LOG NO: 0303	RD.
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	CO LTD.

EXPLORATION

NTS: 104K/11

WESTERN CANADA

ASSESSMENT REPORT

DIAMOND DRILLING ON

TULSEQUAH CHIEF CROWN GRANT

ATLIN MINING DISTRICT, B.C.

LATITUDE: 58°43'
LONGITUDE: 133°35'

24 FEBRUARY 1988

GEOLOGICAL BRANCH M.J. CASSELMAN ASSESSMENT REPORT

FILE

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COMINCO LTD.

EXPLORATION

WESTERN CANADA 24 February 1988

ASSESSMENT REPORT TULSEQUAH CHIEF CROWN GRANT

SUMMARY

Drill hole TC-87-5 was drilled in November, 1987 to test the down dip extension of the Tulsequah Chief upper deposits. The hole intersected the mineral horizon from 2094.5 to 2307 with a significant interval of mineralization over 13.5 ft. from 2102-2115.5 grading: 1.31% Cu, 1.08% Pb, 6.03% Zn, 2.48 oz/t Ag and 0.082 oz/t Au.

The drill hole showed that the upper deposits which previous workers interpreted to pinch out on the 5900 mining level to be only cut off by a diorite dyke and to continue below the dyke.

INTRODUCTION

A joint venture between Cominco Ltd. and Redfern Resources was convened March 25, 1987 to explore the Tulsequah Chief property.

Two phases of field work were completed in 1987. Phase I from June 22 to August 5 mapped the area enclosing the Chief deposits (Central Area) at 1:1000 scale and the surrounding property at 1:2500 scale. Phase II from September 15 to December 3, drill tested downward extensions of the mineral horizon hosting the Chief deposits.

Drilling was carried out on the Tulsequah Chief deposits by Connors Drilling of Kamloops, B.C. using two BBS-37A drills. A total of 5 NQ drill (Plate 87-3) holes were completed to target depths. One other hole was lost short of its target. A total of 11561 feet was drilled. Core recovery averaged 98% + in mineralized and unmineralized sections.

Connors ran two shifts which due to dwindling daylight hours varied from 11 and 13 hours in the begining to 8.0 and 16.0 hours at the end.

Drill site locations were mostly steep and heavily timbered. All sites required brush slashing and tree falling with some cribbing to create level platforms for the drill. Sites normally took 2 days to prepare.

Moves between drill sites were by a Bell 206A helicopter and normally took 2 to $2.5\,$ days and $15-18\,$ hours of helicopter time due in combination to amount of material to move, steep terrane and short days.

Ground conditions for drilling were generally good except within the outer 200 feet of the diorite complex where ground was commonly heavily fractured, and in major fault zones.

Plastic pipe was installed in some holes in case later down hole geophysics was required.

The diamond drilling was supervised by M. Casselman and H. Kang.

LOCATION AND ACCESS

The property is situated on the east side of the Tulsequah River on map sheet 104K/11 in northwestern B.C. and is centered on latitude 58°43' and longitude 133°35' (Fig.1). Access to the area is by air from Atlin 100 km north or by water/air from Juneau 64 km southwest to a gravel airstrip along the Tulsequah River, 10 km south of the Tulsequah Chief mine site where the base camp was located.

TOPOGRAPHY

The property is situated on the west side of Mount Eaton at elevations between 50 and 1850 m above sea level. Topography was molded by large valley and smaller alpine glaciers. Slopes are moderate to steep with cliffs ranging up to several tens of metres in height common. Lower slopes to 1100 metres are covered by spruce and hemlock. Slide and blow down areas common in the forests are covered by thick growths of devils club, alder and stinging nettles.

PROPERTY AND OWNERSHIP

The property consists of the following claims (Fig. 2):

Located Claims

<u>Name</u>	Record No.	Recorded	Assessment Work Due
Ross	5226	May 3, 1963	May 30, 1998
Pat	5225	May:3, 1963	May 30, 1998
Birds	5224	May 3, 1963	May 30, 1998
Co1	995	Mar 4, 1980	Mar 4, 1998
Co2	996	Mar 4, 1980	Mar 4, 1998
Co4	999	Mar 4, 1980	Mar 4, 1998
SEQ 1	933	Jan 28,1980	Jan 28, 1998
SEQ 2	934	Jan 28,1980	Jan 28, 1998
Phil 1	2885	May 8, 1987	May 8, 1998
Phil 2	2886	May 8, 1987	May 8, 1998
Phil 3	2887	May 8, 1987	May 8, 1991
Phil 4	2888	May 8, 1987	May 8, 1991

Crown Grants

<u>Name</u>	Lot No.	Area (Ha)	1986 Mineral Land Taxes
River Fr	5669	7.99	7.91
Tulsequah Bonanza	5668	20.90	20.69
Tulsequah Bald Eagle	5676	14.16	14.02
Tulsequah Chief	5670	20.90	20.69
Tulsequah Elva Fr	5679	9.70	9.60

PREVIOUS WORK

The Tulsequah Chief deposits were discovered by W. Kirkham of Juneau in 1923 while prospecting. He located a lense of high grade barite, pyrite sphalerite, galena, chalcopyrite outcropping in an east-west trending gulley just above the 6500 level adit. Development of this showing between 1923 and 1929 attracted the attention of prospectors to the promise of the area. In 1929 about 40 prospectors were in the area which resulted in the discovery of the Big Bull deposit by V. Manville, the Potlatch (Sparling) and Banker showings and the Whitewater (Polaris Taku) deposit. The Erickson-Ashby deposit was found in 1930.

Cominco Ltd. acquired the Tulsequah Chief and Big Bull deposits in 1946 and production was started in 1951 with an average of 530 tons per day mined. Mining continued until 1957 when the mine was closed due to low metal prices.

The Tulsequah Chief deposits lay dormant until 1987 when the convening of a joint venture with Redfern Resources led to the present work program.

REGIONAL GEOLOGY

The Tulsequah Chief property is situated on the western edge of the Intermontane Belt adjacent to the Coast Plutonic Complex and north of the Stikine Arch. Kerr in 1948 published a 1:50,000 scale geological map of the Taku River area. Souther in 1971 mapped at 1:250,000 scale the Tulsequah area. Monger in 1980 showed the relationship of rocks in the Tulsequah-Taku area to regional features of the Cordillera using Souther's data. Souther and Monger showed the Tulsequah Chief deposits to lie within the basal part of the Upper Triassic Stuhini Group thought to be at least 12000 feet thick and to overlie fossiliferous limestones and quartzites believed to be of Permian age.

Payne, Nelson and Gosson in 1981 mapped at 1:50,000 scale much of the Tulsequah-Taku area as part of a regional exploration program. They suggested the area to be more strongly folded and faulted than previously recognized. They interpreted the Paleozoic rocks to be broken by several major faults into separate lithotectonic blocks representing different stratigraphic levels in the volcanic pile. They also interpreted the rocks hosting the Chief deposits to occupy the central part of a steeply north plunging anticline and thus to underlie Pennsylvannian-Permian limestone units rather than overlying them as originally thought.

