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EXPLORATION

WESTERN CANADA

NTS: 104K/11

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ASSESSMENT REPORT

DIAMOND DRILLING ON

TULSEQUAH CHIEF CROWN GRANT

ATLIN MINING DISTRICT, B.C.

LATITUDE: 58⁰43'

LONGITUDE: 133⁰35'

JANUARY 1991

**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

R.J. AULIS

20,901

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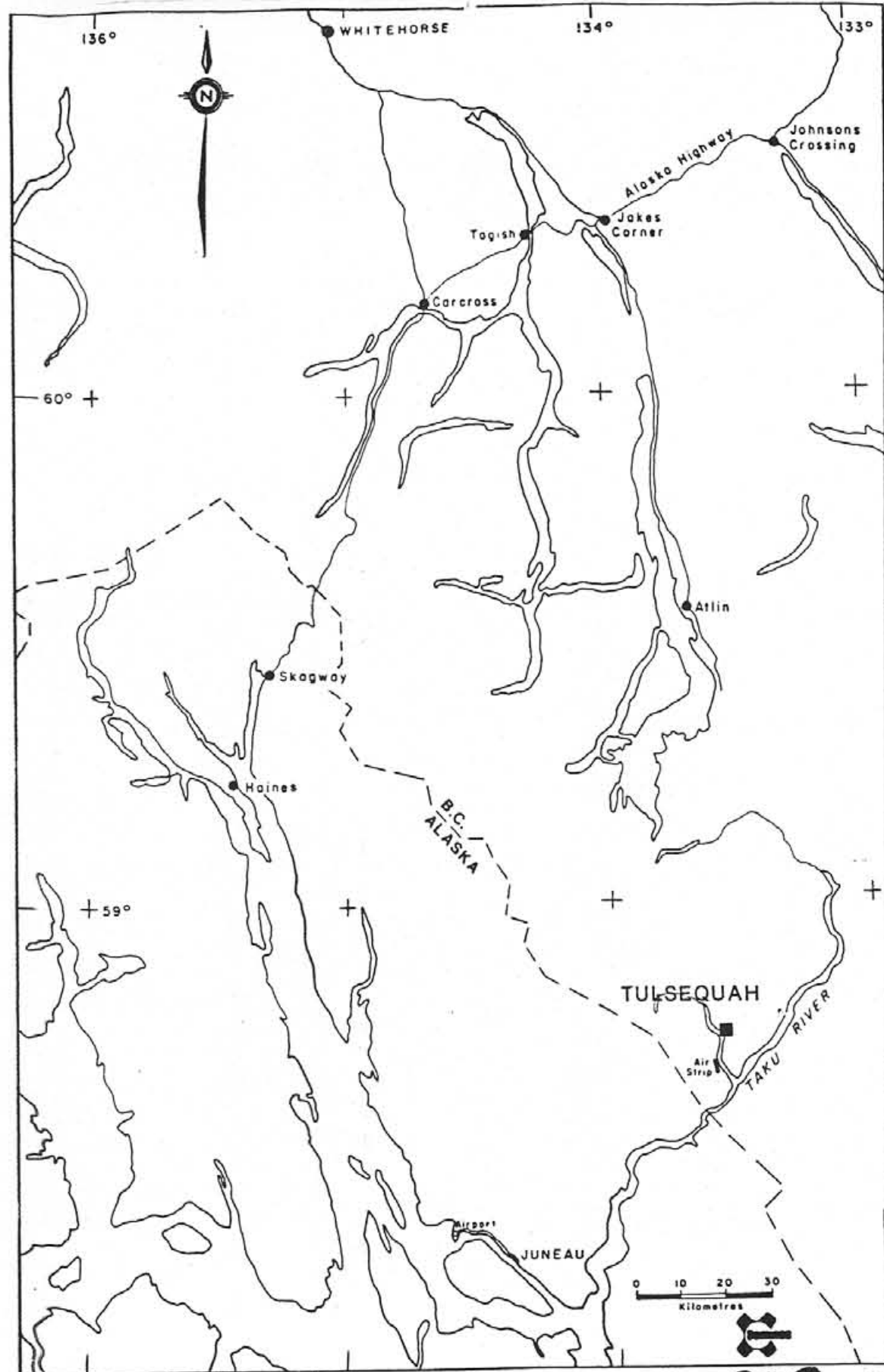
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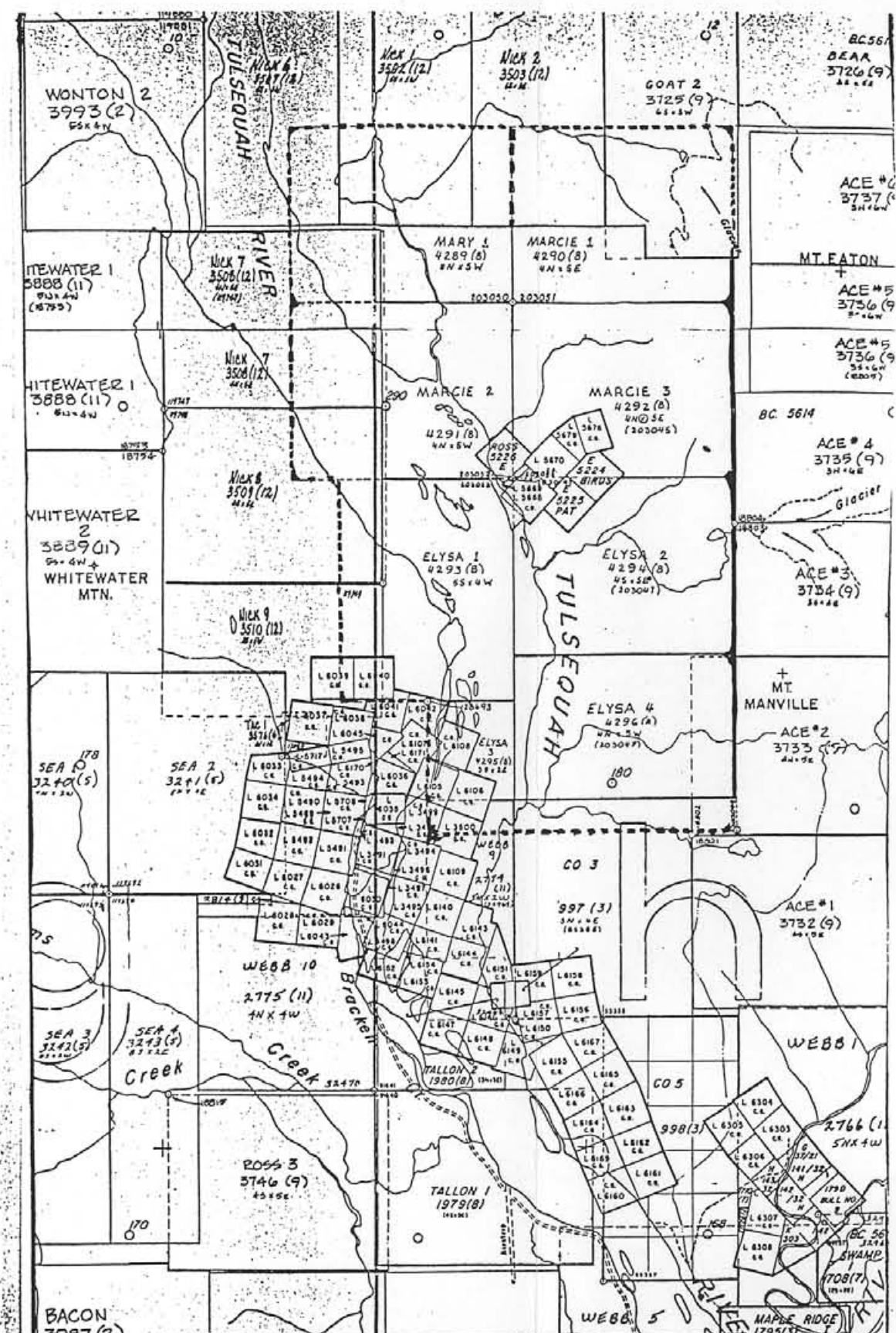
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Drawn by: APR		Traced by:	
Revised by	Date	Revised by	Date
LOCATION MAP 20901			
TULSEQUAH PROPERTY			
Scale: 1:1,000,000		Date: March, 1988	
		Plate: Fig. 1	



Drawn by: RJA		Traced by:	
Revised by	Date	Revised by	Date
TULSEQUAH CHIEF PROPERTY			
CLAIM MAP 20901			
Scale: 1:50,000		Date:	
		Plate Figure 2	

COMINCO LTD

EXPLORATION

WESTERN CANADA

26 January 1991

ASSESSMENT REPORT - TULSEQUAH CHIEF

SUMMARY

Diamond drill holes TCU-90-22 and TCU-90-23 were drilled in May/June 1990 as part of an eight hole, 19612' program. The objective was to test the downdip extension of mineralization encountered in 1989 DDH's TCU-89-17, 13 and 18. Drill hole TCU-90-22 encountered the H lens from 1784.5' to 1948.5' with 164' of significant mineralization grading 2.92% Cu, 1.58% Cu, 1.58% Pb, 9.09% Zn, 0.11 oz/t Au, 4.96 oz/t Ag. DDH TCU-90-23 intersected the same lens approximately 443' downdip from TCU-90-22 with significant mineralization from 1085.0 to 2174.5 grading 1.10% Cu, 1.15% Pb, 5.43% Zn, 0.11 oz/t Au, 4.16 oz/t Ag.

Holes TCU-90-22 and 23 indicate that the H lens thickens considerably and remains open to depth.

INTRODUCTION

A joint venture between Cominco Ltd and Redfern Resources was convened March 25, 1987 to explore the Tulsequah Chief Property. From 1987-1990 work on property has included detailed surface mapping, underground rehabilitation and drifting, and surface and underground drilling.

Work in 1990 included 600 feet of underground drifting from pre-existing workings on the 5400 Level to establish drill stations from which to test downward extension of the mineral horizon hosting Chief deposit. Mining was carried out from May 10 to July 4 and diamond drilling from July 4 to December 8.

Drilling was carried out by Northward Mining Contractors using two drills, a Boyles 37A and a Connors BBS-37A. Eight holes totalling 19612 feet were drilled from 2 adjacent drill stations at the end of the 1990 drift.

Diamond drilling was supervised by R.J. Aulls, M.J. Casselman and S.W. Smith. Ground conditions were generally good with the exception of a clayey-sand zone encountered at depth in three of the eight holes drilled, causing serious drilling problems.

2.

LOCATION AND ACCESS

The property is situated on 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 area is by air from Atlin, 100 km north, or by water/air from Juneau, 64 km southwest, to a gravel airstrip along Tulsequah River, 10 km south of the Tulsequah Chief mine site where the base camp is 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>	<u>Record No.</u>	<u>Recorded</u>	<u>Assessment Work Due</u>
Ross	5226	May 30, 1963	May 30, 2001
Pat	5225	May 30, 1963	May 30, 2001
Birds	5224	May 30, 1963	May 30, 2001
Mary 1	4289	Aug 5, 1990	Aug 5, 2001
Marcie 1	4290	Aug 5, 1990	Aug 5, 2001
Marcie 2	4291	Aug 5, 1990	Aug 5, 2001
Marcie 3	4292	Aug 5, 1990	Aug 5, 2001
Elysa 1	4293	Aug 5, 1990	Aug 5, 2001
Elysa 2	4294	Aug 5, 1990	Aug 5, 2001
Elysa 3	4295	Aug 3, 1990	Aug 3, 2001
Elysa 4	4296	Aug 5, 1990	Aug 5, 2001

August 1990 - Cominco Ltd abandoned 9 claims (119 units) and replaced by 8 claims (146 units) to ensure the tenure of the ground.

3.

<u>Crown Grants</u>			<u>1990 Mineral</u>
<u>Name</u>	<u>Lot No.</u>	<u>Area (Ha)</u>	<u>Land Taxes</u>
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	9.68

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 ongoing work program.

In 1987 the entire property was mapped at 1:2500 with the Central Area being mapped in greater detail at 1:1000. From 1987 to present, 58,800 feet of drilling has been done from surface and underground. To carry out the underground drilling, extensive work in the form of rehabilitation and drifting was done to the 5400 Level from 1988 to 1990.

PROPERTY GEOLOGY

1:2500 scale mapping has shown 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 pyroclastics units. The Chief fault is a regional structure which cuts off west extension of the stratigraphy hosting the Tulsequah Chief deposit. Rocks west of the Chief fault resemble those east of the fault but they possess a much higher degree 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, diorites and quartz monzonites.

4.

1:1000 scale surface and underground mapping in area of deposit (see Plate 90-1) showed it to be broken into separate blocks by north-south striking faults designated Chief, 4400E and 5100E. 4400E and 5100E faults were initially synvolcanic growth faults which developed a graben on the seafloor during deposition of the mineral hosting stratigraphy. There has been later reactivation along these faults. Stratigraphy hosting the Tulsequah Chief deposit is a conformable succession of NE-SW striking, steeply NW dipping volcanics from oldest to youngest as follows:

- 1) Footwall Andesite Volcanics-pyroclastics and flows.
- 2) Mineral Horizon - strongly sericitized and pyritized dacite to rhyolite lapilli tuffs intercalated with a mixed assemblage of tuffs, muds, cherty tuffs and cherts; hosts all the sulphide lenses in deposit.
- 3) Dacite-Rhyolite Pyroclastics.
- 4) Upper Andesite Volcanics-pyroclastics and flows.

The layered rocks have been intruded by a large diorite plug, sill, dyke complex and dacite intrusives of suspected Paleozoic age (subvolcanic-intrusives), and rhyodacite dykes of suspected Eocene age. The Chief deposit occur in one horizon designated the mineral horizon which is located at transition between dominantly andesitic and dominantly felsic volcanism. It can be traced on surface for 700 m with thickest development occurring in graben defined by the 4400E smf 5100E faults.

Mineralization is localized in 3 areas along the mineral horizon; F,E and G sulphide lenses outside graben and A, B, A-B, and H sulphide lenses within graben. The sulphide lenses are stratigraphically controlled and occur as pyrite-rich lenses with varying proportions of sphalerite, galena, chalcopyrite, barite, gypsum, Au and Ag. Production from 1951-1957 was 625,781 tons. Reserves at 1957 to 5200 L were 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 area of deposit contains two large alteration zones interpreted to be feeder pipes; one underlies the Chief deposit (Main Alteration Zone) and the other surrounds the 5200 and 5400 Level portals (5200 Portal Alteration Zone). These pipes developed at different stratigraphic levels.

DIAMOND DRILLING

Drill holes TCU-90-22 and 23 were the first two drill holes of the 1990 season, both drilled on the same section bearing 166⁰ with dips of -70 and -81⁰ respectively (see Plate 90-2).

Drill Hole TCU-90-22 was started in July 12 and completed August 6 to a depth of 2579'. Drill hole TCU 90-23 was started on August 7 and completed to a depth of 2699 on September 5.

5.

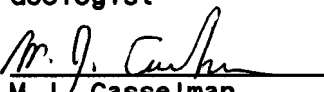
These holes were planned to test downdip the mineralization encountered in the 1989 DDH TCU-90-18, 17 and 13. Hole 90-22 intersected 164' of sulphide mineralization between 1784.5' and 1948.5 feet, grading 2.92% Cu, 1.58% Pb, 9.09% Zn, 0.11 oz/t Au and 4.96 oz/t Ag. Hole 90-23 intersected 89.5 feet of sulphide mineralization from 2085.0 to 2174.5 feet grading, 1.10% Cu, 1.15% Pb, 5.43% Zn, 0.11 oz/t Au, 4.16 oz/t Ag. True thickness of these two intervals are calculated to be 110 and 62 feet respectively.

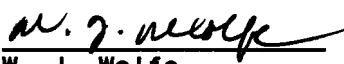
Drill holes TCU-90-22 and 23 were logged by R.J. Aulis and M.J. Casselman and are described in detail in Appendix B. Geochemical and assay data are in Appendix C.

CONCLUSIONS

Drill holes TCU-90-22 and 90-23 extended ore-grading mineralization of the H lens downdip approximately 920' from previous drilling and shows the lens to be open to depth.

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Endorsed by: 
M.J. Casselman
Senior Geologist

Approved for
Release by: 
W. J. Wolfe,
Manager, Exploration-
Western Canada

RJA/pm
Distribution
Mining Recorder
File

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APPENDIX "A"

STATEMENT OF EXPENDITURES

Diamond drill holes TCU-90-22 and 90-23 were part of an 8 hole, 19612 ft. drill program conducted from May 9 to December 8, 1990. This included 600 feet of underground drifting and the slashing of two drill stations from which drilling was done. Drill holes TCU-90-22 and 90-23 were drilled in the period from July 12 to September 5, 1990 for a total of 5278 feet.

Salaries:

Permanent	\$ 48,363.00	
Temporary	85,523.00	
General Roll/Contractor	46,680.25	
Administration	<u>53,364.00</u>	
		\$ 233,930.25

Transportation

Helicopter	230,348.07	
Fixed wing	105,511.80	
Other (freight, fuel)	<u>44,212.93</u>	
		380,072.80

Communication	67,975.64	
Mining/Drilling Site Preparation	748,880.90	
U/G Diamond Drilling	773,555.49	
Camp Costs	103,171.80	
Surveying	31,194.11	
Expense Accounts	29,145.45	
Geochemistry	23,892.50	
Expediting	33,302.99	
Environmental Studies	12,336.23	
Tenure/Staking	25,939.41	
Drafting/Computer	9,217.41	
Geology Supplies/Equipment	<u>21,407.74</u>	
		\$ 2,494,022.80

Cost per foot drilling = \$2,494,022.80 ÷ 19612 feet = \$127.17/ft.

Diamond drill holes TCU-90-22 and 90-23 cost \$127.17 x 5278' = \$671,203.26

APPENDIX B Diamond Drillhole Logs
TCU-90-22 and 90-23.

Property	TULSEQUAH CHIEF	District	ATLIN	Hole No.	TCU-90-22
Commenced	July 12, 1990	Location		Tests at	see end
Completed	Aug 5, 1990	Core size	BQ-2	Cor. dip	-70 degs
Coordinates	N		E	True Brq.	166 degs
Objective	test downdip ext. of 1989 sulphide inter.			% Recov.	
Date	Oct. 2, 1990			Horiz. Comp.	
Logged by	RJA/MJC	<i>Core stored at site</i>		Vert. Comp.	
				Revision Date	November 2, 1990

Feet From	To	Description
0.0	6.0 (0-1.8)	CASING
6.0 (1.8-6.9)	22.5	DIORITE Pale to medium green massive fine grained intrusive, homogeneous generally with felted crystalline texture, occasional feldspar glomeroporphy all less than 1mm. Lower contact vague and indistinct due to digestion and incorporation of host pyroclastic fines, of similar composition and colour. 17-18' dark grey very fine grained interval possible ripped up block of ash-tuff pyroclastic. Lower contact 25 degs to core axis.
22.5 (6.9-20.0m)	65.5	FINE GRAINED TUFFACEOUS SEDIMENTS - Intercalated Andesite Tuff/Lapilli tuff medium to dark grey, locally whitish, fine grained, well bedded; locally tuffaceous intervals 30-32.8'. Bedding oriented 30-40 degs., slightly variable. Core generally good often breaks parallel to bedding, medium hardness- can scratch by knife. 34.7-41' Fractured bleached interval, crackled, finely veined and broken to gravel sized fragments, pale grey green bleached colour. Very fine grained, no bedding left discernable, strongly altered or flooded, looks silicified but is scratchable, contacts sharp at 20 degs to core axis. At 42' well bedded at 27 degs to core axis. 34.7-41' Core very fractured- light greenish grey colour-not sure if bleached or primary colour. 30.1-32.8' Dacite-Andesite volcanoclastic-lapilli tuff and tuff sized fragments, poorly sorted interval of coarser pyroclastics with sharp but conformable contacts, massive but with clasts aligned parallel to bedding direction at 35-40 degs to core axis. Clasts highly variable from light siliceous (dacitic) to dark fine

Property TULSEQUAH CHIEF District ATLIN Hole No. TCU-90-22

Feet		Description
From	To	

grained andesitic, overall dacitic in nature, all in a dark grey fine matrix. At 64' bedding at 37 degs. to core axis.

