consultation with the Rock Group (geotechnical engineers). A decline will be driven from surface at -17% for 1,000 m to access the upper 20% of the reserves. While mining commences in the upper levels, a 5.5 m circular shaft will be sunk internally to a depth of -800 m. Ore will be crushed underground, hoisted up the shaft and conveyed out the decline to the mill. All primary underground development will be driven in the hangingwall series, to avoid the acid-generating rock types encountered in the altered footwall rocks. 75% of the ore will be mined by the open blasthole stoping method and 25% by the shrinkage method.

Metallurgical work is being conducted at Brenda Labs under the direction of Rescan Engineering, which company is also providing detailed engineering related to plant and surface facilities as well as infrastructure. A milling rate of 2250 tonnes per day is planned. A gravity circuit to recover 25% of the gold will be included following the SAG-Ball mill circuit. Zinc, copper and lead concentrates will be produced by differential flotation. Acid-generating pyrite will also be removed

from the tailings and returned to the mine together with cycloned tailings for delayed backfill in the blasthole stopes. The remaining tailings will be neutralized (if necessary) with locally mined and processed limestone, prior to impoundment in a lined storage facility. Bruce Geotechnical is responsible for all site investigation work.

Annual production is forecast to average:

Concentrate	Tonnes/year	Recovery	Grade
Zinc	85,000	87%	57%
Copper	40,000	87%	26%
Lead	15,000	91%	60%
	140.000		

The project will also yield 50,000 ounces of gold annually, and 2 million ounces of silver.

Several alternate access routes are being studied, two of which appear most feasible. The first requires the construction of 125 km of graveled road to connect with the existing highway near Atlin, B.C. Under this scenario, concentrates would be transported from the mine to the port of Skagway, Alaska, a distance of about 400 km. The second involves the barging of concentrates on a seasonal basis (3-5 months per year) from the mine to tidewater at the outlet of the Taku River (about 60 km). Concentrates would then be transferred from the River barges (800 tonnes) to ocean-going barges (8,000 tonnes) for transfer to one or more deep-water port facilities on the west coast. Thurber Engineering is doing the road access design work, and Sandwell Corporation is providing the Taku River route engineering.

PERMITTING

Rescan Environmental is managing all aspects of the environmental program, leading to the submission of the final application for a B.C. Mine Development Certificate in August, 1995.

Fisheries and wildlife values are particularly important along both access routes under investigation. Attention is being given to the management of any impacts from potential sources of acid mine drainage. Acid-Base accounting and humidity cell work is being conducted on all rock types and formations as part of this program. People from the Taku River Tlingit First Nation are actively involved in our environmental assessment process, and Redfern and the TRT are in the process of negotiating a Cooperation Agreement centered around the development of the Tulsequah Chief deposit.

The Alaskan and U.S.Federal governments are included in the permitting process, as are the Governments of Canada and British Columbia (principal agencies). Public consultations will also

be held in the communities of Atlin, B.C., Whitehorse, Y.T., Juneau and Skagway, Alaska.

Once permits are in place, Redfern Resources plans to commence construction in 1996 with the first shipment of concentrates in 1998. The operations will be conducted on a fly in and fly out basis, and will employ about 250 people directly, and an estimated 750 indirectly (suppliers, etc.).

THE FUTURE

Capital costs for the Tulsequah Chief Project are estimated at Canadian $140 million, and annual aftertax cash flows will total $50 million before payout, and $30 million thereafter. At current metal prices, the aftertax rate of return exceeds 20%. A project life of 11 years from the start of construction is indicated, based on the currently defined minable ore reserves. Limits of the main ore zone have not been determined below the -660 m level where some of the thickest and highest grade drill intercepts occur, and exploration potential over the 8 km of prospective terrain between the Tulsequah Chief and the Big Bull deposit is exceptionally high.

Redfern Resources is well positioned, with its high grade diversified metal deposits, to advance profitably into the field of mining operations and to make a significant contribution to the welfare of British Columbia and its neighbours in the Yukon Territory and Alaska. Redfern will do this in a manner consistent with good mining practice and enlightened sensitivity for the environment and the needs of the resident First Nation peoples.

BIG BULL DEPOSIT

The Big Bull deposit is located 8.5 km south of Tulsequah Chief deposit, on the north bank of the Taku River, and is associated with the same suite of felsic-mafic volcanic rocks.

The stratigraphy at Big Bull includes a mafic footwall that is overlain by an altered felsic package which is in turn overlain by second package of mafic rocks. The altered felsic package is the host to the massive sulphide mineralization. This sequence of rocks has been intruded by a diabase-textured mafic sill that has dilated the altered felsic interval, but is relatively unaltered itself, suggesting it was intruded after hydrothermal activity. This overall sequence of lithologies is similar to the stratigraphy at the Tulsequah Chief deposit.

In 1992, Cambria Geological Ltd. undertook a detailed surface mapping program at Big Bull and, in 1993, Redfern Resources Ltd. initiated a detailed compilation and exploration program. During 1993 to 1994, Redfern drilled 9084 metres in 27 holes, successfully demonstrating that massive sulphide mineralization continued below the old workings, with several holes intersecting ore grade material, including:

Hole	From	To	Drill Width (m)	Cu (%)	Pb (%)	Zn (%)	Au (g/t)	Ag (g/t)
BB93001	56.70	68.50	**11.80**	0.70	1.45	2.86	4.32	125.5
	107.70	114.20	**6.50**	0.27	1.33	3.89	3.67	68.5
BB93002	166.20	171.20	**4.80**	1.08	0.39	4.49	3.46	200.2
BB93005	180.60	184.60	**4.00**	0.44	2.92	5.05	6.38	169.7
BB93006	181.80	184.50	**2.70**	0.66	2.28	4.79	14.23	812.9
BB93008	318.10	322.40	**4.30**	0.26	1.87	3.54	3.02	123.0
BB94017	232.00	238.02	**6.02**	0.89	3.24	6.58	1.97	448.0
BB94019	212.15	215.75	**3.60**	0.33	3.99	11.22	2.49	252.1
BB94020	223.47	226.58	**3.11**	0.51	4.46	9.50	8.59	341.6
BB94024	320.10	324.26	**4.16**	0.09	0.72	1.46	3.70	248.1

Mineralization ranges from massive, banded sulphides, to 30 to 40% disseminated and stringer sulphides in a matrix of barite, sericite and silica. The mineralogy comprises pyrite, sphalerite, galena, chalcopyrite and tetrahedrite, in a matrix of barite and sericitized lithic fragments. The sulphides are recrystallized, with well developed annealed textures that have obliterated any primary features.