Nelson and Payne in 1984 collected middle Pennsylvannian-Permian fossils in these limestones and assigned the rocks hosting the Chief deposits to a Pennsylvannian-Permian age group they termed Mount Eaton Group.

Payne and Sisson working for Cominco in 1987 refined Payne, Nelson and Gosson's 1981 mapping. For details of this work see assessment report by Payne and Sisson, 1988.

Mineral deposits in the area include Tulsequah Chief, Big Bull, Ericksen-Ashby The Chief and Bull deposits consist of massive sphaleriteand Polaris Taku. galena-chalcopyrite-barite-pyrite lenses in altered dacite The Erickson-Ashby showing contains pods of sphalerite-galenapyrite in and near felsic volcanic lenses in a chert-limestone sequence in andesite volcanics. The Polaris Taku deposit contains discontinuous quartzcarbonate zones with Au-arsenopyrite-stibnite-pyrite hosted by volcanic and sedimentary rocks and possibly minor ultramafic intrusives. Smaller showings include the Banker and Sparling which contain Au-Ag-sphalerite-galenachalcopyrite-tetrahedrite-arsenopyrite-stibnite hosted by quartz veins in folded shattered limestone-dolomite, and sheared andesite volcanics, respectively.

PROPERTY GEOLOGY

In 1987 the entire property was mapped on two scales: 1:1000 scale mapping over the Central Area which includes the Tulsequah Chief deposits, and 1:2500 scale mapping on the remainder of the property.

1:2500 scale mapping showed the Tulsequah property to be underlain by rocks belonging to two different lithotectonic blocks separated by the Chief fault. The rocks are primarily andesite flows and pyroclastics with lesser clastic, mixed limestone-chert-clastic, and dacite to rhyodacite pyroclastic units. Rocks west of the Chief fault resemble those east of the fault except for a much higher level of deformation and penetrative foliation. All layered rocks are intruded by numerous dykes and plugs including Paleozoic andesites/diorites and dacites, Mesozoic granodiorites, quartz monzonites, diorites and pyroxenites and Tertiary rhyodacites, andesites/diorites and quartz monzonites.

1:1000 scale mapping in the Central Area (Plate 87-3) showed it to be broken into four separate blocks by north-south striking faults designated the Chief, 4400E and 5100E faults. The Tulsequah Chief deposits are hosted by a conformable NE-SW striking, steeply northwest dipping succession of volcanics and minor sediments from oldest to youngest:

- 1. andesite and dacite pyroclastics, mixed limy clastics tuffs, and limestone;
- 2. undifferentiated andesite flows, flow breccias and pyroclastics;
- 3. felsic pyroclastics primarily dacites and rhyodacites with minor dacite andesites:
- 4. andesite pyroclastics minor tuffaceous clastics

The layered rocks have been intruded by a large diorite plug, sill, dyke complex and dacite plugs and dykes of suspected Paleozoic age (subvolcanic intrusives), and rhyodacite dykes of suspected Eocene age.

The Chief deposits occur in one horizon designated the mineral horizon which is located in the lower part of a large lenticular mass of felsic pyroclastics. The mineral horizon comprises an intermixed assemblage of strongly pyritized (5-75%), sericitized and silicified dacite tuffs, muds, cherty tuffs and minor cherts and lapilli tuffs which can be traced on surface for 700 metres across 3 fault blocks. The surface expression of the mineral horizon appears much less contorted than seen from geological reconstructions on the 5200 and 5400 mining levels.

Mineralization is localized in 3 areas in the mineral horizon designated the upper and lower deposits and F zone areas. The depostis are stratigraphically controlled and occur as numerous lenses with varying proportions of sphalerite, galena, chalcopyrite, barite, gypsum,, Au and Ag. Total production was 625,781 tons. Current reserves are 780,000 tons grading 0.07 oz/t Au, 2.9 oz/t Ag, 1.3% Cu, 1.6% Pb and 8.0% Zn.

The Central Area contains two large alteration zones interpreted to be feeder pipes; one underlies the Chief deposits (Main Alteration zone) and the other surrounds the 5200 and 5400 level portals (5200 Portal Alteration zone). These zones have developed at different stratigraphic levels.

DIAMOND DRILLING

Drill hole TC-87-5 started November 7,1987 and was completed to a depth of 2414 feet on November 25, 1987. It was inclined at -50° with a an azimuth of 135° (Plate 87-3). The drill hole was targeted to test the down dip extension of the upper deposits previously interpreted to pinch out at the 5900 mining level. It intersected the mineral horizon at 2094.5 feet and intersected 13.5 feet of: 1.31% Cu, 1.08% Pb, 6.03% Zn, 2.48 oz/t Ag and 0.08 oz/t Au, from 2102-2115.5 feet.

The drill hole was logged by H. Kang and is described in detail in Appendix B. The geochemical and assay data is in Appendix C.

CONCLUSIONS

Drill hole TC-87-5 showed that the upper deposits, previously interpreted to pinch-out at the 5900 mining level, have only been cut off by a diorite dyke and continue below the dyke.

M.J. Casselman, Project Geologist

Endorsed for

Release by:

W. J. Wolfe, Manager, Exploration-Western Canada.

MJC/pm Distribution:

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APPENDIX A

STATEMENT OF EXPENDITURES

Diamond Drill Hole TC-87-5 was part of a 11561 foot drill program from September 14 to November 29, 1987.

Salaries:

M.J. Casselman - September 16-30; October 6-20,			
November 1-5	@\$230/day	\$9,430	
M.J. Osatenko - November 1-15	@\$230/day	3,450	
H. Kang - September 14 - November 29	@\$115/day	8,855	
A.P. Roberts - September 28-30, October 1-11,			
October 26-31; November 1-12	@\$170/day	5,270	
A.L. MacGregor - September 14-30; October 1-2	@\$170/day	3,230	
D. Brulotte - October 1 - November 29	@\$125/day	7,500	37,735
Communications			16,238
Communications			10,230
Drill Site Preparation			18,331
			•
Surveying			2,363
Diamond Drilling			484,420
Dramona Driffing			101,120
Geochemistry and Assaying			12,349
Transportation - Helicopter 158,821		•	255 000
- Fixed Wing 190,067			355,888
Camp Costs			62,956
Camp Costs			02,500
Drafting and Report Writing			8,000
Evnoditing			17,720
Expediting			11,120
	Total	:	1,010,000

Cost per foot drilling \$1,010,000 for 11,561 feet = \$87.36/ft.

