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PRELIMINARY ALTERATION STUDIES ON THE SAMATOSUM POLYMETALLIC MASSIVE SULPHIDE DEPOSIT

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Preliminary

Alteration Studies on the Samatosum

Polymetallic Massive Sulphide Deposit.

Adams Lake Area, South - Central

British Columbia

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Abstract

Detailed study pf two drill holes, from the Samatosum deposit,in the Adams Plateau, South - central British Columbia, has revealed both syngenetic and epigenetic styles of alteration.

Alteration mineralogy is dominated by quartz, sericite, chlorite and aragonite.

Alteration overprints due to deformation, metamorphism and four phases of silification are present. This complexity must be considered in analysis of data.

The identification of silicified argillites, previously logged as cherts, and of fault breccias has significant importance the interpretation of ore zone lithologies.

Geochemical trends in drill hole Rg 85 indicate an inverted syngenetic ore zone sequence while trends in hole RG 122 are due to epigenetic quartz veins.

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1.0 GENERAL INTRODUCTION

This paper examines alteration associated with volcanogenic massive sulphide mineralization at the Samatosum Deposit located near the community of Barriere in south - central British Columbia. While limited in its scope this study was designed to provide a practical and useful framework for further studies in the area.

A major object of this study was to identify and compare hydrothermal alteration patterns from two drill holes within the deposit. Comparison of structural hangingwall and footwall alteration facies was also emphasized.

Selected intervals of drill holes RG - 85 and RG - 122 were chosen to represent structural hangingwall, ore horizon and structural footwall lithologies of the deposit. Drill holes were logged and sampled in January of 1989. A total of 25 whole rock geochemical samples and 17 thin section samples were taken for detailed analysis. X-ray diffraction (X.R.D) analysis of specimens also analyzed in thin section helped to identify alteration mineralogy.

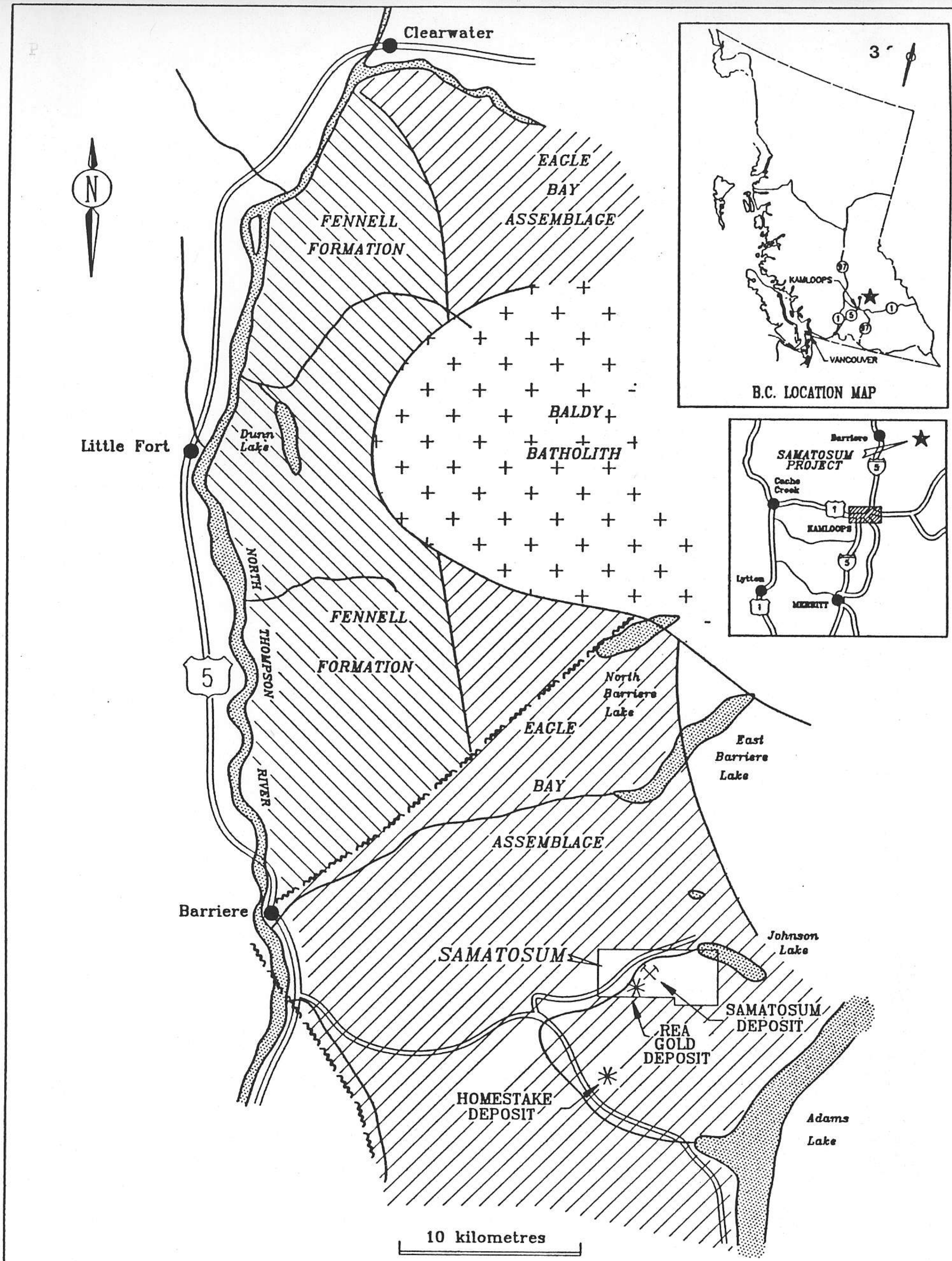
1.1 LOCATION

The Samatosum deposit (MINFILE 82M - 191), located approximately 70 kilometers north east of Kamloops (Fig. 1), British Columbia, is reached by an all weather road that connects the mine site to Highway #5 approximately 3 km south of Barriere. The deposit is situated at approximately 51° 09' 00" N latitude and 120° 59' 00" W longitude on N.T.S map sheet 82M 4/W.

2.0 REGIONAL GEOLOGY (Fig. 1)

The Samatosum deposit is hosted by rocks of the Eagle Bay Assemblage, an allocthonous series of complexly deformed, low grade, metavolcanic and metasedimentary rocks. The Eagle Bay Assemblage occurs along the western margins of the Omineca Crystalline Belt between the Shuswap Metamorphic Complex to the east and rocks of the Intermontane Belt to the west. Devonian to Permian oceanic rocks of the Fennel Formation (Fig. 1) flank the Eagle Bay Assemblage to the north and appear to be tectonically emplaced over the latter (Schiarizza, 1987).

Age determinations on the west side of Adams Lake, within the Eagle Bay Assemblage, range from Early Cambrian to Mississippian (Schiarizza, 1987). However, most volcanogenic deposits in this area--including Samatosum, Rea and Homestake (Fig. 1),-- yield Devonian lead isotope dates (Goutier,1986; A. Andrew, written communication, 1988.).



SAMATOSUM DEPOSIT
LOCATION & REGIONAL GEOLOGY
(AFTER PIRIE 1989)

Figure 1

Deformation and lower greenschist grade metamorphism of the Eagle Bay Assemblage, together with the Fennel Formation, likely occurred during the formation of the Jurra - Cretaceous Columbian Orogeny (Schiarizza, 1987). The development, during this time, of tight to isoclinal folding with coincident southwesterly directed thrust faulting divided the Eagle Bay Assemblage into four imbricate thrust panels (Schiarizza, 1987). Synmetamorphic deformation was followed by the development, during the Cretaceous, of upright, northwest plunging folds associated with the intrusion of the Raft and Baldy batholiths. Other postmetamorphic fabrics are present but do not seriously effect the dominant isoclinal geometry (Schiarizza, 1987).

Faulting in the area consists of Eocene northeast and northerly trending strike slip faults. Late stage vulcanism is represented by Tertiary basalt flows which form discrete outliers in the area.

3.0 GEOLOGY OF THE SAMATOSUM DEPOSIT (Fig. 2)

Stratigraphic units within the Samatosum deposit are inferred to be on the inverted limb of a west verging syncline and the following discussion of stratigraphy is based on this conclusion. However, because of convention, the lack of consistent stratigraphic tops indicators and the association of ore with late crosscutting quartz veins, stratigraphy will be

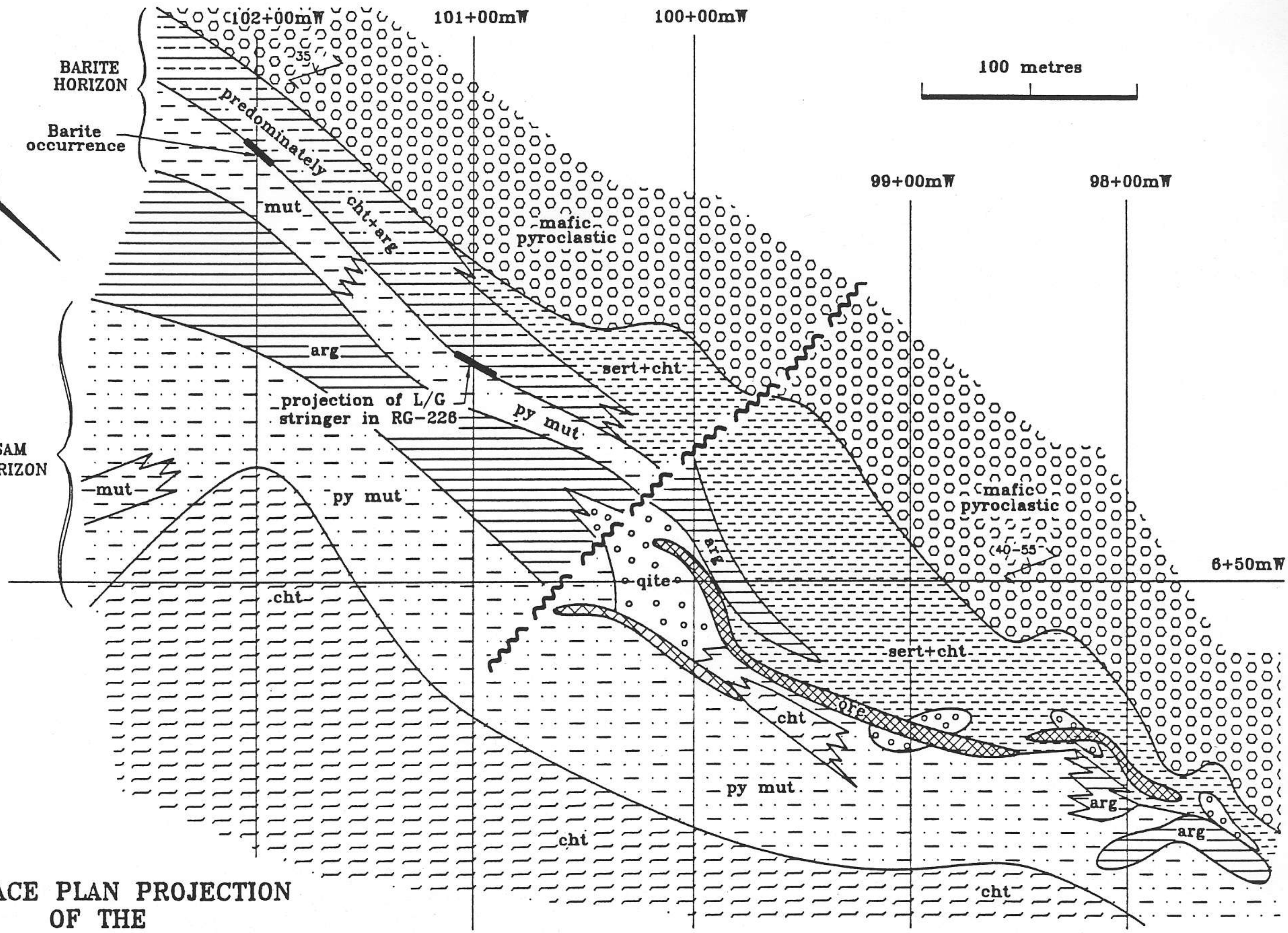


Figure 2

SURFACE PLAN PROJECTION
OF THE
SAMATOSUM DEPOSIT AREA

(AFTER PIRIE 1989)

described elsewhere, in this paper on the basis of structural rather than stratigraphic criteria.

The Samatosum deposit was discovered in 1986 and is presently in the development stage with production scheduled for late 1989. Current reserves are 634 984 Tonnes grading 1035 g/T Ag, 1.9 g/T Au, 1.2% Cu, 3.6% Zn, and 1.7% Pb (Pirie,1989).

The deposit is hosted within an inverted sequence of mafic, pyroclastic volcanics and allocthonous sediments. Massive sulphide deposition likely occurred at the end of the mafic volcanic cycle and appears to be partially interbedded with sediments.

Mafic pyroclastics and tuffs form the stratigraphic footwall (structural hangingwall) to the deposit. Sericitic tuffs conformably overlie the mafic volcanics and are inferred to represent a feeder zone to the deposit. Crosscutting alteration relationships between this unit and the basal mafics have not been recognized (Pirie, 1989).

Massive sulphides are enveloped within the muddy tuff, a term applied to an unusual, grey, homogeneous and otherwise nondescript unit thought to be derived from sediments and tuffaceous components (Pirie, 1989). This unit dominates ore zone stratigraphy and serves as a marker unit. Intercalation of argillites, cherts and wackes occurs within the muddy tuff unit. Localized bands and disseminations of pyrite are also common. A thick sequence of banded cherts covers the stratigraphic footwall to the ore horizon.

Sulphide mineralogy within the deposit consists of pyrite, tetrahedrite, sphalerite, galena and chalcopyrite. Minor phases include electrum, bournonite, gersdorffite, chalcocite, arsenopyrite and covellite. Two sulphide phases, syngenetic and epigenetic, exist within the deposit. The syngenetic phase is supported by the presence of framboidal pyrite outside the economic ore zone (Holder, 1989). Within the economic ore zone, epigenetic, coarse grained sulphides are dominant, often occurring as bands or selveges associated with late crosscutting quartz veins. Epigenetic ore is dominant in the higher areas of the deposit while syngenetic type sulphides dominate deeper levels (Pirie, 1989).

The ore body has a flat tabular shape with a slight southerly plunge and an average thickness of 6 metres.

3.1 GEOLOGY OF OTHER PROXIMAL VOLCANOGENIC DEPOSITS

Two volcanogenic deposits exist within 5 km of the Samatosum Deposit both of which occur on structurally lower horizons within the Eagle Bay Assemblage.

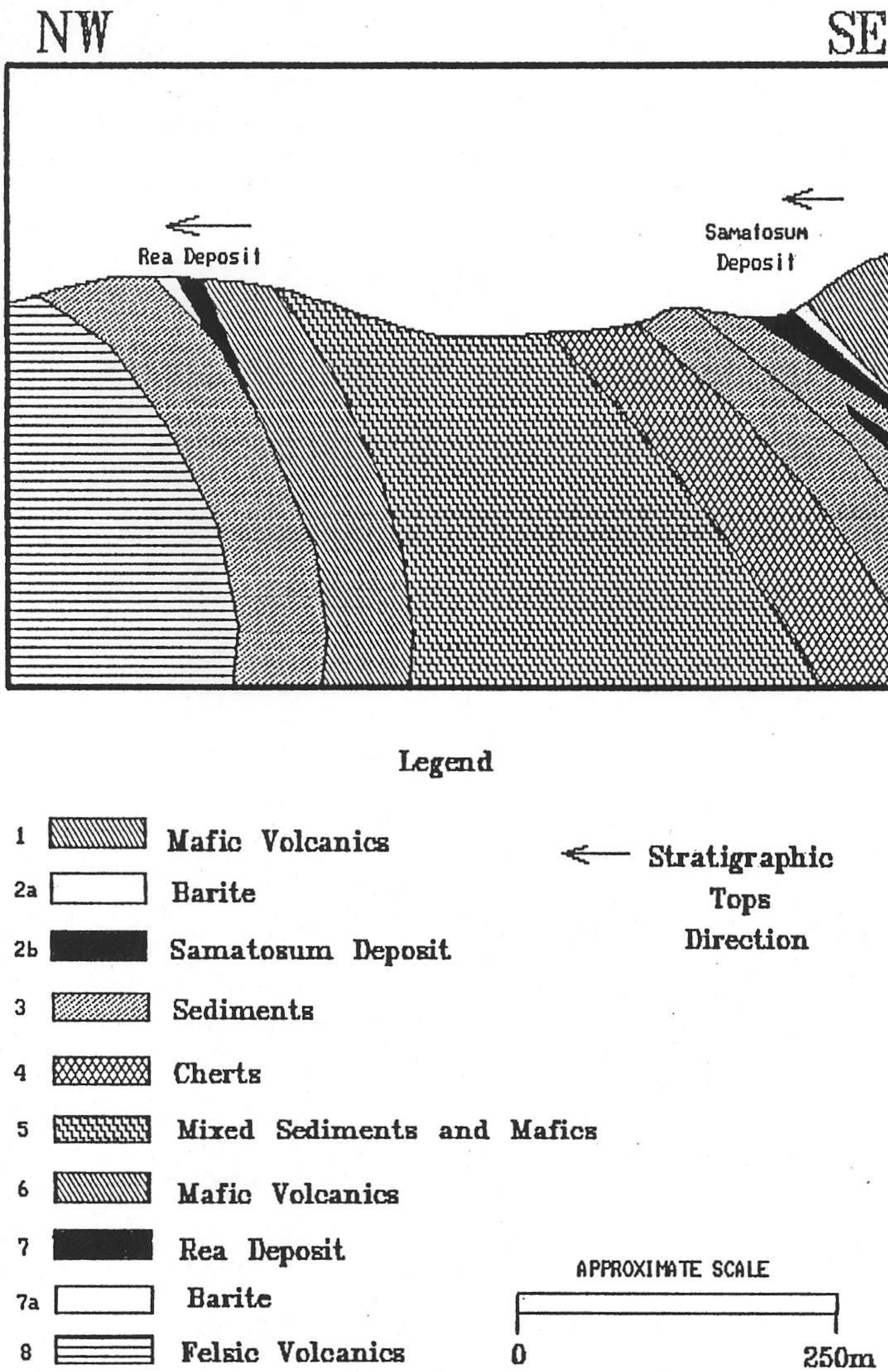


Figure 3 Schematic Cross Section
of the Rea/Samatosum Deposits

The Homestake deposit (Fig. 1), located approximately 5 kilometers south - west of the Samatosum deposit was discovered in the late 1890's and spurred the beginning of exploration in the Eagle Bay Assemblage. This barite hosted Kuroko style massive sulphide deposit was worked, sporadically, until 1983. The deposit is hosted within a sequence of felsic, quartz - sericite schists, chlorite schists and minor intercalated bands of carbonaceous shales. Reserve estimates vary for the deposit but 1 000 000 tonnes grading 200 g/T Ag, 2.5 % Pb, 4 % Zn, 0.5% Cu and 28% barite are possible (Schiarizza, 1987).

The Rea deposit (Fig, 1), located approximately 700 m west of the Samatosum deposit, in a structurally lower horizon (Fig. 3), consists of three sulphide lenses within an inverted sequence of mafic pyroclastic volcanics. Barite is present in the deposits within the stratigraphic hangingwall while pyritic/chloritic/siliceous stringer zones within the stratigraphic footwall may represent feeder systems. The sulphide deposits are stratigraphically overlain by a series of turbiditic shales, greywackes and chert pebble conglomerates. Reserves within the Rea lenses are approximately 150,000 Tonnes of arsenical ore grading 0.21 oz/t Au, 2.5 oz/t Ag, 2.5% Pb, 2.6% Zn, and 0.6% Cu.