In addition to the massive sulphide mineralization at Big Bull, there is a second phase of hydrothermal activity represented by massive manganese oxide and silicates. This unit appears to occur stratigraphically above the massive sulphides, within the mafic tuffs. The manganese mineralization may represent a low temperature hydrothermal system that existed after the higher temperature system that formed the sulphides, or it may be a lateral facies equivalent of the massive sulphides. The structural complexity at the Big Bull deposit presently precludes the establishment of the sulphide-manganese relationships.

Rocks in the Big Bull area have been affected by two phases of folding and several episodes of faulting, creating an area of structural complexity. The lithologic contacts trend north-northwest, with steep dips to the southwest.

The first phase of folding consists of tight, approximately cylindrical, moderately overturned folds with axial planar cleavage oriented at about 140/84° southwest, and fold axes trending 321° and plunging at 30 to 50°. A second, very weak phase of folding is indicated by a spaced, planar crenulation fabric which does not appear to have significantly reoriented either S_0 or S_1 fabrics.

Brittle faulting is an important element in the structural history of the Big Bull deposit. The Bull fault is a northwest-striking, steeply west-dipping structure which is approximately axial planar to the Big Bull syncline. In many instances the Bull fault has disrupted the massive sulphide lenses, with brecciated and rotated mineralized blocks present in the fault gouge.

The fault has had a complex history involving several periods and directions of movement, the latest of which offsets a quartz feldspar porphyry dike of probable Eocene age. Although the amount and direction of displacement across the fault is unknown, apparent offsets of lithologic units suggest sinistral strike-slip movement.

Lithogeochemistry and stratigraphic relationships suggest that the Tulsequah Chief and Big Bull deposits are associated with the same bi-modal suite of volcanic rocks. The main difference between the two is the nature of the volcaniclastic rocks. Felsic volcanic rocks at Tulsequah Chief are primarily coarse grained debris-flows, flows and sills, while those at the Big Bull deposit are finely laminated and very fine grained, with well preserved bed forms and only rare flows or sills. The coarse-grained and poorly sorted nature of the felsic volcaniclastic rocks at Tulsequah Chief, and the prevalence of flows and sills suggests that they were deposited close to a felsic volcanic centre. The finer-grained and more well bedded nature of the felsic rocks at Big Bull suggest a more distal setting for the volcaniclastic rocks and related sulphide deposits.

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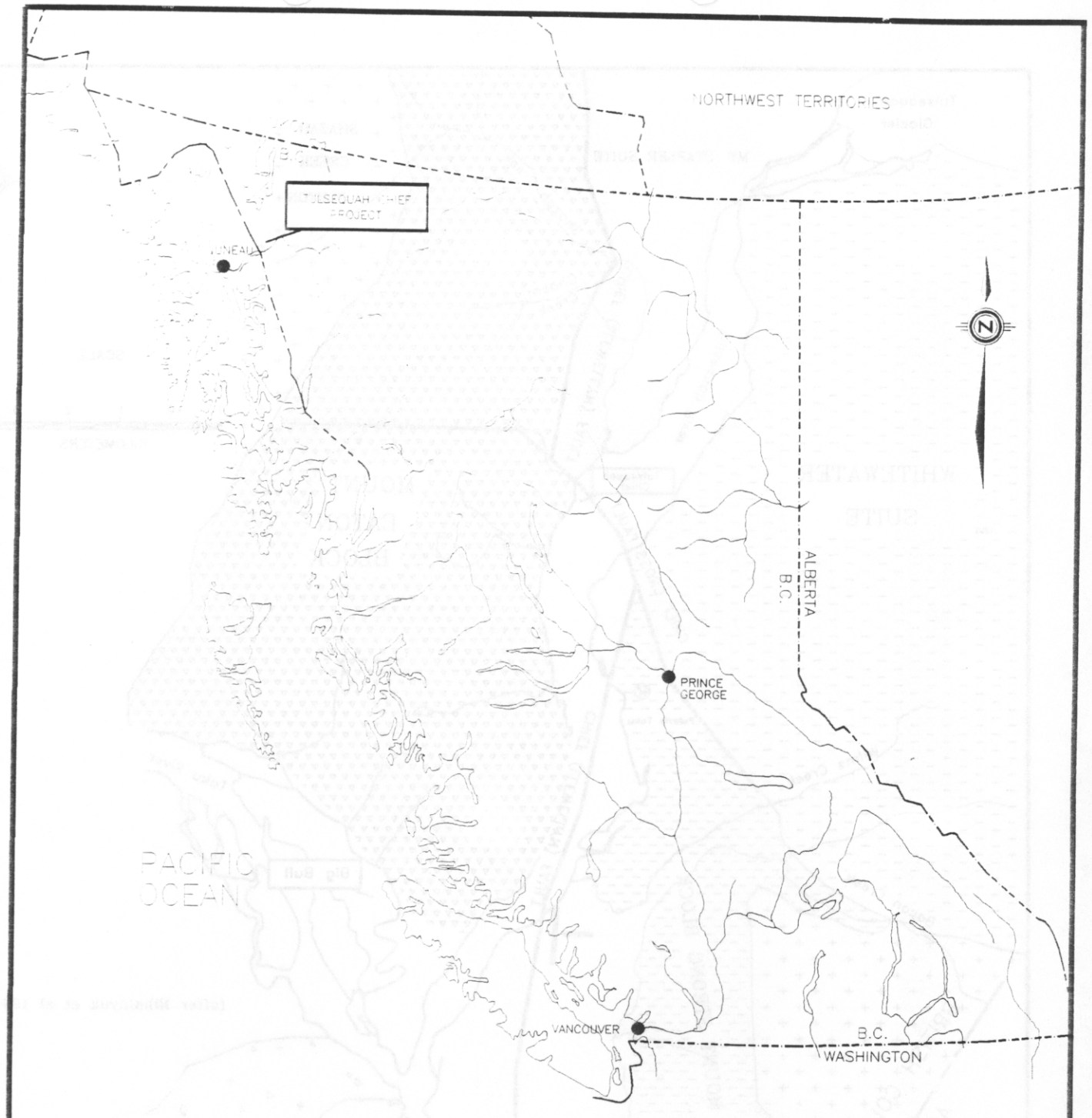
FIGURES