Diamond drill hole TC-87-5 - cost = \$87.36 x 2414 feet = \$210,887.04

24 February 1988

APPENDIX B - Diamond Drill Hole Log

H. Kang- Geologist - 1986 B.Sc. U.B.C.

Core is stored at the camp on claim

Lot 5668 (Tulsequah-Bonanza claim)

1 Foot= 0.3048 metres

Drill Hole Record

COMINCO

Property TULSEQUAH CHIEF	District Atlin M.D.	Hole No. 87	-5 Page 1 of 17
Commenced 87-11-7	Location	Tests at	Horiz, Comp.
Completed 871125	Core size NO	Corr. dip -50	8 degrees Vert, Comp.
Coordinates		True Brg. 13	5 degrees Logged by H.K.
Objective To test downdip at	ratigraphy and massive	% Recov.	Date 87-11-8
sulphide horizon			

Metres		l	1	Ī				i	
From To	Description	FROM	то	Length	Au ppb	Ag pom	Cu ppm	Pb ppm	Zn ppm

0 - 20 CASING

20 - 217.5 ANDESITE FLO

Dark to medium green, fine grained, amygdaloidal, massive, homogeneous andesite flow.

Abundant round, calcite-filled amygdules (4-10 mm) and weak to moderately locally strong calcite veining and epidote alteration (pervasive and in stringers); locally pseudo-fragmental texture due to selective, preferential epidotization — possibly flow breccia

Core moderately (2-3/ft) to strongly fractured.

COMINCO

Property Tulsequah District: Hole No. TC-57-5							P	Page 2 of 17				
	***************************************					,						
Footage From To	Description			FROM	то	Length	Au pob	Ag pom	Cu pom	Pb com	Zn pos	

Strong, pervasive epidotization At 20 - 27 At 51.5 - 52.5 Core strongly fractured At 55 - 77.5 Core strongly fractured and locally gauged Fault/fracture zone At 93 - 99 Core strongly fractured -fault? Strong epidotization - stringers and veins and calcite vein crackle brecciation locally At 99 At 137 - 142 Flow brecciated - monolithic fragmental, with preferential epidotization of matrix around subangular fragments (2-20 mm) At 144 - 146 Core strongly fractured At 152 - 155 Core strongly fractured At 160 - 162 Flow brecciated fragmental with preferential epidote alteration of matrix At 171 - 171.5 Fault gouge At 193 - 202 Flow brecciated

At 202 - 207 Core strongly fractured At 208 - 209 Fault gouge

.

COMINCO

Property Tulse	quah District:	Hole No. TC-87-5					Pg	ge <u>3</u> o	£_17	
Footage	Description									
From To			 FROM	ΤΟ	Length	Au ppb	Ag pom	Cu ppm 1	Pb ppm	ZO POM

217.5 - 222 ANDESITE/DIORITE INTRUSIVE

> Black, dark green, fine grained homogeneous, massive andesite/diorite dyke/sill ?; weak to moderate calcite veining and epidote replacement of veins; locally weak fsp - porphyritic; core moderately (2-3/ft) to strongly fractured.

222 - 225 RHYODACITE INTRUSIVE - SLOKO DYKE

White/tan, fine grained, massive rhyodacite dyke with blocky fractures and weak epidote alteration on fracture

RIMODACITE DIKE AND ANDESITE DIKE MIDED AND HIBRIDIZED ZONE with white/tan rhyodacitic veins and dykelets 225 - 227 cutting through dark green andesite/diorite.

227 - 395 ANDESITE/DIGRITE INTRUSIVE - fine grained, dark green to black, massive. As described in 217.5 - 222.

At 226.5 - 228 Core strongly fractured - fault

At 235 - 237 Core strongly fractured

At 237 - 238.5 Sloke rhyodocite dyke

At 250 - 277 Core strongly fractured and gauged locally

At 254

Slickenside/core axis angle 60-70 degrees

At 286 - 288 Mixed and hybridized with white/grey rhyodacitic sloke dyke?

COMINCO

Property Tulsequah District: Hole No. 10-87-5 Pag										
									_	
Footage Description					`` I					
From To			FROM	то	Length	Au pob i	Ag pom	Cu ope	Pb.pom	Zn pom

At 308 - 312 Fault - core strongly fractured and gauged At 329 - 358 Fsp - porphyritic - white, subhedral phenocrysts (2-5 mm) within dark green matrix A different phase of same intrusive? At 335 - 337 Core strongly fractured At 367 - 374 Strong calcite, quartz veining and fragmented veins Probably fault related At 374 - 375 Fault gauge and core strongly fractured Moderate to strong quartz, calcite veining and associated bleaching (white/grey) of rock

At 375 - 390

At 389 - 390 Fault gouge and shear

395 - 445 DIORITE INTRUSIVE (Px - porphyritic)

Dark green to black, subhedral, mafic (probably pyraxene) phenocrysts (2-5 mm) within pea-green, fine to medium matrix; amount of PX crystals varies from 5 to 15%; very fine epidotized vein/crackle brecciation throughout and disseminated PY - trace amount; core moderately (1-2/ft) fractured except where noted otherwise.

At 399 -401 Core strongly fractured

At 420 - 421 Olive green, dacite/andesite dyke with hornblende needles (1-2 mm) near the contact/core axis

angle 50 degrees (top), 85 (bottom).

COMINCO

Property Tulsequah District: Hole No. TC-87-5 Page										
										
Footage	Description			1						
From To			FROM	70	Length	Au pob	Ag poss	Cu pom	Pb pom	Zn pom

445 - 470 DACITE INTRUSIVE (Fap - porphyritic)

White subhedral fsp crystals (2-5 mm) within dark grey/brown fine biotite-rich dacitic (?) matrix; subround to round quartz anygdules or quartz eyes (3-6 mm) common.

Possibly original quartz crystals reabsorbed into the meit; locally bleached to tan/white color — associated with quartz and calcite veins.

At 467 Slickenside/core axis angle 75-80 degrees

479 - 479 DIORITE/ANDESITE INTRUSIVE - As described in 385 - 445
Dark green to black, fine grained, weakly px-porphyritic.

At 475 ~487 Core strongly fractured and gauged Slickenside/core axis angle 10-15 degrees.

479 - 523 DACITE COARSE PYROCLASTIC - LAPILLI TUFF

Grey to tan, heterolithic coarse (2-25 mm) fragments within fine, tuffaceous and weakly to moderately foliated and sericitized matrix.

Foliation/core axis angle 50-70 degrees; clasts are of mixed origin — Siliceous, quartz, fsp-porphyry, dark green andesite, and common, reddy purple hematitic clasts; local zones of hybridization by fsp-porphyritic, dacite subvolcanic intrusive — fragments commonly within fsp porphyry matrix; fragmented, white siliceous, original chert beds (?) common.

COMINCO

Property Tulsequan District: Hole No. TC-87-5 Page											
					· ···			• • • • • • • • • • • • • • • • • • • •			
Footage From To	Description			FROM	то	Length	Au poio	Ag pom	Cu pom	Pb pos	Zn ppm

At 492 - 493 Fault gauge

At 585 - 524 Core moderately to strongly fractured, locally gauged

and fault related intense quartz/hematite veining - fault/fracture zone.