Genetic relations between the Rea and Samatosum deposits are at this time uncertain. The proximity of the deposits indicates either a structurally stacked sequence or two separate, time stratigraphic, productive horizons (Fig. 3). Stratigraphic and metallurgical comparisons between the two deposits certainly supports the latter assumption. However, consideration of the large structural shortening associated with isoclinal folding, allows the interpretation that both are distal equivalents which have been structurally juxtaposed over one another.

The presence of barite and the close association with mafic pyroclastic volcanics in both the Rea and Samatosum deposits are considered significant exploration parameters.

4.0 DATA COLLECTION METHODS

Two diamond drill holes were selected to represent possible syngenetic and epigenetic types of sulphides. Hole RG 85 contained fine grained, banded and fragmental, massive sulphides with grades below the economic cutoff. Hole RG 122 contained numerous quartz veins and ore grade intervals. Geologic intervals within drill holes were chosen to represent ore horizon lithology and potential alteration changes. Width of intervals were also selected with consideration of the scope of the project. Drill logs and sections are found in Figures 4 a,b and 5 a,b. The object of the study was to compare vertical alteration patterns within the stratigraphic footwall and hangingwall of each hole.

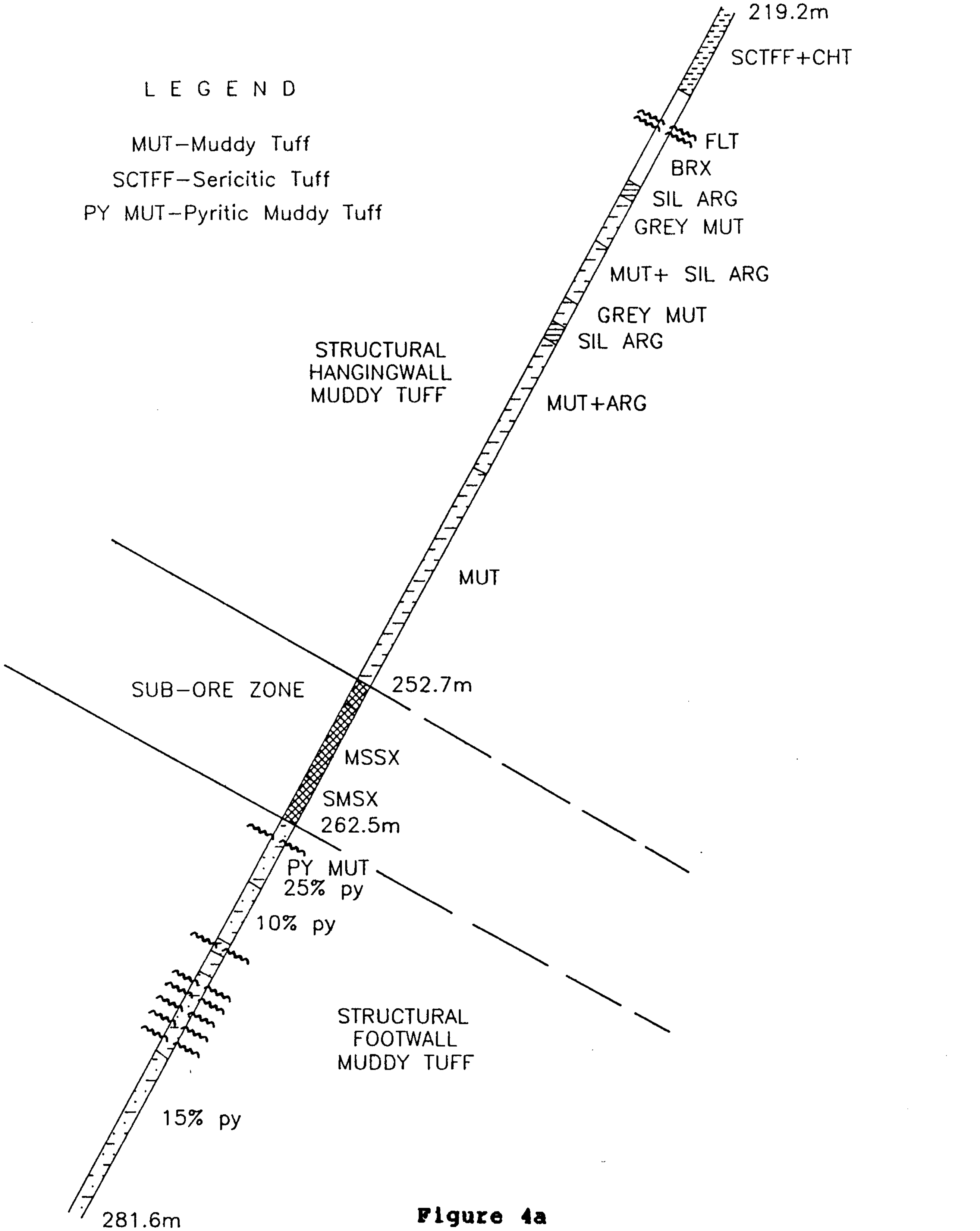


Figure 4a

RG–85 ORE ZONE
(219.2M to 281.6m)
GEOLOGY
LOOKING NORTH EAST

SCALE: 1:250

Summary Log

DDH RG 85

Hole size: NQ **Dip: -62**

from to	rock type	colour	grain size	texture and structure	alteration	sulphides
219.2 223.3	Sericitic Tuff	pale green	f.g.	strongly laminated with white chert folded w. axial planar shears and crenulations. chert increases at base.	strong sericite pervasive	Py bands m.g. paralell to foliation 5 -7%
223.3 252.7	Muddy Tuff	black to grey	f.g.	Phyllitic. chaotic and broken beds siliceous,grey and black shales 224.9 - 225.8 fault 223.3 - 227.8 fault early,rehealed,flattened qz frags. 228.3 - 228.6 silicified argillite Generally finely intercalated sequences	moderate sericite silica stringers	Py 2 - 10% bands 1 -4 cm m.g Py laminae in grey beds
252.7 256.6	Semi Massive sulphides	grey to metallic yellow	f.g. to m.g.	Fine grained lesser fragments siliceous mtx.	mod sericite	50% py 5% sph 1% Gn 1% tt
256.6 260	massive sulphides	yellow	m.g.	very competant weak banding // foln.	minor qz veins	80% py 5% gn 10% spl 2% cpy 2% tt
260 262.5	Semi massive sulphides	yellow	m.g.	weakly phyllitic	mod sericite	
262.5 281.6	Pyritic Muddy Tuff	grey	f.g.	phyllitic. sulphide laminae 5 - 10 cm wide. generally homogenous 262.5 - 263.6 fault 268.2 - 268.6 fault 269.8 - 274.4 fault	5 - 10 % sericite pre and post defm. qz veins	10 - 20% fg.diss. Py. tr. gn,tt tt,gn,spl

Figure 4b

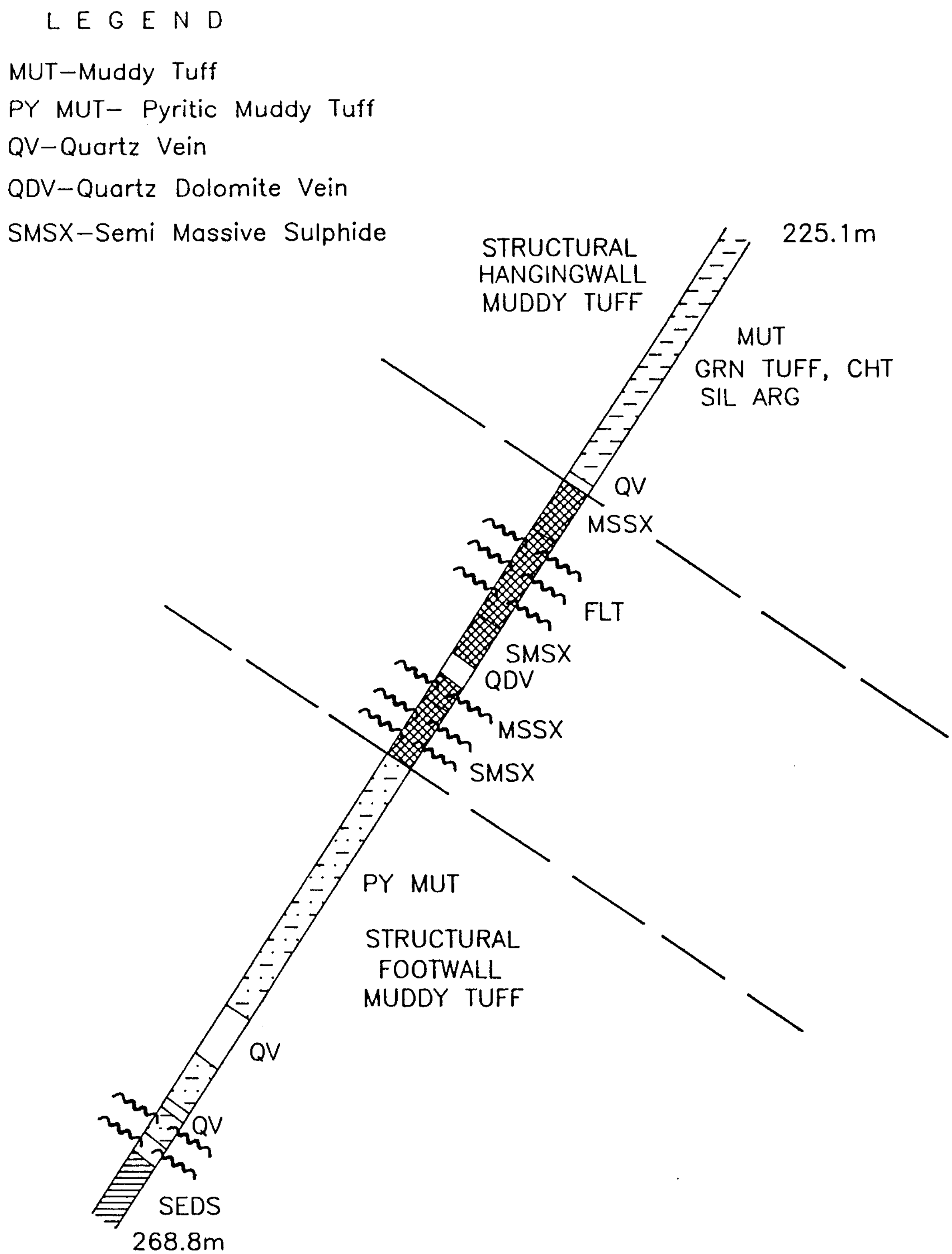


Figure 5a

RG–122 ORE ZONE
(225.1m to 268.8m)
GEOLOGY
LOOKING NORTH EAST
SCALE: 1:250

Summary Log

DDH RG 122

Hole size: NQ Dip: -55

from to	rock type	colour	grain size	texture and structure	alteration	sulphides
225.1 236.4	Muddy Tuff	black and pale green	f.g.	interbedded black carbonaceous shales and green tuffs finely laminated and foliated Qz veins 15% 236.0 - 236.4 Qz vein	moderate sericite pervasive strong sericite	Py 2 -3 % f.g. banded sub// foln. also porphyroblasts 5 -7%
236.4 241.8	Ore zone Massive sulphides	metallic grey and yellow	f.g.	Fragmental or flaser textures 25% siliceous gangue 238.2 - 241.8 fault 241.8 - 243.5 semi massive sulphides 243.5 - 244.2 qz - dolomite vein 244.2 - 245.1 massive sulphides 245.1 - 247.8 semi massive sulphides intense gouge at base	sericitic intervals strong sericite strong sericite	Py 70% f.g. Cpy 10% f.g.whisps Tt 10% f.g. diss. Sph 5% brown f.g. Gn 5% f.g. stringers
247.8 264.3	Muddy Tuff	grey	f.g.	Siliceous,pyritic laminae and flasers homogenous mtx. 258.7 - 260.8 Qz vein 263.2 - 263.8 Qz vein ribbon text.	moderate sericite	Py 5 - 20% fg. bands and diss. trace Tt
264.3 268.8	Argillite and Wacke	black to grey	m.g. to f.g.	laminated interbedded repeating sequences 264.3 - 264.5 fault 268.1 - 268.3 fault	pervasive Qz stringers	pyritic near top 5% f.g.bands

Figure 5b

4.1 SAMPLING METHODS

Lithogeochemical samples were taken over intervals of 1.1 to 3.3 metres according to abundance of material and width of lithologies. Where possible continuous sample strings were selected. Ore zones and intense fault gouges were avoided if possible and large quartz veins were not sampled. However, pervasive quartz stringers impossible to separate from the surrounding host were included. A total of 25 samples, including 4 duplicates, were analyzed for the study (Table 1).

XRD and thin section samples were taken, where possible, at coincident intervals to whole rock samples. Samples were chosen to reflect textural and mineralogical characteristics of respective lithologies (Table 1).

4.2 ANALYTICAL METHODS

A combination of optical, geochemical and X - ray analyses were used for the study.

4.2.1 LITHOGEOCHEMICAL ANALYSIS

Whole rock geochemical samples were sent to Min-En Analytical Laboratories Ltd. of North Vancouver, B.C.. A standard fusion process with induced coupled plasma finish was applied for all major elements. Au was determined by wet geochemistry while aqua-regia digestion with an ICP finish method

TABLE 1

LITHOGEOCHEMICAL AND THIN SECTION SAMPLES

DDH RG 85 | DDH RG 122

SAMPLE	FROM(m)	TO(m)	UNIT	THIN SECTION	SAMPLE	FROM(m)	TO(m)	UNIT	THIN SECTION
11864	219.2	222.2	SERICITIC TUFF	TSSC9	11851	225.1	228.1	MUDDY TUFF	TSSC1
11865	222.2	223.3	SERICITIC TUFF	TSSC10	11852	228.1	231.1	MUDDY TUFF	
11866	219.2	222.2	DUPLICATE		11853	231.1	233	MUDDY TUFF	TSSC2
11867	226.3	227.8	MUDDY TUFF(FLT.)	TSSC11	11854	233	234.9	MUDDY TUFF	TSSC3
11868	234.6	235.3	SIL. ARG.	TSSC12	11855	234.9	236.4	MUDDY TUFF	TSSC4
11869	237.1	240.1	MUDDY TUFF	TSSC13	11856	245.2	247.8	ORE ZONE	
11870	250.1	252.7	MUDDY TUFF	TSSC14	11857	247.8	251.1	MUDDY TUFF	
11871	262.5	265	MUDDY TUFF		11858	251.1	254.3	MUDDY TUFF	
11872	265	267.5	MUDDY TUFF	TSSC16	11859	254.3	258.2	MUDDY TUFF	TSSC5
11873	265	267.5	DUPLICATE		11860	254.3	258.2	DUPLICATE	
11874	274.2	275.6	MUDDY TUFF		11861	260.8	263	MUDDY TUFF	TSSC6 + 7
11875	278.7	281.2	MUDDY TUFF	TSSC17	11862	260.8	263	DUPLICATE	
					11863	266	268.8	WACKE	TSSC8

was used for other trace elements. Duplicate samples were checked for consistency and averaged.

4.2.2 THIN SECTION ANALYSIS

Thin section samples were cut perpendicular to foliation and ground to standard thickness. Hand samples were taken to observe macroscopic textures. Modal mineralogy and textures are detailed in Appendix 2.

4.2.3 XRD ANALYSIS

Small chips were crushed and water mounts were prepared following the procedure outlined by Godwin in Appendix 4.

Mounted samples were X-rayed using Cu radiation, with a scanning speed of 2 degrees two theta per minute. Slides were scanned from 2 degrees to 37 degrees two theta. Charts for unknown minerals were compared against known standards for identification of clay minerals.

4.3 CIPW NORMS

Normative mineralogy was calculated using PETCAL, a BASIC language computer program for PETrologic CALculations which is distributed by the Nevada Bureau of Mines and Geology. Complete data sets are included in Appendix 3.

5.0 INTERPRETATION OF DATA

All analysis were compiled in tables and graphed where appropriate.

5.1 XRD MINERALOGY (TABLES 2 AND 3)

XRD analysis for clay minerals revealed the presence of sericite (muscovite), quartz and potassium feldspar in all samples.

Chlorite and albite are absent in the structural footwall of RG 85 while present in the hanging wall.

Aragonite is present in all lithologies except for the silicified argillites of sample 11868.

Sediments in the structural footwall of RG 122 were notably absent in albite.

5.2 NORMATIVE MINERALOGY

All samples except 11851 display high amounts of normative quartz and are within rhyolite fields (O'Connor, 1965). Silification caused by multiple episodes of quartz and quartz

T .E 2

MINERALOGY

Litho Geochem. sample	HANGINGWALL RG 85 11864	11865	11867	11868	11869	11870	HANGINGWALL RG 122 11851	11852	11853	11854	11855
Thin section sample	TSSC9 ScTff	TSSC10 ScTff Cht	TSSC11 Mut Flt	TSSC12 Sil Arg	TSSC13 Mut	TSSC14 Mut	TSSC1 Mut		TSSC2 Mut	TSSC3 Mut	TSSC4 Mut
X.R.D. mineralogy											
MU	*	*	*	*	*	*	*		*	*	*
CL		*	*	*	*	*			*	*	
AB	*	*	*	*		*	*				
KF	*	*	*	*		*	*		*	*	*
ARAG	*	*	*		*	*	*		*	*	
QZ	*	*	*	*	*	*	*		*	*	*
CIPW NORMS											
QZ	50.14	63.37	46.56	75.02	71.18	63.4	18.51	42.72	40.09	40.71	35.01
C	9.15	5.87	4.87	2.93	2.69	5.09	2.98	12.95	10.17	13.9	13.84
OR	16.96	10.7	9.34	6.86	6.38	6.14	22.52	20.63	16.55	21.1	21
AB	4.65	2.96	4.48	1.18	1.18	5.58	0.68	0.51	0.17	0.59	0.34
AN	0.8	0.65	7.78	2.19	2.19	0.28	25.97	1.12	5.73	0.58	2.66
HY	6.38	4.78	11.51	3.09	3.09	5.41	15.56	11.62	14.19	11.63	14
MT	8	7.13	9.26	4.31	4	9.27	9.42	8.79	11.12	9.35	10.22
IL	1.06	0.66	0.9	0.49	0.49	0.38	1.67	1.54	1.88	1.71	2.17
AP	0.07	0.07	0.09	0.28	0.28	0.09	0.02	0.02	0.02	0.02	2.37
MODAL mineralogy											
Sc	40	35	5	5	20	20	25		20	25	20
Qz	40	55	40	50	60	60	50		30	35	60
Arag			5						5	5	
Chl									5	15	
Bi			20	20	5		10		25	5	
Rutile				2	2	2				1	
Opaques			5	15	5		10		15		
Sulphides	7	10	10	5	7	10	3		5	5	20

TABLE 3

MINERALOGY

FOOTWALL RG 85 | **FOOTWALL RG 122**

Litho Geochem. sample	11871	11872 11873	11874	11875	11856	11857	11858	11859 11860	11861 11862		11863
Thin section sample		TSSC16 Mut		TSSC17 Mut				TSSC5 Mut	TSSC6 Mut	TSSC7 Arg	TSSC8 Wcke
X.R.D. mineralogy											
MU		*		*				*	*	*	*
CL								*			*
AB									*		
KF		*		*				*	*	*	*
ARAG				*				*	*	*	*
QZ		*		*				*	*	*	*
CIPW NORMS											
QZ	41.27	44.15	46.35	39.64	41.42	49.96	56.87	55.31	37.03	67.3	40.71
C	9.81	9	8.68	11.58	8.3	8.18	7.61	8.53	9.6	3.63	13.9
OR	16.9	17.97	18.74	25.47	16.14	17.55	16.31	18.56	20.51	8.69	21.1
AB	4.23	3.97	2.45	3.38	1.27	1.69	1.6	1.69	2.03	0.76	0.59
AN		0.53	0.38	0.2	1.67	1.47	0.82	8.35	0.23	6.13	0.58
HY	8.96	7.49	7.12	3.32	7.56	5.72	4.53	4.37	9.08	6.25	11.63
MT	14	12.69	12.35	10.54	13.05	9.22	7.14	7.03	16.07	5.23	9.35
IL	0.09	0.95	0.91	1.15	1.1	0.8	0.78	0.87	1.19	0.68	1.71
AP	0.94	0.09	0.09	0.07	0.02	0.02	0.02	0.02	0.02	0.02	0.02
MODAL mineralogy											
Sc		20		15				20	10	15	15
Qz		45		60				45	40	40	60
Arag											5
Chl								15			
Bi								5	5	10	15
Rutile		2								2	
Opaques										20	
Sulphides		20		25				10	30	10	5

carbonate veining is the likely source of excess normative quartz. Extremely variable percentages of SiO_2 in mudrocks, ranging from 11 to 84 percent (Blatt, Middleton and Murray, 1980) may also explain the high amounts of quartz present. Abnormal quartz and orthoclase values in samples 11851 are likely caused by late stage carbonate stringers.