64-66.6 Increase in hairline chlorite healed fractures, related to diorite.

65.5 86

Diorite dykes-contacts 30 degs to core axis. Minor-32 pyrite. 42.6-44.3', 40.7-41.3' - small medium grained.

(20.0-26.2m)

Diorite fine grained light to medium grey green intrusive with felted crystalline texture, massive and relatively featureless, softer and chloritic. Contacts broken, veined and calcareous.

FAULT

- 66.6-71' broken, ground approx. 30% calcite vein material, minor FAULT GOUGE.

78-86.6' also quite broken and calcite veined, locally vuggy with sparry calcite. Faulting and fracturing all post emplacement. Minor mixing of host tuffaceous material. Core generally very fractured and broken up especially at 65.6-74.8' and 80-86'.

86.0 93.0
(26.2-28.3)

FINE GRAINED TUFFACEOUS SEDIMENTS

- Veined and locally altered by diorite-small diorite veinlets locally, fine to very fine grained, dark to medium grey. Core broken up in angular 2-8 cm pieces; crackle brecciated with abundant fine chlorite more or less quartz healed fractures; variable hardness generally hard-silicified. Bedding rare approx. 35% to core axis.

93.0 101.7
(28.3-31.0)

FINE GRAINED TUFFACEOUS SEDIMENTS

- Well bedded- Strongly Bleached and Altered locally porphyroblasts.

94.8-96' and 99-100.3' VFG felsic intrusives- possibly - Sloko equivalents - these intrusives result in pale grey green mottled colouring, heterogeneous character. Intrusives easily scratchable by knife - sericite altered. Sharp upper and lower contacts, contacts rimmed with porphyroblastic rich zones - 1.3 mm, round in sediments. Sediments are well bedded - 45 degs to core axis.

Property TULSEQUAH CHIEF District ATLIN Hole No. ICU-90-22

Feet

From To Description

101.7 125
(31.0-38.1)

FINE GRAINED TUFFACEOUS SEDIMENTS

- Cut by Felsic (sloko) Dykelets and possibly minor diorite dykelets. Chlorite-quartz veinlets common throughout section. Cut frequently by quartz rimmed chlorite filled veins coarsing irregularly through sediments grey-black colour very fine grained, relict bedding poorly preserved approx. 50 degs. to core axis.

Some thin felsic dykes

107.9-110.5' contacts 30 degs. to core axis.

- 115.5 (6cm thick)

- 117.1 (30cm thick)

- 119 - 124' coarse volcanoclastic sediment - fragments 1 - 15 mm cut by calcite veinlets - core very fractured in this section.

125 157
(38.1-47.8)

FINE GRAINED TUFFACEOUS SEDIMENTS

- Intruded by Felsic Dykelets (possibly sloko) complicated zone, similar to 101.7-125'

Felsic dykes white to greenish white, fine grained - dykes are generally variably hybridized by sediments. Sediments generally fine grained, grey/black, but near dykes are bleached to white, greenish white colour.

Main areas of felsic dykes - 125-125.6', 129.5', 130.9', 136.8', 139.7' and 151', 154.8',

139.7'-146' Diorite dyke - Two phases - 139.7' - 143.3' fine grained; 143.3 - 145.9' - feldspar porphyry upper contact 45 degs., lower contact 45 degs. core axis.

157 188.6
(47.8-57.5)

TUFFACEOUS SEDIMENTS

- generally fine grained.

176.8-179' coarse grained sediments - fragments 3-15 mm - some pyritic fragments 2-10 mm.

Sediments locally bleached and cut by quartz - chlorite veinlets. Bedding at 45 degs. to core axis.

181-182' Diorite dyke - porphyritic - contacts 45 degs to core axis.

Core moderately fractured 3 fractures/foot.

150.6-156.5' Tuff - fine grained weakly bedded, sericite altered and now with minor biotite alteration, vaguely finely crackled. Sharp contacts.

156.8' Note first appearance of weakly disseminated Fe sulphide, very fine, subhedral

Property TULSEQUAH CHIEF District ATLIN Hole No. TCU-90-22

Feet		Description
From	To	

disseminated evenly in fine grained white, greenish white dyke (rhyolite) lower contact brecciated and upper contact vague approx. 45 degs. to core axis.

48.7 Relatively massive fine grained, dark grey, homogeneous weak alteration now includes BIOTITE and weak py disseminated, approx. 1-2% very finely disseminated subhedral medium or rare clots and fracture healings. Common thin chlorite/qtz healed fractures. Bedding rare but generally at 45 degs to core axis; examples at 170- 172.2', 171.9-172.5' strong biotite presence gives distinct brown tint.

187.6 870
(57.5-265.3)

DIORITE

- Massive homogeneous medium to dark green grey fine to medium grained intrusive, easily distinguished from the extrusives by massive nature and colour (greener). Locally weakly porphyritic. Diorite shows evidence of multiphases with each phase having fine grained contacts. Zones of bleaching observed maybe due to later phases altering earlier phases at diorite.

187.6' - 10 inch quartz - breccia zone.

187.6-269' Generally diorite fine to medium grained and slightly augite porphyritic to equigranular. It is medium hard - leaves patchy knife metal. Irregular wispy chlorite veinlets. Rock grey greenish to greenish colour.

236.2 - 6" Zone broken core - no slickensides.

361-365' Zone of broken core, patchy quartz veinlets and pyrite. Core bleached. 36.4-37' gouge - main FAULT ZONE.

384-385' Zone of broken core.

269-439.6' DIORITE greenish grey to greenish black and coarse grained and equigranular. Minor patchy quartz and chlorite veinlets cutting core 30-90 degs. to core axis.

439.6-529.5' DIORITE fine - medium grained with more patchy mottled (bleached) zones and quartz veinlets more common (45-80 degs. to core axis).

Diorite texturally quite variable in this zone - probably contact zone between phases of diorite.

Property TULSEQUAH CHIEF District ATLIN Hole No. TCU-90-22

Feet		Description
From	To	

460-462.5' DIORITE weakly brecciated and bleached.

529.5-711' DIORITE coarse grained, equigranular greenish grey colour. Few patchy quartz veinlets and chlorite veinlets generally 35 - 70 degs. to core axis.

565.6' 2" gouge zone.
712.6' sheer zone 6" wide.

589-609.5' 2 inch quartz veins 90 degs. end 40 degs to core axis.

711-744 DIORITE fine grained, greenish grey; equigranular. Locally weakly porphyritic.

744-751' Porphyritic dyorite dyke - upper contact 25 degs to core axis and lower contact 45 degs to core axis. Augite phenocrysts aligned 10-20 degs to core axis.

751-810 Diorite fine grained, greenish grey.

799-820 Core very broken and fractured; minor slickensides on some fractures.

776' 8" epidote healed fracture zone 35 degs. to core axis.

795.5 2" quartz vein 90 degs to core axis.

811-816' Porphyrite diorite dyke - Augite phenocrysts 15% 1-2mm. Contacts 15-20 degs to core axis.

816-870' Fine grained equigranular diorite. Rock greenish grey.

820', 842', 850' 2-3 inch quartz veinlets 90, 45 and 45 degs respectively to core axis.

861 - 12" Shatter zone reannealed by quartz.

Note; except where indicated core generally only weakly fractured 1-2 fractures/ft.

870 918
(265.3-280.1)

FINE GRAINED TUFFACEOUS SIDEMENTS

- Very fine grained, massive, grey to slighty brownish grey, 3-5% disseminated to locally banded pyrite; sediments appear hornfelsed. Unit is strongly porphyroblastic -

Property TULSEQUAH CHIEF District ATLIN Hole No. TCU-90-22

Feet
From To Description

porphyroblasts 1-3 mm, bluish and round to squarish; comprise 10-30% of rock. Sediments are locally shattered and reannealed by chlorite veinlets and some quartz veinlets. Rare bedding approx. 30-35 degs. to core axis. Tiny non oriented quartz veinlets scattered throughout section. Some have pyrite core. Some chlorite veinlets contain magnetite.

918 952
(280.1-290.3)

DACITE. ANDESITE.

- Volcaniclastic with muddy matrix - tuff and lapilli sized fragments. A difficult to determine composition as some phases harder than others (leave knife or rock) and have slightly conchoidal fracture. Some felsic fragments locally. Generally rock could vary from dacitic to andesitic in composition. Light colour and slightly conchoidal fracture suggest dacite, but general appearance and hardness suggest andesite. Matrix contains variable clastic component resembling volcanoclastic sediments. Rock is fairly homogeneous in colour and texture, greyish, green in colour. Fragments aligned and 3 mm to 2 cm size. Fragments aligned 0-30 degs to core axis.

Generally - 30 degs at 914' and 924'
- 0 degs at 933.5' and 951'

Red hematite fragments common approx. at 5%. Zone locally cut by chlorite-quartz, epidote magnetite veinlets. Some fragments augite porphyry, some amygdaloidal, some chlorite but most massive aphanitic.

952- 956
(290.3-291.6)

F.G. TUFFACEOUS SEDIMENTS

- same as 870-919' very fine grained, grey soft to knife cut. Fine grained, grey, massive. No porphyroblasts; 1-5% pyrite. Rare bedding 15-20 degs. to core axis.

956- 959.7
(291.6-292.6)

DACITE-ANDESITE VOLCANICLASTIC

- same as 919'-952'. Muddy matrix. Bedding 0-15 degs to core axis. Hematite fragments 1-5% (red). Core very fractured.

959.7 963
(292.6-293.5)

F.G. TUFFACEOUS SEDIMENTS

- same as 870-919'. Very fine grained, grey. Soft to knife cut. Bedding 0-10 degs to core axis. No porphyroblasts. 1-5% pyrite.

963 970
(293.5-295.7)

DACITE-ANDESITE, VOLCANICLASTIC

- same as 919-952' Muddy matrix. Bedding 0-15

Property TULSEQUAH CHIEF District ATLIN Hole No. TCU-90-22

Feet		Description
From	To	
		degs to core axis. Hematite fragments 1-59 (red)
970-	977 (295.7-297.8)	F.G. TUFFACEOUS SEDIMENTS - Bedding 20-25 degs to core axis. Same as 870-939. Very fine grained, grey. Soft to knife cut. Core very fractured. No porphyroblastic; 1-5% pyrite.
977-	980 (297.8-299m)	DACITE-ANDESITE VOLCANICLASTIC - Same as 286.1-290.3 Muddy matrix. Bedding 0-10 degs. to core axis. Hematitic fragments 1-5% (red).
980	980 (299-300.4)	>FG TUFFACEOUS SEDIMENTS< - Same as 870-919' No porphyroblasts. Very fine grained grey. Soft to knife cut. Bedding 25-30 degs to core axis. 1-5% pyrite. Core very fractured.
984	995 (300.4-303.3)	DACITE ANDESITE-VOLCANICLASTIC - Same as 919-952' Red hematitic fragments common 5-8%. Bedding rare but 40 degs. to core axis. Zone is very disturbed by chlorite-quartz veining - possibly related to nearby diorite dyke. Core quite fractured.
995	1000.5 (303.4-305m)	DIORITE DYKE - Fine grained, hard, massive, grey green, equigranular. Upper contact very altered and irregular - possibly low angle to core axis. Lower contact approx. 30 degs to core axis.
1000.5-	1010 (305.0307.9)	FELSIC DYKE - Possibly Sloko equivalent - Dyke appears to have occupied FAULT zone. Very mashed up and sheared - shearing 10-30 degs to core axis - parallel to upper contact. Core strongly fractured and broken. Some slickensides. Chlorite veinlets common. Upper contact 80 degs. to core axis. Dyke very hard to knife cut.
1010	1020.9 (307.9-313.9)	DIORITE DYKE - Variably intruded sheared and altered by felsic dyke (diorite locally quite hybridized). Diorite contains veinlets and patches at felsic dyke throughout. Quartz veinlets locally throughout diorite. Shearing diorite generally 30-40 degs. to core axis.
		1018.5-1023 - diorite strongly hybridized by felsic dyke.
		1027.5-1029.5 - diorite strongly hybridized by felsic dyke.

Property TULSEQUAH CHIEF District ATLIN Hole No. TCU-90-22

Feet		Description
From	To	
		Upper contact approx. 80 degs to core axis and lower contact vague.
1029.5 (313.9-324.6)	1064.7	<p>FELSIC DYKE</p> <p>- Related to 1000.5-1010' - possibly Sloko equivalent - Variably hybridized throughout - difficult to determine original composition. Variably sheared approx. 30-40 degs. to core axis.</p> <p>1029.5-1037' and 1057-1064.7' - These sections are the least hybridized view of dyke - closest to original composition and texture. Contacts 30-80 degs to core axis.</p> <p>1037-1057' - Variably hybridized diorite dyke or felsic dyke, strong mixture at both rock types, difficult to recognize either.</p> <p>1033-1037 - Considerable pink - reddish pink material in dyke - maybe either hematite or kspar. Zone contains minor patchy pyrite. Moderately fractured.</p>
1064.7 (324.6-331.9)	1088.7	<p>DIORITE DYKE</p> <p>- Strongly sheared and hybridized by intruding felsic dyke. Shearing generally 30-45 degs to core axis. Quartz veinlets and chlorite veinlets common.</p> <p>1077-1088.7 - Effects of felsic dyke much more obvious - rock is hybridized combination diorite and felsic dyke. Minor patchy pyrite. Moderately fractured.</p>
1088.7 (331.9-339.9)	1115	<p>STRONGLY SHEARED AND BRECCIATED FELSIC DYKE</p> <p>- Possibly Sloko equivalent - FAULT ZONE. Breccia fragments 3mm - 3cm. Dyke has been extensively sheared and fragmented. Locally gouge zones 0-20 degs to core axis.</p> <p>1094' (20degs) and 1104-1108' (0degs) Marioposite throughout in breccia fragments and matrix. Pyrite patchy 0-3%. Upper contact 45 degs to core axis. Lower contact 20 degs to core axis. This zone should be assayed for gold.</p> <p>NOTE: 1005.5-1115 - Whole zone is part of major zone at disturbance - fault zone with main faults probably centered on 1000.5-1010' and 1088.7-1115'.</p>
1115 (339.9-362.6)	1189.5	<p>DIORITE DYKE</p> <p>- Grey black colour.</p>

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Feet
From _____ To _____ Description _____

1115-1151 - Fine grained, moderately fractured,
4-5 fractures/foot.

1151-1171 - Medium to coarse grained approx.
augite phenocrysts common.

1168.5-1170 - Small felsic dyke with 6 inches
bleach zone on either side of dyke. Dyke similar
to 1088.7-1115'. Upper and lower contacts 30degs
to core axis.

1171-1181 - Fine grained.

1181-1189.5 - Zone of mixed diorite and dacite
rhyolite pyroclastics - quartz veins common;
zone 60% diorite, rest contaminated diorite and
minor felsic pyroclastics. Upper contact against
sheared Sloko dyke; lower contact irregular.
Some shearing in dyke 35 degs to core axis.
Fracturing 2/foot 179.5-180.5 core shattered.

1189.5 1256
(362.6-382.9)

DACITE - RHYOLITE PYROCLASTICS

- Grey white to greenish white colours. Feldspar
crystals common. Fragments grey aphanitic,
feldspar porphyritic, reddish hematitic and
locally chloritic (andesitic). Fragments commonly
1mm to 12cm, average 3mm to 5cm. Locally small
hematitic (red) fragments.

1203.5-1207 - Diorite dyke, upper contact 65
degs to core axis, lower contact similar

1211.5-1213.5 - Diorite dyke, upper contact
undeterminable, lower contact 30 degs to core
axis. Quartz veinlets common

1200-1203.5 - Diorite dyke contacts to 60-70
degs to core axis.

Possible bedding - Bedding on tuff beds end
flattened fragments.

1250.5' - 40 degs to core axis

1256' - 40 degs to core axis

1227' - 40 degs to core axis

1231-1232' and locally elsewhere in section 3-
5mm round spots, greenish in colour. Minor
quartz veinlets throughout section. 1224' - 2"
diorite dyke.

1256 1491
(382.9-454.6)

DIORITE DYKE

- Upper contact 65 degs. to core axis.

Grey black colour, medium to medium coarse
grained, hard to knife cut. Equigranular, mafics
chloritized. Blocky rock, 1 fracture/foot; few

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Feet		Description
From	To	

scattered quartz-chlorite veinlets.

1318-1320 - Fine grained, possible contact between two diorite phases approx. 90 degs to core axis.

1357-1360 - Fine grained, possible contact between two diorite phases, foliation at 45 degs. to core axis.

1371.5-1373 - Fine grained, contact between phase, 70 degs to core axis.

1440-1441 - Fine grained contact between phases, 70 degs. to core axis.

1408-1417 - Similar diorite but slightly lighter colour - grey instead of grey-black.

1430-1432 - Fine grained - contact between two phases - 60 degs to core axis.

1462-1463 - Fine grained - contact between two phases - 45 degs to core axis. Core very blocky, 1 fracture/foot.

1491 1503
(454.6-458.2)

FELDSPAR PORPHYRY DIORITE
- probably a phase of diorite. Feldspar phenocryst 1-2 mm and 10-15% degs of core; feldspar crystals often zoned and locally glomerocrystic.
Rock grey-black and hard to knife. Minor quartz-chlorite veinlets.
Lower contact 10 degs to core axis; upper contact 50 degs to core axis. Core blocky, 1 fracture/foot.

1503 1764
(458.2-537.8)

DIORITE
- Fine to medium grained, equigranular, massive, grey-black colour.

1523-1525 - Fine grained, possible contact between dyke phases.

1597-1598 - Fine grained feldspar porphyry diorite dyke feldspar phenocrysts 10-15% and 1-2mm; rock is grey-black colour; VFG cooling margin. Minor scattered quartz-chlorite veinlets.

1613.5-1614.5'; 1619-1630' - patch zones of feldspar porphyry diorite to equigranular

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Feet
From _____ To _____ Description _____

diorite in places feldspar, rich pods look like fragments in diorite, grey black colour; fine to medium coarse grained. Difficult to define margins in dykes.

1687-1764 - More quartz-chlorite-epidote veinlets (locally magnetite). Then rest of section generally at 50-80 degs. to core axis. Some pyrite in veinlets. Diorite generally fine grained in this section. Looks like contact zone.