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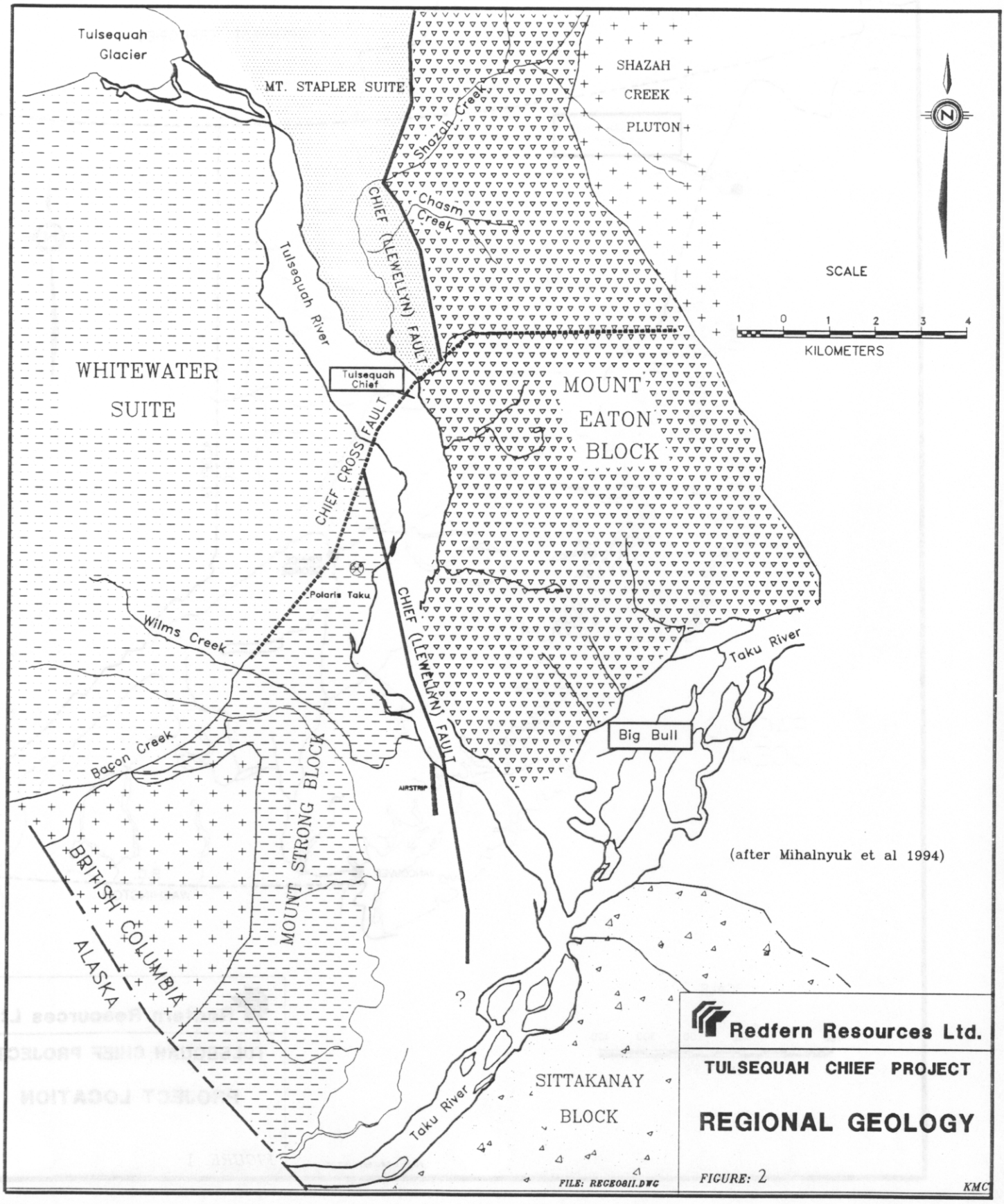
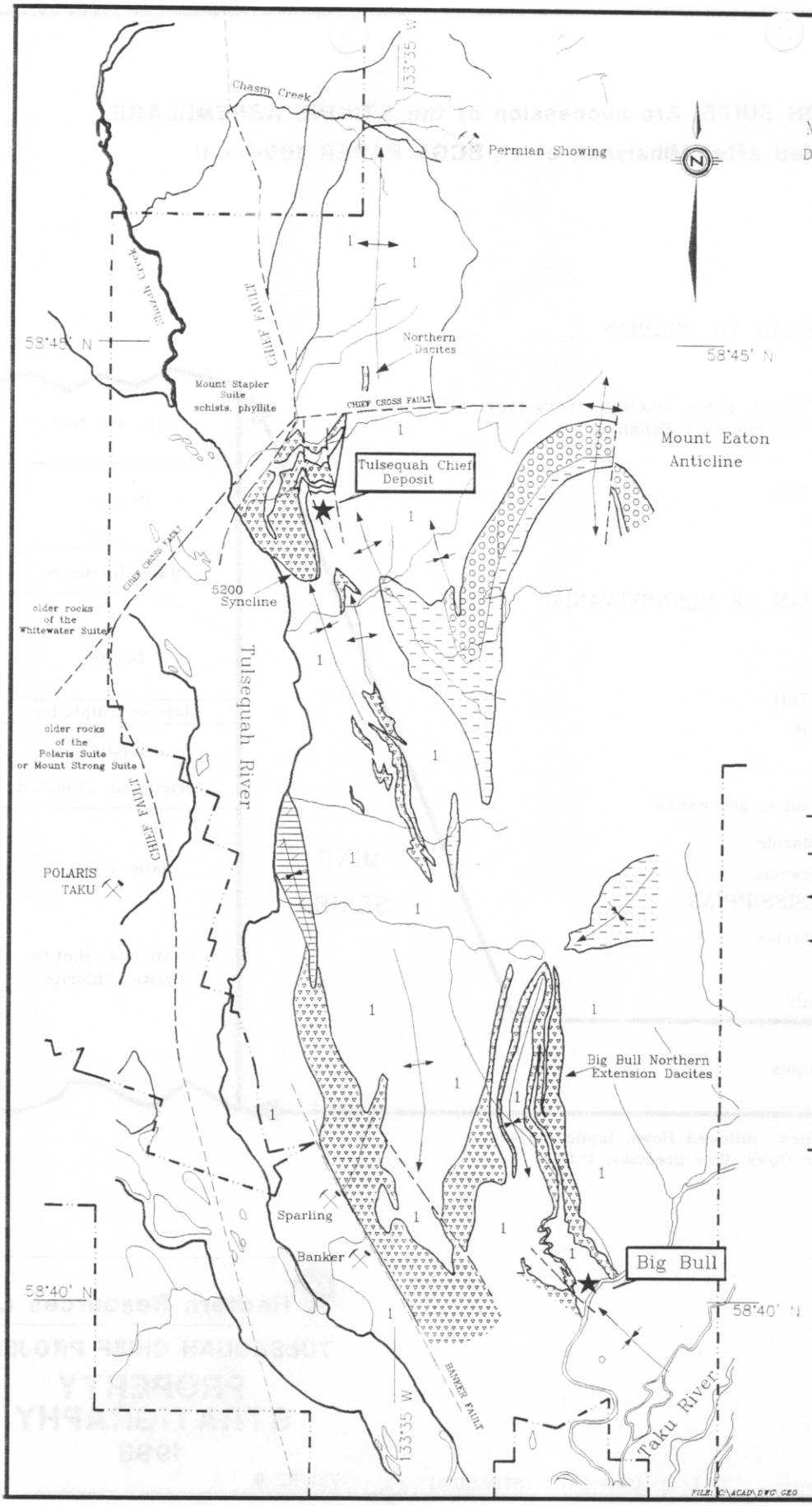
TULSEQUAH CHIEF PROJECT