RG 122 displays a distinct lack of normative albite compared to RG 85. High levels of normative quartz are present in the hangingwall of RG 85 compared to footwall lithologies.

Abnormal quartz content exists in all samples however values are extremely high in the hangingwall of RG 85. This is attributable to one or more stages of silification. None of the samples display normative mineralogy comparable to average, unaltered, major rock types (Best, 1982).

5.3 THIN SECTION STUDY

Thin section analysis yielded a variety of textural and mineralogical changes within lithologic units.

5.3.1 MINERALOGY

The following notes describe major minerals observed.

QUARTZ - Fine grained, microcystalline in all samples except wackes (Plate 3.9) and fault breccias where coarse (>1mm), flattened, quartz vein fragments were identified. Commonly occurs in fine grained bands, flasers (<.3mm) and in pressure shadows around porphyroblastic pyrite (Plate 3.11).

SERICITE Defines foliation in all sections. High amounts of a pale green variety exist within the sericitic tuff unit. A silvery grey variety is common in sediments and the muddy tuff.

ARAGONITE is present in the hangingwall of RG 122 and in fault breccia (TSSC 11) and wacke (TSSC 8). Slightly curved twin lamellae indicate minor, probably post folding, strain.

CHLORITE is Mg-Fe rich and shows apparent cross cutting relationships in TSSC 3 (Plate 3.8). It is very fine grained along surfaces of foliation.

BIOTITE is present in argillite and wacke and minor amounts in Muddy Tuff.

RUTILE is red in thin section. It occurs in minor amounts in sediments and Muddy Tuff (Plate 3.12). It possibly occurs as a hydrothermal replacement of ilmenite.

5.3.2 TEXTURES

The notes that follow describe dominant textures.

Penetrative axial planar foliation dominates all lithologies.

Tight to isoclinal parasitic folds are noted within the sericitic tuffs (Plate 3.2) and within the Muddy Tuff (Plate 3.4) of RG 122. Analysis of folds infers antiformal east verging closure up hole and to the east. Micro - folds were not apparent close to the ore zone.

Flaser textures (Plate 3.10) and S-C fabric (Plate 3.11) indicate late stage shearing. This may be reflected in a reduction of grain size in some of the quartz rich rocks.

5.3.3 SILICIFICATION

Four phases of silification are recognized within thin sections and hand samples from the ore zone.

PHASE 1 - Pre - metamorphic, minute (<.1mm), quartz stringers are possibly associated with a feeder zone and are cut by foliation.

PHASE 2 - Pre isoclinal folding veins occur as ptygmatic quartz veins and stringers (Plates 3.5,3.6).

PHASE 3 - Post - isoclinal folding bull quartz veining. Cross - cuts foliation at moderate to low angles (Plate 3.7). It is associated with epigenetic ore grade sulphides. This phase is highly fractured and open space textures were not apparent. A mesothermal origin is proposed.

PHASE 3 - Quartz-dolomite veins display intense wallrock alteration that overprints all metamorphic fabrics. Open space textures indicate a higher level origins for this event.

5.3.4 PROTOLITHOLOGY

Many ambiguities persist in the analysis of textures and mineralogy with respect to protolithology.

SERICITIC TUFFS - The fine grained laminae, absence of chlorite, opaques and biotite indicates a probable dacitic water lain tuff. "Chert" bands may be due to compositional segregation or primary chert laminae recrystallized to a larger (at least microcrystalline) grain size during metamorphism. Vitroclastic textures are not apparent.

MUDDY TUFF - The exact genesis of the muddy tuff remains obscure. This unit consists of fine grained layers and flasers of quartz and sericite. Bands of fine grained sulphides give the unit its distinct grey colour. Minor amounts of biotite, rutile and carbon may infer a partial sedimentary origin. Drill hole geology indicates an active cycle of allochthonous sediment deposition during muddy tuff deposition. Association of this unit with massive sulphides suggests a synchronous deposition of both cherty, tuffaceous and continentally derived sediments during an exhalative event. Thick (>15m), homogenous sequences were apparent in the footwalls of both drill holes. Hangingwall sequences were finely interbedded with allocthonous sediments and green tuffs.

SILICIFIED ARGILLITES - This unit can be easily mistaken for black chert. Thin section analysis revealed the presence of up to 15% quartz stringers (Plate 3.7).

TECTONIC BRECCIA - This unit can be easily mistaken for debris flows. However, broken foliation, S-C fabric, and large (.5cm to

TABLE 4

SAMATOSUM DEPOSIT - LITHOGEOCHEMISTRY

HANGING WALL RG 85 | HANGINGWALL RG 122

SAMPLE	11864	11865	11867	11868	11869	11870	11851	11852	11853	11854	11855
UNIT	11866 ScTff	ScTff Cht	Mut Flt	Sil Arg	Mut	Mut	Mut	Mut	Mut	Mut	Mut
MAJOR OXIDES %											
Al2O3	13.46	8.64	10.3	5.23	4.89	7.41	16.76	17.24	15.34	18.09	18.72
Ba	0.098	0.068	0.07	0.081	0.075	0.12	0.564	0.51	0.45	0.672	0.802
CaO	0.2	0.17	1.62	0.62	0.6	0.11	5.25	0.24	1.17	0.13	0.55
Fe2O3	5.52	4.92	6.39	2.97	2.76	6.4	6.5	6.06	7.67	6.45	7.05
K2O	2.87	1.81	1.58	1.16	1.08	1.04	3.81	3.49	2.8	3.57	3.55
MgO	1.09	0.54	2.7	0.51	0.5	0.22	4.59	3.18	3.75	3.14	4.04
MnO2	0.07	0.03	0.26	0.03	0.03	0.01	0.22	0.08	0.19	0.07	0.08
Na2O	0.55	0.35	0.53	0.14	0.14	0.66	0.08	0.06	0.02	0.07	0.04
P2O5	0.03	0.03	0.04	0.13	0.12	0.04	0.01	0.01	0.01	0.01	0.01
SiO2	67.97	75	65.26	82.91	79.37	73.89	53.5	63.35	61.21	61.46	57.81
Sr	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01
TiO2	0.56	0.35	0.47	0.27	0.26	0.2	0.88	0.81	0.99	0.9	1.14
Zr	0.005	0.005	0.005	0.005	0.005	0.005	0.01	0.008	0.009	0.008	0.011
S	4.68	4.78	5.9	2.75	7.3	6.8	2.93	0.71	1.16	1.13	1.35
TOTAL	97.09	96.99	95.14	96.81	97.13	96.92	95.11	95.74	94.76	95.72	95.15
TRACE ELEMENT PPM											
AG	0.8	1.4	2.4	25.14	1.6	19.1	2.2	0.9	0.8	1	2.1
AS	118	90	54	241	91	430	36	34	41	34	59
BA	72	62	94	140	69	118	164	216	265	431	349
CU	93	60	111	1413	106	1292	86	22	29	86	39
PB	35	529	360	575	143	3098	33	19	12	16	20
SB	19	33	55	729	50	477	5	1	2	1	1
ZN	60	1091	88	1477	32	3410	81	97	108	100	124
TIO2-PPM	5600	3500	4700	2700	2600	2000	8800	8100	9900	9000	11400
NB	6	4	5	1	5	3	14	11	11	9	11
Y	18	8	15	10	19	14	26	20	22	18	2
ZR-PPM	29	1	16	3	55	44	77	60	66	60	79
AU-PPB	18	5	5	15	5	85	35	10	5	10	10

NOTE: DUPLICATE SAMPLES AVERAGED

FOOTWALL RG 85 | FOOTWALL RG 122

SAMPLE	11871	11872	11874	11875		11856	11857	11858	11859	11861	11863
UNIT	MUT	11873 MUT	MUT	MUT		SmSX	MUT	MUT	11860 MUT	11862 MUT	MUT
MAJOR OXIDES %											
Al2O3	12.96	13.26	12.73	16.98		12.12	12.26	11.22	12.29	13.84	7.62
Ba	0.184	0.185	0.153	0.194		1.019	0.744	0.389	0.298	0.317	0.176
CaO	0.10	0.16	0.13	0.08		0.35	0.31	0.18	0.03	0.06	1.25
Fe2O3	9.65	8.75	8.52	7.27		9	6.36	4.93	4.85	11.09	3.61
K2O	2.86	3.04	3.17	4.31		2.73	2.97	2.76	3.14	3.47	1.47
MgO	0.50	0.49	0.41	0.47		0.5	0.5	0.48	0.48	0.46	1.53
MnO2	0.02	0.01	0.01	0.03		0.01	0.02	0.02	0.02	0.01	0.08
Na2O	0.50	0.47	0.29	0.4		0.15	0.2	0.19	0.2	0.24	0.09
P2O5	0.40	0.04	0.04	0.03		0.01	0.01	0.01	0.01	0.01	0.01
SiO2	58.47	62.34	63.74	60.24		57.09	65.92	71.14	70.7	56.12	79.51
Sr	0.02	0.01	0.01	0.01		0.01	0.01	0.01	0.01	0.01	0.01
TiO2	0.05	0.5	0.48	0.61		0.58	0.42	0.41	0.46	0.63	0.36
Zr	0.006	0.005	0.005	0.008		0.005	0.005	0.005	0.005	0.007	0.009
S	11.53	8.4	7.9	7.1		9.16	7.2	5.64	5.18	11.13	0.18
TOTAL	97.28	97.66	97.59	97.73		92.7	96.9	97.38	96.65	97.34	95.87
TRACE ELEMENT PPM											
AG	1.9	5.4	1.8	2.4		86	15.4	7.9	9.1	118.5	1.3
AS	152	156	145	173		1	137	133	130	237	75
BA	118	114	129	141		129	246	301	208	122	316
CU	28	216	16	59		839	280	175	193	494	15
PB	418	360	141	82		20850	2356	552	191	1176	32
SB	16	87	9	23		341	140	99	98	257	6
ZN	798	268	34	37		27796	3362	1346	164	1622	52
TIO2-PPM	500	5000	4800	6100		5800	42300	4100	4600	6300	3600
NB	5	4	4	6		6	3	1	1	4	1
Y	8	9	7	9		12	11	8	8	9	12
ZR-PPM	36	29	22	56		34	15	20	13	56	62
AU-PPB	68	60	150	325		495	210	85	88	345	10

NOTE: DUPLICATE SAMPLES AVERAGED

2 cm) quartz vein fragments indicates a post isoclinal folding, origin for these zones.

5.4 LITHOGEOCHEMISTRY

Results of whole rock analysis were divided between footwall and hangingwall lithologies and compiled (Table 4).

Graphs of most major elements and trace elements were produced to match results to respective lithology and to facilite visualization of vertical zonation. Legends for summarized drill hole geology are provided in Figures 6 and 7.

The terms enrichment and depletion as used in the following discussion reflect empirical treatment of data and are not based on statistical methods. Statistics were not applied because of the small number of samples taken.

5.4.1 MAJOR OXIDES (Figs. 8 to 12)

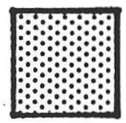
Two distinctly different major element trends are apparent in RG 85 and RG 122.

Oxide trends in RG 85 display trends more likely to appear in an upright sequence. K_2O, Al_2O_3, Ba% and iron are enriched in the structural footwall (stratigraphic hangingwall). These

LEGEND

DDH RG 85

Sericitic Tuff
strongly sheared. White chert
laminae increase towards
base.



Hangingwall Muddy Tuff
Interbedded Grey siliceous
and Black silicified, carbonaceous shales
Py 5 - 15%, 1cm laminae,
bands, and flasers.

Ore Zone.
Sub - economic
50 - 70 % pyrite
1 - 2% Cpy
5% Gn bands 1 to 10 mm.
7% Sph. fg. yellow

Footwall Muddy Tuff
Homogenous,grey,siliceous.
Intense faulting
minor Qz veins at base
Pyrite 5 - 25%, bands and
dissemenated.

Figure 6

LEGEND

DDH RG 122

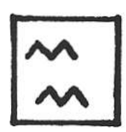
Hangingwall Muddy Tuff
Intercalated Black,carbonaceous
shales, green sericitic tuffs
and black cherts
M - folds.
Qz vein at base

Ore Zone
Semi massive to
massive sulphides.
Frags. or flasers
60% fg.Py
10% Cpy
10% TT
5% Sph.
Qz dolomite veins

Footwall Muddy Tuff
Homogenous, grey, siliceous.
sericitic bands and flasers
of fg. Qz.
Qz veins
Py 3 - 10%

Argillite and Wacke
Interbedded,carbonaceous.
Py rich flasers.
minor Qz -Carb. stringers.