1753-1764 - Patchy felsic dykelets 1\2-4" could be xenoliths of underlying felsic volcanics.

1764 1784.5
(537.8-544.1)

DACITE-RHYOLITE-PYROCLASTICS-LAPILLI-TUFF
- Weakly altered (sericite/biotite). Light grey, greenish grey fragments (hard) in grey-black to black matrix - matrix soft to knife cut. Matrix probably variably altered to account for dark colour - mixed chlorite-sericite. Fragments 3mm to 20 cm. Alteration in matrix strongest from 1774-1784.5'. Bedding approx. 40-45 degs to core axis. Fragments commonly aligned parallel to bedding. Bedding common in tuffaceous matrix.

1781.5-1784.5 Coarse grained dark felsic tuff, black colour altered, bedding 45 degs. to core axis.

1784.5 1948.5
(544.1-594.1)

MINERAL HORIZON
MASSIVE SULPHIDE ZONE
- host rock strongly altered upper contact with overlying dacite-rhyolite pyroclastics knife sharp and 40 degs to core axis. Rock strongly altered, sericitized and bleached. 1784.5-1785.5 - Strongly bleached, sericitized tuffs; 1-5% pyrite, minor sphalerite. Bedding 45 degs to core axis. 1785.5-1829 - High grade sphalerite (mainly yellow coloured) interbedded (finely) with pyrite. Host rock strongly sericitized, bleached tuffs.

Bedding

- 1785.5-1791' - 45 degs to core axis
- 1791-1794' - 30-35 to core axis
- 1794-1803.5' - 45 degs to core axis locally folded and 60-90 to core axis.
- 1803.5-1812' - Variable 0-90 degs but averages 40 degs to core axis.

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Feet From	To	Description
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- 1812-1816' - 40-45 degs.
- 1816-1819' Variable, difficult to tell may parallel core axis.
- 1829-1831' 60% pyrite with variable sphalerite and chalcopyrite, patches and bands, strongly altered tuffs; bedding.
- 1831-1834' Strongly sericitized and bleached tuff; 2-5% pyrite. Bedding variable averages approx. 20 degs.. Minor chalcopyrite.
- 1834-1867.5' 65% pyrite with variably but significant chalcopyrite, minor sphalerite as definite beds. Rocks strongly altered dacite tuff.

Bedding:

- 1834-1839' - 30 degs.
- 1839-1853' - 30 degs.
- 1867.5-1881' Intercalated 60% pyrite bands 1-3 feet thick with cpy and sphalerite with interbedded sph, galena, pyrite bands (5-15%), 1-3 'thick. Significant Cu and Zn; host rock strongly altered dacite tuffs.

Bedding: 1807.5-1876' 50 to 65 degs average approx. 55-60 degs contortions and folding in places. 1876-1881' - 20-40 Avg approx. 30 degs. Some contortions
 1881-1885 Semi-massive pyrite (30%) with disseminated sphalerite and blebs at cpy; tan-white matrix maybe sphalerite or barite. Host rock strongly altered dacite tuffs.
 Bedding-rock is contorted, bedding 0-50 degs averages 10-15%.

1885-1889.5 - 40-60% pyrite with disseminated black sphalerite and gobs of cpy. Light white-tan coloured matrix maybe barite or sphalerite. Host rock strongly altered tuffs.
 Bedding contoured 10-50 degs. Averages 35 degs.

1889.5-1899.5 Primarily light yellow coloured sphalerite with some disseminated (5-15%) pyrite and 40-60% pyrite bands. Good grade Zn. Host rock strongly altered dacite tuff. Bedding 25-50 degs Avg approx. 40 degs.

1899.5-1895 Similar to 1889.5-1899.5', but less sphalerite. Bedding 40 degs to core axis.

1895-1910 Looks like footwall feeder zone, large bleached siliceous fragments surrounded by chalcopyrite-pyrite veinlets. Light tan coloured

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Feet		Description
From	To	
		matrix maybe sphalerite or barite. Host rock altered dacite lapilli tuff. Bedding 30-40 degs.
		1910-1928.5 Well banded light coloured sphalerite and pyrite. Pyrite averages 5-20%; except for 0.5-2' bands of 25-50% pyrite.
		1910-1920 tan-white coloured matrix either sphalerite or barite. Chalcopyrite gobs in heavier pyrite sections. Banding - 30 degs to core axis.
		1928.5-1933.5 Well banded pyrite and lesser chalcopyrite and sphalerite. Pyrite bands 2-10mm, averages 30%. Host rock strongly altered dacite tuffs, leached, sericitized. Bedding 40-55 degs approx. averages 40-45 degs.
		1933.5-1948.5 Heavy pyrite (50-60%) with significant chalcopyrite bands and minor sphalerite.
		1938-1940.5 Minor sulphide, well banded 5-15% in strongly altered dacite tuffs. Banding approx. 30 degs to core axis with one zone 0-10 degs (averages 30 degs.)
1948.5	1963.5 (594.0-598.6)	DACITE-RHYOLITE TUFF, CHERTY TUFF, CHERT - Strongly Altered (ser,py) with minor intermixed lapilli tuff phases.
		1948.5-1956 Strongly leached, sericitized intermixed dacite tuff, chert, cherty-tuff bands, pyrite 5-10% finely disseminated.
		1956-1960 Weakly altered dacite, rhyolite tuff, lapilli tuff, grey black colour very similar to
		1781.4-1784.5 which immediately overlies the mineral horizon- dark colour due to alteration 3-8% pyrite.
		1960-1963.5 Strongly altered dacite tuff, lapilli tuff, 5% disseminated pyrite. Bedding in section averages 45-50 degs. to core axis. Alteration, strongly bleached and sericitized - 3-10% disseminated and banded pyrite.
1963.5	1981.5 (598.6-604.1)	DACITE-RHYOLITE LAPILLI TUFF Strongly Altered. (ser,py) - Rock is strongly bleached and sericitized with

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Feet		
From	To	Description

3-5% disseminated pyrite. Relict fragments visible as grey-white blebs 3mm-10cm; locally some fragments appear to have quartz amygdule-like shapes. This unit may be a mixed dacite and andesite pyroclastic unit, but difficult to confirm due to alteration. Most fragments siliceous and hard to knife cut.

1970-1971 Relict less altered section grey-black coloured matrix with slighty greenish fragments.

Weak alignment of fragments in core:

1965' - 30 degs to core axis
 1970' - 50 degs to core axis
 1980' - 70 degs to core axis
 1981' - 30 degs to core axis

Note: Most fragments siliceous and interpreted to have been felsic in origin but 10-25% of fragments. Have round to ovoid 2-10 mm sized siliceous clots which could be relict amygdule and thus andesitic in origin. Best guess is unit dacite-rhyolite pyroclastic with 1-15 % andesite fragments.

1981.5 2002
 (604.1-610.4)

ANDESITE LAPILLI TUFF, Strongly Altered, difficult to be certain of composition. Vague relict fragments stretched around 30 degs to core axis. Fragments irregular shaped 3mm to 10 cm, bleached, grey-white and strongly sericitized. Pyrite disseminated and as veinlets 3-10%. Minor quartz veinings. Some possible relict quartz amygdules 2mm-10mm ovoid, throughout section. Rock is soft to knife. Matrix and fragments similar- grey-white, soft, sericitized. Banding 0-35 degs averaging 25-20 degs to core axis.

Note: difficult to determine original rock-type composition, but presence of possible amygdules, softness to knife and look of good siliceous fragments suggests rock is altered andesite.

2002 2029
 (610.4-618.6)

DACITE INTRUSIVE Strongly Altered. Grey-white colour, variable but locally abundant very tiny quartz veinlets, hardness (leaves knife) pyrite spots (1-5mm) disseminated and fair by massive homogeneous texture suggests altered dacite intrusive.

Rock has been bleached and sericitized; average 3-5% pyrite primarily as disseminations but locally pyrite veinlets 1-3mm top 7 cm thick.

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Feet		Description
From	To	

Upper contact irregular but averages 30 degs to core axis. Alteration, bleaching and pervasive sericitization and pyrite.

2009.5-2011.5 - strongly bleached sericitized dacite lapilli tuff.

2029 2045.5
(618.6-623.5)

DACITE LAPILLI TUFF - Strongly Altered (py,ser) - Rock bleached, grey and sericitized; can be cut with knife but considerable knife left in rock. Remnant fragments vague and difficult to tell from matrix 3mm - 7cm. Pyrite disseminated and some clast-like - 3-8%.

2039-2045.5 Black-greyblack dacite lapilli tuff; matrix black and softer than fragments which are grey. Fragments 3mm to 5 cm, siliceous. Matrix probably VFG chlorite, biotite, sericite mix. Pyrite 3-5%. Vague foliation in rock 45 degs to core axis.

2045.5 2075.5
(623.5-632.8)

DACITE INTRUSIVE- variably altered. - Grey, aphanitic and hard. 3-8% disseminated pyrite. Cut by tiny chlorite veinlets and 1 mm - 5 cm thick quartz veinlet.

2058-2060.5 Diorite dyke-lower contact 45 degs to core axis, upper contact 45 degs to core axis.

2043-2046.5 Core shattered.

2075.5 2095
(632.8-638.7)

DIORITE DYKE - Fine grained, green-grey scratchable intrusive, homogeneous and equigranular; cut by occasional fine anastomosing quartz veinlets. Sharp chilled upper contact, broken veined lower contact over 1.5m.

2080.5-2086 DACITE DYKE pale grey siliceous extremely hard fine grained intrusive with abundant 0.2-2.0cm. Bull qtz veins at 80-90 degs to core axis, weakly disseminated by clots and stringers, more fractured than surrounding diorite.

2095 2128
(638.7-648.7)

ANDESITE TUFF-LAPILLI TUFF - Foliated, Locally with Dacitic Fragments.

Weakly altered, bleached and possibly sericitized chloritized may have some mud in the matrix. Relatively homogeneous fine grained

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Feet		Description
From	To	

massive grey-black coloured; lapilli fragments form fine crackle breccia-like mosaic pattern 3-30mm; fragments soft.

Soft, easily knife scratched matrix; matrix black, darker than fragments.

Foliation and weak alteration give grains common orientation, usually at low angle to core axis (0-30 degs) and very indistinct grain boundaries.

No distinct bedding, overprinting foliation masks it but suggestions of it being parallel to foliation (low angle). Locally kink banded (rare).

2099-2104 FRACTURED ZONE core broken into knife like shards possible small 15-20 cm felsic dyke at 2099-2100', minor gouge and weak slickensides suggest movement - FAULT

Approx. 2120 matrix becomes lighter, higher degree of recrystallized/mobilized feldspar somewhat finer grained matrix but with

2106-2128' - lapilli tuff phase

2095-2106' - mainly tuffs, bedding 15-20 degs to core axis.

2128 2174
(648.8-662.8)

ANDESITE LAPILLI TUFF With Tuffaceous Phases (weakly altered) with 10% dacite fragments and bombs 3mm - 30cm throughout may have some mud with matrix.

2128' beginning of approx. 10% felsic dacitic lapilli sized clasts, generally highly siliceous/quartz subrounded and occurring within similar to andesitic pyroclastic of last section. Very soft and black matrix with grey-black fragments.

2135' Large Dacite bomb with irregular contacts at low angle to core axis fragments difficult to discern. Pale grey-green, very hard and siliceous "bedding" at 25 degs to core axis.

Similar pulses always 2' or less seen at 2128-2128.8', 2130', 2132', 2137.7', 2143'.

At 2143' aligned fragments at 5 degs to core axis.

2145-2150 Strongly altered bleached sericitized, approx. 10% dacitic fragments. Core fractured, calcite healed.

2150-2175 Weakly to moderately altered bleached sericitized andesite coarse tuff to fine lapilli tuff with bedding and/or foliation oriented 10-

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Feet
 From ----- To ----- Description -----

20 degs to core axis. Difficult to distinguish, locally appears as bedding where continuity maintained otherwise simply manifest as common grain orientation, grain boundaries vague, corroded or eaten away.

Dacite component ? 5% as rare felsic 2-5 mm fragment.

Bedding common in tuffs approx. 15-20 degs. varies 0-30 degs.

Andesite material soft to knife, weakly altered sericite (chlorite), bleached (pervasive). This is a best guess at the alteration bleaching is very minor, lighting of units colour.

2174 2196
 (663.1-669.5)

ANDESITE FELDSPAR PORPHYRY DYKE

- could be tuff but homogeneous, massive nature, fine grained, quartz rich contacts and similar andesitic pyroclastic rock on either side suggest dyke. Matrix black, muddish black, probably pervasively biotite altered with 5-10% feldspar crystals. Fine grained dark green/brown massive homogeneous. Frequent fine fractures or veinlets of quartz-calc-epi-py.

Brown tint attributed to pervasive biotite alteration. Intermediate hardness, varies.

2184-2194 Siliceous intervals of harder material increased alteration (epidote/bleaching) with tiny (1 mm to 0.5mm) felsic phenocrysts. Represents dacite intermixing.

2194-2199 Flow banding on margin at dyke angular fragments dark in a swirlitg siliceous matrix to 2196'.

Banding 45 degs to core axis on lower contact and 20 degs on upper contact. Core 1-2 fractures /foot.

2196 2215
 (669.5-675.3)

FINE ANDESITE LAPILLI TUFF Weakly altered - Same as 2128-2174' except for red jasperoid fragments 5-10%, possible mud component in matrix. Locally magnetic, weakly foliated. Propylitic alteration as see 2150-2175', indistinct grain boundaries, soft, sericite and chlorite present; fairly homogeneous on a dm scale. Lapilli fragments indistinguishable from matrix generally - 3mm-2cm. Locally jasperoid fragments.

Foliation weak, weaker than 2095-2175' intervals. Magnetic dacite clasts beginning at 2200', rare but distinct, at 2206' they are

Property TULSEQUAH CHIEF District ATLIN Hole No. TCU-90-22

Feet		Description
From	To	

hematitic as well, elongate reddish amorphous blebs.

2213-2215 Cherty contorted bands mixed with hematite, strongly magnetic. Alignment of fragments 10-30 degs to core axis.

2215 2225
(675.3-678.4)

ANDESITE LAPILLI TUFF with Variable Dacite - Fragment Component 65% - probably weakly altered with porphyroblasts, possible mud component in matrix. Distinctive looking unit strongly fragmental dark, grey, green angular sub-angular fragments in darker matrix all overprinted by strong porphyroblastic development; Porphyroblasts generally in matrix 1-3mm bloated rice shaped ovoids; felsic fragments 3-30mm and subround to irregular shape. Core good, unit of variable hardness where matrix rich it is hard and light non scratchable, fragments scratchable, porphyroblasts hard and siliceous.

Note: odd looking unit; very distinct porphyroblasts developed throughout. Some felsic looking fragments are coalescing porphyroblasts. Some definite andesitic fragments 3-30mm but generally fragmental texture due to porphyroblasts- porphyroblasts might be due to adjacent dacite intrusive.

2225 2272
(679.3-692.7)

FELDSPAR PORPHYRY DACITE INTRUSIVE - Hard, magnetic; dark fine, grained dacite dyke characterized by unusual hardness and 5-10% fine anhedral to subhedral feldspar crystals (plag). Cut by frequent irregular quartz epidote veins/veinlets. Looks aphanitic, very smooth, leaves knife frequently; grey-black colour, but fairly siliceous in hard lens. Local metamorphic textures includes incipient porphyroblastic growths, segregation of felsics and mafics or rimming if larger xtals. See 2249-2251 for example.

2261-2265.5 Xenolith of andesite lapilli tuff with porphyroblasts similar to 2215-2225'.

Note: hardness, generally uniform texture and quartz, epidote veinlets further evidence this unit intrusive and not tuff or flow.

2272 2305
(692.7-702.7)

ANDESITE LAPILLI TUFF - very porphyroblastic, similar to 2215-2225' except no dacitic fragments; possibly mud component in matrix.

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Feet
 From _____ To _____ Description _____

Again a fine dark to medium grey andesite pyroclastic with weak to strong porphyroblastic development as 0.5 to 3.0 round to oval. Ubiquitous evenly, distributed porphyroblasts, usually faint to ghosted, always lighter than the matrix.

Composition unknown, await thin section analysis. Now possibly represents zone of higher alteration resulting from cooking by the surrounding intrusive material.

Core good, massive homogeneous intact - 1 fracture\foot. Easily knife scratchable; unit is massive with no alignment or bedding. 2290-2292' ghosted fragments. Pale subrounded 2-10 mm forms.

Noticeable decrease in frequency of veins and fractures, little or no epidote alteration seen in surrounding andesite. Which "unit" has higher degree of alteration?. Perhaps "Feldspar phyrlic" intervals are intrusive.

Difficult to see fragments except through supposition due to porphyroblasts distribution.

2305 2339.5
 (702.7-712.2)

FELDSPAR PORPHYRY DACITE

- Intrusive hard magnetic. Light to medium grey (distinct from above unit) similar to 2225-2272', very hard, leaves knife in almost all instances. Cut by abundant 1-10mm wide veins of soft white crystalline mineral- gypsum.

Locally brecciating the wallrock. Averg. 2 to 3 per meter. Also abundant amorphous quartz-epidote anastomosing veinlets. Sharp upper and lower contacts to abundant seric/chlorite veining 30 degs to core axis.

Some incipient feldspar developed in adjacent andesite volcanics suggesting some ingesting of volcanics by intrusive.

2339.5 2363
 (712.2-720.4)

ANDESITE LAPILLI TUFF Strongly Porphyroblastic; 1-2% dacite fragments 5-30mm as previously described. Dark grey fine grained massive homogeneous unit, easily scratched with local harder zones. Similar to 2272-2305' - probably mud component in matrix.

Evenly distributed subrounded pale 0.4 - 5.0mm porphyroblasts in darker grey-green matrix, locally and weakly biotite tinged brown. 2354' example of where porphyroblastic look more porphyritic, possible crystal faces, may represent feldspar phenocrysts from which porphyroblastic originate.

Very difficult to see andesite fragments. Can

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Feet		Description
From	To	

only guess due to distribution of porphyroblasts.

2363 2381.5
(720.4-726.1)

FELDSPAR PORPHYRY DACITE INTRUSIVE (magnetic)
- Same as previous Feldspar Porphyry Dacite intrusive but with locally intermixing of pyroclastics.

At 2371-2377' find bands of non felds-phyric tuff oriented at 30 degs to core axis. Again find increase presence of quartz-epidote veinlets. Feldspar phenocrysts plentiful. 3-5% scattered fine 0.1-1.0mm, subhedral, sharp lower contact at 10-15 degs to core axis. Some flow banding 35-40 degs to core axis.

2381.5 2390
(726.1-728.7)

DACITE LAPILLI TUFF
- Or phraetic/breccia and shearing on margin of dacite intrusion.
Light, grey clast supported, dacitic pyroclastic. Clasts and matrix very similar, difficult to discern difference, clast boundaries vague. Core good, intermediate to very hard, leaves knife here and there. Lower contact difficult, appears gradual, feldspar phenocrysts appear within this interval. Cut by occasional thin chlorite wavy veinlets. Non magnetic but for the thin chloritic veins.