PROJECT LOCATION

FIGURE: 1

FILE: D:DWG:8x11:BCLOC


Tulsequah Glacier
MT. STAPLER SUITE
SHAZAH CREEK PLUTON
Shazah Creek
Chasm Creek
CHIEF (LLEWELLYN) FAULT
Tulsequah River
Tulsequah Chief
WHITEWATER SUITE
CHIEF CROSS FAULT
MOUNT EATON BLOCK
Polaris Taku
Wilms Creek
Taku River
Big Bull
Bacon Creek
AIRSTRIP
MOUNT STRONG BLOCK
BRITISH COLUMBIA
ALASKA
?
SITTAKANAY BLOCK
Taku River
SCALE
1 0 1 2 3 4
KILOMETERS
(after Mihalnyuk et al 1994)
Redfern Resources Ltd.
TULSEQUAH CHIEF PROJECT
REGIONAL GEOLOGY
FIGURE: 2
FILE: REGEO811.DWG
KMC



LEGEND

MOUNT EATON SUITE:
Devono–Mississippian to Permian

Pennsylvanian to Permian

- Bioclastics, shale and Sedimentary exhalites

Mississippian or Pennsylvanian

- Maroon matrix volcanic Agglomerate
- Shale, chert and volcanic derived clastics

Early Mississippian

- Limestone Marble
- Felsic (dacitic) Volcanics
- 1 — MAFIC VOLCANICS not a single stratigraphic interval

SYMBOLS

- geological contact (defined, inferred)
- fault (defined, inferred)
- axis of syncline (direction of plunge)
- axis of anticline (direction of plunge)
- Massive Sulphide deposits
- Mineral occurrences

Regional geology modified from; Mihalnyuk, Smith et al B.C.G.S PAPER 1994 – 1; and Payne and Sisson (1987) B.C.M.E.M.P.R. Assessment Report 17054.

- PROPERTY BOUNDARY (March,1994)