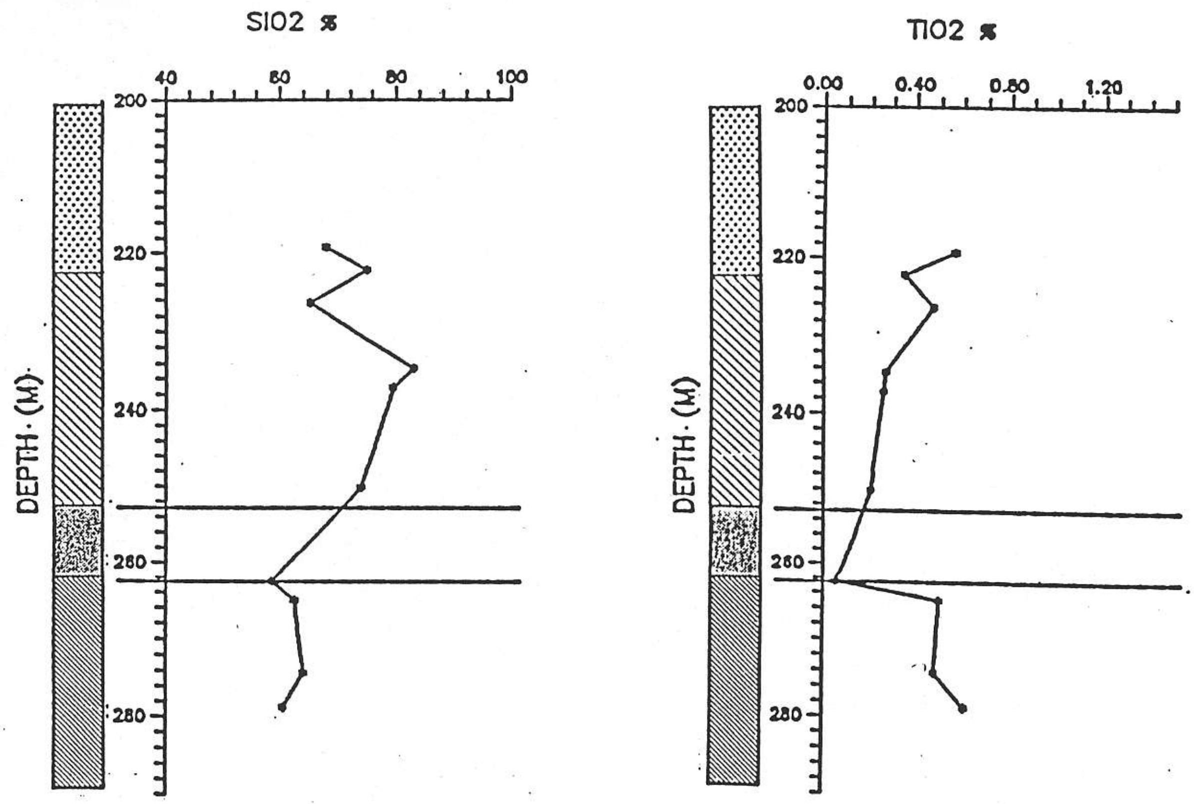
Fault



Quartz vein

Figure 7

DDH RG 85



DDH RG 122

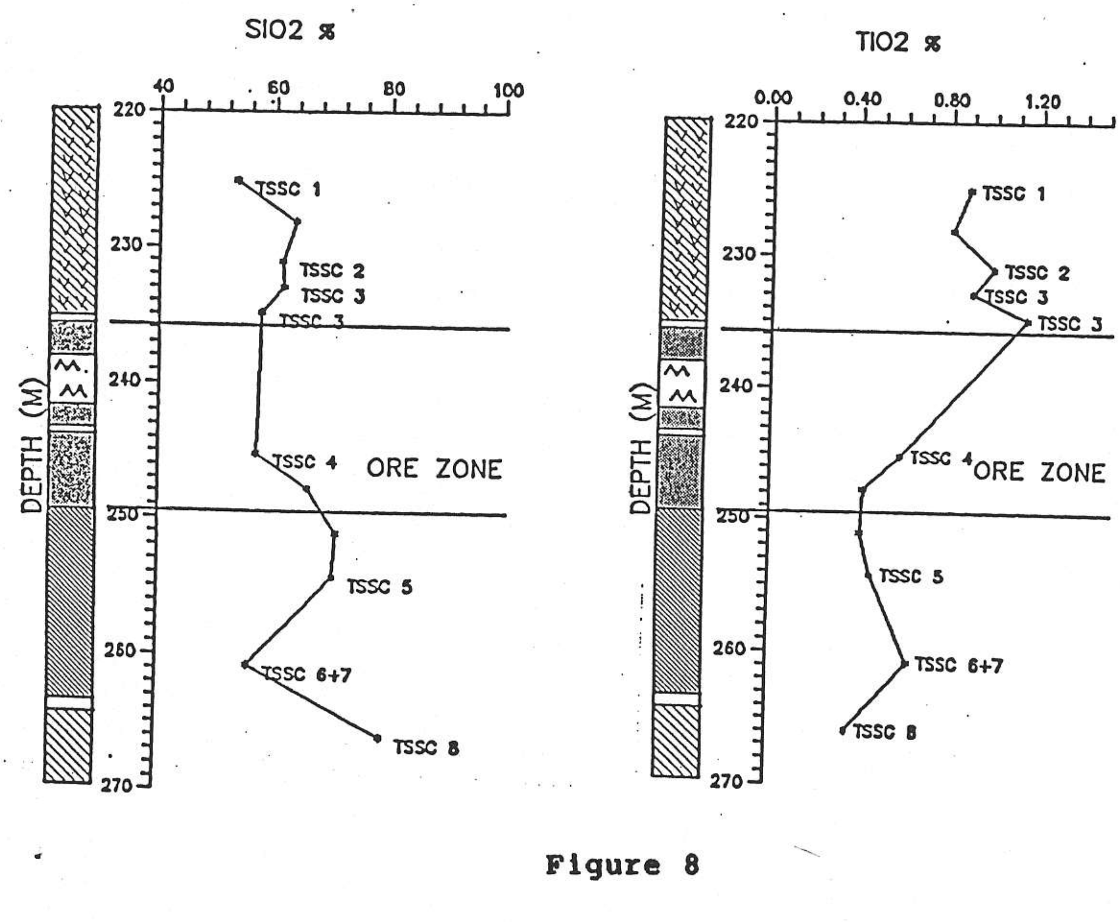


Figure 8

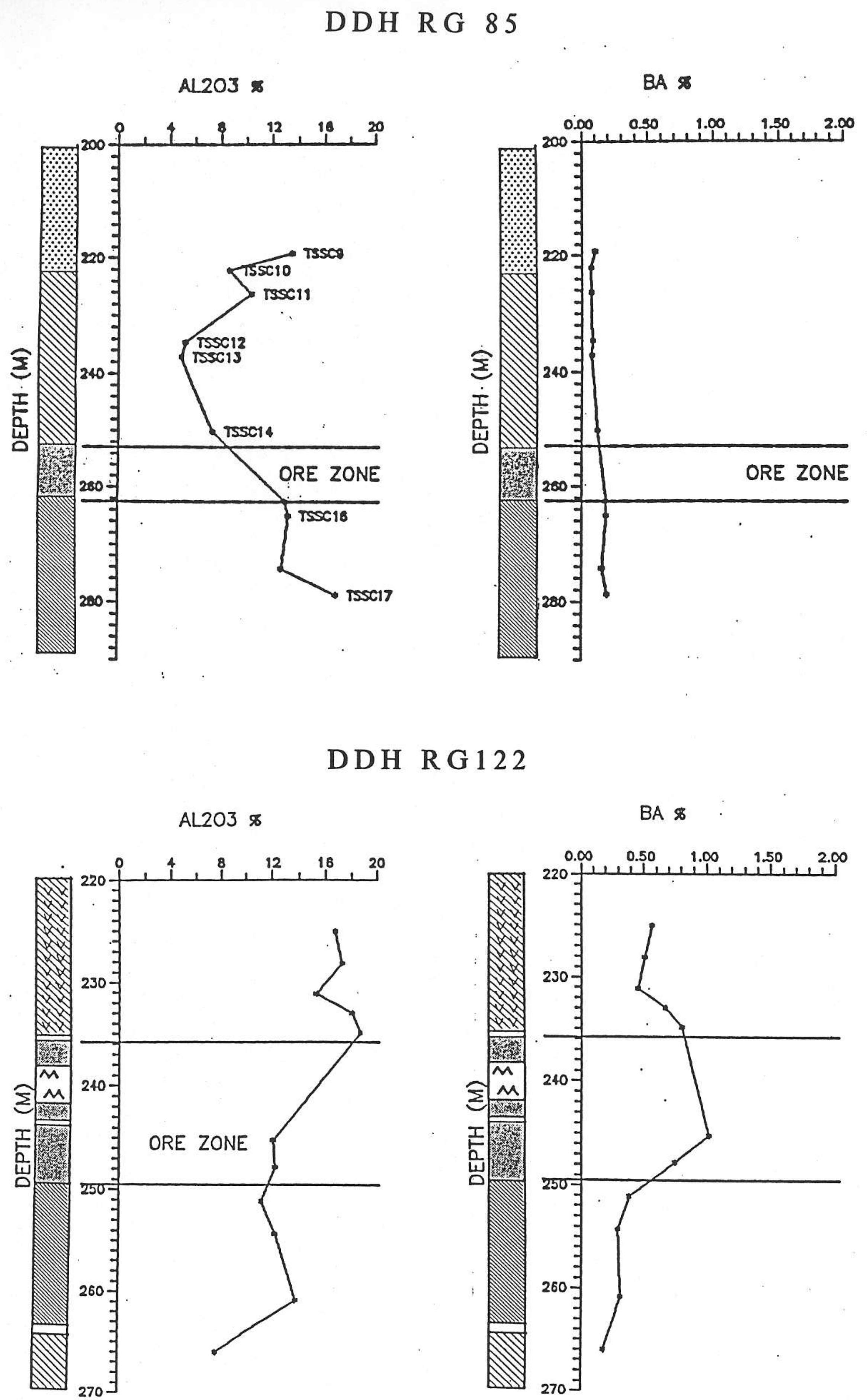

DDH RG 85
AL2O3 %
BA %
DEPTH (M)
TSSC9
TSSC10
TSSC11
TSSC12
TSSC13
TSSC14
TSSC16
TSSC17
ORE ZONE
DDH RG122
AL2O3 %
BA %
DEPTH (M)
ORE ZONE

Figure 9

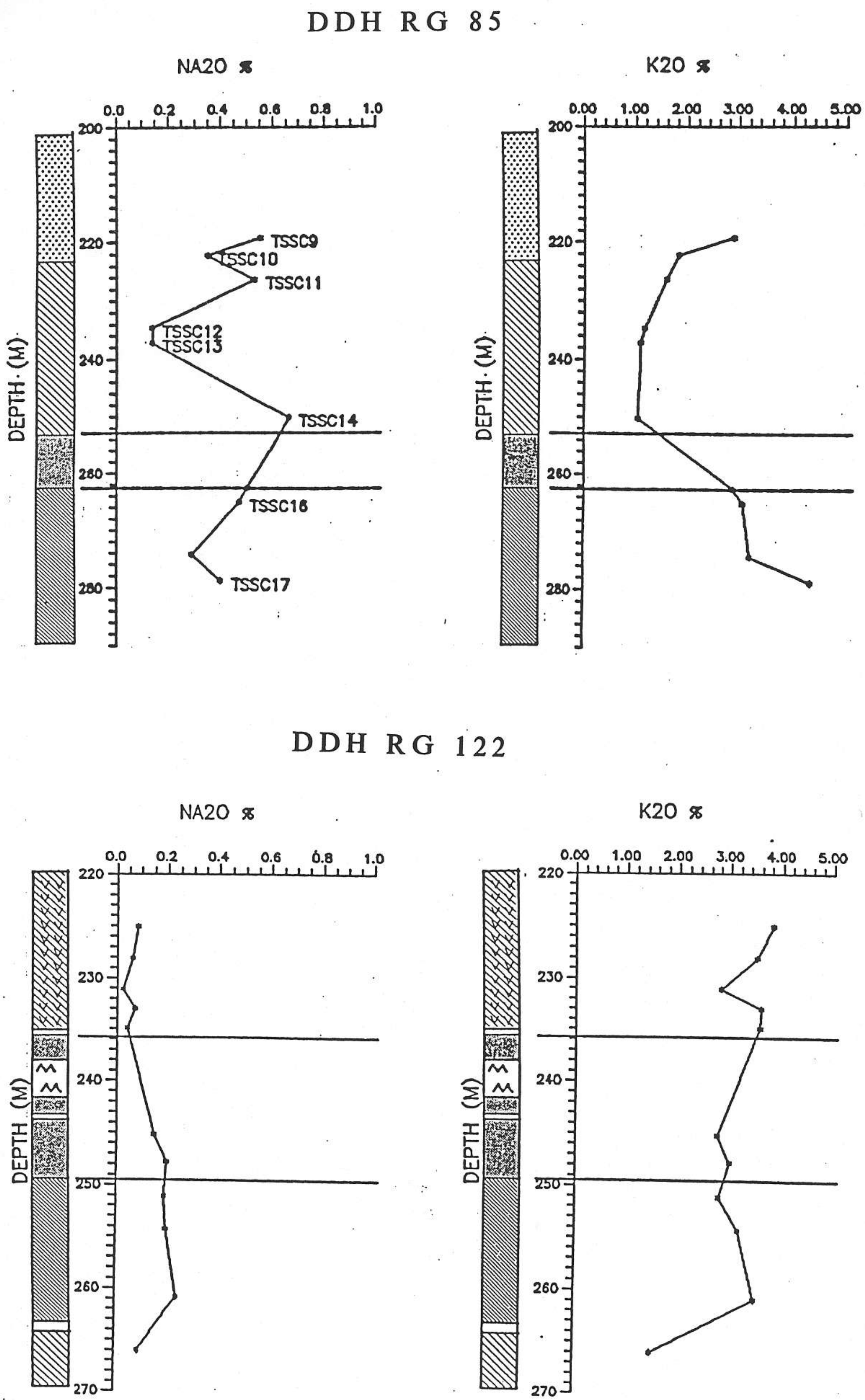
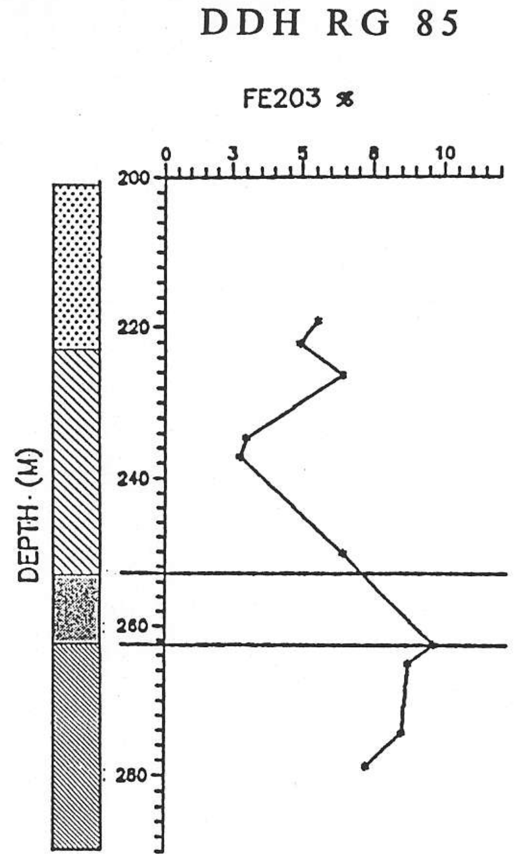

DDH RG 85
NA2O %
0.0 0.2 0.4 0.6 0.8 1.0
200 220 240 260 280
DEPTH (M)
TSSC9
TSSC10
TSSC11
TSSC12
TSSC13
TSSC14
TSSC16
TSSC17
K2O %
0.00 1.00 2.00 3.00 4.00 5.00
200 220 240 260 280
DEPTH (M)
DDH RG 122
NA2O %
0.0 0.2 0.4 0.6 0.8 1.0
220 230 240 250 260 270
DEPTH (M)
K2O %
0.00 1.00 2.00 3.00 4.00 5.00
220 230 240 250 260 270
DEPTH (M)

Figure 10


DDH RG 85
FE203 %
0 3 5 8 10
200
220
240
260
280
DEPTH (M)

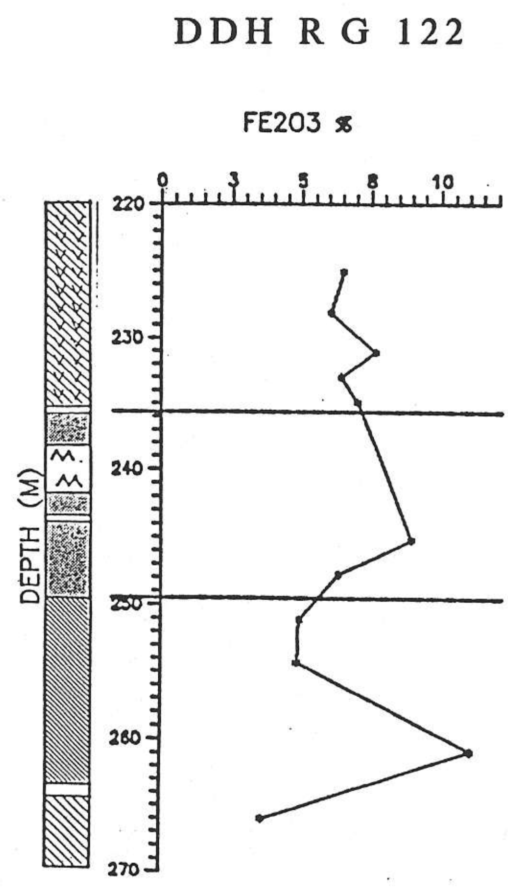

DDH RG 122
FE203 %
0 3 5 8 10
220
230
240
250
260
270
DEPTH (M)

Figure 11

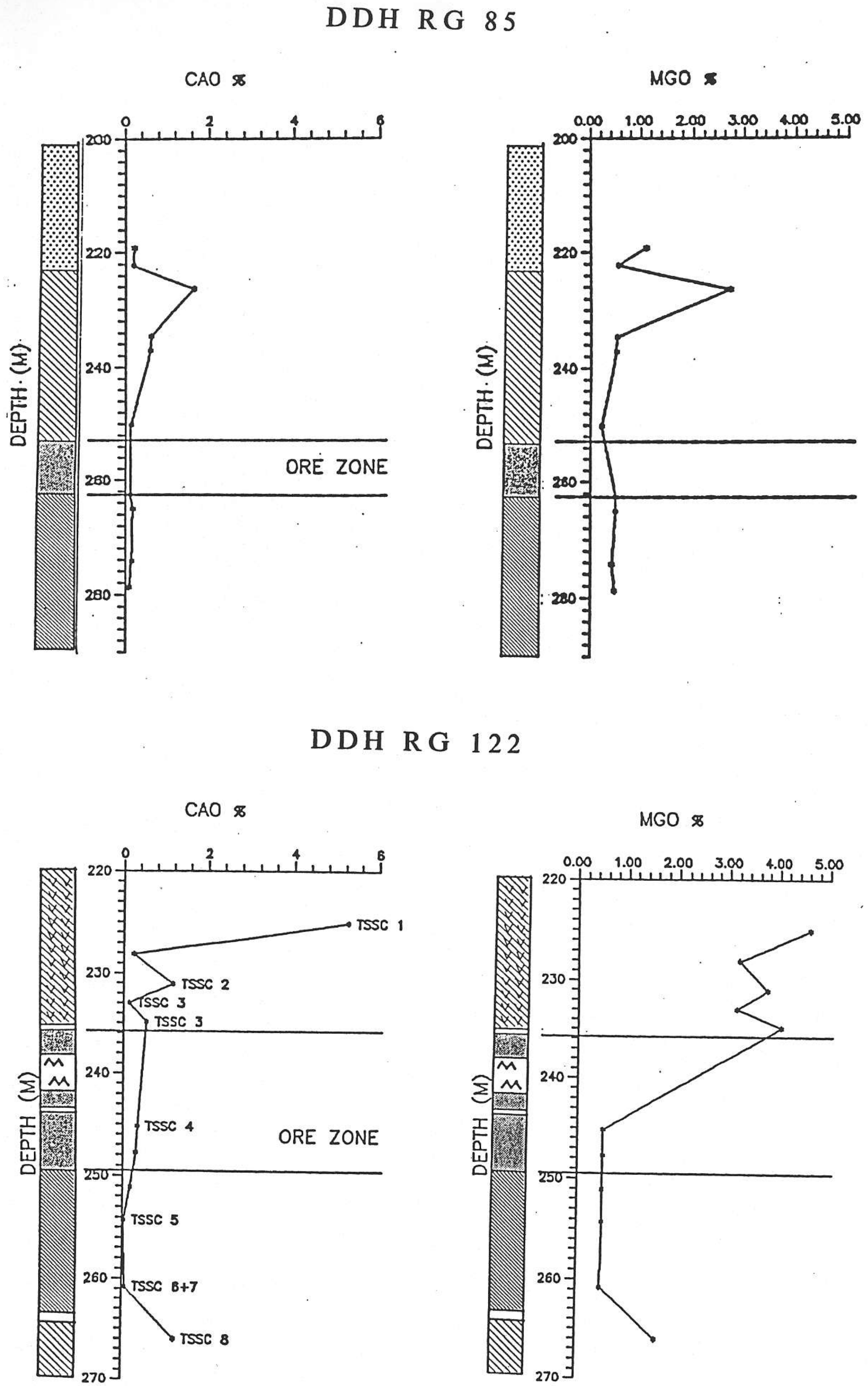

DDH RG 85
CAO %
0
2
4
6
MGO %
0.00
1.00
2.00
3.00
4.00
5.00
200
220
240
260
280
DEPTH (M)
ORE ZONE
DDH RG 122
CAO %
MGO %
220
230
240
250
260
270
TSSC 1
TSSC 2
TSSC 3
TSSC 3
TSSC 4
TSSC 5
TSSC 6+7
TSSC 8
DEPTH (M)
ORE ZONE

Figure 12

elements also show coincident depletion in the structural hangingwall.

Oxide trends in RG 122 are in general opposite to those found in RG 85. The presence of quartz vein related alteration may be reflected by depletion of Fe_2O_3, K_2O and enrichment of Ba coincident with the ore zone.

Sharp increases on the amounts of CaO and MgO may be attributed to the increase of quartz-dolomite stringers.

SiO_2 values show marked decreases towards and within the ore zones of both holes.

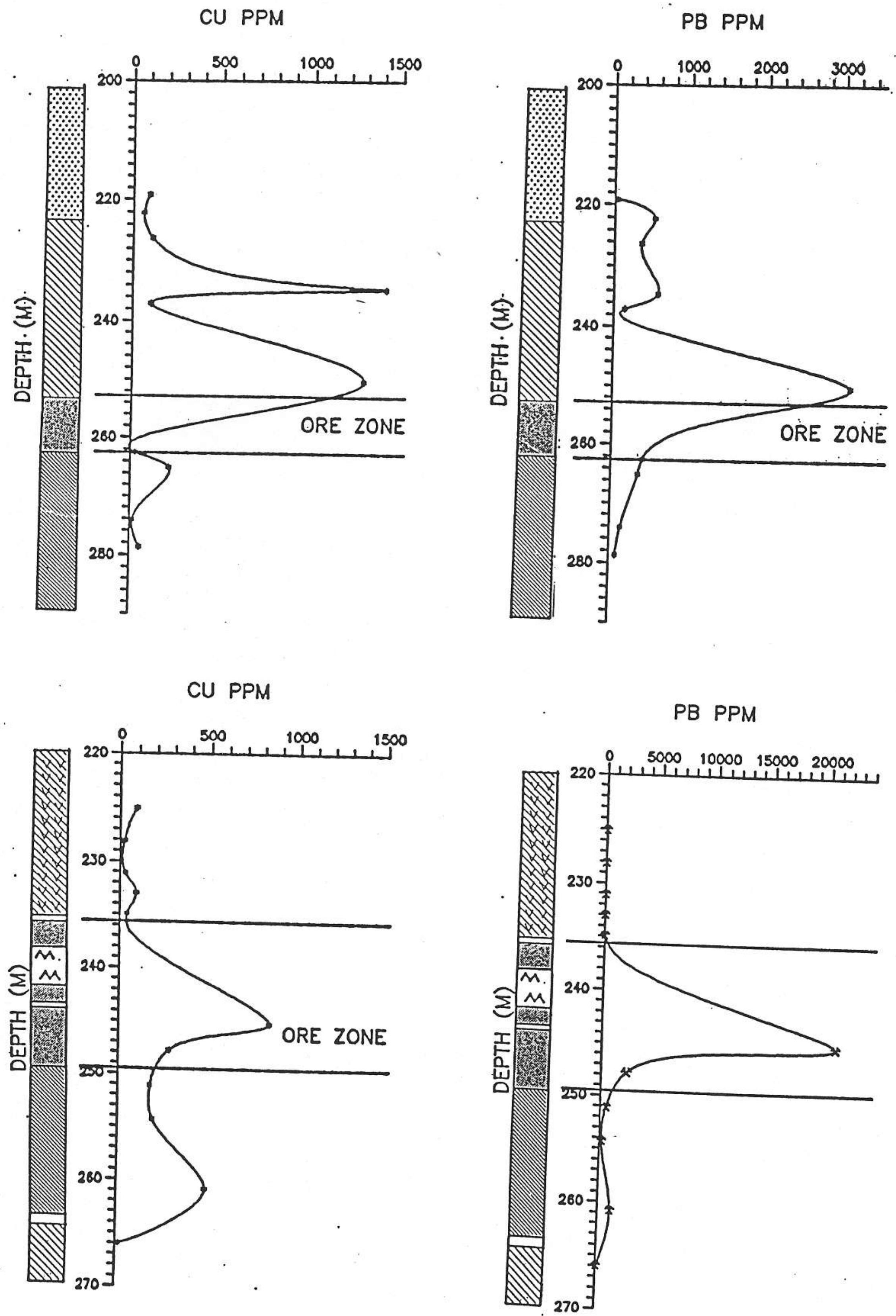
5.4.2 TRACE ELEMENTS

Trace element plots also show opposite trends within RG 85 and RG 122.