Stringers of PY along fracture surfaces ≤ 2%.

523 -537.5 DACITE SUBVOLCANIC INTRUSIVE (Fsp - porphyritic)

As described in 445 -479 Core weakly fractured.

537.5 - 743 ANDESITE/DIORITE INTRUSIVE

Fine grained, pea-green, weakly pyroxene-porphyritic (locally).

As described in 395 - 445

Top contact/core axis angle 70 degrees; core weakly fractured

At 724 - 735 Fine grained grey/green weakly bleached with local PY blobs and disseminations (< 1%).

743 - 778 DACITE COARSE PYROCLASTIC - LAPILLI TUFF

> Lapilli sized (2-20 mm), heterolithic fragments including siliceous quartz fsp porphyry, green andesite, and abundant reddy purple hematitic clasts within weakly foliated, sericitized, tuffaceous matrix - foliation/core axis angle 55-60 degrees.

Foliation plane is possibly original bedding.

COMINCO

Property Tulsequen District:	Hole No. TC-87-5		<u>-</u>		Page 7	of 17
Footage Description				l		
From To		FROM	170 Le	nath Au pob	Ag pom Cu pom	Po pom Znopom

At 757 - 759 Core strongly fractured

At 771 - 773 Grey/tan fine grained docite (?) dykelets (2-10 cm thick)

Contact/core axis angle 50-90 degrees

At 773 - 778 Lower contact zone - grades into fine dacite tuff; locally bedded - bedding/core axis angle 75-

80 degrees

Fine tuff mixed with and hybridized by docite dykelets (as described in 771 - 773).

778 - 1007.5 ANDESITE/DIORITE INTRUSIVE - AS DESCRIBED IN 395 - 445

Dark green to pea-green, medium grained (locally fine to course), locally px-porphyritic.

At 789 - 790 Fault gauge/shear zone

Shear/core axis angle 64 degrees

At 894.5 - Core moderately to strongly fractured with questionable slickensides - slick/core axis angle 5-

907.5

10 degrees.

At 841 - 844.5 Core strongly fractured/sheared - fault

At 853 - 856.5 Core strongly fractured - fault.

At 882 - 884 Core strongly fractured

At 965 - 967.5 Breccia, dacitic fragments 0.5 - 4 cm matrix light green (inclusion?)

At 977.0 - Highly epidotized feldepar porphyry inclusion? or dyke

977.5

At 996 - 1003 Inclusions of dacitic breccia and fine to medium grained dacitic material (inclusions).

COMINCO

Property Tulse	gudh District:	Hole No. TO-67-5						P	Page 8 of 17						
					Α.										
From To	Description			FROM	то	Length	Au ppb	Ag ppm	Cu ppm	Pb ppm	Zn pps				
1007.5 - 1019.0	COARSE DACITIC PYROCLASTIC - dacitic fragme fragments uncitered	nts (0.5 – 3 cm) within fine to medium graine	d, chloritic matrix;												

fragments unalitered

1019.0 — Feldspar porphyry, plagiaciase phenocrysts (up to 30% of ??) in fine grained greenish matrix, some 1045.0 feldspar/epidate veinlets (.2 - 1 cm); also docitic fragments near lower contact.

At 1019.0 - Highly sheared fault gouge. Abundant clay in gouge, 50 degrees to core axis. 1021.5

At 1022.0 — Sericitized pale greenish fault gouge 1027.0

1045.0 - 1709 ANDESITE/DIORITE INTRUSIVE, DARK GREEN F-M GR?

At 1149 - 1156 Highly fractured zone, quartz/calcite veinlets (0.3 - 0.5 cm wide).

At 1255 - 1257 1/2

Sloco rhyodocite dyke

Flowbanding/core axis angle 40 degrees

At 1348 - 1349 Shear/bleached zone

Inclusion of felsic material?

Shear/core axis angle 55 degrees

COMINCO

Property Tulsequal	District:	Hole No. TC-57-5					P	age 9	of 17	
Footage (Description		FROM	то	Length	Au pob	Ag pon	Cu pos	Pb pos	Zn pom

At 1403 - 1586 Fault/fracture zone - core strongly fractured and gauged with strong calcite veining throughout; stickensides commonly visible throughout but difficult to determine orientation with respect to core axis because core is badly broken At 1529 Slickenside/core axis angle 55 degrees At 1581 Stickeneide/core axis angle 25 degrees At 1699 - 1688 Fault/fracture zone - core strongly fractured and gouged, gouge brecciated At 1617 - 1632 1/2 Weakly fap-porphyritic, hybridized dacite coarse fragmental rock (lapilli tuff) with subround, siliceous fragments. Inclusion (xenolithic?) Core badly fractured due to faulting At 1660 - 1664 Sloko Rhyodacite dyke At 1684 1/2 - 1687

DACITE SUBVOLCANIC INTRUSIVE 1709 - 1721

Tan/grey, fine grained dacite, locally hybridized by dark green andesite intrusive; weak to moderate chlorite veining throughout, locally pyrite replaced; locally weak, fsp-porphyritic; pyrite coating on fracture surfaces common; core moderately fractured (2"3/ft.).

Stoko rhyodacite dyke flow banding (core axis angle 45-50 degrees).

COMINCO

Property Tulsequah District: Hole No. TC-87-5 Page 10 of 17 Footage Description From To

1721 - 1734 ANDESITE/DIORITE INTRUSIVE

Fine to medium grained, dark green with disseminated and vein-replaced PY stringers ($\leq 2\%$).

At 1724 - 1727 Fault - slickenside/core axis angle 50 degrees

At 1730 - 1732 Fault

1734 - 1756 DACITE SUBVOLCANIC INTRUSIVE (Fep - porphyritic)

Subhedral to euhedral fsp phenocrysts (1-3 mm) within grey, green, fine grained dacite (locally rhyodacitic?) matrix; weak chlorite/actinolite (?) veining and tension gashes throughout; trace amount of disseminated PY

locally.

1756 -- 1781 ANDESITE/DIORITE INTRUSIVE hybridized with fep-porphyritic docite aubvolcanic intrusive; veins and veinlets of felsic material (commonly fsp-porphyritic) cross cutting (?) dark green, fine grained andesite; it is difficult to see whether fep-porphyry cross cuts andesite or visa versa; chiorite/actinolite veins commonly accompany

magnetite stringers; dissem. py ≤ 1%.

COMINCO

Property Tulesquah District: Hole No. TC-67-5 Page 11 of 17

Footage Description FROM TO Length Au pob Ag page Cu page Pb page Zn page

1781 - 1879 DACITE SUBVOLCANIC INTRUSIVE - fep porphyritic

As described in 1734 - 1756.