SCALE

400 0 400 800 1200 1600

METRES

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TULSEQUAH CHIEF PROJECT

PROPERTY GEOLOGY

AND

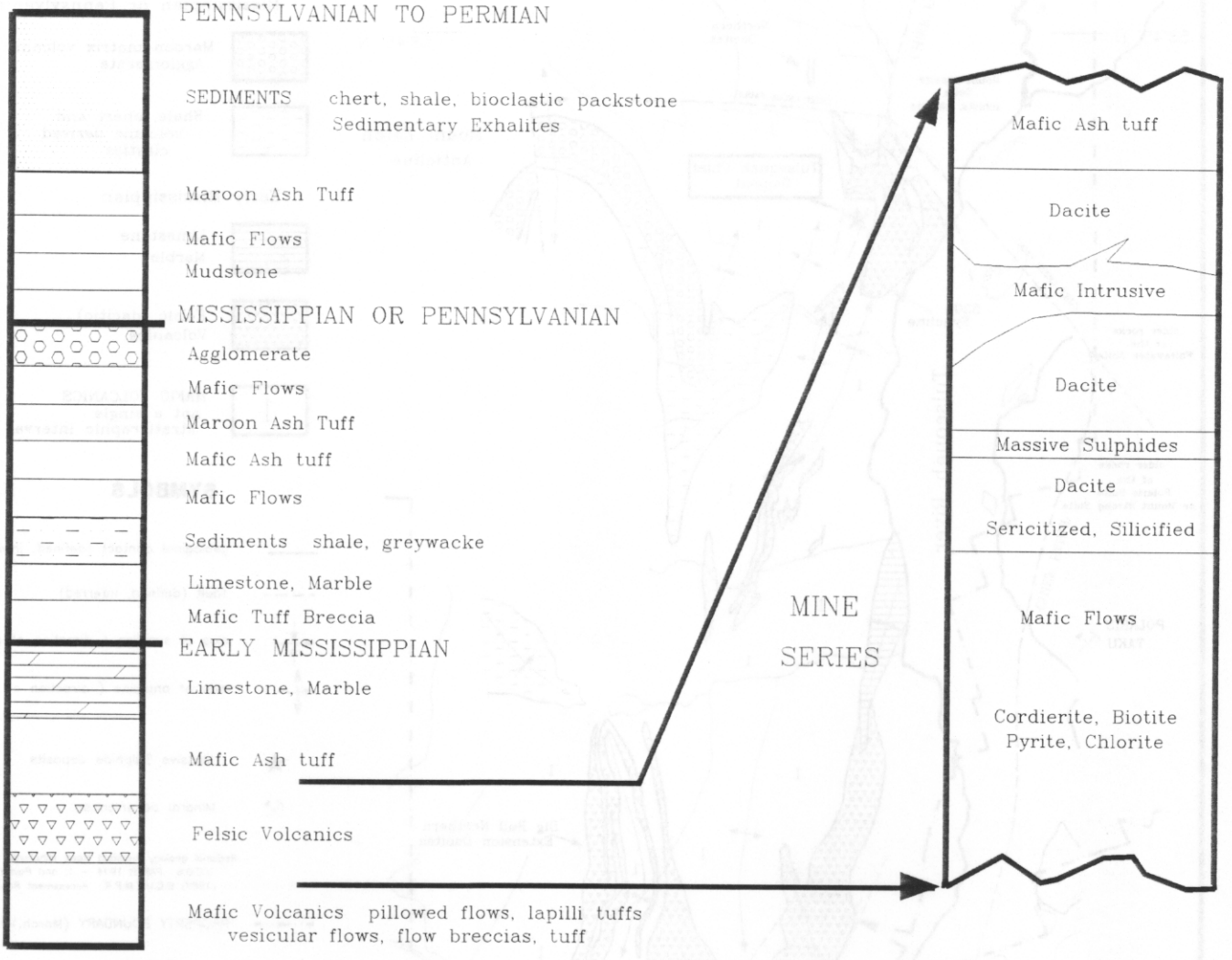
MINERAL OCCURRENCES

FIGURE: 3

FILE: C:\ACAD\DWG.GEO

KMC

MOUNT EATON SUITE; Arc succession of the STIKINE ASSEMBLAGE
(modified after Mihalynuk et al, BCGS PAPER 1994 - 1)