Metal enrichment occurs within the hangingwall with coincident depletion in the footwall of RG 85. Copper (Fig 13), silver and zinc (Fig 15), antimony (Fig 14), and arsenic (Fig.16) are all generally confined to the hangingwall. This is consistent with similar upright stratabound models (McConnell,1976).

Barium - ppm (Fig. 16) shows a "pulse" at 234 m within the hangingwall muddy tuff. This is consistent with a sharp rise in

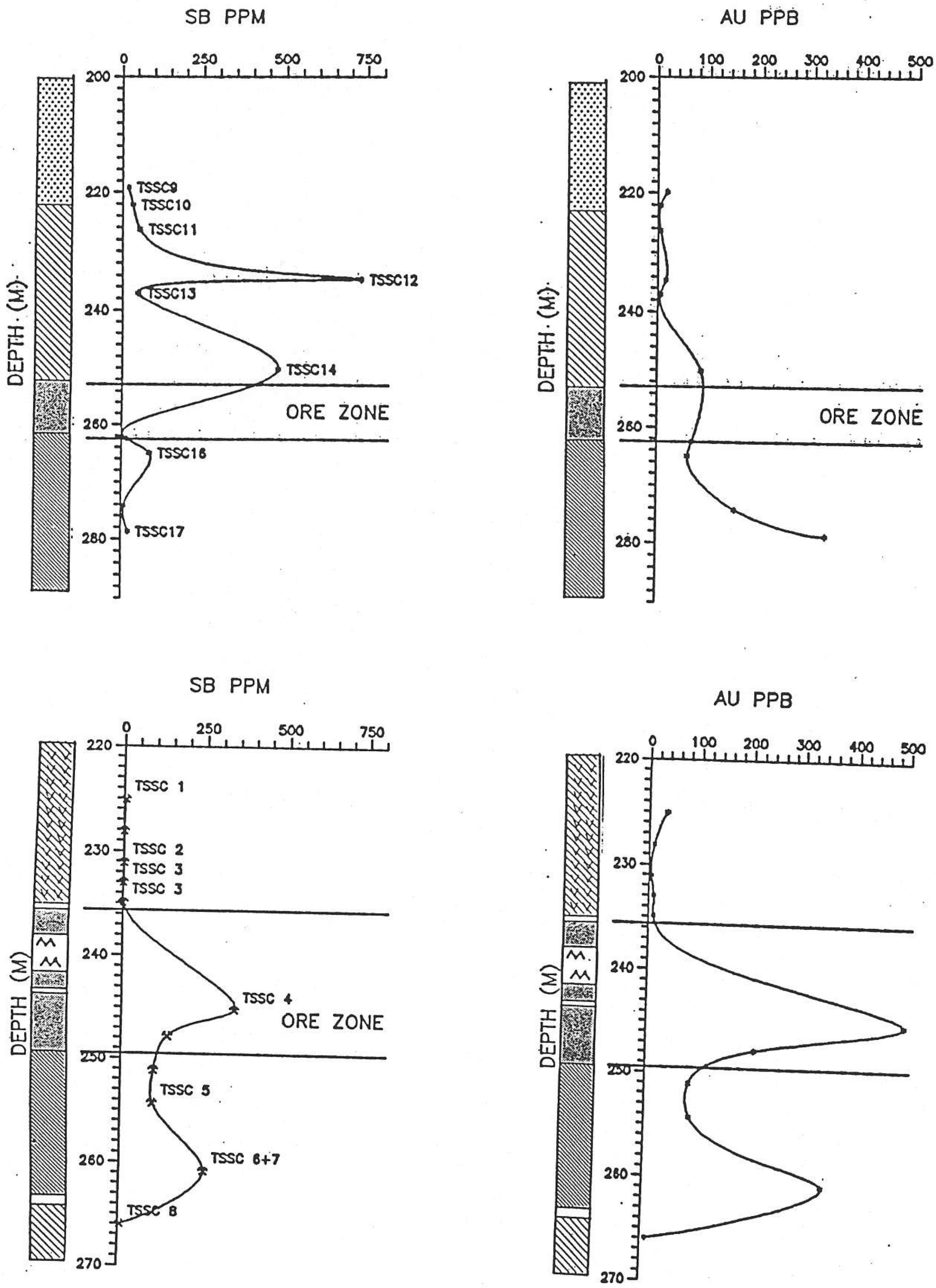
DDH RG 85



DDH RG 122

Figure 13

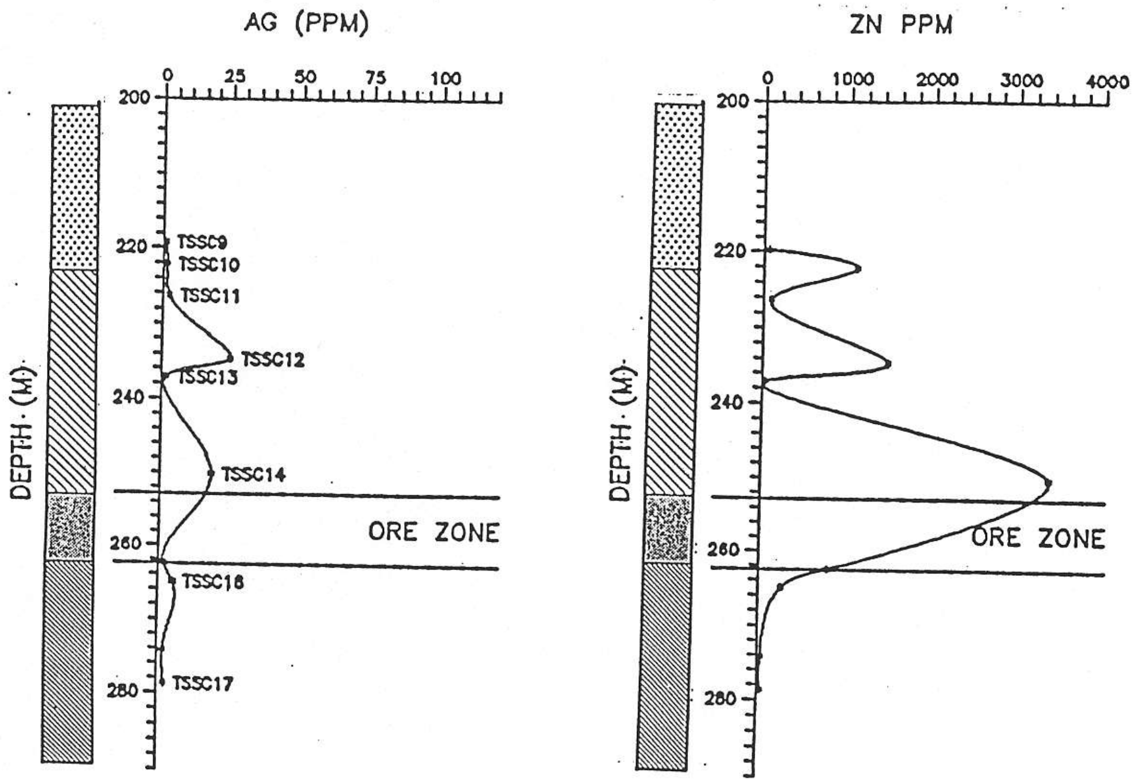
DDH RG 85

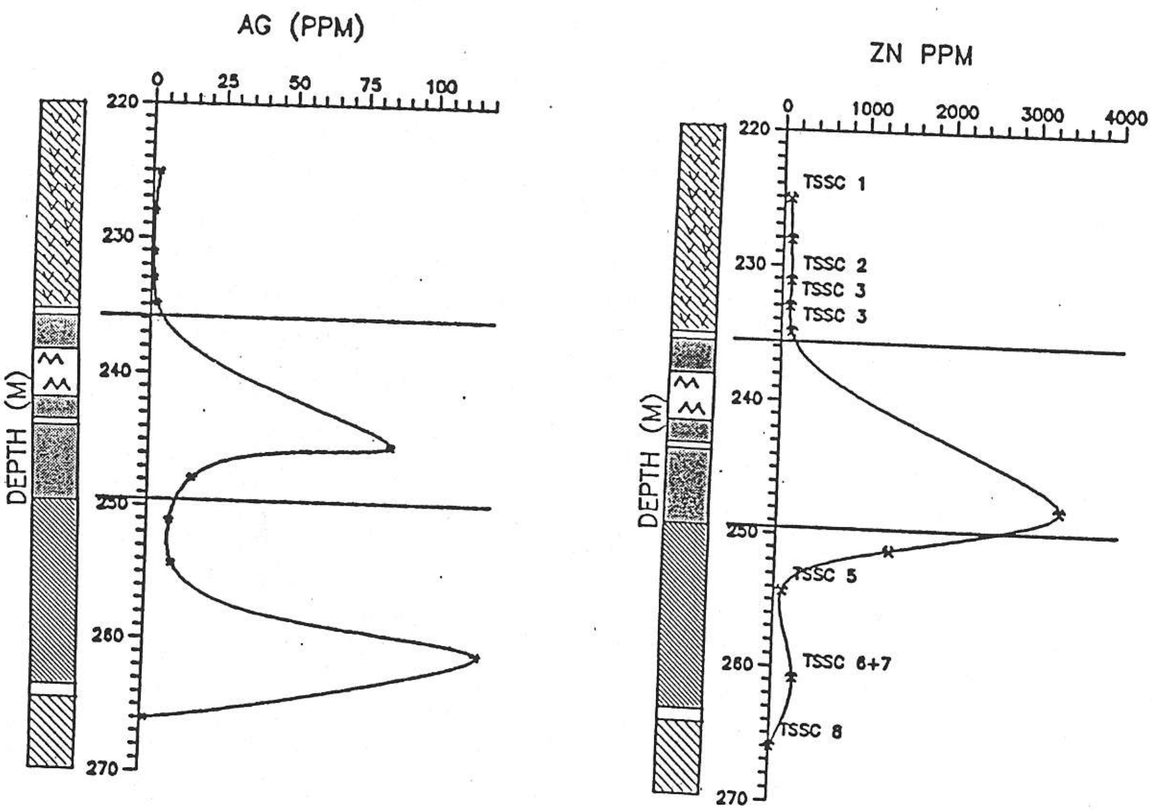


DDH RG 122

Figure 14

DDH RG 85

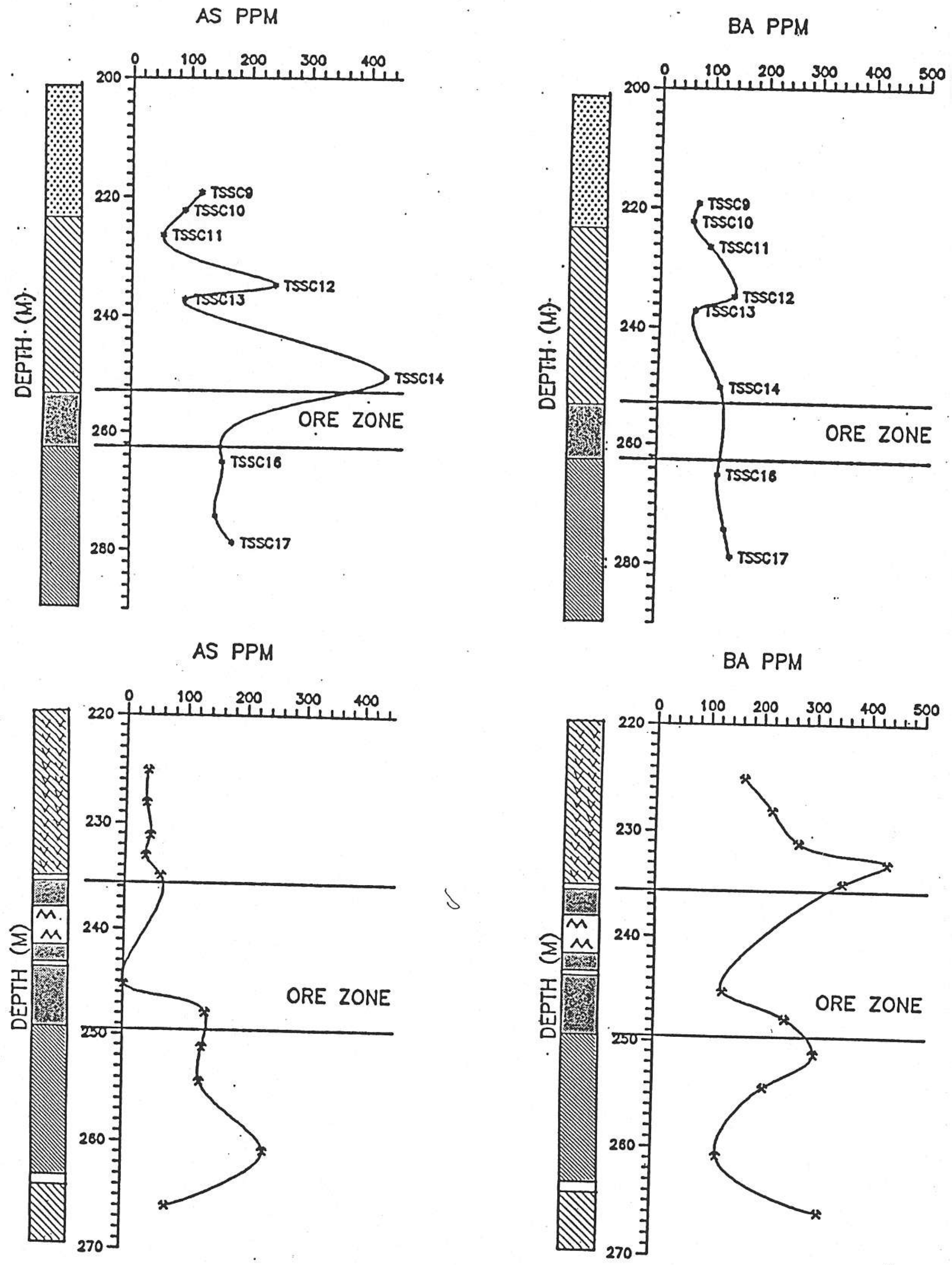




DDH RG 122

Figure 15

DDH RG 85



DDH RG 122

Figure 16

all other trace elements (except gold) in this interval.

Au content increases in the footwall of both holes.

RG 122 displays depletion of most metals adjacent to the ore zone. This may be attributed to remobilization and concentration due to late stage quartz veining.

5.4.3 CaO vs. MgO (Fig. 19)

Values of MgO plotted against CaO to show that all rocks with the ore zone are altered with respect to these oxides. This diagram is applicable only to volcanic rocks (de Rosen-Spence, 1976). Many of the lithologies present in this study are obviously sediments and careful consideration must be given. Late stage dolomite veining also occurs.

5.4.4 ALTERATION INDEX (FIG 20a,b)

The alteration index (AI, below) was developed as a measure of the degree of alteration associated with hydrothermal events in the Kuroko deposits. In Fukazawa, Japan the alteration index was found to rise from a value of 50% at a distance of 3 km to 90% close to the ore (Kalageropoulis and Scott,1983). Different threshold values exist at many deposits.

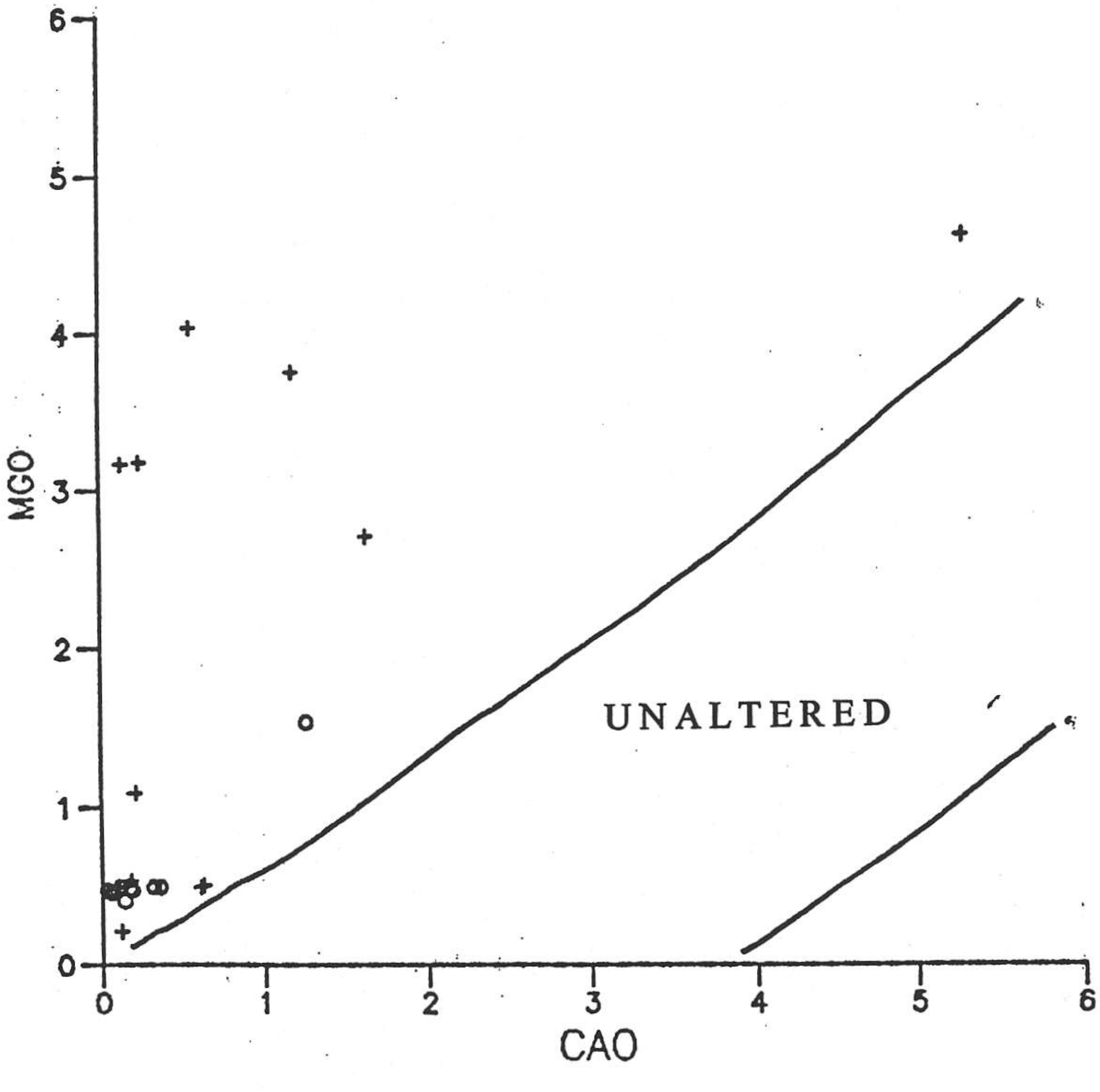
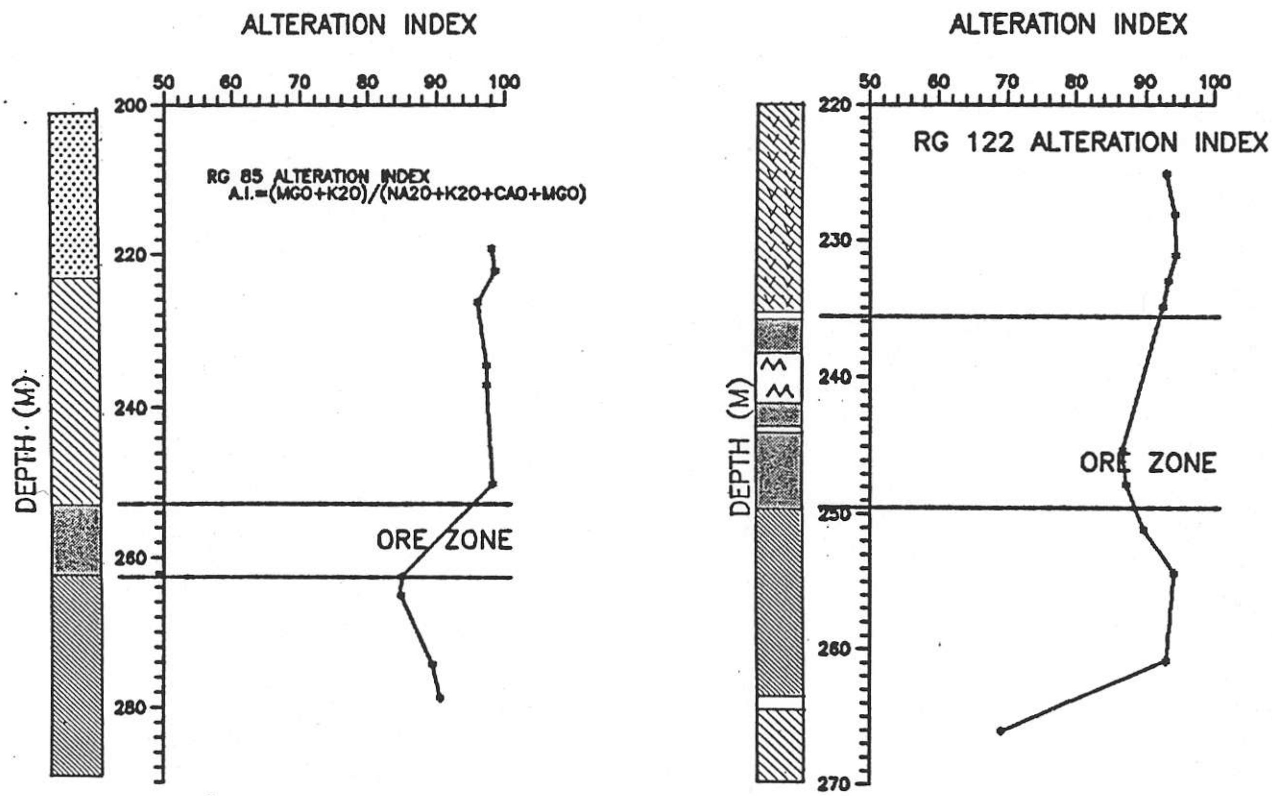


Figure 17 CaO vs. MgO

open squares = sediments
triangles = sericitic tuff
circles = footwall muddy tuff
crosses = hangingwall muddy tuff
Domains from de Rosen - Spence,1976.