White, fine docitic/monzonitic (?) stockwork veins throughout and locally pervasively bleached; locally contain lapilli sized (5 – 30 mm) subround, white/tan rhyodacitic fragments ($\leq 5\%$).

At 1807 - 1817 Argillic (clay) alteration

At 1834 - 1840 Weakly reddy purple - hematitic

At 1851 - 1852.5

Weakly reddy purple, hematitic, with epidote veining

At 1875.5 - 1876.5

Quartz, epidote, actinolite, garnet veins

1879 - 1997.5 DACITE COARSE PYROCLASTIC - LAPILLI TUFF

Lapilli size (2 – 50 mm) subround to subangular, mixed but predominately white, siliceous rhyodacitic fragments within fine tuffaceous, and locally fsp-porphyritic matrix; trace amount of disseminated PY.

1907.5 - 1927 ANDESITE/DIORITE INTRUSIVE

Fine grained, dark green, locally hybridized with dacite subvolcanic intrusive.

At 1913 Fauit.

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Property Tulseq	uch District:				Р	oge 12	of 17		
			<u>-</u>						
Footage From To	Description		ROM T) Length	Au ppb	Ag ppm	Cu pom	Pb pom	Zn pom

1927 - 1940 DACITE COARSE PYROCLASTIC - LAPILLI TUFF
As described in 1879 - 1997.5.

1940 - 1945 ANDESITE/DIORITE INTRUSIVE

1945 - 1952 DACITE COARSE PYROCLASTIC - LAPILLI TUFF
As described in 1879 - 1997.5.

1952 - 1973.5 ANDESITE/DIORITE INTRUSIVE
With local, quartz epidote - magnetite veining

1973.5 - 1994 DACITE COARSE PYROCLASTIC - LAPILLI TUFF
As described in 1879 - 1997.5.

1994 - 2029 ANDESITE/DIORITE INTRUSIVE

2029 - 2094.5 DACITE COARSE PYROCLASTIC - LAPILLI TLFF

White, siliceous quartz fsp porphyritic fragments (5-45 mm) within dark grey/green fine tuffaceous, and andesitic (?) matrix; commonly mixed with, and hybridized by fsp-porphyritic intrusive - white siliceous fragments within fsp-porphyritic matrix.

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Property Tulse	quah District: Hole No. TC-57-5					P	oge 13	of 17	
Footage From To	Description	FROM	то	Length	Au ppb	Ag ppm	Cuppe	Pb ppm	Zn ppm
2094.5 - 2098	ALTERED DACITE COARSE PYROCLASTIC - UPPER PART OF MINERAL HORIZON								
2007.0	Lapilli sized, white siliceous, quartz fep-porphyritic fragments within fine tuffaceous matrix; weakly to moderately sericitized and weakly pyritized matrix ~ 5% PY - disseminated.								
2898 - 2102	ALTERED DACITE PINE PYROCLASTIC UPPER PART OF MINERAL HORIZON	2894.50	2098.00	3.50	394.	10.4	2320.	157.	950.
	Tan/white, strongly sericitized, moderately pyritized (5-8% PY) rock with rare, white siliceous lapilli	2098.00	2102.00	4.00	634.	33.3	4740.	3020.	21666.
	fragments within finer matrix; original rock was probably dacite tuff; strongly sericitized layers possibly	2102.00	2105.50	3.50	2350.	94.9	10370.	7970.	63700.
	represent original bedding - also slightly foliated - bedding/ foliation to core axis angle 60 degrees;	2105.50	2110.50	5.00	1540.	46.2	11900.	5850.	46050.
	disseminated chalcopyrite 1-2%, sphalerite 2-3%.	2110.50	2115.50	5.00	3760.	11.7	23000.	16200.	82500.
		2115.50	2121.00	5.50	276.	7.9	1540.	1120.	14000.
	At 2098 Banded massive sphalerite 1 cm thick.	2121.00	2124.50	3.50	24.	1.8	72.	77.	360.

2102 - 2115.5 MINERAL HORIZON

Strongly pyritized (10-25%), sericitized, barite-rich, fine grained rock with rare lapitli size, white siliceous fragments — possibly disturbed chert beds?; locally foliated (after original bedding?) — foliation/core axis angle 40-50 degrees; disseminated chalcopyrite throughout (5-7%), and 7-10% sphalerite locally; banded sulfides — interbedded with chert (?)/barite beds.

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otage om To	Description	FROM	то	Length	Au ppb	Ag ppm	Cu ppm	Pb ppm	Zn.pr
115.5 -	ALTERED DACITE/RHYCOACITE INTRUSIVE (SUBVOLCANIC?)								
124.5	White to tan, locally quartz fep porphyritic, bleached, and weakly to moderately pyritized (2-5%), sericitized subvolcanic dacite (or rhyodacitic?) intrusive; PY occurs as disseminations and as fracture replaced stringers along crackled and possibly phreatically brecciated fractures; trace amount of chalcopyrite locally.								
124.5 - 2168	ALTERED DACITE COARSE PYROCLASTIC	2124.50	2130.00	5.50	20.	1.5	51.	48.	17
	White to tan, strongly bleached, weakly sericitized and pyritized, coarse fragmental rock with siliceous clasts	2130.00	2135.00	5.00	0.	0.0	11.	4.	7
	within altered matrix; no visible bedding or foliation; PY as fine disseminations 2-6%; locally hybridized by	2135.00	2140.00	5.00	0.	0.6	17.	4.	8
	dacitic subvolcanic intrusive rock.	2140.00	2145.00	5.00	32.	0.1	17.	20.	8
		2145.69	2150.00	5.00	20.	1.6	37 .	21.	18
		2150.00	2155.00	5.00	120.	2.2	23.	110.	27
		2155.00	2160.00	5.00	376.	5.2	33.	219.	86
			2165.00	5.00	252.	5.4	22.	121.	52
		2165.00	2168.00	3.00	248.	4.7	23.	104.	21

2187 - 2206

ANDESITE/DIORITE INTRUSIVE

Dark green to black, fine grained, massive rock with quartz-epidote-garnet veins throughout (vein thickness

range 2 - 40 mm); trace amount of disseminated PY.

the rock is clast-supported (i.e. 50 - 60% fragmental).