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TULSEQUAH CHIEF PROJECT

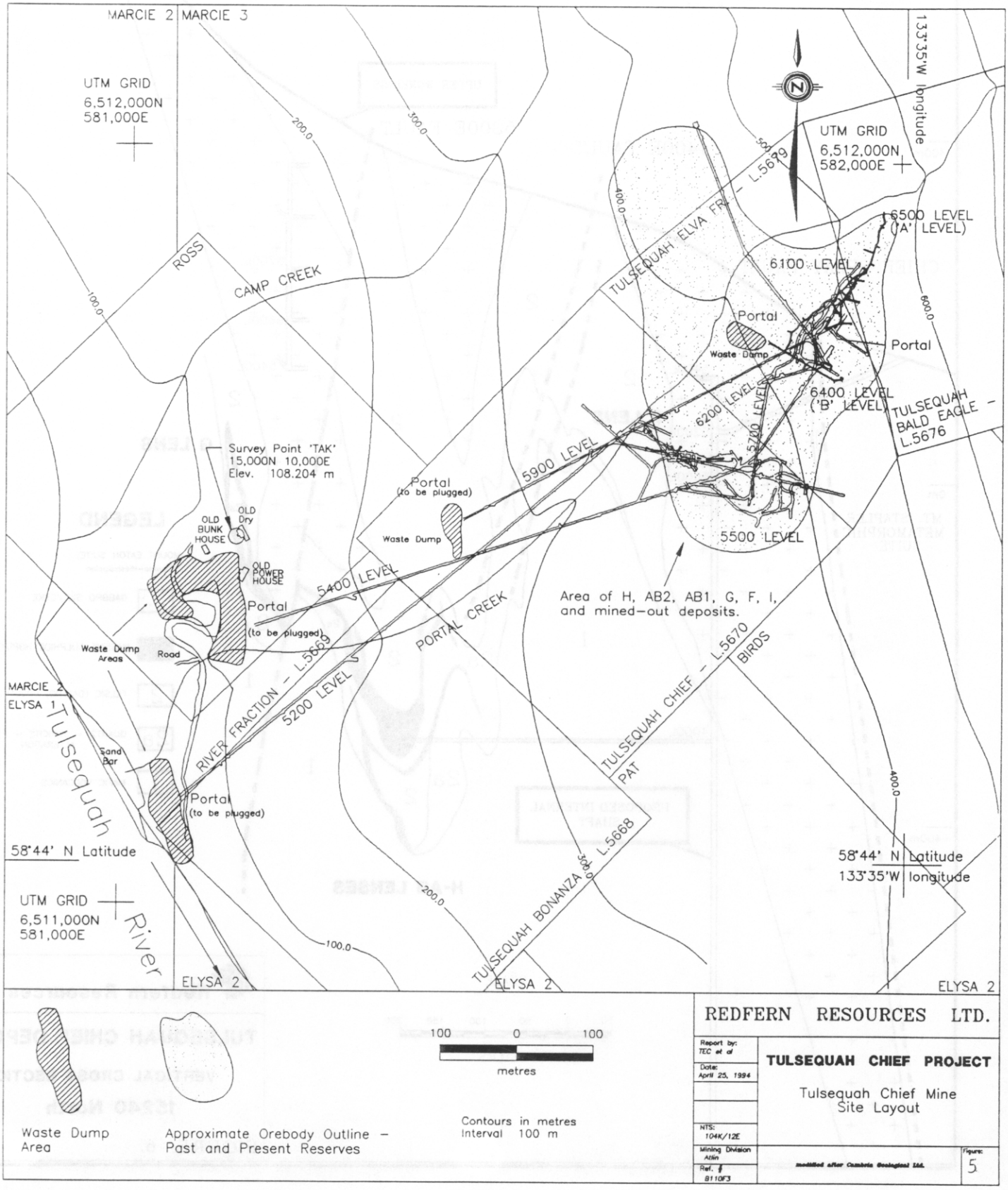
PROPERTY STRATIGRAPHY

1993

FILE: C:\ACAD\DWG\TCSTRAT.DWG

FIGURE: 4

KMC



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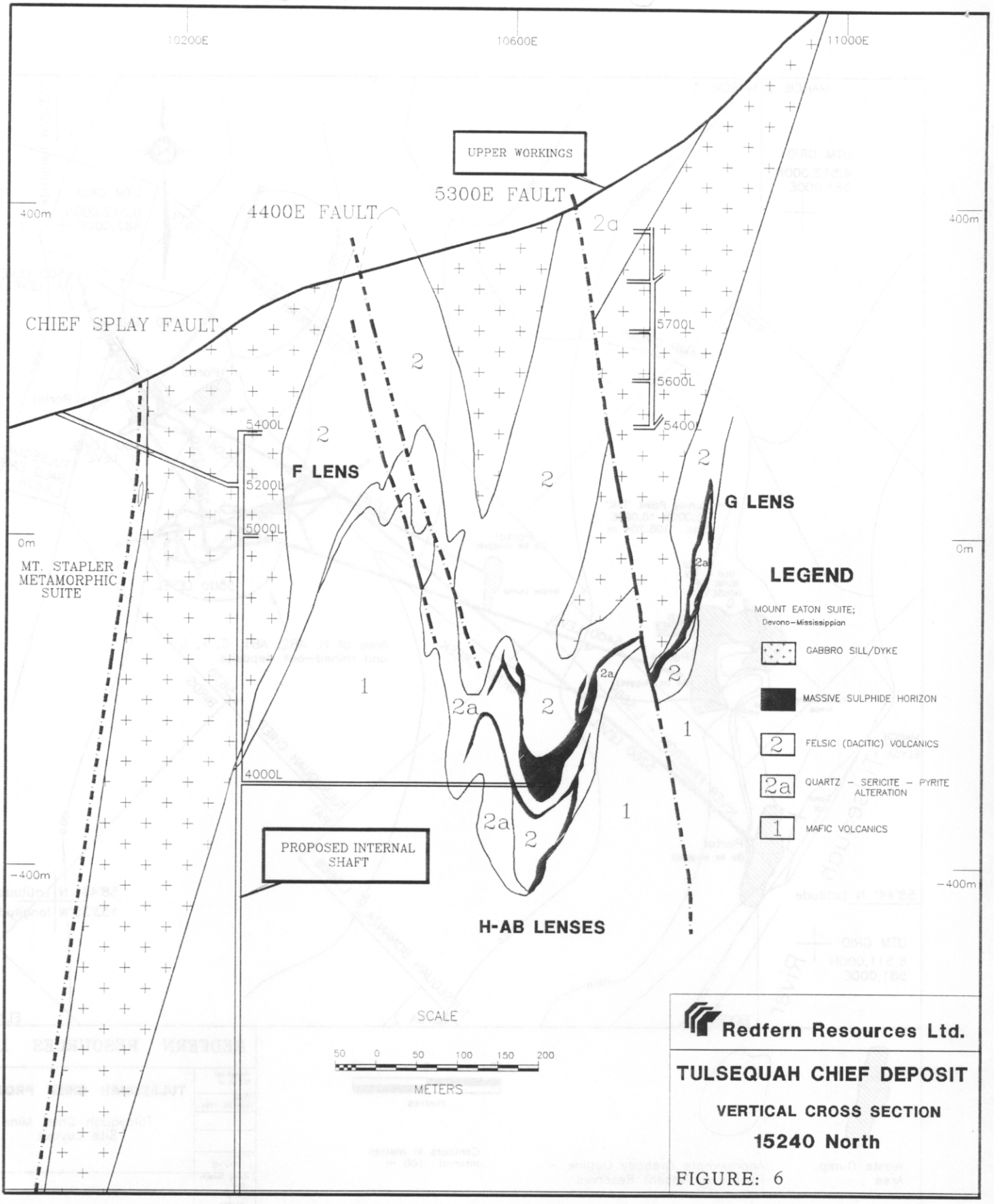
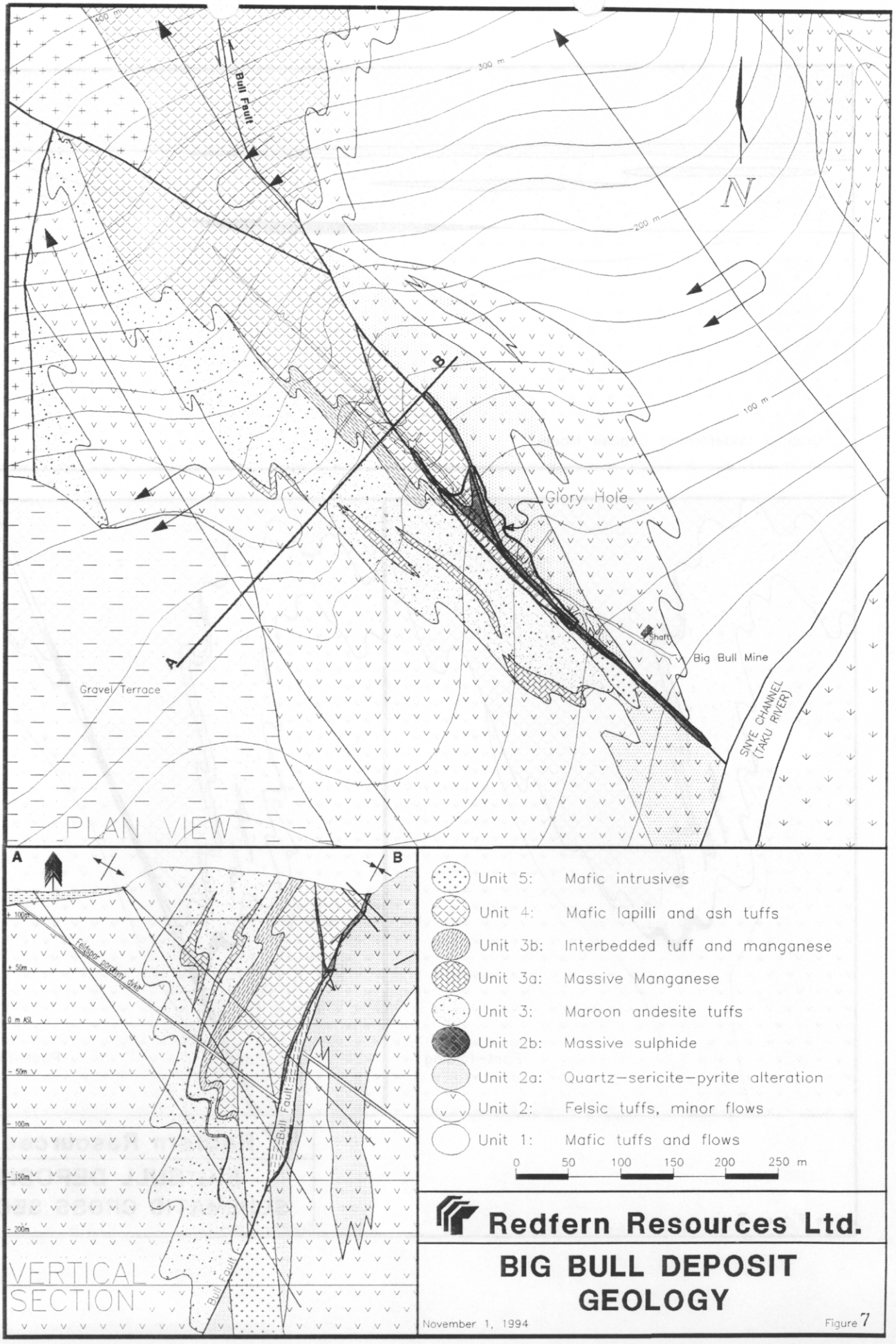