ALTERATION INDEX
50 60 70 80 90 100
RG 85 ALTERATION INDEX
A.I.=(MGO+K2O)/(NA2O+K2O+CAO+MGO)
DEPTH (M)
200
220
240
260
280
ORE ZONE
ALTERATION INDEX
50 60 70 80 90 100
RG 122 ALTERATION INDEX
DEPTH (M)
220
230
240
250
260
270
ORE ZONE

Figure 19 a,b

$AI = (K_2O + MgO)/(Na_2O + K_2O + CaO + MgO) \times 100$

Alteration indices for RG 85 display strong alteration in the hangingwall and lesser alteration in the footwall. This is consistent with an inverted syngenetic model.

RG 122 displays increased alteration adjacent to the ore zone. This is attributed to late stage quartz veining.

5.4.5 IMMOBILE ELEMENTS (FIGS 21 AND 22)

Immobile element plots were produced to gain information on protolithology and are derived from similar plots on volcanic suites by Winchester and Floyd (1977). The sedimentary origin of many of the ore zone rocks must be considered.

Figure 21 shows major clusters within sub-alkaline basalt fields indicating possible parent source type. Figure 22 shows comparison when plotted against SiO_2. Increases towards rhyolitic fields may be due to phases of post deposition silification. Removal of 12% SiO_2 would place most samples within sub-alkaline basalt fields.

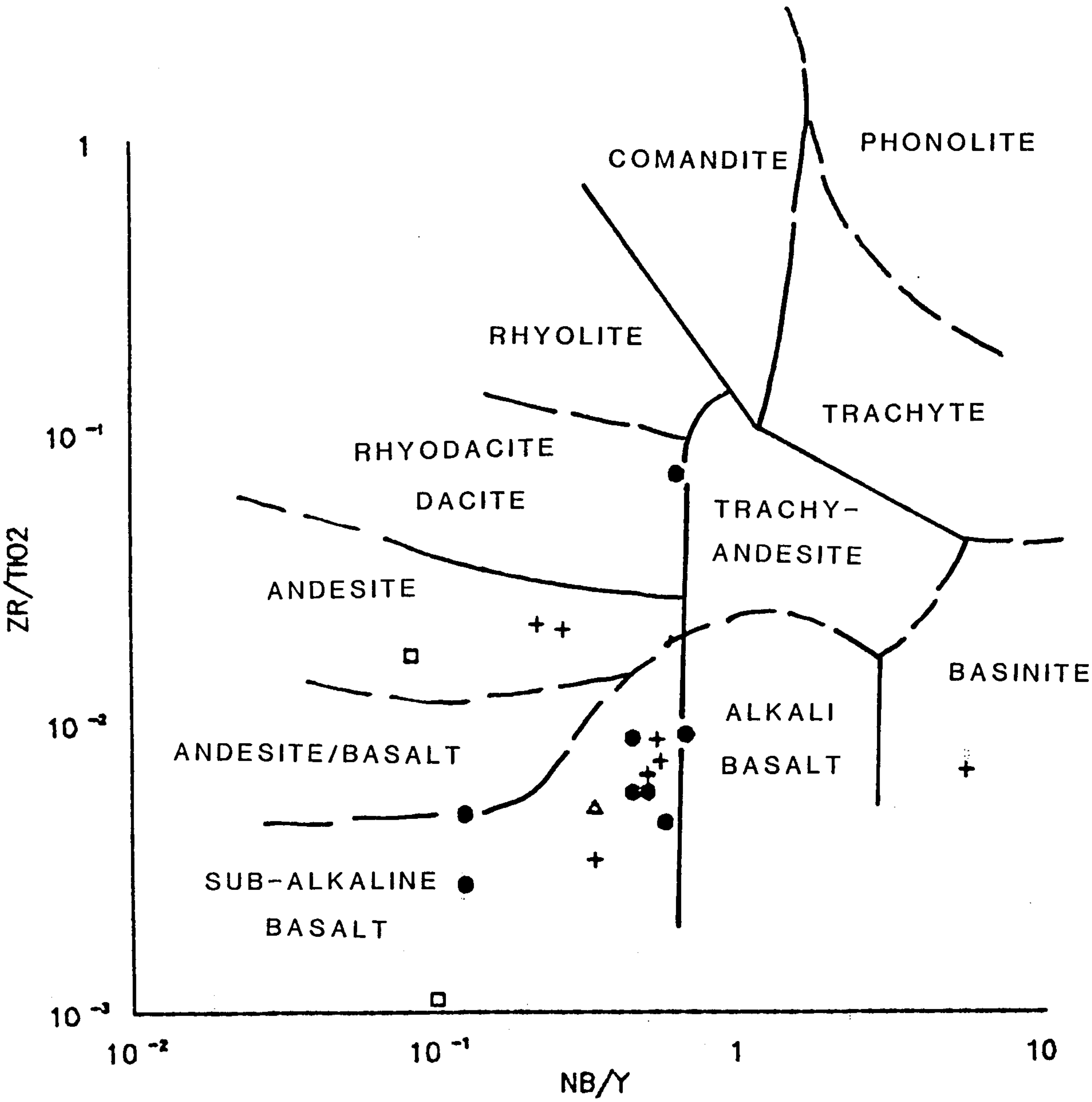


Figure 20 Zr/TiO2 vs. Nb/Y
squares = sediments
triangles = sericitic tuff
circles = footwall muddy tuff
crosses = hangingwall muddy tuff
Boundaries from Winchester and Floyd,1977.

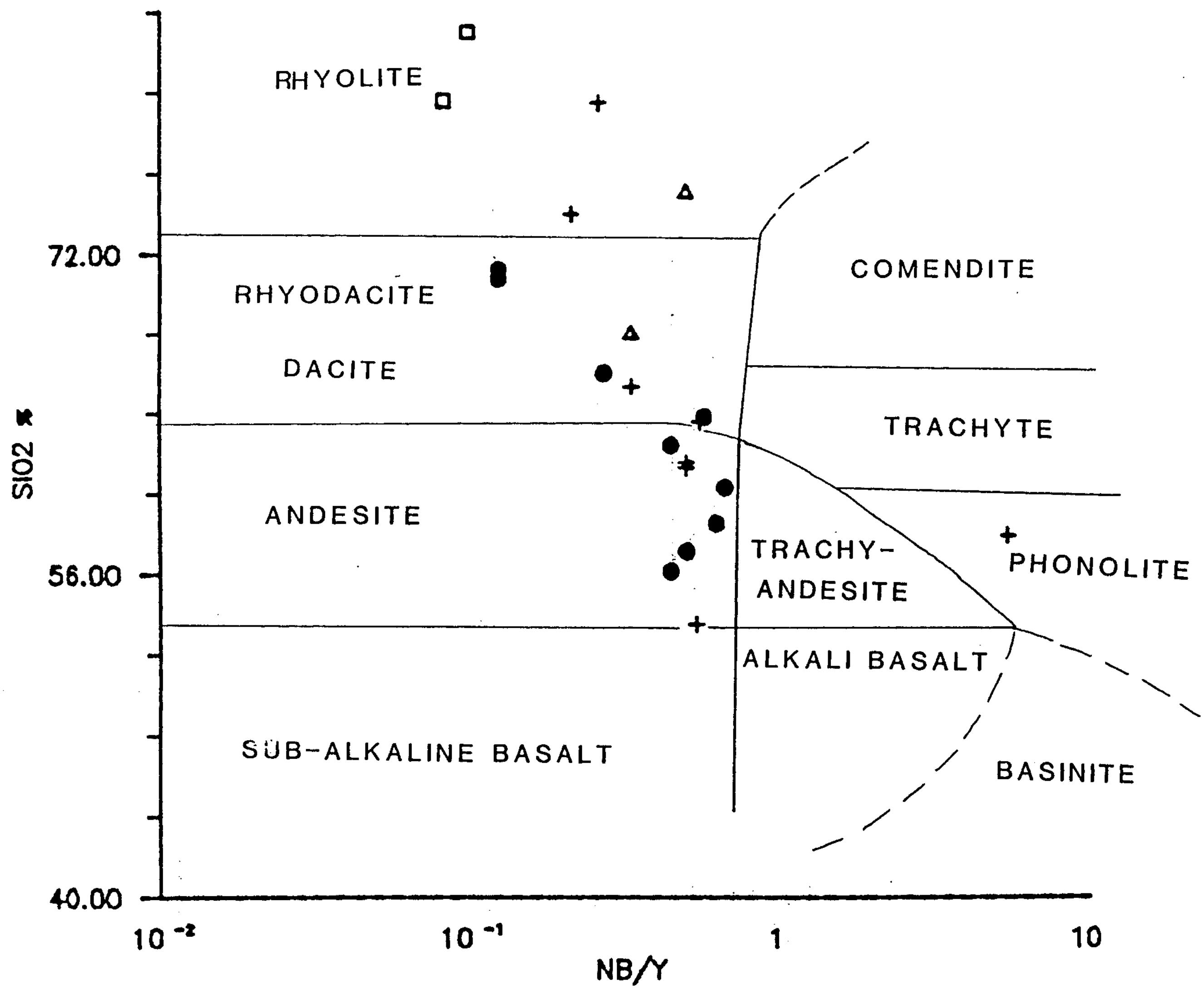


Figure 21 SiO2 vs. Nb/Y
squares = sediments
triangles = sericitic tuff
circles = footwall muddy tuff
crosses = hangingwall muddy tuff
Boundaries from Winchester and Floyd,1977

6.0 CONCLUSIONS

Detailed study of drill hole RG 85 and RG 122 has indicated alteration mineralogy dominated by quartz and sericite with minor Mg-Fe chlorite. The absenoe of other clay minerals is caused by combined lower greenschist metamorphism and later stages of post-metamorphic quartz veining.

A total of four phases of quartz veining were identified. The first of these is is pre-deformation and may be related to the original feeder zone. The second phase is also pre-deformational. A third post deformation, crosscutting phase is responsible for enrichment and remobilization of sulphide phases. This event is represented in drill hole RG 122. The fourth phase consists of quartz dolomite veins.

Vertical zonation of trace elements in RG 85 is highly characteristic of typical volcanogenio deposits with enrichment in the stratigraphic footwall and depletion in the hangingwall. Si_{02} amounts are abnormally high within the stratigraphic footwall of RG 85 while K_2O enrichment occurs within the stratigraphic hangingwall.

Whole rock geochemistry samples in RG 122 show different trends to those obtained in RG 85. These patterns are attributed to alteration overprints induced by late stage quartz veins.

The identification of silicified argillites and tectonic breccias previously logged as cherts and debris flows respectively, suggests a re-interpretation of ore zone stratigraphy is necessary.

An absence of microfolds in the ore zone and may be attributed to either of the following:

1. The ore zone lies within the core of a major structure and is thus not subjected to the rigorous and ductile deformation seen on the limbs.
2. Tectonite zones may cause a significant overprint near and within the ore zone. Earlier fabrics related to isoclinal folding are obliterated.
3. The siliceous nature of many of the ore zone lithologies induced a ductility contrast with adjacent rocks, resulting in differing wavelengths of folds respectively (analysis 1. and 3. may be intimately related).

Limb shear, often filled with quartz stringers, is common in microfolds and may be significant the interpretation of large scale structures.

BIBLIOGRAPHY

Blatt, Middleton and Murphy, 1980. Origin of Sedimentary Rocks. P.400-404. Prentice Hall, N.J.

deRosen Spence and Sinclair, 1986. Classification of Cretaceous Volcanic Sequences of British Columbia and the Yukon. Geological Fieldwork 1986, B.C.G.S. Paper 87-1. Victoria, B.C.

Goutier, F., 1986. Galena Lead Isotope Study of Mineral Deposits in the Eagle Bay Formation, Southeastern B.C.. Master's Thesis. University Of British Columbia.

Holder, R., 1989. Polished Section Study on the Samatosum Deposit. Unpublished ore microscopy report. University of British Columbia.

Hydrothermal Alteration for Mineral Exploration Workshop. 1985. P.420-424. University of Idaho.

Kaleageropoulis and Scott, 1983. see Hydrothermal Alteration for Mineral Exporation Workshop(1985). P.421. University of Idaho.

McConnel, J.W., 1976. Geochemical Dispersion in Wallrocks of Archean Massive Sulphide Deposits. Unpublished Master's Thesis. Queen's University, Kingston Ont.

O'Conner, 1965. A Classification for Quartz-rich Igneous Rocks Based on Feldspar Ratios. U.S. Geol. Surv. Prof. Paper 525-B, P.B79-B84.

Pirie,I., 1989. The Samatosum Deposit. In Press for Northern Miner Press.

Schiarizza, P., 1987. Geology of the Adams Plateau-Clearwater-Vaveby Area. B.C.G.S. Paper 87-2. Victoria,B.C.

Winchester, J.A., and P.A. Floyd, 1977. Geochemical Discrimination of Different Magma Series and their Differentiation Products using Immoblie Elements. Chemical Geology, Vol 26 P.225-246.

APPENDIX 1

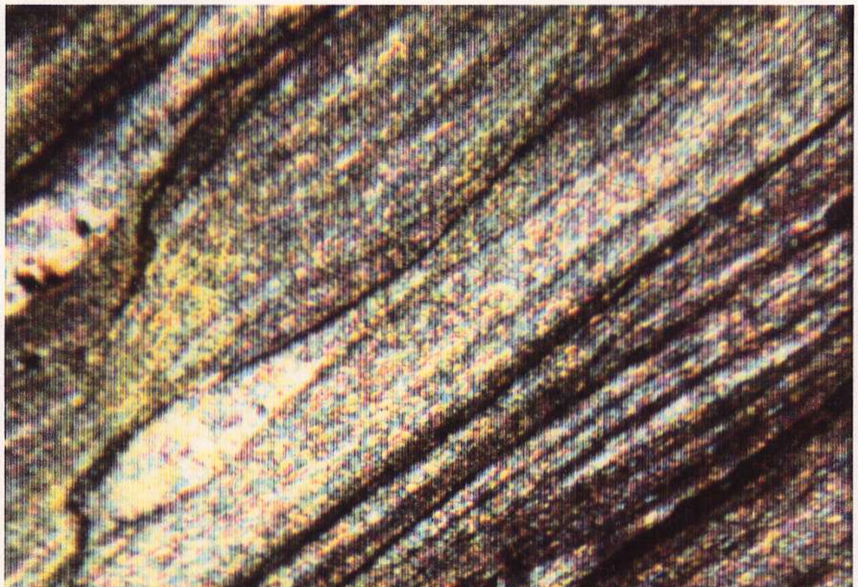


PLATE 3.1 TSSC 9

SERICITIC TUFF UNIT

Width: 1.2 mm with gypsum plate
Fine laminae of QZ and sericite
Note QZ flasers

PLATE 3.2   TSSC 10

SERICITIC TUFF UNIT

Width 1.2 mm with gypsum plate

Folded, fine grained QZ laminae with limb shear. Crenulations in axial plane.

PLATE 3.3 HAND SPECIMEN

TYPICAL SERICITIC TUFF

Alternating bands of QZ and sericite.
Strongly brecciated.

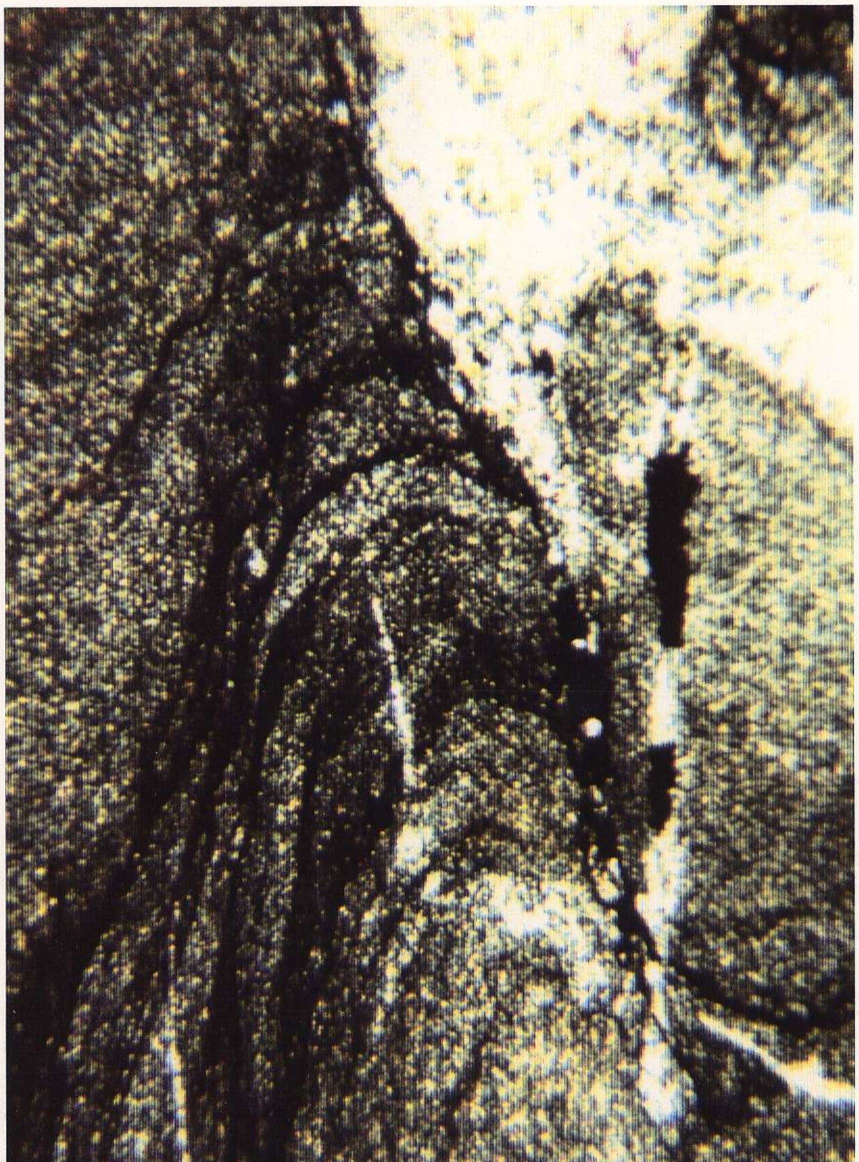


PLATE 3.4 TSSC 2

SERICITIC TUFF UNIT

Width: 1.2 mm
Tight to isoclinal micro folds.
Note limb shear filled with QZ
stringer.