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CONTINCO

Property Tulsequal District: Hole No. TC-87-5 Page 15 of 17										
Footage	Description									
From To		FROM	то	Length	Au ppb	Ag ppm	Cu ppe	Pb ppm	Zn pom	
2296 - 2225.5	ALTERED PARTIE COARSE EMBOS ACTIC - Milled with and behaldland by white fam at the coarse during the coarse									
2205 - 2223.5	ALTERED DACITE COARSE PYROCLASTIC — Mixed with and hybridized by white/tan, siliceous dacite (rhyodacite subvolcanic intrusive; weakly sericitized, pyritized (3 - 8%) fine matrix with trace amount of disseminated									
	sphalerite.									
	Upper port of mineral horizon?									
	oppor part of minarat nations									
2225.5 - 2234	ALTERED DACITE FINE PYROCLASTIC	2168.69	2173.00	5.00	1266.	31.4	69.	616.	776.	
	Strongly sericitized, bleached, weakly to moderately pyritized (3 - 8%) rock; originally fine dacite tuff or	2173.00	2178.00	5.00	1460.	41.3	108.	1110.	1980.	
	subvoicanic intrusive?	2178.00	2183.00	5.00	856.	41.1	44.	1250.	1250.	
	Locally hybridized by rhyodocite subvolcanic intrusive; disseminated sphalerite (1 - 2%) throughout.		2187.00	4.00	816.	27.2	45.	118.	208.	
		2206.00	2210.00	4.00	42.	0.8	57.	79.	868.	
		2210.00	2215.00	5.00	56.	1.2	139.	70.	1369.	

2234 - 2269 ALTERED DACITE COARSE PYROCLASTIC

White, siliceous iapilli fragments within pyrite, quartz, sericite-altered matrix; portions of the siliceous fragments are possibly disturbed chert beds - locally shows contacted chert beds at 2268 - 2269; PY occurs as disseminations and fine massive blobs 5 - 10% but locally up to 20%; dissem sphalerite 1 - 2%, trace amounts of chalcopyrite and galena.

At 2260.5 Pyrite bed/core axis angle 40 degrees.

erty Tuls	equal District: Hole No. TC-87-5					P	oge 16	of 17	
tage	Description	<u> </u>		T	T	1	<u> </u>	Ι	T
то То		FROM	TO	Length	Au ppb	Ag ppm	Cu ppm	Pb ppm	Zn po
59 - 23 07	MINERAL HORIZON - HEAVY PY ZONE								
	Quartz, barite, sericite, pyrite rich (15 - 40%) fine grained rock; original rock was probably fine dacitic	2215.00	2220.00	5.00	96.	1.3	132.	15.	1650
	tuff; pyrite occurs as fine and coarse disseminations and fine blobs and layers; disseminated sphalerite 2 -	2220.00	2225.50	5.50	102.	6.5	165.	52.	272
	3%: bedding/foliation to core axis angle 5 - 25 degrees; locally mixed and hybridized by white/tan, bleached,	2225.50	2230.00	4.50	274.	0.5	160.	128.	493
	originally rhyodacitic (?) intrusive rock.	2230.00	2235.00	5.00	280.	4.5	247.	227.	164
		2235.00	2240.00	5.00	146.	8.6	1230.	232.	47
	At 2297 Bedding/foliation to core axis angle 35 degrees.	2240.00	2245.00	5.00	402.	25.8	7460.	898.	113
			2250.00	5.00	458.	14.1	3190.	526.	100
			2255.00	5.00	206.	2.5	259.	997.	
		2255.00		5.00	160.	0.2	85.	648.	136
			2265.00	5.00	260.	5.6	592.	1930.	216
			2269.00	4.00	162.	0.3	159.	681.	173
			2275.00	6.00	336.	6.5	98.	436.	134
		2275.00		5.00	244.	9.8	242.	1300.	202
		2280.00		5.00	280.	11.4	349.	1130.	308
		2285.00		5.00	352.	11.8	301.	247.	
		2290.00		5.00	220.	6.5	161.	62.	
		2295.00	2300.00	5.00	176.	2.4	304.	40.	865
7 - 2365	ALTERED ANDESITE COARSE PYROCLASTIC - FOOTWALL ANDESITE								
	White to tan, bleached, lapilii sized (2 - 40 mm) amygdaloidal fragments within grey to reddy brown, fine blotite-rich, tuffaceous matrix; amygdules within clasts are commonly pyrite replaced; 3 - 10% PY occurs as	2300.00		5.00	216.	2.5	120.	35.	123
	disseminations and in crude layers along foliation (after original bedding?) surfaces - foliation/core axis		2307.00	2.00	508.	. 3.5	183.	41.	1110
	angle 40 -50 degrees.	2307.00		3.00	4 2.	0.0	19.	8.	97
	ungre no -co begrees.		2315.00	5.00	40.	0.0	18.	5.	75
	At 2350 - 2351.5 Dark green, fine andesite dyke	2315.00 2320.00	2320.00	5.00	40.	0.4	32.	5.	417 155
	At 2359 - 2360 Dark green, fine andesite dyke.		2330.00	5.00	36.	0.0	53.	11. 7.	
	and and group the disserts after	2330.00		5.00 5.00	40. 60.	0.0 0.4	47. 122.	7. 9.	101 578
			2340.00	5.00	76.	0. 4 0.8	176.	4.	43
		2340.00		5.00	76. 36.	0.0 0.7	91.	7. 6.	35
			2350.00	5.00	<i>3</i> 0. 0.	0.0	17.	5. 5.	54
		2350.00		5.00	54.	0.5	98.	12.	96
		2355.00		5.00	42.	0.5	25. 75.	5.	111

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Property Tulse	quah District:	Hole No. TC-87-5		-			P	age 17	of 17	
Footage From To	Description		FROM	то	Length	Au ppb	Ag ppm	Cu ppm	Pb pom	Zn pom
			2360.00	2365.00	5.00	98.	0.1	108.	15.	135.

2365 - 2385 ANDESITE INTRUSIVE

Dark green, fine grained, massive, homogeneous with local, calcite/magnetite veins.

At 2380 - 2387 Core strongly fractured.

2385 - 2392

ALTERED ANDESITE COARSE PYROCLASTIC

As described in 2307 - 2365.

2392 - 2411

ANDESITE INTRUSIVE

Dark green, fine grained, massive.

As described in 2365 - 2385.

Core strongly fractured.

2411 - 2414.0

ALTERED ANDESITE COARSE PYROCLASTIC

< EOH >

As described in 2307 - 2365.

Core strongly fractured and gouged — beginning of a fault zone.