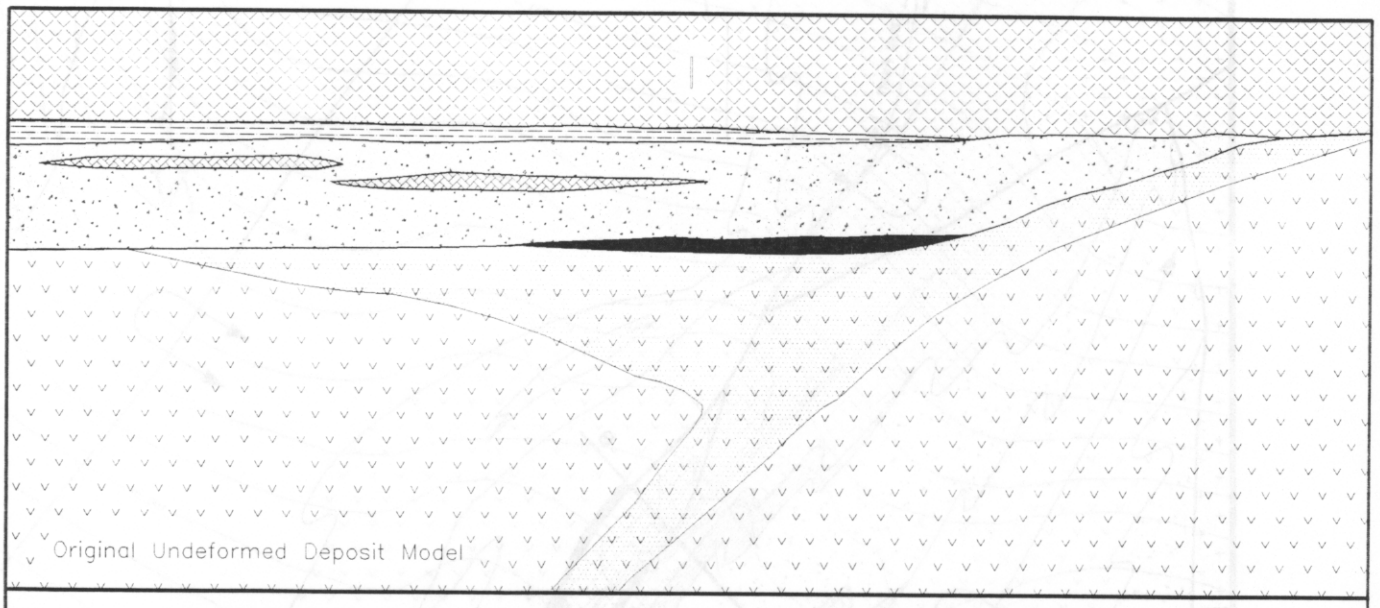
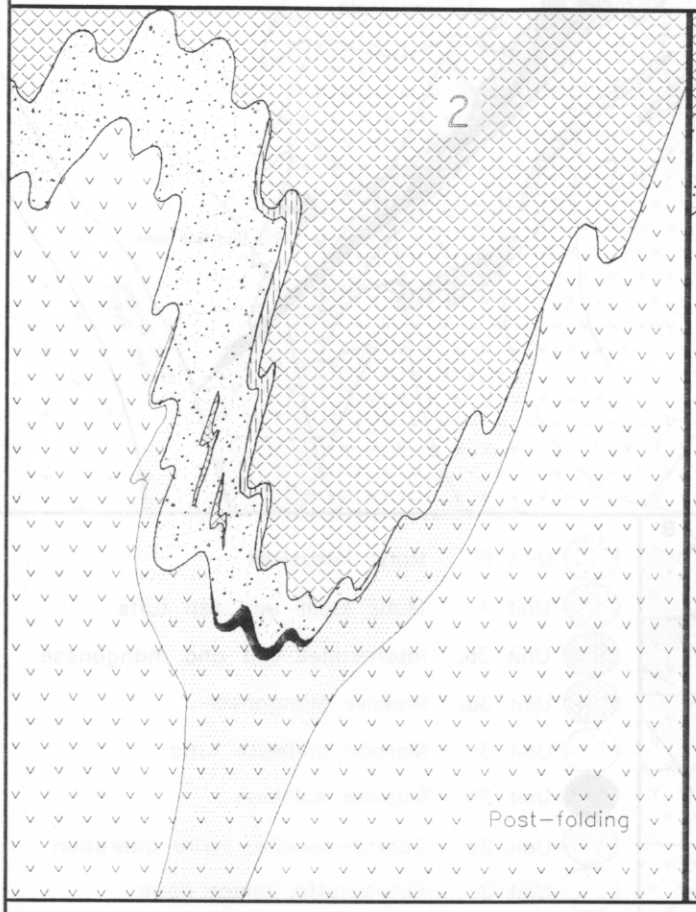
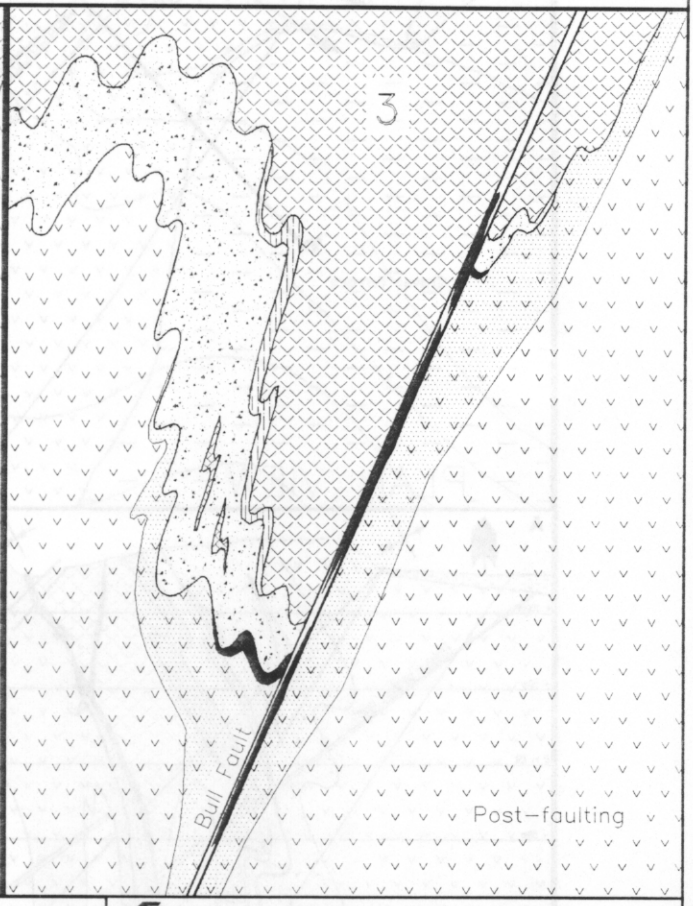
Report by: TEC et al	**TULSEQUAH CHIEF PROJECT**
Date: April 25, 1994	Tulsequah Chief Mine Site Layout
NTS: 104K/12E	
Mining Division Atlin	modified after Cambria Geological Ltd.
Ref. # 8110F3	Figure: 5