PLATE 3.5 TSSC 2

SERICITIC TUFF UNIT

Width: 1.2 mm
Pre-deformation ptigmatic QZ veins.
Note strong axial planar fabric.

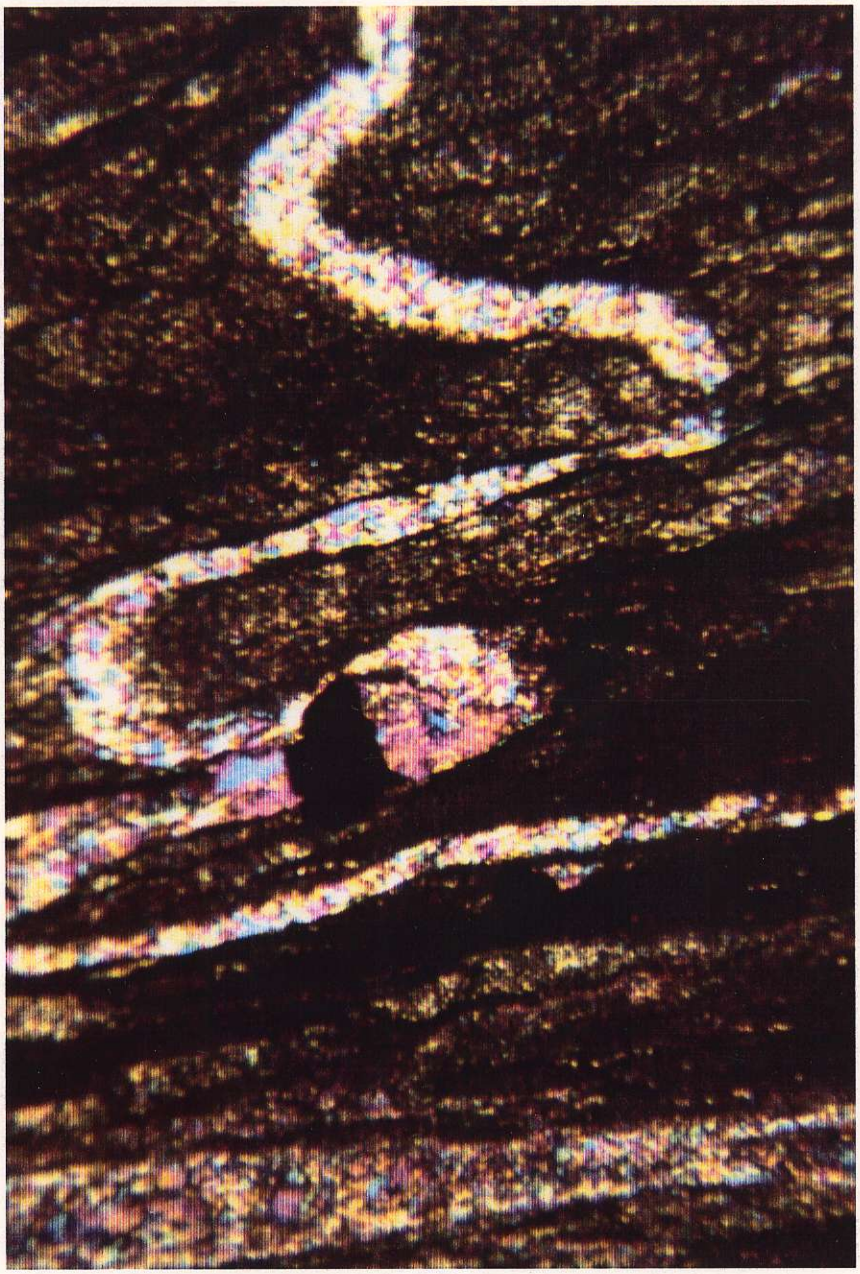


PLATE 3.6 TSSC 2

SERICITIC TUFF UNIT

Width: 1.2 mm with gypsum plate
Pre-deformation ptigmatic QZ stringers.
Note pyrite porphyroblast in center,
and dark matrix

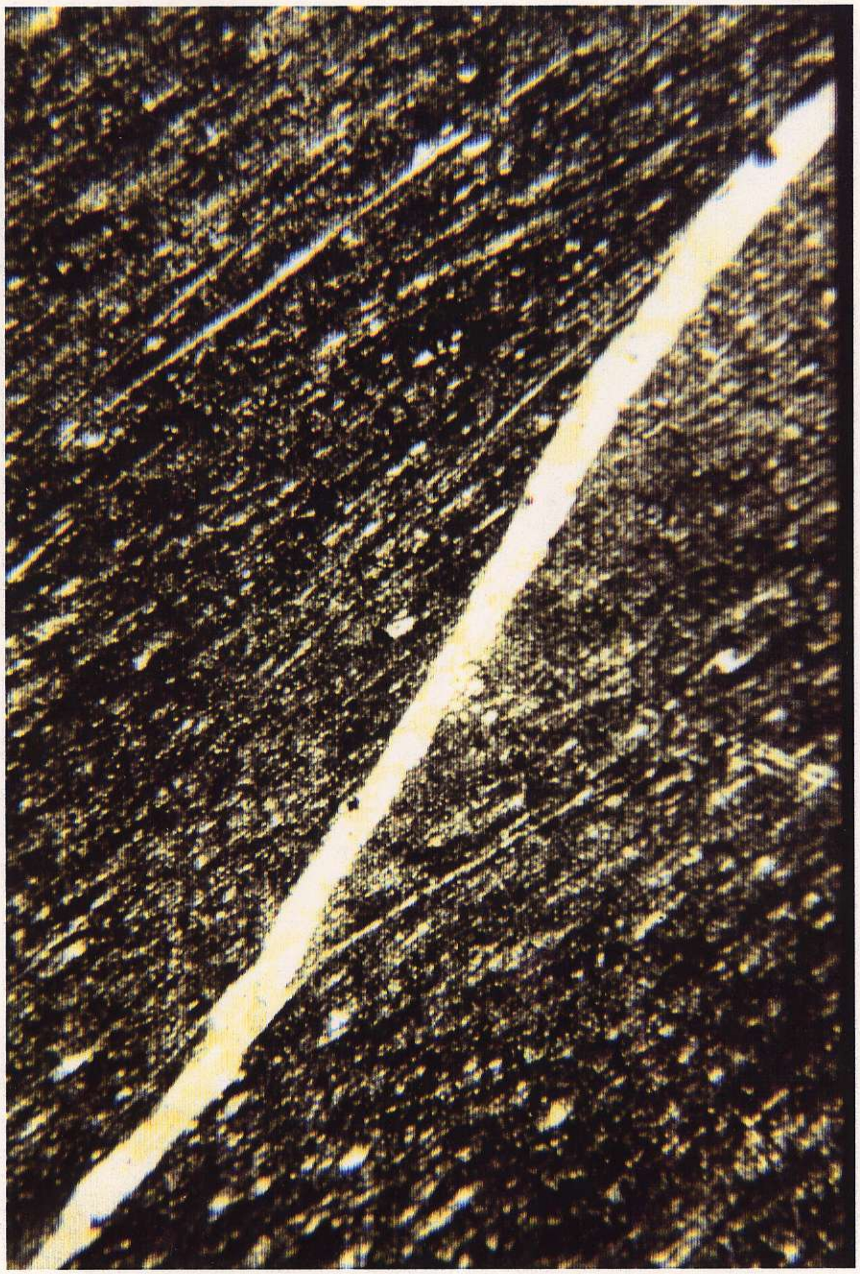


PLATE 3.7 TSSC 12

Width: 1.2 mm
Post deformation, third order,
QZ stringer in silicified argillite

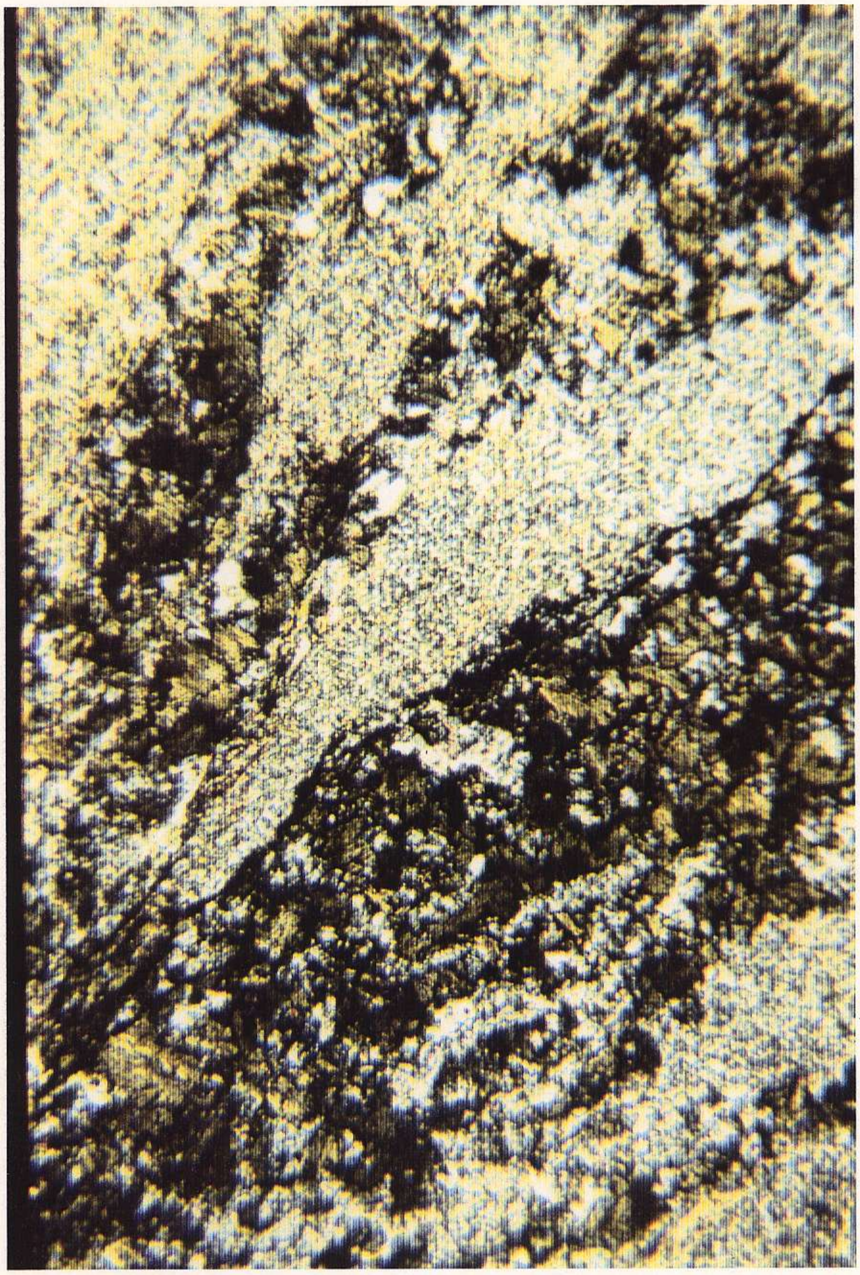


PLATE 3.8 TSSC 3

Width: 1.2 mm
Mg rich chlorite and fine grained QTZ fragments.

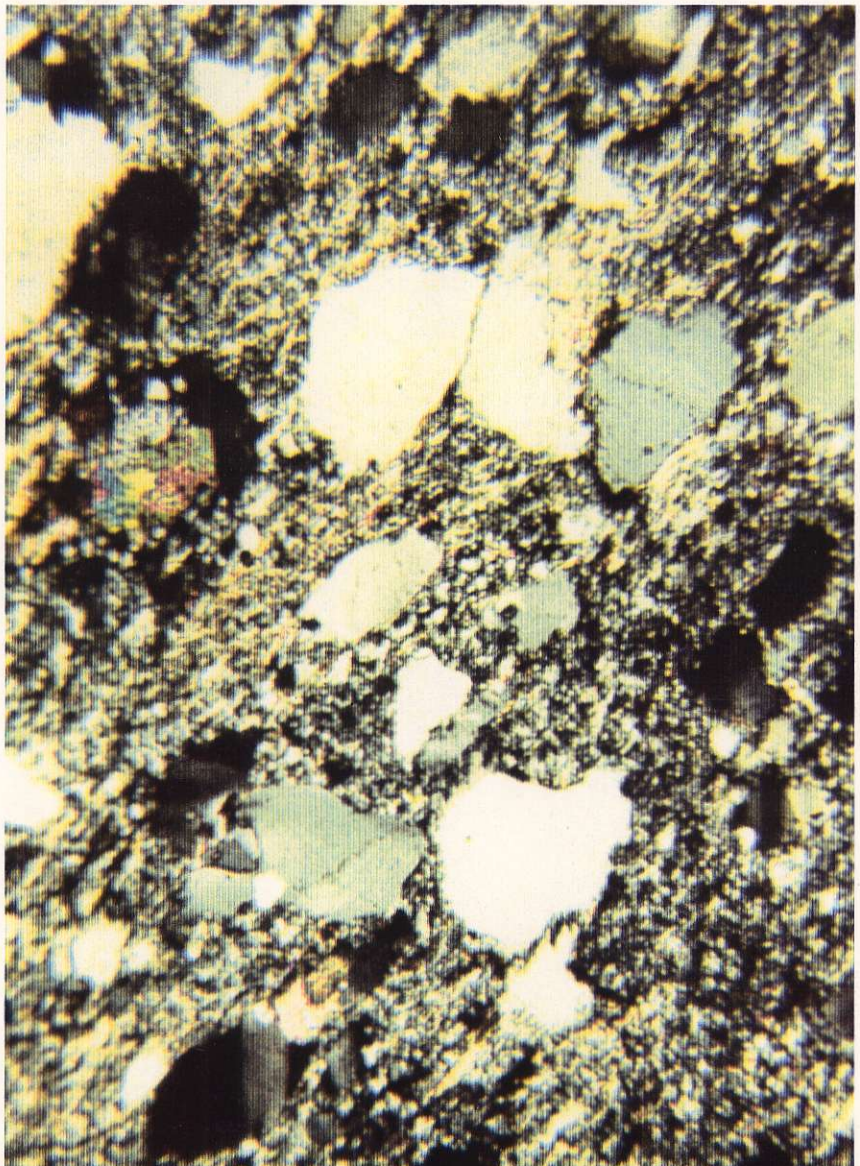


PLATE 3.9 TSSC 8

Width: 1.2 mm
Grey wacke. Note angular QTZ clasts and undulose extinction. Biotite shows high birefringence.

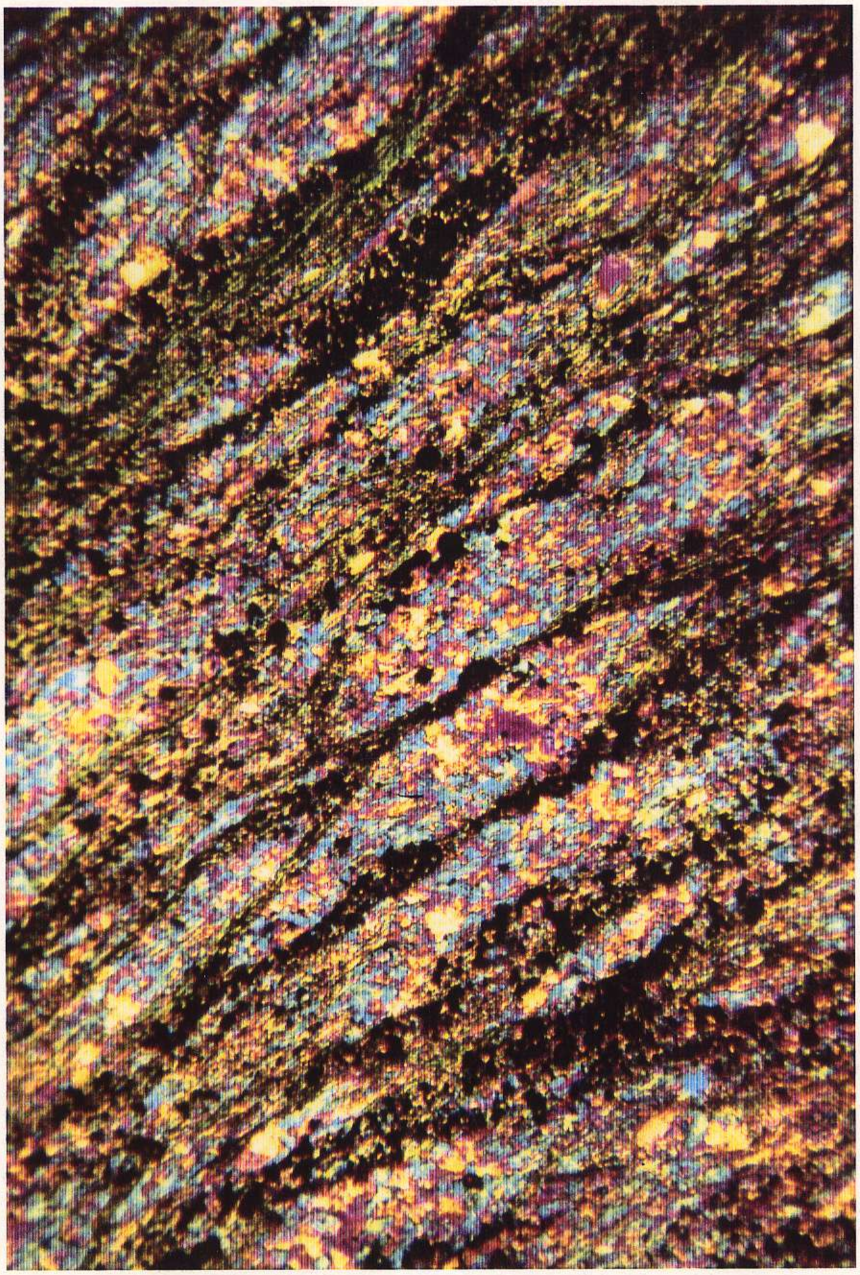


PLATE 3.10 TSSC 16

Width: 1.2 mm with gypsum plate
Fine grained QTZ and sulphides
in muddy tuff unit. Note flaser
type texture.

PLATE 3.11 TSSC 11

Width: 1.2 mm
Pyrite porphyroblast with QZ in pressure shadow. Note low angle foliation and high angle shear cleavage (S-C fabric).