2390 2415
(728.7-

ANDESITE LAPILLI TUFF With some tuff sections (Occasional dacitic fragments) clearly pyroclastic (locally bedded tuff) dark grey with tinges of green and brown (chlorite and biotite alteration weak). Locally weakly feldspar phyric, irregularly scattered small < 1mm feldspar crystals, varying abundance. Hardness widely variable, locally very hard, can't be scratched.

2392-2395 has moderately foliated appearance, foliation (bedding) at around 5-10 degs to core axis. Sharp contacts. Frequently magnetic disseminated magnetite or veined.

2409-2412 Bedding clearly defined; fine grained bedded andesite tuff oriented at 30 degs to core axis. Note absence of phenocrysts or p.blasts.

2425 Note presence of cm scale lighter dacitic clasts.

2415 2434
(736.1-742.4)

FELDSPAR PORPHYRY DACITE INTRUSIVE
- Possibly some phraetic brecciation. Similar to

Property TULSEQUAH CHIEF District ATLIN Hole No. TCU-90-22

Feet		Description
From	To	
		previous intrusive 2863-2381.5' Upper contact 20 degs to core axis. Generally grey colour - darker colours patchy probably due to ingestion of andesite volcanics.
2434 (742.4-748.2)	2453	ANDESITE LAPILLI TUFF - 5% dacite fragments. Black colour. Fragments aligned 35 degs to core axis.
		2435-2449 Fragments lighter colour than matrix. Minor patchy porphyroblasts.
		2449-2453 bedding 45-50 degs to core axis. Increasing dacite fragment component towards base of section.
2453 (748.2-754.0)	2474	DACITE-RHYOLITE LAPILLI TUFF - weakly altered - Light coloured fragments (white-pale green white) in dark green matrix. Fragments 3 mm - 10 cm. Alteration pyrite 2-4% and slight darkening of core (chlorite/sericite) 2467-2468' pyrite 15% dacite tuff. Fragments aligned 45 degs to core axis.
2474 (754.0-763.1)	2502	ANDESITE LAPILLI TUFF - Up to 20% Dacite fragments, weakly altered. Grey-black colour with fragments distinct. Fragments aligned 40 degs to core axis. Sections up to 12" with 75% dacite fragments. Alteration pyrite 2-5% disseminated and veinlets; weak chlorite and sericite.
		Core generally moderate hardness, some bands are chertier thus harder i.e 2493'. Core broken, generally < 10cm any piece. Common py healed fractures.
		2499-2501' Broken to gravel size calcite py-chlorite-epidote alteration.
		2500-2502' Coarse tuff, fine lapilli tuff, andesite, dark altered, dacite, bedded vaguely at 35 degs to core axis.
2502 (763.1-764.9)	2509	FELSIC SLOKO DYKE - Extremely siliceous, white creamy green weakly banded interval cut by tangled network of chlorite by veinlets, approx. 10%
		2505-2509' Broken up fractured, darker, contains xenoliths of wall rock. Pseudobrecciated texture. Sharp lower contact.

Property TULSEQUAH CHIEF District ATLIN Hole No. TCU-90-22

Feet
From _____ To _____ Description _____

2509 2518.5
(764.9-768.1)

DACITE LAPILLI TUFF Strongly altered
Mineral Horizon

- Vaguely banded bedded py rich hard, dark grey pyroclastic strongly sericite, altered and py impregnated; most notably at 2511-2515' with 30% py. py appears to be mostly secondary, occurs along fractures and bedding planes replacement. Frequent quartz lenses/eyes 3-20mm wide oriented parallel to bedding. Trace chalcopyrite. Gouge dacite fragments surrounded by pyrite. Some pyrite that is banded (bedded) but coarse dacite fragments with it - maybe two feet of pseudobanded pyrite with only minor coarse dacite fragments.

Alteration - pyrite, sericite bleaching. Section is probably mineral horizon, but quiescent interval too short to have developed good bedding sulphides. Interesting that associated with phase at felsic volcanism.

2518.5 2571
(768.1-784.2)

ANDESITE LAPILLI TUFF Weakly Altered

- Strongly veined, chlorite, epidote quartz, garnet veins. Fairly massive homogeneous package of dark grey (grey-green) andesite pyroclastics, fragments barely visible, hard to discern from matrix; bedding only very rarely evident generally 30-35 degs to core axis. Quartz-epidote-garnet veins abundant, irregular, amorphous white-green orange patches. Pyroclastic pyrite rich fragments locally common, py also infilling many fractures.
2542-2544.5 DIORITE classic chilled margins, coarse grained (feldspar & pyroxenes) intrusive.

2546-2547 Weak porphyroblastic development mm scale subrounded to subangular dark porphyroblasts in lighter matrix, possibly nucleating about mafic phenocrysts. Estimate core composed 15-20% of the quartz-epidote-garnet vein material.

Note: Difficult rock to determine type. Can occasionally see relict fragments with vague pyroxene phenocrysts and amygdules. The dark green colour, inhomogeneous texture in detail (homogeneous in general) and pyrite fragments suggest rock is andesite pyroclastic.

Abundance of quartz-epidote-garnet veinlets suggest dacite intrusive nearby.

Property TULSEQUAH CHIEF District ATLIN Hole No. TCU-90-22

Feet		
From	To	Description

SULPHIDE INTERSECTION DESCRIPTIONSH_HORIZON 1784-1954'

1784'-1785.5'	(4a)	tan and grey ZnS, 75% host rock, 10%py
1785.5-1790'	(4a)	well bedded with cherty bands, 15%py, 40% host rock
1790-1796'	(5a/6)	5% py massive to bedded
1796-1831.5'	(4a)	massive to bedded, tan ZnS, abundant py 25-40%
1831.5-1834'		soft folded bedded anhydrite with 3-5%py
1834-1867.5'	(3)	massive py, moderately bedded, cpy
1867.5-1869'	(4a)	same as 1796'
1869-1871'	(3c)	with minor dissem ZnS
1871-1873.5'	(4a)	same as 1796'
1873.5-1879'	(3c)	with patchy cpy
1879-1887.5'	(3a)	5% py, also barite, cpy
1887.5-1890'	(2)	barren py
1890-1904'	(4a)	same as 1796', high py 15-30%, variable
1904-1911.5'	(4/7a,b)	30-60% cherty host rock, silicic frags with cpy
1911.5-1920.5'	(4a)	same as 1796', but with banded and dissem cpy, well bedded with 30-35% py
1920.5-1924'	(5)	well bedded, yellow Zns with barite
1924-1933'	(4a)	same as 1796'-30-35%py
1933-1938'	(3a)	well banded py-sph-cpy, 40%py, no host rock
1938-1940.5'	(7b)	Sericitic bedded tuff, 5% dissem py
1940.5-1948'	(3a)	same as 1933-1938'
1948-1954'		well bedded cherty unit with trace ZnS, 2-4% py.

Property TULSEQUAH CHIEF District ATLIN Hole No. TCU-90-23
 Commenced August 8, 1990 Location Pro.undergrd. Tests at _____
 Completed September 5, 1990 Core size B.Q. Cor. dip -81 degs
 Coordinates N E True Brg. 166 degs
 Objective Test downdip extent of new 'H' lens % Recov. _____
 Date October 5, 1990 Horiz. Comp. _____
 Logged by MJC/RJA Vert. Comp. _____
 _____ Revision Date November 2, 1990

Feet From	To	Description
0	6	CASING - NO CORE
6 (1.8-11.1)	36.5	<p>DIORITE</p> <p>- Fine grained, mottled appearance. Greenish-gray, fine grained, inhomogeneous texture and mottled appearance; patchy medium grained texture; locally small chloritized xenoliths. Core can be cut by knife. Locally flow banded and some relict xenoliths of sediment (27'); minor patchy pyrite 0-1%.</p> <p>- 33-36.5 Feldspar phenocrysts - square to roughly ovoid shape. 5-10% phenocrysts. Core hard. Veins and banding in core generally 35-40 degs to core axis. General appearance of section developed near contact of diorite. Lower contact 30 degs to core axis. Core moderately fractured 2-4 fractures/foot.</p>
36.5 (11.1-25.6)	84	<p>FINE GRAINED TUFFACEOUS SEDIMENTS</p> <p>- Grey colour, well bedded; bedding 30 degs to core axis. Core is locally mottled in colour due to chlorite-epidote-quartz veining probably from adjacent diorite (36.5-44' and 78-84'). Some texture variation in sediments from very fine grained to fine grained with suggestion of graded beds and flame structures (47').</p> <p>51-60 Coarse grained sediment-volcaniclastic could be slump or landslide; fragments very firm 1mm (average 1-4mm) to 6cm. Massive unit with only vague bedding. High proportion of light, white to grey fragments; many which resemble feldspar crystals. Core varies from massive to strongly fractures zone. Strongly fractured zones include 63-84'.</p>
84 (25.6-33.8)	111	<p>DIORITE</p> <p>- Fine to medium grained. Greenish grey colour but become mottled in colour near lower contact (101-111')</p>
		<p>102-109 Mixed zone - 60% tuffaceous sediments, fine grained and mottled grey to black and diorite veinlets and dykelets. FAULT 84-86' - gouge zone in places. Upper contact diorite strongly broken zone, gouge zone (fault) 84-86'.</p>

Property TULSEQUAH CHIEF District ATLIN Hole No. TCU-90-23

Feet		Description
From	To	

111 (33.8-43.6)	143	Lower contact very irregular as veinlets in sediments. Core moderately fractured 2-3/foot FELSIC DYKE - Possibly Sloko, strongly hybridized, large fault zone. Dyke is sheared and extensively cut by chloritized fractures and contains chloritized patches.
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120-135 Dyke brecciated. Quartz and/or pyrite veinlets throughout. Pyrite 1-5% as disseminations and veinlets.

135-140 Relict feldspar-porphyrty diorite dyke hybridized by felsic dyke-diorite fine grained and mottled in colour. Abundant feldspar crystals part of diorite. Main part of fault zone 111-135'.
Upper contact of dyke very irregular. Lower contact 35 degs to core axis. Core in zone generally sheared and well fractured. Shearing varies from generally 40 degs to parallel to core axis.

143 (43.6-46.9)	154	FELDSPAR PORPHYRY DIORITE DYKE - Locally hybridized. Dyke is porphyritic, grey black and locally cut by chlorite veinlets and/or felsic dyke (Sloko). Feldspar phenocrysts 1-4mm 10-20%. 146-148 Strong chlorite veining, some brecciation.
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148-149.5 Hybridized felsic dyke, cut by quartz veinlets with pyrite. Lower contact irregular approx. 20-25 degs to core axis. Core massive, 1 fracture/foot.

154 (46.9-50.9)	167	FINE GRAINED TUFFACEOUS SEDIMENTS - Sediments greyish, fine grained, hornfelsed and bedded. Cut by chlorite veinlets.
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164.5-167 Sediments bleached and epidotized, could be hybridized by felsic dyke (Sloko). Bedding disguised by hornfelsing and chlorite veinlets but approx. 35 degs to core axis. Core moderately fractured 2-3 fractures/foot.

167 (50.9-69.5)	228	FELDSPAR PORPHYRY-DIORITE-DYKE - Greenish grey, porphyritic with 10-20% feldspar phenocrysts 1-10mm. Upper contact 50 degs to core axis. Feldspar 1-10mm and strongly chloritized. Matrix generally medium grained. Minor quartz veinlets, 60-90 degs to core axis. 2mm-10cm. Core blocky, 1 fracture/foot. Core moderately hard, some knife left in cut.
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Property TULSEQUAH CHIEF District ATLIN Hole No. TCU-90-23

Feet		Description
From	To	

228 (69.5-79.1)	259.5	MIXED ZONE of SEDIMENTS and FELSIC DYKES Fine grained tuffaceous sediments cut by hornblende porphyry felsic dykes - possibly Sloko equivalent. Sediments grey to grey-black and fine grained; hornfelsed. Bedding distinguished by bleaching veinlets and hornfelsing but generally 0-40 degs to core axis. Average 20-30 degs. Sediments hard, cherty component.
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235-248.5 Hornblende porphyry felsic dyke, hybridized, upper end, lower contacts 50 degs to core axis. Cut by chlorite-quartz veinlets, colour variable due to hybridization, normal colour greenish white to grey with 10-15% hornblende phenocrysts (0.5-1mm).

250.5-251.5' and 255-259.5' Hornblende porphyry dykes, cut by quartz-chlorite veinlets, fine grained and mottled in colour but generally grey to greenish white in colour. Contacts at dykes generally 45-50 degs to core axis. Core blocky, 1 fracture/foot.

259.5 (79.1-92.7)	304	FINE GRAINED CHERTY TUFFACEOUS SEDIMENTS - Grey to greyish black colour, fine grained, hard and well bedded. Bedding 30-40 degs to core axis. Averages 35-40 degs. to core axis. Zones of bleaching and minor chlorite veinlets. Pyrite approx. 1% as disseminations and veinlets; minor bands. Sediments hard, cherty. Some hornfelsing of sediments. Core moderately to strongly fractured.
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259.5-276' 2 fractures/foot
276-304' 3-5 fractures/foot

304 (92.7-186.8)	613	DIORITE - Medium to coarse grained. Rock is greenish black and massive; pyroxene chloritized. Upper contact is irregular approx. 60-70 degs to core axis.
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304-337 Diorite is medium grained.

323.5-330 - Hornfelsed cherty tuffaceous sediments, tan coloured.
- bedding 55 degs to core axis
- diorite contact with sediments vague, but very fine grained.

Property TULSEQUAH CHIEF District ATLIN Hole No. TCU-90-23

Feet		Description
From	To	

337-425 Diorite coarse grained; pyroxenes and feldspar crystals chloritized. Minor epidote veining; a few quartz veinlets.

339-352 Core moderately fractured 2-3/foot

304' Core blocky - 1 fracture/foot.

425-465 Diorite - medium grained; blocky - 1 fracture/foot.

465-493 Diorite - coarse grained; blocky - 1 fracture/foot.

493-496 Fine grained contact between diorite phases.

496-505 Diorite - coarse grained, blocky - 1 fracture/ft.

505-510 Diorite - fine grained with some well digested xenoliths of sediment.

510-554.5 Andesite dyke, fine grained, black to black green colour with large (1-10mm; 5-8%). Chloritized clots-crystals generally ovoid shaped and generally circular zoning suggests amygdules. Rock looks like diorite but could be andesite dyke or possibly xenolith at andesite flow. Fine grained contacts 70 degs to core axis. Suggest andesite dyke. Core moderately fractured 2-4/foot; 508-509' core shattered.

554.5-613' Diorite - coarse grained; equigranular to porphyritic with augite phenocrysts. 584.5-592.5' and 609.5-613'. Augite phenocrysts 10-20% 1-4mm and slightly trachytic; matrix medium grained. Core generally blocky with 1 fracture/foot except for 580-591' Core well fractured 3-5 fractures/foot.

613 680
(186.8-207.3)

FELDSPAR PORPHYRY DIORITE

- Fine medium grained matrix with 5-20% feldspar phenocrysts. Rock grey black and fine grained in contact aureole. Upper contact 45 degs with 613-633' fine grained possibly cooled margin border dyke - Few phenocrysts noted in this area. Maybe several fine grained contact phases of this dyke as another possible contact at 617' and 628'. Contacts all approx. 45 degs to core axis.

613-680 Core blocky to weak, moderate fracture 1 to 3 (623-630) fractures/foot.

Property TULSEQUAH CHIEF District ATLIN Hole No. TCU-90-23

Feet
From _____ To _____ Description _____

680 777.5
(207.3-237.0) DIORITE
- Medium grained, black green colour. Core blocky 1 fracture/foot except for intervals 681-693', 3-4 fractures/foot.

721.5-729 Considerable quartz-chlorite-epidote veinlets.

777.5 818.5
(237.0-249.5) FELSIC DYKE - probably Sloko
- Major shear, FAULT ZONE. Varies from mid green to tan greenish-grey colour, 5-10% strongly altered (sericite/chlorite). Mafics (hornblende) 1-3mm. In places mafics replaced by fuchsite. 784-790', 805-810'

777.5-800.5' Dyke mainly tan greenish grey colour, pyrite 1-3% and core moderately sericitized.

800.5-805' Dyke mainly mid green colour; pyrite 1-2% and core weakly sericitized.

805-814' Dyke strongly sheared, shattered and replaced by quartz. Fuchsite common as spots in brecciated, shattered rock. This is the Main Fault Zone. GOUGE common. Gouge zone parallel core axis with slickensides in gouge 20 degs to core axis. Lower and upper contacts dyke irregular approx. 20 degs to core axis.

Note: main FAULT 805-814'

818.5 918.5
(249.5-280.0) DIORITE
- 818.5-870 Fine-medium grained.
818.5-843 Core very fractured 5-12 fractures/foot.
870-892 Core medium to coarse grained.
843-907 Core 1 fracture/foot
907-918.5 4 fractures/foot
892-918.5 Fine medium grained

918.5 955
(280.0-291.1) FELSIC DYKE - SLOKO
- Strongly hybridized, mixed with altered diorite (cooked). Extremely fractured & broken. FAULT ZONE.
Rare slickensides noted, well developed. Trace gouge only. Dyke strongly siliceous, very hard, variably coloured from light green-grey-beige to darker brownish tint (biotite). Abundant quartz-chlorite annealed hairline fractures - crackle brecciated.

Property TULSEQUAH CHIEF District ATLIN Hole No. TCU-90-23

Feet		Description
From	To	

Estimate at least 50% incorporated altered DIORITE, diorite strongly altered, bleached, silicified with locally abundant fine round porphyroblasts most prominent at 933-942' where degree of hybridization appears highest.

924-932 Strictly diorite, relatively intact with core size avrg 4 cm. Dark grey, fine grained, gradual contacts into hybrid zone.

946-947 Minor GOUGE

950-951.5 Solid dyke material, vaguely banded.

951.5-955 Melange silicified brecciated lower margin, mottled with quartz clots, ext. approx. 5% clots of vfg pyrite.

955 1267
(291.1-386.2)

DIORITE

- Generally fine grained dark green/grey homogeneous massive intrusive, same as seen above the felsic intrusive/ fault. Core good, avg. 40-60cm pieces. 2-4 fine fractures per meter. Has quartz-calcite veins 1 per 3 meter average, 3-20cm wide with minor to traces of epidote, magnetite, hematite, pyrrhotite, pyrite, chalcopyrite, locally with hornblende crystals, more prominent veins at 979', 984', 990', 1018.5', 1024', 1028', 1029', 1090'.

955-963 Mixed up appearances, bands and clots of coarser chlorite rich material throughout, accompanied by 2-3% disseminated pyrite.

963-966 Weakly biotite altered. Locally vaguely banded as at 1080-1090', lighter bands 1-3 cm wide and slightly coarser grained.

1122' Bleached veined interval 10" wide to break the complete monotony of this intrusive. Quartz-calcite veined.

1170-1176 Weakly pyroxene phyric. 3-4% fine subeuhedral pyroxene phenocrysts, not uncommon throughout, just a bit more predominant here.
1200' Slight increase in overall bleaching along this vein in the diorite to give irregular patches of lighter green.

1218 - 10" quartz vein with 3% sulphide clots, calcite, magnetite.