10200E
10600E
11000E
UPPER WORKINGS
5300E FAULT
4400E FAULT
CHIEF SPLAY FAULT
400m
0m
-400m
5700L
5600L
5400L
5200L
5000L
4000L
F LENS
G LENS
H-AB LENSES
MT. STAPLER METAMORPHIC SUITE
PROPOSED INTERNAL SHAFT
LEGEND
MOUNT EATON SUITE; Devono-Mississippian
GABBRO SILL/DYKE
MASSIVE SULPHIDE HORIZON
FELSIC (DACITIC) VOLCANICS
QUARTZ - SERICITE - PYRITE ALTERATION
MAFIC VOLCANICS
SCALE
50 0 50 100 150 200
METERS
Redfern Resources Ltd.
TULSEQUAH CHIEF DEPOSIT
VERTICAL CROSS SECTION
15240 North
FIGURE: 6


Bull Fault
400 m
300 m
200 m
100 m
N
A
B
Glory Hole
Shaft
Big Bull Mine
Gravel Terrace
SNYE CHANNEL (TAKU RIVER)
PLAN VIEW
A
B
+ 100m
+ 50m
0 m ASL
- 50m
- 100m
- 150m
- 200m
Feldspar porphyry dyke
Bull Fault
Bull Fault
VERTICAL SECTION
Unit 5: Mafic intrusives
Unit 4: Mafic lapilli and ash tuffs
Unit 3b: Interbedded tuff and manganese
Unit 3a: Massive Manganese
Unit 3: Maroon andesite tuffs
Unit 2b: Massive sulphide
Unit 2a: Quartz–sericite–pyrite alteration
Unit 2: Felsic tuffs, minor flows
Unit 1: Mafic tuffs and flows
0 50 100 150 200 250 m
Redfern Resources Ltd.
BIG BULL DEPOSIT
GEOLOGY
November 1, 1994
Figure 7







See Figure 7 for Legend

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BIG BULL DEPOSIT

SCHEMATIC CROSS SECTION

November 1, 1994

Figure 8