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APPENDIX C - Diamond Drill Hole Geochemical and Assay Data

Footage		Au	Ag	Cu	Pb	Zn
2094.50 2098.00 2098.00 2102.00 2102.00 2105.50 2105.50 2110.50	:	394 634 2350 1540	10.4 33.3 94.9 46.2	2320 4740 10370 11900	157 3020 7970 5850	950 21600 63700 46050
2110.50 2115.50 2115.50 2121.00 2121.00 2124.50 2124.50 2130.00 2130.00 2135.00		3760 276 24 20 0.0	117 7.9 1.8 1.5 0.0	23000 1540 72 51 11	16200 1120 77 48 4	82500 14000 360 172 74
2135.00 2140.00 2140.00 2145.00 2145.00 2150.00 2150.00 2155.00 2155.00 2160.00	•	0.0 32 20 120 376	.6 1 1.6 2.2 5.2	17 17 37 23 33	4 20 21 110 219	80 92 192 277 809
2160.00 2165.00 2165.00 2168.00 2168.00 2173.00 2173.00 2178.00 2178.00 2183.00	·: :	252 248 1266 1460 856	5.4 4.7 31.4 41.3	22 23 69 108 44	121 104 616 1110 1250	529 216 776 1980 1250
2183.00 2187.00	•	816	41.1 27.2	45	118	208
2206.00 2210.00 2210.00 2215.00 2215.00 2220.00 2220.00 2225.50 2225.50 2230.00 2230.00 2235.00	•	42 56 96 102 274 280	.8 1.2 1.3 6.5 4.5	57 139 132 165 160 247	70 70 15 52 128 227	868 1360 1650 2720 4930 1640
2235.00 2240.00 2240.00 2245.00 2245.00 2250.00 2250.00 2255.00		146 402 458 206	8.6 25.8 14.1 2.5	1230 7460 3190 259	232 698 526 997	471 1137 1008 1570
2255.00 2260.00 2260.00 2265.00 2265.00 2269.00		160 260 162	5.6 3	85 592 159	648 1930 681	1360 2160 1730
2269.00 2275.00 2275.00 2280.00 2280.00 2285.00 2285.00 2290.00 2290.00 2295.00		336 244 280 352 220	6.5 8 11.4 11.8 6.5	98 242 349 301 161	436 1300 1130 247 62	1340 2020 3080 3150 1240
2295.00 2300.00 2300.00 2305.00 2305.00 2307.00 2307.00 2310.00 2310.00 2315.00		176 216 508 42 40	2.4 2.5 3.5 0.0 0.0	304 120 183 19 18	40 35 41 8 5	865 1230 1110 97 75
2315.00 2320.00 2320.00 2325.00 2325.00 2330.00 2330.00 2335.00 2335.00 2340.00		40 36 40 60 76	0.0	32 53 47 122 176	5 11 7 9	417 155 101 578 43
2340.00 2345.00 2345.00 2350.00 2350.00 2355.00 2355.00 2360.00 2360.00 2365.00		36 0.0 54 42 98	0.0 .5 .5	91 17 98 75 108	6 5 12 5 15	35 54 90 111 135

TULSEGUAH CHIEF-WD -ASSAY DATA-DDH-87-5

TC 87-5

JOB V 87-0721R REPORT BATE 8 JAN 1988

LAD NO	FIELD MANBER	BRILL	INTERVAL	Au	NT Au	A6	Po	Zn	Cu	Au(1)	Au(1)	As (1)	As(1)	Cu(1)	Pa (1)	Zn(1)
		reen (s	ETRES) TO			PPM	· · · PPR -	PPH-		6/1	02/7-	6/T-	02/1	¥		

RB723157	TC 87-5	2094.50	2098.00	394	5	10.4	157	950	2320	0.206	0.006	3.840	0.112	0.16	0.01	0.10
R8723158	TC 87-5	2098.00	2102.00	634	5	33.3	3020	E21600	4740	1.097	0.032	24.915	0.785	0.46	0.32	2.00
R8723159	TC 87-5	2102.00	2105.50	2350	5	74.9	7970	E63700	E10370	2.447	0.072	88.595	2.584	1.05	0.90	5.90
R8723160	TC 87-5	2105.50	2110.50	1540	5	46.2	5850	E46050	E11900	1.886	0.055	48.755	1.422	1.09	6.63	4.90
	-TC-87-5-	2110.50	- 2115.50	3760	5	E117	E16200	E82500 -	- E23000	3.977	0.116	_118.97_	3,470_	1.70_	1.65 _	7.25 -
R8723162	TC 87-5	2115.50		276	5	7.9	1120	E14000	1540	0.617	0.018	8.812	0.257	0.29	0.13	1.65

APPENDIX "D"

EXPLORATION

WESTERN CANADA

IN THE MATTER OF THE B.C. MINERAL ACT AND

IN THE MATTER OF DIAMOND DRILLING

CARRIED OUT ON THE TULSEQUAH PROPERTY

LOCATED IN THE ATLIN MINING DIVISION OF THE PROVINCE OF

BRITISH COLUMBIA - MORE PARTICULARLY N.T.S. 104K/11.12

AFFIDAVIT

- I, MICHAEL J. CASSELMAN, OF THE CITY OF DELTA, IN THE PROVINCE OF BRITISH COLUMBIA, MAKE OATH AND SAY:
- 1. THAT I AM EMPLOYED AS A PROJECT GEOLOGIST BY COMINCO LTD. AND AS SUCH HAVE A PERSONAL KNOWLEDGE OF THE FACTS TO WHICH I HEREINAFTER DEPOSE:
- 2. THAT ANNEXED HERETO AND MARKED AS "APPENDIX A" TO THIS REPORT IS A TRUE COPY OF EXPENDITURE OF A DIAMOND DRILLING PROGRAM CARRIED OUT ON THE TULSEQUAH PROPERTY:
- 3. THAT THE SAID EXPENDITURES WERE INCURRED BETWEEN THE 14 DAY OF SEPTEMBER 1987 AND THE 29 DAY OF NOVEMBER 1987 FOR THE PURPOSE OF MINERAL EXPLORATION ON THE ABOVE NOTED PROPERTY.

MICHAEL J. CASSELMAN, M.Sc.

APPENDIX "E"