Property TULSEQUAH CHIEF District ATLIN Hole No. TCU-90-23

Feet		Description
From	To	
		1225 - 1" wide light green chlorite-magnetite vein.
		1240-1267 Increase of magnetite bearing quartz veins with epidote, estimate 2 per meter, average 3-4cm wide, 40-50 to core axis.
		1260' Slight lightening of green colour to end of unit. No discernable decrease in grain size. Lower contact is a 0.5m chilled fractured aphanitic contact. Silicified and very hard, not scratchable. Note small anhydrite vein just below contact.
1267	1287 (386.2-392.3)	<p>FINE GRAINED TUFFACEOUS SEDIMENTS</p> <p>1267-1287 Dark grey massive fg tuff exhibits only rare bedding to 1281' then becomes gradually coarser grained and better bedded. Locally cherty intervals 3-5cm wide, very hard, creamy coloured, example at 4272'. Generally of intermediate hardness, barely knife scratchable. Core good, rare fracture or quartz-epidot-mt veins.</p> <p>Upper contact semi-digested by dyke over 1'. Lower contact is gradual, grading to coarser tuff then to lapilli tuff.</p>
		1278-1279 Blocky with small FAULT at 1279' with 3cm clayey GOUGE. Bedding at 1270' approx. 22 degs to core axis; at 1283' approx. 33 degs to core axis.; 1286' approx. 32 degs to core axis.
		1282-1287 Coarsening grain size to small lapilli locally. Fragments lighter than muddy matrix. Graded bedding, great examples of fining upward, tops = top of hole. Weak porphyroblastic development over top 3'. Small round avg. 1mm
1287	1306.5 (392.3-398.2)	<p>DACITE-ANDESITE-VOLCANOCLASTIC-Tuff and Lapilli Tuff size Fragments</p> <p>Overall a fine lapilli tuff, clast supported with dark fine tuff-mud matrix, variable character (heterogeneous). Clasts vary from dacitic to clearly andesitic to trace sulphide clasts. (see example at 1289.3' pyrite). Soft, early scratchable but for occasional dacite clast, weakly chloritic. Bedding or clast alignment averages 30-35 degs to core axis. Core good, rare fracture at shallow angle to core axis (5-10 degs). Rare small quartz-epidote-chlorite vein +/- magnetite.</p>

Property TULSEQUAH CHIEF District ATLIN Hole No. TCU-90-23

Feet		Description
From	To	
		1303-1306.5 Massive interval slump debris flow, no bedding, no clast orientation, sharp lower contact, gradual upper traces of reddish, fine hematite.
		1306.5-1309 Fine grained TUFFACEOUS SEDIMENT, 32 degs to core axis bedded sharp quartz veined lower contact at 32 degs.
1309	1317 (399.0-401.4)	ANDESITE LAPILLI-TUFF Only vaguely pyroclastic massive interval clasts subangular 2mm - 2cm clast.
1317	1320 (401.4-402.3)	DIORITE DYKE - Massive green grey fine to medium grained very homogeneous dyke peppered with fine (<1mm) dark chloritized pyroxenes.
1320	1330 (402.3-405.4)	FINE GRAINED TUFFACEOUS SEDIMENT - Massive very fine grained dark grey homogeneous tuffaceous sediments with only rare trace of bedding at 1327' and 1329' (chert lighter 1cm wide bed) at 1327' is very faint thin but continuous lamellae. Variable hardness, generally intermediate scratchable but just.
1330	1342 (405.4-409.0)	DIORITE - Characterized by amorphous light apple green epidote patches and irregular quartz-epidote veinlets; overall a dark green-grey with lighter glomeroporphs of feldspar. Increased fracturing, trace slickensides reveal movement roughly perpendicular to core axis direction (see 1334.5')
1342	1372 (409.0-418.2)	FINE DACITE-ANDESITE-VOLCANOCLASTIC - Moderately to Extremely Altered (sericitized, bleached) (to minor dacite) 1342-1346 FAULT ZONE strong-moderate. Elements of breccias, gouge, and SLOKO dyke in small amounts. Mostly a broken veined and gouged strongly bleached and altered pyroclastic as described below. Slickensides of fracture surfaces. 1342-1355 Tan-green pale coloured, bleached and very heavily sericitized unit interpreted to be a fine lapilli tuff of andesitic composition, estimate approx. 5-10% dacitic fragments, standing out as lighter yet and not scratchable as is the rest.

Feet

From

To

Description

Locally contains approx. 2% << 1mm leucoxene/kaolinite specks, pale yellow, anhedral. No bedding, but vague sense of orientation of clasts (possibly somewhat flattened) at 40 degs to core axis; becoming stronger with underlying less altered rock. Locally purplish where clots or disseminations of hematitic material. Clasts vague and varied, generally dacitic white, subrounded elongate and 3-5mm.

1355-1366 Continuation of above but with gradually decreasing of alteration to now a light medium grey moderately to strongly sericite altered coarse tuff - fine lapilli tuff. Original rock questionable - a muddy matrixed andesite with minor dacite seams most likely, very soft easily scratchable. Colour variations within the grey-purple hematitic bands mixed with dark green more chlorite bands make for distinctive appearance up close. Still with 2-4% very fine, disseminated small pale yellow-white speckling of leucoxene/kaolinite. Core good, 2-3 fractures per meter, 3 quartz-epidote veine 2-4cm wide.

1366-1370 (416.3-417.6) Back to strongly altered, extremely sericitized and bleached to pale tan, grey green colour. Very soft, powders under knife. Approx. 15% small anhedral 1-2mm purple dark clasts over top 3', all commonly aligned at 45 degs to core axis.

1368.5-1370 Cut by branching white quartz-calcite veins, paralleling "bedding".

1372 1389

(418.2-423.4)

DIORITE

- Dark green massive and homogeneous intrusive with sharp but somewhat digesting contacts. Characterized by distinctive vein-alteration overprinting, light green irregular network of weakly calcareous crisscrossing veinlets with alteration rims. Locally magnetic (magnetite in veins). Vague banding over top 3'.

1389 1394

(423.4-424.9)

DACITE - ANDESITE TUFF

- A light-medium grey homogeneous weakly bedded tuffaceous unit; composition somewhere between dacite and andesite. Harder than previous tuff/lapilli-tuff with less mafics. Only rarely are distinct beds (1393' example) but overall strong sense of alignment at 35-45 degs to core

Property TULSEQUAH CHIEF

District ATLIN

Hole No. TCU-90-23

Feet

From

To

Description

axis. Rare lapilli sized hard pale dacitic fragment.

1394 1408
(424.9-429)

COARSE DACITE PYROCLASTIC WITH SUBVOLCANIC INTERVALS, QUARTZ-FELDS PHYRIC

- Heterogeneous package of veined dacite dyke with irregular intervals of volcanics primarily rhyo-dacite with minor andesite/diorite. Corresponds to 1189.5-1256' "Dacite Rhyolite Pyroclastics" of TCU-90-22, as does underlying interval.

Estimate approx. 20/80 dacite intrusive/extrusive ratio.

Strongly veined with quartz-epidote veins resting mainly within intrusive aphanitic portions.

Intrusive portions pale white-grey/green and very hard siliceous, veined.

1407-1407.8' chunk of diorite.

Fragments range from tuff sized to approx. 10cm and a frequently difficult to discern from subvolcanic dykelets. Fragments mainly aphanitic veined, siliceous broken up and lying in the tuff matrix. Bedding appears to be 20-30 degs to core axis suggesting a slope.

1408 1428
(429.2-433.7)

DACITE COARSE TUFF to Lapilli Tuff

- Relatively massive and homogeneous coarse tuff (10% or less lapilli sized clasts); percentage of lapilli sized clasts increases below 1414.5'. Intermediate hardness, knife scratchable. Core good, rare fracture occasional (2 per meter) quartz-epidote vein 2-30mm wide. 1413' and down find weak greenish tint due to chlorite increase, possibly a slightly more intermediate source.

Bedding rare but moderate common clast alignment at 25-30 degs to core axis.

1416-1423 Feldspar phyric 3-5% fine 1mm anhedral feldspar crystals. Also small hematitic specks and/or patches in the hard green chloritic matrix. Increased hardness below 1416', like 1394-1408'; locally magnetic.

1422-1423 Pyroclastic sulphide fragments, pyrite along with some unusual apple green epidote-quartz.

Property TULSEQUAH CHIEF

District ATLIN

Hole No. TCU-90-23

Feet		Description
From	To	
1423 (433.7-439.5)	1442 (439.5-446.7)	<p>MIXED DIORITE AND DACITE (RHYO-DACITE) LAPILLI-TUFF</p> <p>- A heterogeneous mixture of the coarse pyroclastic seen at 1394-1408' and a dark massive silicified, hard diorite as seen 1372-1389' with its frequent quartz-epidote veining/alteration; sharp contacts, locally chilled margins on the diorite.</p> <p>1423-1425.5 Diorite, intermediate to extreme hardness.</p> <p>1425.5-1429 Strongly veined Dacite pyroclastic, extremely hard, with sub-volcanic dacite as well.</p> <p>1429-1432 Diorite 1432-1434 Dacite pyroclastic. 1434-1435 Diorite 1435-1435.8 Dacite 1435.8-1436.8 Diorite 1436.5-1438.0 Dacite with strong epidote altered fragments and 2% anhedral pyrite fragments. 1438-1442 Very hard DIORITE with patchy epidote alteration.</p>
1442 (439.5-446.7)	1465.5 (446.7-465.6)	<p>DACITE LAPILLI-TUFF</p> <p>- Clearly fragmental medium grey with slight local variations due to sericite or chlorite. 40-80% lapilli sized subrounded fragments, lighter grey-creamy coloured than dark grey tuffaceous matrix, generally matrix supported. Very to locally intermediately hard, lighter clasts more felsic consistently leave knife. Rare dark green andesite/diorite clast approx. 1-3%. Core good, weakly fractured; approx. 1 quartz-epidote vein per 2 meters, quartz-epidote. Sharp lower contact, semi-digested vague upper contact. Common clast alignment suggests bedding at 28-33 degs to core axis.</p>
1465.5 (446.7-465.6)	1527.5 (465.6-484.6)	<p>MIXED DACITE PYROCLASTICS AND DACITE SUB-VOLCANIC DYKES</p> <p>- Very heterogenous package of dacite lapilli-tuffs and dacite autobrecciated dykes churning through and incorporating the pyroclastics. The non-extruded dacite appears as aphanitic, generally lighter coloured than the volcanics; shows little or no preferred orientation; cut by frequent veins quartz, epidote +/- mt, chl; contains up to 25% feldspar phenocrysts.</p>

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Feet		
From	To	Description

The extrusive Dacite is a lapilli-tuff, darker grey, locally scratchable by knife along sericite-chlorite altered tuffaceous matrix. Fragments varied from dacitic to andesitic.

System is probably much like the "toothpaste tube" image, the "non extruded" material described above is probably in fact being squeezed through existing pyroclastics.

1465.5-1486 Lighter coloured - lite grey-buff green, probably due to increased sericite alteration, occasional calcareous vein.

1486-1502 Primarily clearly pyroclastic dacite, fine lapilli tuff with occasional dm-scale gobs of the feldspar phyric subvolcanics. Bedding indicated at 40-45 degs to core axis.

1502-1514 Approx. 20% feldspar phenocrysts 1-2mm subhedral white crystals afloat in an aphanitic to fine grained siliceous matrix, very mottled and irregular with patches of purplish (hematitic) material, frequent fine discontinuous fractures, dark.

1514-1527.5 Pyroclastic, altered and bleached below 1520'.

1527.5 1542
(465.6-470.0)

DACITE DYKE - FELDSPAR PHENOCRYSTS
- Banded siliceous aphanitic dyke, light grey, massive over top 6'. Below 1534' are incorporated some tuffaceous blocks and quartz-chlorite vein/patches, hybridized. Upper contact sharp but broken, core ground up (rounded). 2.5" diorite dykelets cuts sharply through at 1533' across felsic banding. Banding oriented 40 degs to core axis. Lower contact sharp, 45 degs. to core axis.

1542 1833
(470-558.7)

DIORITE
- Dark green, massive and homogeneous fine grained intrusive. Variations in grain size, colour, porphyritic nature all fairly minimal. Colour locally fades to lighter green adjacent to the common mm to cm scale chlorite +/- quartz veins. Veining by chlorite +/- quartz common, thin mm to cm scale wide with thin bleached alteration veins commonly at 45-60 degs to core axis. Various phases of intrusion leave us with occasional inter-pulse contacts, weakly chilled margins, sometimes marked by fine biotite brown presence. Trace sulphides usually vein

Feet

From

To

Description

associated pyrite.

1554 FAULT - CRUSH ZONE over 3" rock friable and broken, no disturbance with surrounding rock.

1551 Diorite/diorite phase contact, chilled margin on top.

1560-1564 Banding of diorite at approx. 60 degs to core axis.

1575 Weak increase with veining/fracturing up to 10/m.

1599 Phase contact, upper portion later.

1606-1609 Distinct interval banding 50-60 degs to core axis.

~1655 Note coarsening grain size, individual crystals some easily seen, vitreous, micaceous platy cleavage surfaces, occasional intervals with lighter feldspar glomeroporphy.

1670 Coarser yet 1-2mm size crystals.

1675 Calcite vein/vein breccia at 20 degs to core axis, bleaching and calcite impregnation of surrounding diorite. Core badly broken.

1702 Patchy quartz vein with patchier lighter green chlorite alteration.

1717-1718 Thin FAULT, minor clayey GOUGE, trace sulphides (py).

1769 Note diorite/diorite contact to biotite margin alteration at base of uppermost diorite. 1760' Diorite becomes fine grained and harder, more knife resistant, difficult to scratch.

1760-1800 Very massive and homogeneous equigranular fine grained dark grey with significant less green (chlorite), significantly less veining or fracturing.

1800 Biotitic veined with minor py (~4% over 1') Diorite/diorite contact. Below 1800 diorite is grey-black green and finer grained yet. Very fractured grained with increased hardness, difficult to scratch, local small scale heterogeneity, interval mixing of dyke. Lower contact weakly chilled, feldspar phyrlic, sharp.

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Feet		Description
From	To	
1833 (558.7-560.6)	1839	COARSE DACITE - RHYOLITE LAPILLI TUFF - FELDSPAR PHYRIC - Coarse felsic pyroclastic with light grey to off-white broken siliceous clasts 1mm to 15cm diameter within darker grey-green tuffaceous matrix, minor chlorite veining and alteration of matrix. Dark matrix softer than felsic clasts, clasts harder than knife. Vague sense of bedding through common orientation of clasts at 45 degs to core axis. Lower contact vague, somewhat digested by dyke over last 2'. Subhedral mm size feldspar white phenocrysts scattered through matrix and clasts, ~10%.
1839 (560.6-562.4)	1845	DIORITE - Fine grained near black dyke as described above 1833'. Lower contact sharp and chilled at 46 degs to core axis.
1845 (562.4-563.3)	1848	DACITE - RHYOLITE PYROCLASTIC - As described 1833-1839', bedding somewhat better defined at 48-50 degs to core axis. Upper and lower contacts sharp, lower at 50 degs to core axis.
1848 (563.3-566.3)	1858	DIORITE - Same unit as 1839-1845'. Lower contact faint but very sharp at 58 degs to core axis.
1858 (566.3-572.1)	1877	DACITE COARSE TUFF-FINE LAPILLI-TUFF, FELDSPAR PHYRIC - Unlike above Dacite pyroclastic this one is finer and more homogeneous/massive. Light grey with 1-2mm size common feldspar subhedral crystals or glomeroporphy. Fine grained, siliceous and very hard, leaves knife in all but the slightly coarser intervals. Fragments difficult to discern after 1860', vague outlines suggest a matrix rich lapilli tuff. Local suggestions of bedding at 55 degs to core axis; example at 1863. Possibly some clasts are bomb sized but with boundaries indistinct. 1858-1860 Resembles Dacite (rhyolite?) noted above with its distinctly darker chloritic matrix. Average 1 quartz vein per meter 2-4cm wide cutting core at 40-60 degs, locally brecciating. Trace sulphides, weakly disseminated <1mm euhedral py. Trace to minor reddish hematite blobs.

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Feet		Description
From	To	

1874-1877 Large white quartz +/- calcite, chlorite vein, cuts core at 15-20 degs to core axis.

1877- 1953
(572.1-595.3)

DIORITE

- Same as previous diorites, a dark grey-green homogeneous massive intrusive of fine to medium grain size. Hardness varies from intermediate to very hard, locally leaves knife, harder intervals usual associated with quartz veining.

1877-1902 Frequent thin quartz (+/- calcite-chlorite-epidote) veins thin 1-2mm and at various angles to core axis, 5-6 per meter. Upper contact digested over top 2', chilled and fine grained, black.

1885 Small 2cm wide calcite vein at 25 degs to core axis. Lower contact sharp at 45 degs to core axis. Weakly bleached over last 2mm. Unusual in that veinlets of underlying rhyodacite snake up several cm into the diorite. Possibly a later felsic dyke right at contact.

1953 1977
(595.3-602.6)

DACITE - RHYOLITE - LAPILLI - TUFF

- Coarse and Locally Feldspar Phyric. Coarse matrix supported lapilli of dacite +/- rhyolite ? composition with mottled marbly appearance due to differences between clast and matrix, same unit as described at 1833-1839'.

Clasts are light creamy grey to pale grey-green in colour, siliceous and harder than knife; clast boundaries usually indistinct, size ranges from 1mm to 8cm, making it not quite as coarse as 1833-1839' interval. Matrix medium to dark grey fine tuff, generally softer and scratchable, possibly more andesitic in composition. Bedding rare, best described by common clast orientation of 35-45 degs to core axis.

1953-1953.6 Small felsic dyke right at contact grey-pale green with epidote alteration, quartz eyes, and abundant small thin veinlets. Lower contact vague.

1977 1992
(602.6-607.2)

FINE LAPILLI TUFF

- Clasts supported with matrix and clasts of mixed DACITE ANDESITE, similar composition, giving much more homogeneous appearance, softer than surrounding more felsic material, easily scratchable. Contains ~2-4% only of the pale felsic fragments.

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Feet		Description
From	To	

Speckled with small inconspicuous hematite grains. Possibly MIXED DACITE ANDESITE, at any rate its distinct from the surrounding coarse felsic pyroclastics.

1992 2045
(607.2-623.3)

COARSE DACITE-RHYOLITE - LAPILLI-TUFF - FELDSPAR PHYRIC

- Same as 1953-1977', but with an increase of epidote hematite, garnet (see 2008') altered felsic light clasts; all still supported in a dark tuffaceous more basic matrix with local hematite staining patches, not noted in 1953-1977' interval.

2045 2072.5
(623.3-631.7)

DACITE COARSE TUFF/FINE LAPILLI - TUFF

- Weakly sericite altered. Precursor of above coarser Dacite - Rhyolite pyroclastic but here with <5% of the lighter more felsic fragments. This interval has matrix and clasts of similar composition and is only rarely feldspar phyric. Light to dark, grey coarse tuff prevails. Lapilli sized fragments average ~ 20%. Bedding rare but clast orientation common at 45-50 degs to core axis. Core easily scratchable, rendered soft and darker by sericite alteration. Core good, most pieces greater than 2', fracturing rare to absent.

2068-2071.5 Strongly feldspar phyric ext. approx. 25% 1-3mm white subhedral feldspar phenocrysts, extremely hard, leaves knife a more felsic siliceous belch of volcanism.

2071.5-2072.5 Weakly bedded dacite coarse tuff, bedding clearly at 64 degs to core axis.