EXPLORATION

WESTERN CANADA

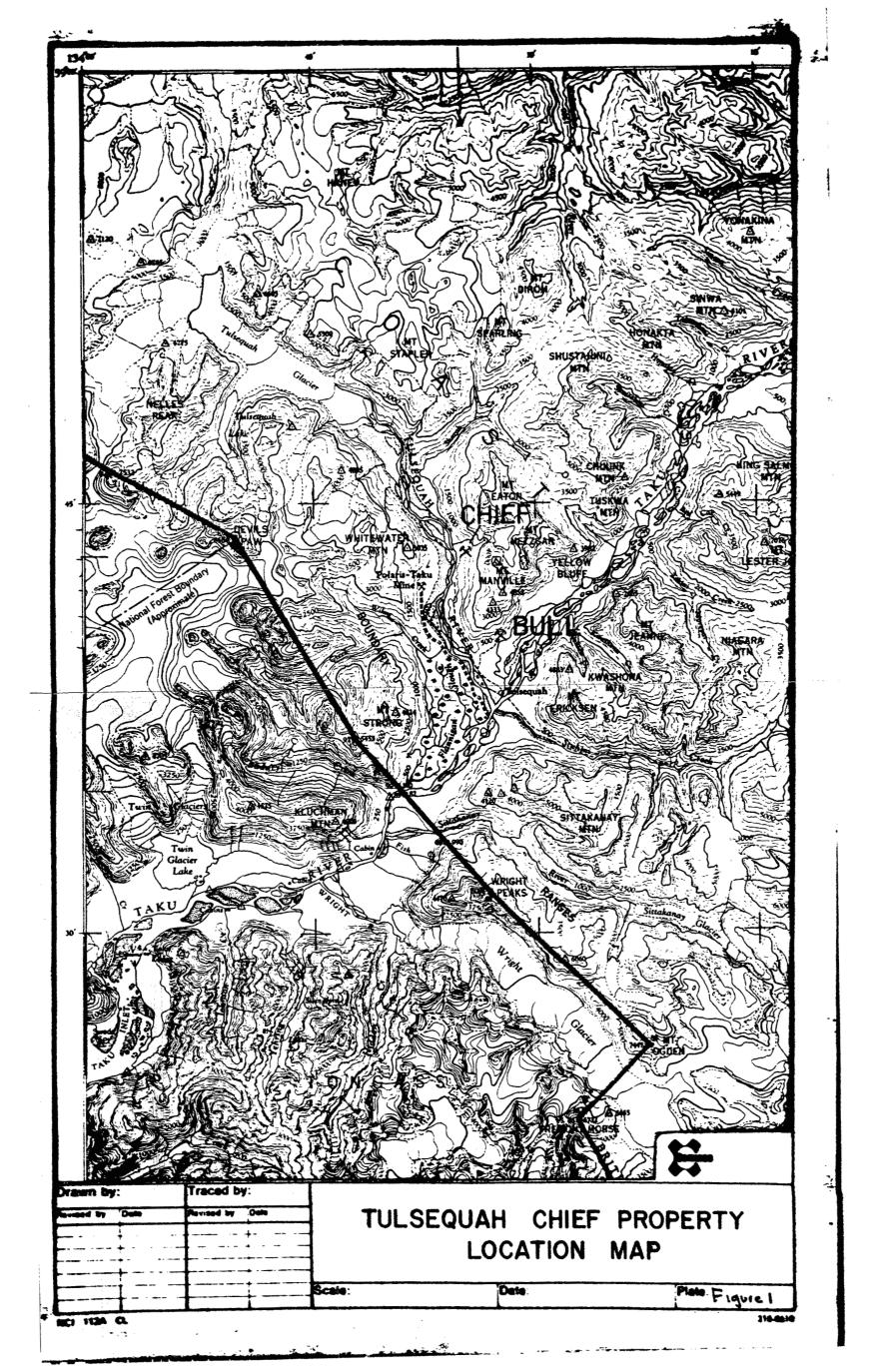
STATEMENT OF QUALIFICATIONS

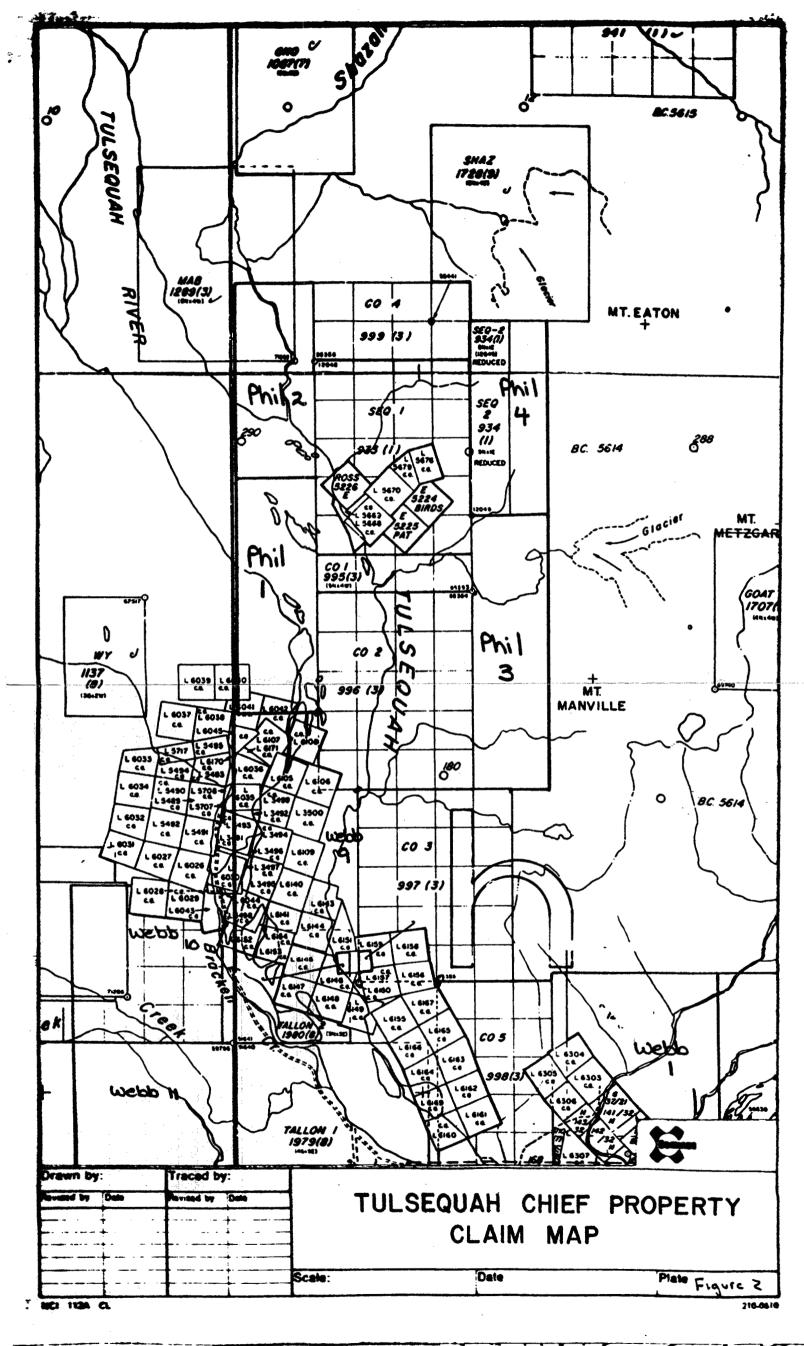
I, MICHAEL J. CASSELMAN, OF THE CITY OF DELTA, BRITISH COLUMBIA, HEREBY CERTIFY:

- BRITISH COLUMBIA, WITH A BUSINESS ADDRESS AT 700-409 GRANVILLE STREET, VANCOUVER, BRITISH COLUMBIA.
- THAT I GRADUATED WITH B.Sc.AND M.Sc. DEGREES IN GEOLOGY FROM THE UNIVERSITY OF BRITISH COLUMBIA IN 1969 AND CARELTON UNIVERSITY IN 1977.
- THAT I HAVE PRACTISED GEOLOGY WITH COMINCO LTD. FROM 1969 TO PRESENT.

DATED THIS 29 DAY OF JANUARY 1988 AT VANCOUVER, BRITISH COLUMBIA.

MICHAEL J/ CASSELMAN, M.Sc.





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