2072.5 2080.3
(631.7-634.1)

DACITE INTRUSIVE, Feldspar Phyric

- Light grey massive and very homogeneous dacite intrusive, completely lacks any muddy matrix type of darker material seen in tuffaceous intervals; cut by thin quartz-epidote veining, 1-3mm wide at 60-80 degs to core axis. Feldspar phenocrysts 20-30%, evenly distributed 1-3mm in size.

Contacts sharp, 85-90 degs to core axis, weakly chilled, knife sharp.

2080.3 2083.0
(634.1-634.9)

DACITE COARSE TUFF - FINE LAPILLI TUFF

- Weakly sericite altered. Massive non bedded homogeneous dark grey tuffaceous pyroclastic becoming gradually lapillious. Knife scratchable, easily.

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Feet

From To Description

Common sense of direction of clasts defines "bedding" at 50-55 degs to core axis.

2083.0 2085
(634.9-635.5)

DACITE - LAPILLI - TUFF
- Fine to medium, moderately bleached and sericitized. Continuation of above unit, coarsening and suffering stronger alteration. Powders under knife. No distinct contacts.

2085 2174.5
(635.5-662.8)

MINERAL HORIZON Strongly Altered
- Pyroclastic sulphides variably developed throughout mixed with altered dacite fragments. Bedded sulphides >pyroclastic sulphides.

2085-2094 DACITE LAPILLI TUFF WITH SULPHIDES FRAGMENTS - all pyroclastics sulphides; strongly altered. Very distinctly fragmental unit with strong unsorted appearance; good sense of bedding/common alignment at 40 degs to core axis; possibly a debris flow. Fragments of widely varied compositions: massive py, massive Zn, cpy-rich, and dacitic, all subrounded, usually elongate and aligned and up to 4-5cm diameter. Matrix is strongly sericitized tuffaceous muddy material, very soft. Estimate 2-3% Zinc, 0.5-1.0% cpy.

2094-2106.5 Porphyroblastic sericite unit, nearly massive sericite with irregular patches/pyroblasts of slightly harder material. Has soapy feel to it. Variety of colours green-grey brownish very heterogeneous. Has locally altered feldspar glomeroporphy, kaolinite altered?.
Locally bedded at 35-40 degs to core axis; sharp upper and lower contacts parallel bedding. Rare but significant cm scale bands of disseminated sulphides-pyrite in trace cpy (ex. at 2096). Brings to mind immediately TCU-89-14, 1013-1050' correlateable?; pyritic 2-5%

2106.5-2174.5 SULPHIDE ZONE - Heterogeneous package of mixed sulphide rich dacite and altered lapilli-tuffs, weakly bedded sulphide rich tuffs or more rarely massive sulphide rock, breakdown as follows: 2106.6-2112.0' much same as 2085-2094'; pyroclastic sulphides in strongly altered Dacite Lapilli Tuff/Sulphides, increased sulphides, more bedded. Fragments finer and overall more abundant, higher fragments: matrix ratio with strongly disseminated pyrite, sulphides, cpy within matrix +/- barite (core seems quite dense)

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Feet		Description
From	To	

2112-2118.5 High grade. Zn, Pbs, BaSO, high specific grav., estimate 15% ZnS; 3-5% PbS, 0.5% Cpy; weaker zone at 2114-2117', occasional dacitic pyroclastic fragment up to 5cm diameter, poorly bedded at 30-35 degs to core axis. This section still mainly pyroclastic sulphides.

2118.5-2126 Banded sulphides/Strongly altered Dacite pyroclastics. Distinctly banded (poorly bedded) at 45 degs to core axis. Heterogeneous mixture of dacite lapilli, tuff, nearly pure sericite, massive by bands up to 20 cm, contorted boudined cherty intervals estimate ~20% py, 4-5% Zn over top 5', minor Cpy <2%.

2126-2128 "Sericite rock", very soft dark massive unit with vague lapilli sized felsic (3-6mm) size clasts, speckled with tiny alteration crystals (kaolinite) estimate ~ 15% finely disseminated py.

2128-2131.5 Same as 2118.5-2126' Strongly Altered and Sulphide rich lapilli tuff with vague/weak bedding at 45 degs to core axis. Approx. 5-8% ZnS bearing pyroclastics. Estimate ~5% ZnS, 1-2% PbS, 0.5% Cpy again.

2132.5-2137.5 Porphyroblastic Sericite rock with Cpy-Stringers. Converted nearly totally to sericite, soapy feeling near-translucent interval, very soft, powders under knife; rounded oblong 3-6mm scale porphyroblasts throughout. Remnant bedding at 46-48 degs to core axis, masked by alteration as are the fragments. Cpy- rich sulphides stringers throughout, wispy clots surrounding ghosted fragments 8" interval of massive py at 2136'

2137-2140 Semi massive py-Cpy, HIGH GRADE cu, massive interval (non bedded) with 40-50% py fine grained and 10-12% Cpy as clots and stringers much as the above sericite unit but now with pyrite in place of sericite. Vague ghosted clasts, lapilli sized.

2140-2163 Sulphide Rich Altered Dacite Lapilli Tuff. Clearly fragmental, locally bedded pyroclastic, strongly sericite py altered. Where more coarsely fragmental there is 20% dacite subrounded clasts in a sulphide +/- barite matrix; sulphide clasts rare; clasts up to 5 cm diameter but average 1-2cm. ; occasional cm/dm scale bands of massive fine-medium grained py

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Feet From	To	Description
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with 1-3% py.

Fairly heterogeneous on a dm-m scale. Bedding varies from 10-40 degs to core axis, best guess average 30 degs. Cpy occurs as stringers and clots frequently along clast rims (estimate ~ 1.5% Cu)

2163-2166 Chert/Sphalerite/Galena - weakly banded (at 40degs to core axis) unit made distinct by its silica content and honey yellow sphalerite in discontinuous bands with wisps with associated galena. Weakly fragmental in appearance-slumping, brecciating or boudinaging of chert bed. Sharp upper and lower contacts.

2166-2172 Interbedded fine lapilli-tuff, Sulphides, Py-mud, Cherty tuff. Moderately well bedded interval of varying lithologies, basically a strongly py and sericite altered fine dacitic tuff - lapilli/tuff with occasional contorted cherty bands. Sulphides sphalerite and pyrite mainly, disseminated throughout, concentrated usually along bedding. Coarser intervals have 1-10mm size siliceous felsic rounded fragments.

2171-2172 is fine well bedded sericite-sulphide altered tuff, bedding at 55 degs to core axis.

2172-2174.5 Bedding sulphide unit. Moderately well bedded interval of ~60% py, 10-15% ZnS, 3-5% Cpy stringers and clots. ~20% Fine pyroclastic material, muddy matrix (very fine py), small rounded siliceous fragments 1-3mm diameter. Bedding at 50-55 degs to core axis. Top contact sharp. Lower 4" shows rapidly decreasing Su'ph. content then has a questionably conformable knife sharp contact. Ironically with a significant increase in chalcopyrite.

2174.5 2178
(662.8-663.9)

ANDESITE TUFF TO LAPILLI TUFF Weakly Sericite Altered. +/- Dacite component.
- A dark grey to local dark red (hematite/jasper) fine pyroclastic. Well bedded fine pyroclastic - tuff with ~10% lapilli sized fragments, small rounded oblong and oriented parallel to bedding, similar in composition and appearance to the tuffaceous matrix slightly lighter. Bedding at 50-60 degs to core axis. 3-4% finely disseminated pyrite, concentrated along bedding.

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Feet

From To Description

Long thin Cpy healed fracture parallels core with bleached Cpy disseminated alteration rim.

2178 2187
(663.9-666.6)

DACITE - RHYOLITE LAPILLI - TUFF
- Variably hybridized by diorite. Similar to that seen above the mineral horizon, light siliceous amorphous clasts or clots of strongly felsic material afloat in silicified fine dark tuffaceous matrix. Matrix soft than clasts, can be scratched, darkened by sericite alteration. Abundant silica-chlorite veins with siliceous alteration rims. Has subvolcanic look to it locally - veined.

2182.5-2185 DIORITE Sharp weakly chilled upper contact. Fine grained chloritic, green with homogeneous massive character. Lower contact darker, finer and slightly mixed with underlying dacite.

2187 2238
(666.6-682.1)

INTERMIXED ANDESITE FLOWS, PYROCLASTICS AND DIORITE

- Difficult interval to interpret, quite heterogeneous package of strongly chlorite dark green mafics - volcanics contain dark-green ovoid - round porphyroblasts. Common orientation to pervasive fabric - tectonic or depositional or flow. Some intervals are massive with strong porphyritic nature, 1-3mm pyroxenes. Interpret unit to be primarily andesite flows with brecciated finer grained. Diorite/dyke contacts 40% to core axis cut by Sloko felsic dyke.

2187-2193 Coarse grained pyroxene porphyritic interior and brecciated fine grained lower margin from 2191-2193' containing rounded siliceous clasts of more felsic looking material Sloko dyke 12 inches thick and bleaches dyorite.

2215.5-2220 Fine grained diorite - upper contact 40 degs to core axis and lower contact 50 degs to core axis.

2193-2207 Andesite pyroclastics, lapilli-tuff - minor felsic dyke cuts it (Sloko). Vague dark fragments, vague sense of bedding at 35-40 degs to core axis.

2198.5 2x6cm py, Cpy sulphide clast, rounded, lying in a fine andesitic tuff.

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2203.5 Weakly disseminated Cpy <1% at possible flow margin with disseminated magnetite.

2203.5-2205.5 Possible chlorite filled amygdules, difficult to distinguish from anhedral chlorite replaced pyroxene phenocrysts.

2206 Darker, very fine grained interval, dyke, diorite.

2207-2215 Andesite lapilli-tuff? vague lapilli sized clasts in a massive looking otherwise fractureless interval, possible fine tuff bedding over last 8" at 45 degs to core axis.

2215-2218 Cross cutting very fine grained diorite dykes, finely veined massive, dark green and homogeneous, lower contact marked by 4" of silica-epidote alteration-vein.

2218-2231 Fine andesite pyroclastic what looks like fragments could simply be minor autobrecciation of a non two-viscous andesite flow. Local banding possibly flow banding near flow margins. No amygdules noted but frequently massive and porphyritic nature suggests flows. Phenocrysts could be porphyroblasts. Moderately developed fabric oriented at 45 degs to core axis. Some pyrite - pyrrhotite clasts.

2231 2699
(682.1

DIORITE DYKE

- Fine to very fine grained massive homogeneous - difficult call - probably drilling in diorite parallel to contact, locally cutting back and forth across contact into andesite volcanics.

Hardness quite variable as patchy vein related silicification occurs throughout local very hard patches leave knife. Dark green to black green grey, locally faint brown (biot) tint.

2246 Magnetite patches with chlorite spots on pyrite cubes.

Homogeneity broken by networks of thin light green quartz-epidote veining, usually short, discontinuous and irregular. Large patchy quartz-epidote +/- orange garnet at 2260-2262', 2264', 2270', 2278', 2280'.

Sulphides are rare isolated 0.5-2.0mm euhedral py crystals. <1% resembles also a very fine grained diorite due to faint occasional flow band or interval mixing heterogeneity giving weak fragment look.

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 Feet
 From _____ To _____ Description _____

Core fairly good down to 2260 approx., only locally blocky.

2260-2275 Increasing blockiness, average length 10-15cm, fracturing tends to be at low angle to core axis.

2275' Core badly fractured/broken, average piece 3-6cm, slow drilling, abundant fine calcite healed fractures, hairline, faint, locally more intense brecciating the diorite.

2292-2294 Diorite/diorite contact with veining-chlorite/calcite

2300-2312 Gravel sized core, local slickensides, hematite coated fracture surfaces.

2312-2336 Slightly better core, 8-10cm average size, diorite unchanging massive dark-green-grey-black, finely veined, fractured.

2336-2340 Bleached to pale grey-green, 1cm calcite vein paralleling core axis broken over last 1'.

2340-2342.5 FAULT STRONG BRECCIA

Very distinctive fault breccia, angular quartz clasts (possibly some sloko) 1mm to 2cm (average 0.8cm) afloat in calcite-chlorite matrix, matrix supported but barely, sharp contacts. Euhedral to subhedral py 0.5-2mm diameter isolated within matrix 1-2%.

2342.5 2360

2342.5-2344.5 Sericite-Calcite-Chlorite altered zone, too heavy to recognize original diorite mottled with swirl patterns of straw coloured sericite, fizzes with HCL throughout. Sharp lower contact with unaltered fine grained diorite.

2344.5-2360 Continued fine to very fine grained diorite, increasing veining and/or alteration by calcite/chlorite with faint wisps of tan sericite, also interval mixing of diorite adds to heterogeneity of otherwise massive and homogeneous intrusive. Slightly increased overall chlorite alteration. Core moderately competent/intact - average length 20-40cm.

2360 2363.5
(719.3-720.4)

QUARTZ-FELDSPAR-PORPHYRY

- Distinctive fine grained chilled knife sharp contacts grading coarser grained towards centre.

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Feet
 From _____ To _____ Description _____

Estimate 50-60% matrix supported light grey anhedral to subhedral quartz and feldspar phenocrysts afloat in darken finer matrix. Vaguely to strongly banded (at margins) Contacts at 50 degs to core axis. See QFP of 1667-1671 in TCU-89-18.

A strongly veined with felsic/chlorite veinlets; hornfelsed; some relict fragmental texture - difficult call, similar to 2231-2336'. Off chance it could be diorite, locally ghosted relict fragmental texture but most fragmental textures breccia due to veining.

← 2363.5-2385 Fine grained, increased alteration due to veining. Pervasive chlorite alteration with trace biotite alteration? - slight brownish tint. Ubiquitous thin hairline calcite healed fractures and/or veinlets, up to 10-12 per foot generally cutting core at 70-90 degs but frequently irregular. Where most strongly altered the diorite is bleached to lighter green, locally weakly banded or brecciated.

2375-2385 Cpy occurs in trace amounts within small veinlets within this distinctly more altered/bleached interval featuring also patchy quartz-epidote vein associated alteration not seen outside this interval. Same alteration event possibly responsible for remobilization of cpy from a lower source?!

2385-2461 Decrease in alteration intensity and also grain size, increase in ~~INTERNAL~~ ~~INTERNAL~~ BRECCIATION and weak calcite flooding about the fragments, core good, average 30-50cm lengths, fine grained. Chlorite alteration more localized now, overall colour a medium, stronger grey to grey green.

2406-2416 Especially heavy brecciation, weakly bleached, stronger calcite and chlorite presence.

2457-2465 Beginning of common epidote alteration, after sudden sharp appearance along foliated shear at 2457-2458', rock is f~~o~~ssile, represents an internal contact? Weakly banded or brecciated down to 2461'. Epidote appears hereafter as irregular patches or veins, accompanied by quartz, calcite, chlorite and rarely garnet, average 1-2 irregular patch/veins per foot.

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Feet

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Diorite very fine grained, smooth to the touch, massive, homogeneous, dark, grey-green, locally vein brecciated weakly.

2464 Sulphides py in epidote quartz vein with magnetite (3-5%).

2504 2699
(-822.7)

DIORITE fine grained, massive homogeneous, more homogeneous than previous sections- resembles diorite on fresh surface and diorite or andesite volcanic or andesite volcanic on cored surface. This section more massive, homogeneous and less fractured than previous sections. Much more like diorite.

2504-2606.5 Quartz veins (2-20mm) rimmed with epidote becoming more common. Epidote veining and alteration showing increasing garnet content (at 2544' show garnet xtals 1-3mm). Diorite very hard (leaves knife), magnetite content varies from moderate to strong at 2590.5', 7cm zone altered to sericite and clay. Core is competent, locally small zones (15-30cm) blocky, veins show minor py (<1%) with trace of cpy locally blebs of magnetite 1-2mm and scattered calcite.

2606.5-2612 Bleached grey altered zone with weak salt and pepper texture; bands or layers that are calcite rich trend 50-55 degs. Upper and lower contact distinct at 55-60 degs to core axis.

2612-2645 Back into black to light grey fine grained diorite with quartz veining thin (<1mm) to locally 30mm (@ 2620.5'), veins carry varying amounts of epidote, garnet and chlorite with minor calcite.

806.2
820.8

2645-2693 Within diorite locally find zones altered to dark green clay and sand contains ser and minor swelling clays; largest zone at 2682-2684' is completely sand and clay, locally most zones 5-10cm wide (occur 1-2/5' length) at 2673' quartz-garnet-epidote vein contains blebs of Cpy.

2693-2699 Diorite contains clasts 2-12cm wide, clasts light to dark grey rimmed with epidote alteration and weakly fspar phytic.

2699' END OF HOLE, September 5, 1990 at 7:00 a.m.
(822.7m)

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Feet

From To Description

SPERRY SUN

1012	82.5	188
1150	82.2	195
1400	84.0	188
1412	84.0	178
1600	84.2	
1612	84.0	180
1812	84.0	178
2012	84.0	188
2212	84.0	188
2412	84.5	186
2612	84.5	176

SULPHIDE INTERSECTION DESCRIPTIONSH HORIZON 2085-2174.5

2085-2093 (1/1A) fragmental sulphides with 25-35% py ZnS (tan)

2093-2111 "Sericite rock" porphyroblastic, 5% py, trace ZnS

2111-2115 (1/1A) fragmental with good ZnS, 1' massive ZnS 2113'

2115-2122 (5a) Heavy yellow ZnS/barite, minor cpy, well bedded fine lapilli-tuff

2122-2129 Cherty py banded, locally fragmental, 15% py, trace ZnS

2129-2134 (1/1A) 20-25% host rock, 20-30% py, locally massive

2134-2150 (1/1A/7ab) bedded to contorted fragmental

2150-2163.5 (6) banded py/tan ZnS, 30% py, 30% host rock

2163.5-2166.5 (5) yellow massive ZnS

2166.5-2174.5 (6) well bedded py/tan ZnS with 25-30% host rock, avg 20-30% py in strong bands, sharp lower contact.

APPENDIX C Diamond Drillhole Geochemistry and Asssay Data

0002

COMINCO E.R. LAB --- COMINCO EXPL'N

8604 885 3032

08/09/90 12:40

TULSEQUAH-ND

JOB V-90
REPORT DATE

LAB NO	FIELD NUMBER	DRILL INTERVAL	Cu	Pb	Zn	Au	Hg	Ag	Cd(I)	Pb(I)	Zn(I)	Mn(I)	As(I)	Se(I)	Am(I)	Co(I)
		FROM (FEET) TO	PPM	PPM	PPM	PPM	PPM	PPM	%	%	%	%	g/t	g/t	g/t	g/t
R9007270	TCU90-22	1779.00 1784.50	60	30	410	<10	5	7.5								
R9007271	TCU90-22	1784.50 1785.50	2025	2860	E17900	404	5	11.5	0.21	0.29	1.94	0.789	0.023	8.057	0.235	
R9007272	TCU90-22	1785.50 1789.00	5150	E20800	E84500	1360	5	50.5	0.59	2.10	9.95	3.257	0.093	59.572	1.475	
R9007273	TCU90-22	1789.00 1794.00	6200	E37100	E131500	4660	5	E223.0	0.70	3.35	15.71	6.755	0.197	233.91	6.822	
R9007274	TCU90-22	1794.00 1797.00	3690	E30850	E76500	1962	5	E165.0	0.41	3.40	9.88	2.160	0.063	172.61	3.034	
R9007275	TCU90-22	1797.00 1802.00	E15030	E108300	E181500	3200	5	E497.5	1.52	10.74	18.32	C5.280	C0.154	487.63	14.223	
R9007276	TCU90-22	1802.00 1807.00	8500	E10800	E74500	3840	5	E159.0	0.85	1.95	8.73	5.534	0.162	160.59	4.684	
R9007277	TCU90-22	1807.00 1810.50	5100	E19350	E70000	2100	5	89.0	0.48	1.75	8.28	2.812	0.082	81.378	2.374	
R9007278	TCU90-22	1810.50 1815.00	8650	E43200	E141500	1420	5	E201.0	0.93	4.50	15.49	2.880	0.084	188.35	5.494	
R9007279	TCU90-22	1815.00 1820.00	7350	E35150	E233000	7840	5	E174.5	0.77	3.30	24.15	2.743	0.080	161.92	4.723	
R9007280	TCU90-22	1820.00 1825.00	E13400	E26400	E164000	1532	5	E157.0	1.43	2.75	17.90	1.989	0.058	150.60	4.393	
R9007281	TCU90-22	1825.00 1826.00	E13400	E22050	E43000	812	5	81.5	1.33	2.15	4.65	1.371	0.040	72.944	2.128	
R9007282	TCU90-22	1826.00 1828.00	9600	E40100	E79000	1612	5	E166.0	1.01	4.00	9.24	1.643	0.048	165.70	4.833	
R9007283	TCU90-22	1828.00 1831.00	E16250	9800	E52000	1366	5	E131.5	1.52	9.84	5.30	1.577	0.046	137.31	4.005	
R9007284	TCU90-22	1831.00 1834.00	3005	605	1765	274	5	13.5	0.29	0.06	0.17	0.274	0.008	10.00	0.292	
R9007285	TCU90-22	1834.00 1839.00	E16300	430	2063	824	5	39.0	1.62	0.44	0.21	1.132	0.033	38.955	1.124	
R9007286	TCU90-22	1839.00 1844.00	34500	935	11200	1056	5	99.0	3.49	0.07	1.00	2.674	0.078	96.927	2.827	
R9007287	TCU90-22	1844.00 1848.00	16400	3370	9150	1492	5	E287.0	3.70	0.29	0.78	3.429	0.100	284.40	8.295	
R9007288	TCU90-22	1848.00 1852.00	49000	4940	25000	E13800	5	E351.0	5.20	0.46	2.44	11.897	0.347	342.63	9.993	
R9007289	TCU90-22	1852.00 1857.00	51000	3510	4650	E22000	5	E174.0	5.60	0.32	0.41	C17.760	C0.518	171.03	4.989	
R9007290	TCU90-22	1857.00 1862.00	E53000	885	3350	1150	5	E143.0	6.25	0.08	0.29	1.646	0.048	134.88	3.934	
R9007291	TCU90-22	1862.00 1867.50	E48950	2150	6150	2760	5	E171.0	5.25	0.20	0.55	2.743	0.080	176.40	5.145	
R9007292	TCU90-22	1867.50 1869.00	E24900	E28100	E107500	3300	5	E309.5	2.56	2.75	11.26	3.772	0.110	292.64	8.535	
R9007293	TCU90-22	1869.00 1874.00	E19500	E23500	E108000	2580	5	E219.5	1.83	2.50	11.16	3.189	0.093	214.00	6.263	
R9007294	TCU90-22	1874.00 1876.50	E38500	7750	E42000	3780	5	E274.0	4.10	0.71	4.40	6.411	0.187	289.66	7.573	
R9007295	TCU90-22	1876.50 1878.00	E36350	E22000	E83000	E16200	5	E200.5	3.64	2.00	10.17	3.793	0.108	184.59	5.501	
R9007296	TCU90-22	1878.00 1881.00	E23650	E11800	E70000	572	5	80.5	2.42	1.07	7.89	C0.686	C0.020	80.229	2.340	
R9007297	TCU90-22	1881.00 1885.00	E32100	1485	E78000	2420	5	E140.5	3.15	0.14	8.48	C2.469	C0.072	C118.33	C3.451	
R9007298	TCU90-22	1885.00 1889.50	E45200	4800	E30150	4400	5	E344.5	4.65	0.43	2.90	5.314	0.153	313.76	9.151	
R9007299	TCU90-22	1889.50 1894.00	E36800	6050	E159000	1712	5	E270.5	3.80	0.58	16.17	3.223	0.094	260.64	7.602	
R9007300	TCU90-22	1894.00 1895.50	E18600	E13350	E116000	530	5	E165.5	1.90	1.25	11.57	0.617	0.018	168.80	4.923	
R9007301	TCU90-22	1895.50 1899.50	E29600	E16200	E138000	1636	5	E374.5	3.15	1.50	14.38	1.896	0.055	C360.60	C10.518	
R9007302	TCU90-22	1899.50 1904.50	E34450	E15550	E101500	1050	5	E247.0	3.54	1.35	11.08	C1.303	C0.038	214.68	6.262	

LAB NO	FIELD NUMBER	DRILL INTERVAL FROM (INCHES) TO	CU	PB	ZN	AU	HT AU	AG	CU(1)	PB(1)	ZN(1)	AU(1)	AU(1)	AU(1)	AU(1)	
																PPM
R9007303	TCU90-22	1904.50 1910.00	E45450	E13530	E104000	2220	5	E152.5	4.55	1.26	11.56	3.566	0.104	160.16	4.671	5.5
R9007304	TCU90-22	1910.00 1911.00	E13000	E30200	E186500	212	5	49.0	1.27	3.50	21.51	0.891	0.026	64.252	1.874	1.0
R9007305	TCU90-22	1911.00 1913.00	E11750	E15550	E131500	7800	5	E122.5	1.19	1.28	14.51	0.926	0.027	119.19	3.476	2.0
R9007306	TCU90-22	1913.00 1917.00	E15500	E19200	E137000	1840	5	E118.0	1.37	1.60	15.91	1.714	0.050	116.71	3.404	4.0
R9007307	TCU90-22	1917.00 1919.50	E28850	3150	E34400	3180	5	E125.0	3.09	0.26	3.60	05.554	00.162	C110.52	C3.224	2.5
R9007308	TCU90-22	1919.50 1924.50	E26100	E14400	E203500	4440	5	E141.0	2.77	1.35	24.40	04.446	00.188	C121.47	C3.543	5.0
R9007309	TCU90-22	1924.50 1929.00	E30800	775	7750	7000	5	E110.0	3.14	0.05	0.67	1.749	0.051	94.415	2.754	4.5
R9007310	TCU90-22	1929.00 1932.00	E23200	2710	E23500	C3200	5	99.0	2.42	0.21	2.38	3.154	0.092	94.184	2.747	3.0
R9007311	TCU90-22	1932.00 1933.50	E13650	E13000	E100000	C2240	5	79.5	1.45	1.10	9.40	2.606	0.076	74.847	2.183	1.5
R9007312	TCU90-22	1933.50 1937.00	E63500	4970	E78500	5900	5	E164.0	7.45	0.43	9.35	08.914	00.260	160.90	4.693	7.5
R9007313	TCU90-22	1937.00 1938.00	E10550	E22350	E124000	2200	5	E107.0	1.04	1.75	11.67	2.949	0.086	102.06	2.977	1.0
R9007314	TCU90-22	1938.00 1940.00	4400	E10400	E22550	1136	5	27.0	0.49	0.88	2.38	1.234	0.036	19.783	0.577	2.0
R9007315	TCU90-22	1940.00 1942.00	E73500	9200	E88000	C5300	5	E162.0	0.80	0.79	10.10	5.486	0.160	155.67	4.540	2.0
R9007316	TCU90-22	1942.00 1947.00	E56000	5700	E84000	C2380	5	87.5	6.65	0.45	10.08	2.743	0.080	77.301	2.255	5.0
R9007317	TCU90-22	1947.00 1948.50	E40200	E11800	E44500	3800	5	E184.0	4.55	0.96	6.30	3.292	0.096	179.24	5.228	1.5
R9007318	TCU90-22	1948.50 1953.50	300	4100	8500	1152	5	18.5	0.05	0.33	0.80	1.234	0.036	13.852	0.404	

I=INSUFFICIENT SAMPLE X=SMALL SAMPLE E=EXCESS CALIBRATION C=BEING CHECKED R=REVIEW

IF REQUESTED ANALYSES ARE NOT SHOWN, RESULTS ARE TO FOLLOW

ANALYTICAL METHODS

- CU AQUA REGIA DECOMPOSITION / AAS
- PB AQUA REGIA DECOMPOSITION / AAS
- ZN AQUA REGIA DECOMPOSITION / AAS
- AU AQUA REGIA DECOMPOSITION / SOLVENT EXTRACTION / AAS
- HT AU THE WEIGHT OF SAMPLE TAKEN TO ANALYSE FOR GOLD (GEOCKEN)
- AG AQUA REGIA DECOMPOSITION / AAS
- CU(1) ASSAY
- PB(1) ASSAY
- ZN(1) ASSAY
- AU(1) FIRE ASSAY, LEAD COLLECTION / GRAVIMETRIC FINISH
- AU(1) FIRE ASSAY, LEAD COLLECTION / AA FINISH (LOW LEVEL) 1/2 A.T.
- AU(1) FIRE ASSAY, LEAD COLLECTION / GRAVIMETRIC FINISH
- AU(1) FIRE ASSAY, LEAD COLLECTION / AA FINISH (LOW LEVEL) 1/2 A.T.

RJA

TULSEQUAH-WD

TCU-90-22

JOB V 90-0354R

REPORT DATE 21 AUG 1990

LAB NO	FIELD NUMBER	DRILL INTERVAL		Au	Wt Au	Ag	Cu	Zn	Pb
		FROM (METERS) TO	PPM	GRAM	PPM	PPM	PPM	PPM	
R9008071	TCU-90-22	1088.00	1092.00	<10	5	<.4	8	105	<4
R9008072	TCU-90-22	1092.00	1097.00	<10	5	<.4	12	88	6
R9008073	TCU-90-22	1097.00	1102.00	<10	5	<.4	7	86	<4
R9008074	TCU-90-22	1102.00	1107.00	<10	5	<.4	5	121	<4
R9008075	TCU-90-22	1107.00	1112.00	<10	5	<.4	4	88	<4
R9008076	TCU-90-22	1112.00	1115.00	<10	5	<.4	8	60	<4
R9008077	90-CC 65M			<10	5	<.4	26	41	37

I=INSUFFICIENT SAMPLE X=SMALL SAMPLE E=EXCEEDS CALIBRATION C=BEING CHECKED R=REVISED
 IF REQUESTED ANALYSES ARE NOT SHOWN /RESULTS ARE TO FOLLOW

ANALYTICAL METHODS

- AU AQUA REGIA DECOMPOSITION / SOLVENT EXTRACTION / AAS
- WT AU THE WEIGHT OF SAMPLE TAKEN TO ANALYSE FOR GOLD (GEOCHEM)
- AG AQUA REGIA DECOMPOSITION / AAS
- CU AQUA REGIA DECOMPOSITION / AAS
- ZN AQUA REGIA DECOMPOSITION / AAS
- PB AQUA REGIA DECOMPOSITION / AAS

RJA

TULSEQUAH-WD

JOB V 90-0367R
REPORT DATE 1 SEP 1990

LAB NO	FIELD NUMBER	DRILL INTERVAL		Cu PPM	Zn PPM	Pb PPM	Au PPB	Wt Au GRAM	Ag PPM	Au(1) G/T	Au(1) OZ/T
		FROM (METRES)	TO								
R9008398	TCU-90-22	2460.00	2464.00	34	95	5	<10	5	<.4		
R9008399	TCU-90-22	2464.00	2467.00	46	69	14	<10	5	.7		
R9008400	TCU-90-22	2467.00	2469.00	266	97	12	60	5	1.8		
R9008401	TCU-90-22	2469.00	2471.50	43	50	12	<10	5	.7		
R9008402	TCU-90-22	2471.50	2474.00	214	155	8	46	5	1.2		
R9008403	TCU-90-22	2474.00	2478.00	59	139	<4	<10	5	<.4		
R9008404	TCU-90-22	2498.00	2502.00	61	123	<4	<10	5	<.4		
R9008405	TCU-90-22	2502.00	2505.00	10	91	<4	<10	5	<.4		
R9008406	TCU-90-22	2505.00	2509.00	69	91	10	36	5	.6		
R9008407	TCU-90-22	2509.00	2512.00	460	401	49	212	5	2.2		
R9008408	TCU-90-22	2512.00	2516.00	4760	7040	433	1140	5	20.4	1.029	0.030
R9008409	TCU-90-22	2516.00	2519.00	264	318	32	110	5	2		
R9008410	TCU-90-22	2519.00	2524.00	94	184	80	32	5	.6		

I=INSUFFICIENT SAMPLE X=SMALL SAMPLE E=EXCEEDS CALIBRATION C=BEING CHECKED R=REVISED
 IF REQUESTED ANALYSES ARE NOT SHOWN, RESULTS ARE TO FOLLOW

ANALYTICAL METHODS

- Cu AQUA REGIA DECOMPOSITION / AAS
- Zn AQUA REGIA DECOMPOSITION / AAS
- Pb AQUA REGIA DECOMPOSITION / AAS
- Au AQUA REGIA DECOMPOSITION / SOLVENT EXTRACTION / AAS
- Wt Au THE WEIGHT OF SAMPLE TAKEN TO ANALYSE FOR GOLD (GEOCHEM)
- Ag AQUA REGIA DECOMPOSITION / AAS
- Au(1) FIRE ASSAY; LEAD COLLECTION / GRAVIMETRIC FINISH
- Au(1) FIRE ASSAY; LEAD COLLECTION / AA FINISH (LOW LEVEL) 1/2 A.T.

TULSEQUAH-WD

JOB V 90-0419R
REPORT DATE 10 SEP 1990

TCU90-23

LAB NO	FIELD NUMBER	DRILL INTERVAL	Au	Ht Au	Ag	Cu	Zn	Pb	Au(1)	Au(1)	Ag(1)	Ag(1)	Cu(1)	Zn(1)	Pb(1)		
		FROM (METRES) TO	PPM	GRAM	PPM	PPM	PPM	PPM	G/T	OZ/T	G/T	OZ/T	%	%	%		
R9009949	66601	TCU-90-23	2068.00	2072.50	<10	5	<4	15	97	4			0.02	0.02	<0.01		
R9009950	66602	TCU-90-23	2072.50	2080.30	<10	5	<4	13	46	6			<0.01	<0.01	<0.01		
R9009951	66603	TCU-90-23	2080.30	2085.00	<10	5	<4	37	358	27			<0.01	0.07	<0.01		
R9009952	66604	TCU-90-23	2085.00	2090.00	1164	5	66.8	3680	E44400	E17100	2.057	0.060	74.846	2.183	0.40	4.85	1.78
R9009953	66605	TCU-90-23	2090.00	2094.00	1912	5	66.4	6420	E73100	E11600	2.263	0.066	76.081	2.219	0.63	8.35	1.27
R9009954	66606	TCU-90-23	2094.00	2099.00	680	5	12.8	741	9070	1860	0.617	0.018	13.152	0.384	0.10	0.89	0.21
R9009955	66607	TCU-90-23	2099.00	2103.00	E10973	5	E110.0	967	7110	6400	10.172	0.297	114.99	3.354	0.11	0.69	0.65
R9009956	66608	TCU-90-23	2103.00	2106.50	4263	5	47.3	471	1160	2020	3.223	0.094	54.035	1.576	0.05	0.16	0.19
R9009957	66609	TCU-90-23	2106.50	2112.00	3520	5	98.3	5750	E42300	9500	3.840	0.112	107.52	3.136	0.56	4.39	1.14
R9009959	66610	TCU-90-23	2112.00	2115.00	4320	5	E303.5	9410	E148000	E52500	4.937	0.144	300.65	8.769	0.93	14.29	4.53
R9009960	66611	TCU-90-23	2115.00	2118.50	5820	5	E402.5	E13500	E119000	E46400	5.726	0.167	329.74	9.617	1.37	12.44	4.45
R9009961	66612	TCU-90-23	2118.50	2123.00	4260	5	E158	9820	E48300	E9300	4.183	0.122	186.23	5.432	1.07	5.40	1.08
R9009962	66613	TCU-90-23	2123.00	2126.00	300	5	10.3	978	8480	913	0.617	0.018	13.50	0.394	0.13	0.86	0.09
R9009963	66614	TCU-90-23	2126.00	2128.00	180	5	3.0	105	171	208	<0.069	<0.002	3.411	0.099	0.03	0.03	0.02
R9009964	66615	TCU-90-23	2128.00	2132.50	2510	5	E166	9080	E35800	9590	2.720	0.079	191.13	5.575	0.97	3.65	0.93
R9009965	66616	TCU-90-23	2132.50	2137.50	E16640	5	E367	E31300	E13300	3810	10.457	0.305	391.95	11.432	3.43	1.38	0.34
R9009966	66617	TCU-90-23	2137.50	2140.00	9560	5	E377	E65800	9700	E1300	7.863	0.229	427.82	12.478	5.98	0.83	0.10
R9009967	66618	TCU-90-23	2140.00	2145.00	1684	5	E162	E23000	E59000	E12600	2.195	0.064	172.00	5.017	2.24	7.92	1.08
R9009968	66619	TCU-90-23	2145.00	2150.00	1668	5	72.3	E17200	E42200	5430	2.606	0.076	88.890	2.593	1.64	3.95	0.47
R9009969	66620	TCU-90-23	2150.00	2155.00	2000	5	82.9	E15900	E56600	E10500	1.886	0.055	100.11	2.920	1.36	6.07	1.00
R9009970	66621	TCU-90-23	2155.00	2160.00	1582	5	82.1	9900	E54100	E10600	2.880	0.084	101.38	2.957	1.11	7.21	1.15
R9009971	66622	TCU-90-23	2160.00	2163.00	2440	5	E100	9400	E48200	7500	2.640	0.077	118.85	3.466	1.13	5.30	0.78
R9009972	66623	TCU-90-23	2163.00	2166.00	1692	5	98.8	1650	E154000	E44050	4.114	0.120	103.37	3.015	0.19	16.80	3.61
R9009973	66624	TCU-90-23	2166.00	2169.00	2020	5	E145	7360	E60900	7890	3.018	0.088	159.43	4.650	0.77	8.51	0.70
R9009974	66625	TCU-90-23	2169.00	2172.00	1400	5	49.4	7040	E45800	5070	1.715	0.050	60.550	1.766	0.67	4.80	0.59
R9009975	66626	TCU-90-23	2172.00	2174.50	2200	5	E100.3	E34000	E95000	8510	2.660	0.078	128.43	3.746	3.38	9.85	0.88
R9009976	66277	TCU-90-23	2174.50	2178.00	86	5	7.1	1200	532	97			0.15	0.08	<0.01		

I=INSUFFICIENT SAMPLE X=SMALL SAMPLE E=EXCEEDS CALIBRATION C=BEING CHECKED R=REVISED

IF REQUESTED ANALYSES ARE NOT SHOWN, RESULTS ARE TO FOLLOW

ANALYTICAL METHODS

Au AQUA REGIA DECOMPOSITION / SOLVENT EXTRACTION / AAS

Ht Au THE WEIGHT OF SAMPLE TAKEN TO ANALYSE FOR GOLD (GEOCHEM)

Ag AQUA REGIA DECOMPOSITION / AAS

Cu AQUA REGIA DECOMPOSITION / AAS


APPENDIX "D"

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

A F F I D A V I T

I, RANDAL J. AULIS OF THE CITY OF VANCOUVER, IN THE PROVINCE OF BRITISH COLUMBIA,
MAKE OATH AND SAY:

1. THAT I AM EMPLOYED AS A 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 12th DAY OF JULY 1990 AND THE 5th DAY OF SEPTEMBER 1990 FOR THE PURPOSE OF MINERAL EXPLORATION ON THE ABOVE NOTED PROPERTY.



RANDAL J. AULIS

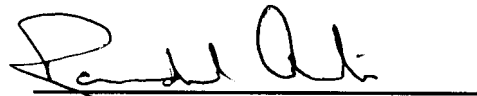
APPENDIX "E"

STATEMENT OF QUALIFICATIONS

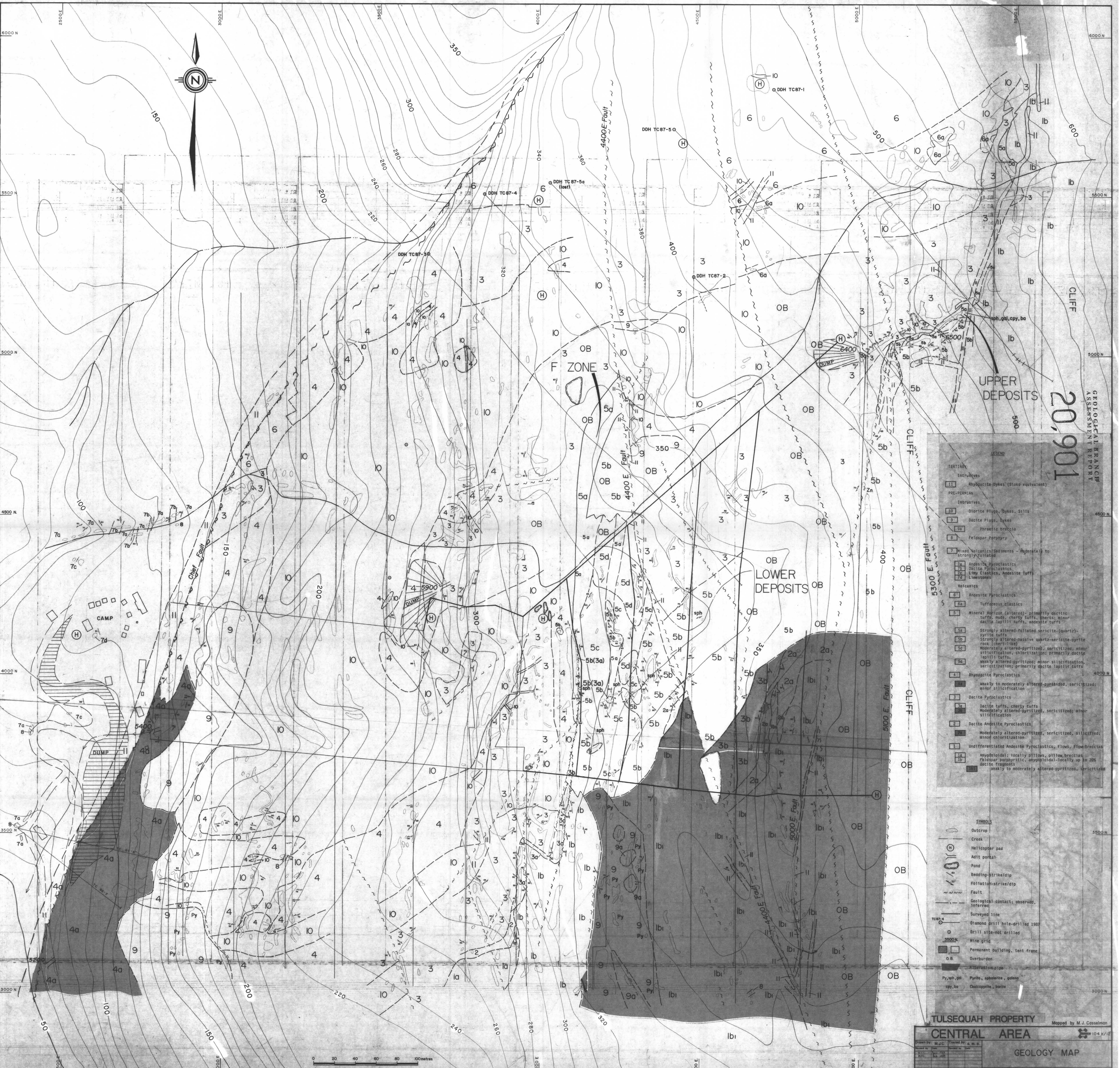
I, RANDAL J. AULIS OF THE CITY OF VANCOUVER, BRITISH COLUMBIA, HEREBY CERTIFY:

1. THAT I GRADUATED WITH A BSc DEGREE IN EARTH SCIENCES FROM THE UNIVERSITY OF WATERLOO IN 1986.
2. THAT I HAVE PRACTICED GEOLOGY WITH COMINCO LTD FROM 1986 TO PRESENT.
3. THAT I AM A GEOLOGIST WITH A BUSINESS ADDRESS AT 700-409 GRANVILLE STREET, VANCOUVER, B.C.

DATED THIS 28th DAY OF JANUARY 1990 AT VANCOUVER, BRITISH COLUMBIA.



RANDAL J. AULIS



20,901
 GEOLOGICAL REPORT
 ASSESSMENT REPORT

LEGEND	
TERTIARY	
11	Intrusives Rhyolite dykes (Stoak equivalents)
PRE-PERMIAN	
Intrusives	
10	Diorite Plugs, Dykes, Sills
9	Dacite Plugs, Dykes
8a	Phreatic breccia
8	Feldspar Porphyry
7	Mixed Volcanics/Sediments - moderately to strongly foliated
Andesite Pyroclastics	
7a	Andesite Pyroclastics
7b	Dacite Pyroclastics
7c	Lamy Clastics, Andesite Tuffs
7d	Limestones
Volcanics	
6	Andesite Pyroclastics
5a	Tuffaceous clastics
5	Mineral horizon (altered) - primarily dacitic tuffs, muds, cherty tuffs, sherts; minor dacite lapilli tuffs, andesite tuffs
5a	Strongly altered-foliated sericite-(quartz)-pyrite tuffs
5b	Strongly altered-massive quartz-sericite-pyrite rock (chert-like)
5c	Moderately altered-pyritized, sericitized, minor silicification, chloritization; primarily dacite lapilli tuffs
5d	Weakly altered-pyritized; minor silicification, sericitization; primarily dacite lapilli tuffs
Rhyolite Pyroclastics	
4	Rhyolite Pyroclastics
3	Weakly to moderately altered-pyritized, sericitized; minor silicification
Dacite Pyroclastics	
3a	Dacite tuffs, cherty tuffs
3b	Moderately altered-pyritized, sericitized; minor silicification
Dacite Andesite Pyroclastics	
2	Moderately altered-pyritized, sericitized, silicified; minor chloritization
Undifferentiated Andesite Pyroclastics, Flows, Flow Breccias	
1a	Amphiboloid; locally pillows, pillow breccias
1b	Feldspar porphyritic, amphiboloid-locally up to 20% dacite fragments
1c	Weakly to moderately altered-pyritized, sericitized

SYMBOLS	
	Outcrop
	Creek
	Helicopter pad
	Adit portal
	Pond
	Bedding-strike/dip
	Foliation-strike/dip
	Fault
	Geological contact: observed, inferred
	Surveyed line
	Diamond drill hole-drilled 1987
	Drill site-not drilled
	Mine grid
	Permanent building, tent frame
	Overburden
	Alteration pipe
	Py, sph, gal Pyrite, sphalerite, galena
	cpy, ba Chalcopyrite, barite

DEPARTURE

20,901

GEOLOGICAL BRANCH
ASSESSMENT REPORT

LEGEND

TERTIARY

9 Sifco rhyolite dyke

PRE-TERMIAN

8 Feldspar porphyry

7 Diorite plugs, dykes

7A Feldspar-porphry diorite(dactite)

6 Dactite intrusive

Volcanics, Sediments

4 Upper andesite volcanics undifferentiated pyroclastics, minor flows

4A Fine-grained tuffaceous sediments

4B Dactite-andesite volcanoclastics

4C Andesite pyroclastics

3 Dactite-rhyolite pyroclastics

3A Weakly-moderately altered, sericite, pyrite 1-5%

2 Mineral Horizon-strongly altered, sericite, pyrite 5-80%

2A Sulphide Zone-pyrite 10-80%, significant cpy, sphal, gal, bar, gyp, Au and Ag

1 Footwall andesite volcanics-pyroclastics

1B Altered andesite volcanics-variable sericite biotite (phlogopite) pyrite 5-25%

2.9/1.3/9.0/5.1/11/53 ft. = %Cu/%Pb/%Zn/oz./t. Ag/oz./t. Au/ft. (true)

Scale 1:1000



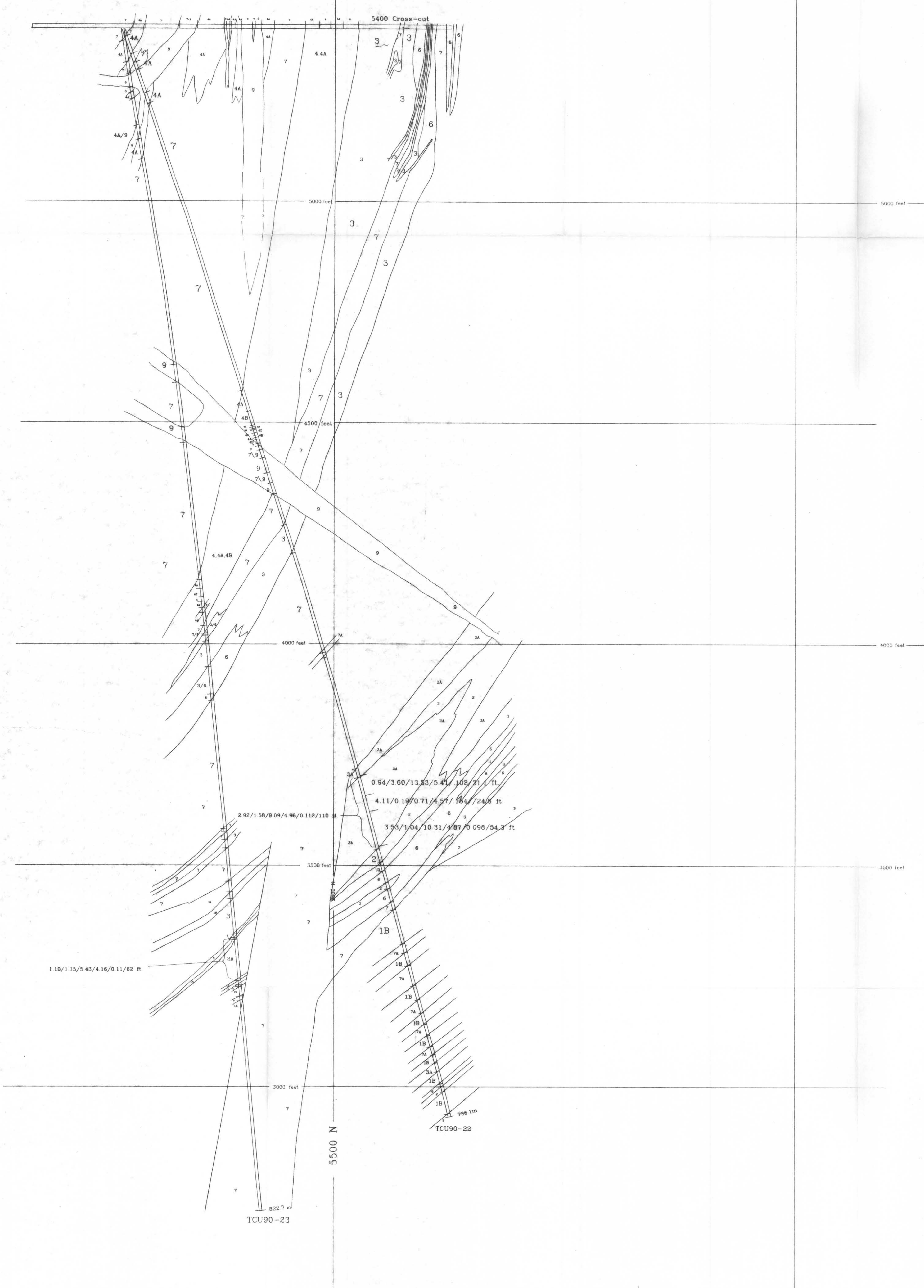
TULSEQUAH CHIEF



Original No.	APR
Revised By	10447/1
Date	10/1989
Scale	1"=83'
Date	Oct. 1989
Plate	90-2

GEOLGY
TCU90-22.23

Scale 1"=83' Date Oct. 1989 Plate 90-2



5500 N

LATITUDE

TCU90-23

TCU90-22

1.10/1.15/5.43/4.16/0.11/62 ft

2.92/1.58/9.09/4.96/0.112/110 ft

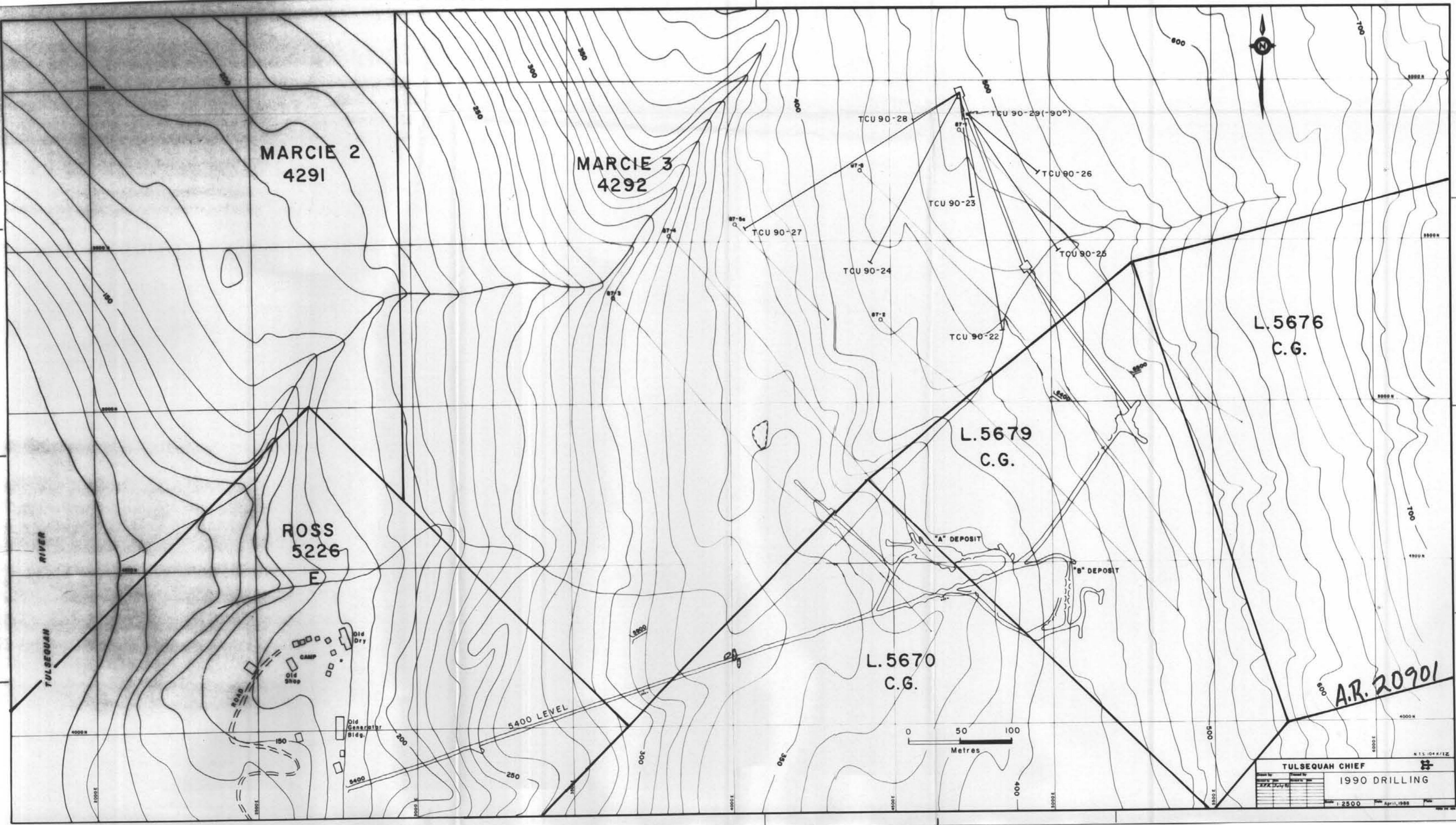
0.94/3.60/13.53/5.41/102/31.1 ft

4.11/0.19/0.71/4.57/184/24.5 ft

3.55/1.04/10.31/4.87/0.098/54.3 ft

786 1m

822.7 m



MARCIE 2
4291

MARCIE 3
4292

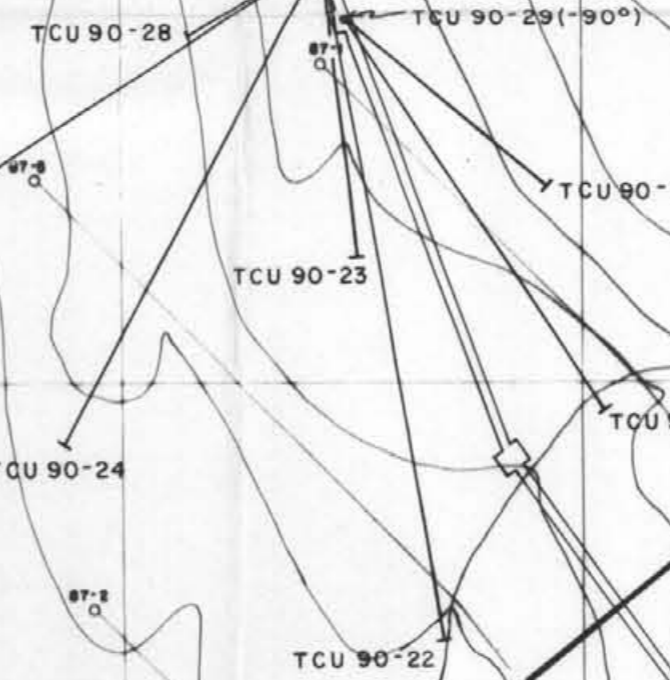
ROSS
5226

L. 5676
C.G.

L. 5679
C.G.

L. 5670
C.G.

A.R. 20901



TULSEQUAH CHIEF	
Drawn by	Checked by
Scale	Date
1990 DRILLING	
Scale 1:2500 Date April, 1988	