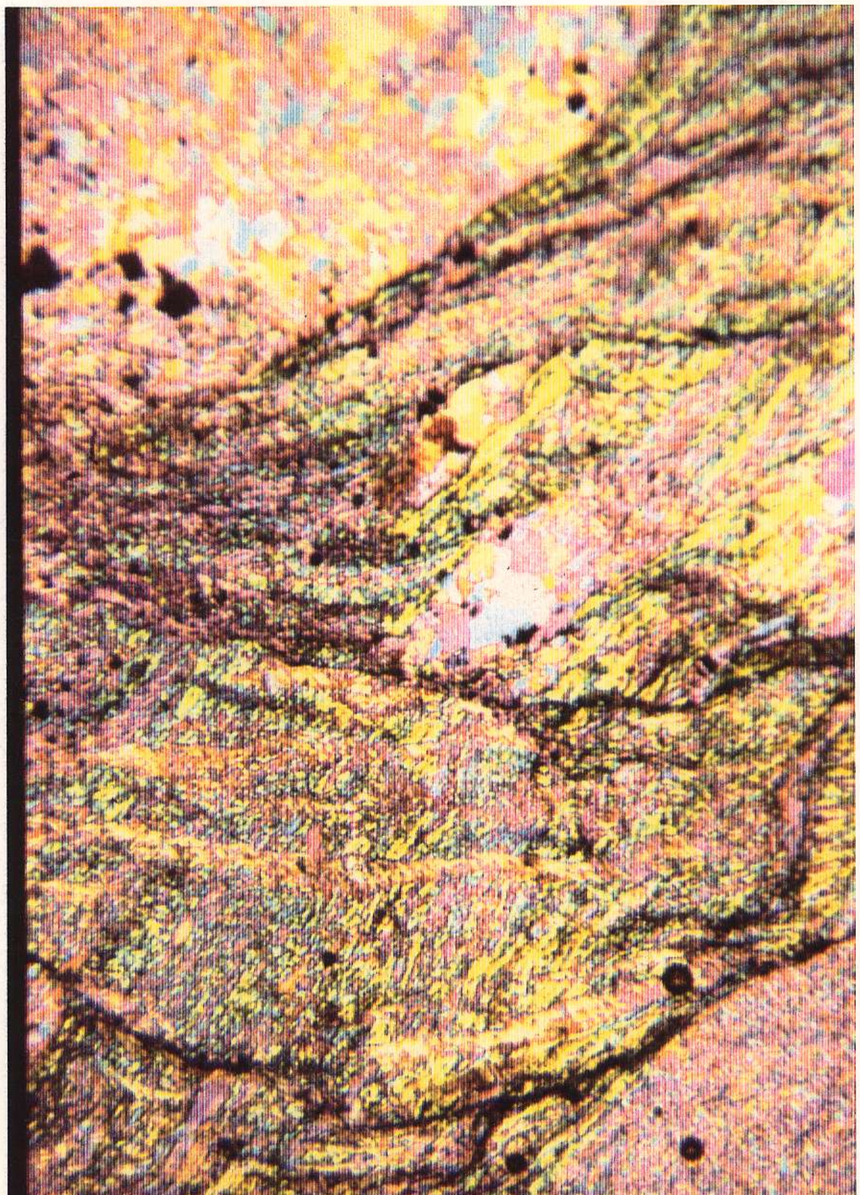


PLATE 3.12 TSSC 11

Width: 1.2 mm with gypsum plate
Muddy tuff unit, broken, chaotic fabrics in QTZ sericitic rock. Note small rutile pheno (red) and crenulation cleavage.

APPENDIX 2

THIN SECTION DESCRIPTION

SAMPLE NO.: TSSC 1

HOLE NO.: RG 122

UNIT: MUDDY TUFF (HW.)

COLOR INDEX: 15

FABRICS: DEF. FOLIATION
AUGEN TEXTURE

PHOTOS:
EXC. PRESSURE SHADOWS.

MINERALOGY:

MINERAL:	PERCENT:	REMARKS:
QTZ	50%	FINE ANHEDRAL AGGREGATES IN AUGENS AND BANDS.
Se	25%	DEFINES CLVG.
GR.	10%	POSS BEDDING?
PY	2-3%	SUB HEDRAL 1-2mm NOTE QTZ PRESSURE SHADOWS MINOR 5% QTZ STRING
BI	10%	ASSOCIATED WITH AND INTERSTITIAL TO QUARTZ GRAINS.
SPHENE	TR	- IN GRAPHITE TRAINS.

REMARKS:

NOTE AMT. OF BIOTITE → PELITIC SED.
SILICIFIED

NOTE: BRWN. MIN.

CARBONACEOUS SED WITH BANDS OF F.G. QTZ (GREYWACKE)
PRE DEF^M. SILICA FLOODING.

HAND SAMPLE DESCRIPTION

SAMPLE NO.: T3SC / **HOLE NO.:** 122 **LOCATION (FW/HW):** FW (MUT)

UNIT: MUDDY TUFF (BLACK TO GREY INCL. CARBONACEOUS MATERIAL)

COLOR INDEX:

TEXTURE:

GRAIN SIZE: V.F.G.
FABRIC: CONTORTED COMPOSITIONAL LAYERING – PHYLLITIC
SIZE RELATIONS: ALL FINE GRAINED
BEDDING: POSSIBLE REMANENT BEDS DEFINED BY GRAPHITIC HORIZONS
COMPOSITIONAL LAYERING: DEFINATELY – QUARTZ, SERICITE
STRUCTURES:
- QUARTZ AUGENS (3mm)
- MINOR QTZ STRINGERS.

MINERALOGY:	PERCENT	COLOR	G.SIZE
SERICITE:	25% ± (BIOTITE)	GREY-GREEN	VFG
QUARTZ:	45%	GREY	FG - MG.
ANKERITE:	5%	Fe YELLOW	
KSPARS:			
CHLORITE:	5%	GREEN	
OTHER:			
PY	2-3%		
CARBON	10%		

NAME:

SILICEOUS SEDIMENT

REMARKS:

THIN SECTION DESCRIPTION

SAMPLE NO.: TSSC 2

PHOTOS:

HOLE NO.: RG 122.

UNIT: HW MUDDY TUFF

COLOR INDEX: 15

FABRICS: EXC. FOLDING, CRENULATIONS.

MINERALOGY:

MINERAL:	PERCENT:	REMARKS:
QTZ	30%	BIMODAL - 1° - F.G. AGGREGATES 2° - PTIGMATIC STRINGERS
CARBONATE	5%	- NOTE CURVED TWIN LAMELLAE
BIOTITE	25%	DEFINES CLVG.
SERICITE	20%	ASSOC. w̄ 1° QTZ.
CHLORITE	5%	IN PRESSURE SHADOWS W PY.
OPAQUES (GR)	15%	DISCRETE TRAINS // TO CLVG.
PY.	5%	SUBHEDRAL 1-2mm

REMARKS:

QTZ CARB. STRINGERS // FOL^n

PTIGMATIC QTZ STRINGERS. - POST 1° DEF^m, PRE 2°

NOTE AUGEN SHAPED QTZ AGGREGATES

HAND SAMPLE DESCRIPTION

SAMPLE NO.: TSSC2 **HOLE NO.:** 122 **LOCATION (FW/HW):** HW MUT.

UNIT: MUDDY TUFF.

COLOR INDEX: 40

TEXTURE: PRESSURE SOL^ DEFORMATION FEATURES – FOLDING

GRAIN SIZE: VFG
FABRIC: PHYLLITIC
SIZE RELATIONS: ALL F.G.
BEDDING: YES
COMPOSITIONAL LAYERING: YES
STRUCTURES:

MICRO FOLDS
ANTIFORMAL VERGENCE UP HOLE
PARASITIC S FOLDS.

]ERALOGY:	PERCENT	COLOR	G.SIZE
SERICITE:	25%	APPLE GRN	
QUARTZ:	30%	GREY	VISABLE STRINGERS
ANKERITE: (CALCITE)	15%	NOTE FIZZ	
KSPARS:			
CHLORITE:	1-2%		
OTHER: BIOTITE	25%		
PY	2-3%		

NAME:

REMARKS:

SERICITE ALTERATION DOES NOT CROSS DEFORMATIONAL FABRIC. ∴ PRE-DEFM.

HAND SAMPLE DESCRIPTION

SAMPLE NO.: TSSC 3 HOLE NO.: 122 LOCATION (FW/HW): HW

UNIT: MUT.

COLOR INDEX: 35

TEXTURE: PHYLLITIC

GRAIN SIZE: F.G. w QTZ STRINGS (BROKEN)
FABRIC: PHYLLITIC
SIZE RELATIONS:
BEDDING: NONE
COMPOSITIONAL LAYERING: YES
STRUCTURES:
CONTORTED + BROKEN LAYERING

MINERALOGY:	PERCENT	COLOR	G.SIZE
SERICITE:	5%	PALE GRN.	V.F.G
QUARTZ:	40%	GREY + WHITE	M.G + F.G
ANKERITE:			
KSPARS:			
CHLORITE:			
OTHER: GR	15%		
BIOTITE	25%		

NAME:

REMARKS:

CARBONACEOUS PELITIC SEDIMENT

THIN SECTION DESCRIPTION

SAMPLE NO.: TSSC 3

HOLE NO.: 122

UNIT: HW MUT.

PHOTOS:
EXC. PRESSURE SHADOWS

COLOR INDEX:

FABRICS:

MINERALOGY:

MINERAL:	PERCENT:	REMARKS:
QTZ	35%	BI MODAL 25% - 1°, 10% STRING.
CHL	15%	BANDED W QTZ 1°
BI	5%	MINOR
SC	25%	F.G. W/QTZ AGGREGATES
ARAG.	5%	2°
RUTILE	1%	
PEROVSKITE ?	TR	
PY	2-3%	ISOTROPIC.

REMARKS:

NOTE INCREASE IN QTZ AND CL AND < IN BI
MINOR QTZ STRING - 1°
CHL APPEARS 2° ?

HAND SAMPLE DESCRIPTION

SAMPLE NO.: T55C 4 **HOLE NO.:** 122 **LOCATION (FW/HW):** ORE ZONE

UNIT: MUT.

COLOR INDEX: 5

TEXTURE: WK PHYLLITIC

GRAIN SIZE: F.G.
FABRIC:
SIZE RELATIONS: ALL F.G.
BEDDING: NONE
COMPOSITIONAL LAYERING: YES, QTZ LAYERS.
STRUCTURES:

QTZ BANDS.

MINERALOGY:	PERCENT	COLOR	G.SIZE
SERICITE:	5%	GRN	
QUARTZ:	65%		
ANKERITE:			
KSPARS:			
CHLORITE:			
OTHER: PY	10%		
Gr	5%		

NAME:

REMARKS:

THIN SECTION DESCRIPTION

SAMPLE NO.: T3SC 4

HOLE NO.: RG 122

UNIT: ORE ZONE

COLOR INDEX: 5

FABRICS: AUGEN TEXT.

PHOTOS:

EPITAXIAL GROWTHS

MINERALOGY:

MINERAL:	PERCENT:	REMARKS:
QZ	60%	BIMODAL 1° AGGREGATES W Sc. 2° STRINGERS NOTE EPITAXIAL GROWTHS.
CL	—	
Sc	20%	V.F.G LATHS + STRINGERS
SULPHIDES	20%	BANDS W INTERSTICIAL QTZ + Sc.
BIOTITE	TR.	

REMARKS:

NOTE THE AMOUNT OF EPITAXIAL QTZ IN STRINGERS ASSOCIATED WITH SULPHIDES.

LACK OF CHLORITE, BIOTITE – INCREASE IN SERICITE

LIKELY INTENSELY ALTERED SEDIMENT. SILICIFIED

THIN SECTION DESCRIPTION

SAMPLE NO.: TSSC 5

HOLE NO.: RG 122

UNIT: PY MUT

PHOTOS:

EXC. PRESS. SHADOWS,

COLOR INDEX: 15

FABRICS: AUGEN TEXT
WEAKLY PHYLLITIC

MINERALOGY:

MINERAL:	PERCENT:	REMARKS:
QZ	45%	– 1° F.G. ANHEDRAL AGGREGATES. 2° MG. (0.5mm) UNDULOSE EXTn EPITAXIAL GROWTH
SC.	20%	– IN STRINGERS AND FOLn COMMONLY WITH SULPHIDES
BI	5%	– IN FOLn
CL (Fe)	15%	– IN FOLIATION AS PRESSURE SHADOWS.
SX	10%	– PY, SPL

REMARKS:

NOTE AMT OF QTZ IN AGGREGATES

HAND SAMPLE DESCRIPTION

SAMPLE NO.: TSSC 5 **HOLE NO.:** 122 **LOCATION (FW/HW):** FW

UNIT: MUDDY TUFF (PYRITIC)

COLOR INDEX: 20 - GREY

TEXTURE:

GRAIN SIZE: V. F. G
FABRIC: PHYLLITIC
SIZE RELATIONS:
BEDDING: NONE
COMPOSITIONAL LAYERING: WEAK DEF^{n} BY QZ
STRUCTURES:
AUGEN TEXTURE PROMINENT
QZ STRINGERS PERVASIVE

MINERALOGY:	PERCENT	COLOR	G.SIZE
SERICITE:	15%	APPLE GRN	V. F. G
QUARTZ:	50%	2° WHITE 1° GREY	MG.-F. G
ANKERITE:			
KSPARS:			
CHLORITE:	1-2%		
OTHER: PY	5-10%		
BIOTITE	10%		
OPAQUES	5%		

NAME:

REMARKS:

HAND SAMPLE DESCRIPTION

SAMPLE NO.: TSSC 6 **HOLE NO.:** 122 **LOCATION (FW/HW):** FW

UNIT: PY MUT

COLOR INDEX: 30

TEXTURE: F.G. PHYLLITIC

GRAIN SIZE: V. F. G
FABRIC:
SIZE RELATIONS:
BEDDING: POSS. REMANENT SX BEDS.
COMPOSITIONAL LAYERING: YES QTZ, SX.
STRUCTURES:

NONE

MINERALOGY:	PERCENT	COLOR	G.SIZE
SERICITE:	15%	GREY	
QUARTZ:	45%	GREY + WHITE	F.G - M.G
ANKERITE:	✓		
KSPARS:	✓		
CHLORITE:			
OTHER: SX	30%	CPY, TT, SL	

NAME:

REMARKS:

NOTE .75mm DK GREY QUARTZ PHENOS.

THIN SECTION DESCRIPTION

SAMPLE NO.: TSSC 6

HOLE NO.: 122

UNIT: F.W. PY MUT.

PHOTOS: PRESSURE SHADOWS AROUND SX'S.

COLOR INDEX: 20%

FABRICS: WEAKLY PHYLLITIC

MINERALOGY:

MINERAL:	PERCENT:	REMARKS:
QZ	40%	1° F.G (<.1mm) AGGREGATE SUBHEDRAL. 2° M.G (.25-.5mm) V. UNDULOSE ANHEDHRAL
SC.	10%	W̄ QUARTZ
BI	5%	IN FOLIATIONS
SX	30%	BANDED AND CLASTS SL, PY. GN. TT.

REMARKS:

NOTE BANDS OF F.G QTZ ALTERNATING W SX BANDS

ABSENCE OF CL.

HAND SAMPLE DESCRIPTION

SAMPLE NO.: TSSC 7 **HOLE NO.:** **LOCATION (FW/HW):** FW

UNIT: FW MUT. (SHALE?)

COLOR INDEX: 35

TEXTURE: WK. PHYLLITIC.

GRAIN SIZE: F.G.
FABRIC: POOR
SIZE RELATIONS: SULPHIDE RICH CLASTS F.G. CARBN MTX,
BEDDING: YES, FINE
COMPOSITIONAL LAYERING: WK. AND FINE
STRUCTURES:

FINE QZ STRINGERS.

MINERALOGY:	PERCENT	COLOR	G.SIZE
SERICITE:	5%		
QUARTZ:	45%		
ANKERITE:			
KSPARS:			
CHLORITE:			
OTHER:			
GR.	25%		
BI	10%		

NAME:

REMARKS:

MINOR SILICIFICATION

WEAKLY PHYLLITIC

THIN SECTION DESCRIPTION

SAMPLE NO.: TSSC 7

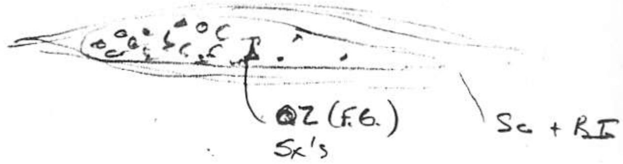
HOLE NO.: RG 122.

UNIT: SHALE

COLOR INDEX: 70 +

PHOTOS:

OVOID . CLASTS ω Sx's



FABRICS: FINE BEDDING BUT POORLY INDURATED
WEAK CRENULATION.

MINERALOGY:

MINERAL:	PERCENT:	REMARKS:
QZ	40%	F.G. (.1 - .5mm) UNDULOSE. OVOID CLASTS ω SULPHIDES 4mm LARGER PHENOS STRONGLY UNDULOSE
BI	10%	FOLIATION SURFACES
Sc	15%	V.F.G IN QTZ AGG.
OP	20%	MAINLY GRAPHITE, Sx's.
Sx	10%	PY
RUTILE	1-2%	RED

REMARKS:

NOTE RELATIVE ABSENCE OF SILICIFICATION.

HAND SAMPLE DESCRIPTION

SAMPLE NO.: T5SC 8 **HOLE NO.:** RG 122 **LOCATION (FW/HW):** F.W

UNIT: WCKE

COLOR INDEX: 35

TEXTURE: V. WEAKLY PHYLLITIC

GRAIN SIZE: MG. .5mm
FABRIC:
SIZE RELATIONS: F.G MATRIX.
BEDDING: NONE
COMPOSITIONAL LAYERING: YES QTZ RICH LAYERS.
STRUCTURES:

MINOR CARB. VEINS.

MINERALOGY:	PERCENT	COLOR	G.SIZE
SERICITE:	5%	MATRIX.	
QUARTZ:	50%	BIMODAL SIZE.	
ANKERITE:			
KSPARS:	/		
CHLORITE:	/		
OTHER: BI	25%	MATRIX.	
OP	1%		

NAME:

GREY WACKE.

REMARKS:

THIN SECTION DESCRIPTION

SAMPLE NO.: TSSC 8

HOLE NO.: RG 122.

UNIT: GREYWACKE FW.

PHOTOS: WHY NOT !!

COLOR INDEX: 35.

FABRICS: POORLY INDURATED.

MINERALOGY:

MINERAL:	PERCENT:	REMARKS:
QZ	60%	BIMODAL IN FRAMEWORK AND MATRIX.
BI	15%	F.G MATRIX.
ARAG.	5%	IN STRINGERS
GC.	15%	MATRIX.

REMARKS:

NOTE STRONG UNDULOSE EXT^N IN QZ.

UNALTERED

HAND SAMPLE DESCRIPTION

SAMPLE NO.: TSSC 9 **HOLE NO.:** 85 **LOCATION (FW/HW):** HW

UNIT: SERICITIC TUFF

COLOR INDEX: 5

TEXTURE: WELL INDURATED

GRAIN SIZE: V.F.G.
FABRIC: SCHISTOSE
SIZE RELATIONS:
BEDDING: POSSIBLE
COMPOSITIONAL LAYERING: DEFINATE SERICITE/QTZ
STRUCTURES:
WELL FOLDED LAYERS OF (CHERT) + SC.

MINERALOGY:	PERCENT	COLOR	G.SIZE
SERICITE:	65%	LIME GRN.	V.FG
QUARTZ:	25%	BIMODAL	M.G./F.G.
ANKERITE:			
KSPARS:			
CHLORITE:	5%		
OTHER: PY	10%		

NAME:

REMARKS:

NOTE QTZ STRINGERS SUB // TO FOLN CARRY PYRITE

THIN SECTION DESCRIPTION

SAMPLE NO.: TSSC 9

PHOTOS:

HOLE NO.: RG 85

UNIT: SC TUFF

COLOR INDEX: 5-10

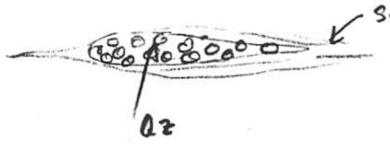
FABRICS: WELL FOLIATED (SCHISTOSE.)

MINERALOGY:

MINERAL:	PERCENT:	REMARKS:
QZ	35%	1° VFG >.1mm 2° (.1-.3m) STRINGERS AUGEN AGGREGATES WITH ALTERNATING BANDS OF QZ + SC.
SC	40%	F.G BANDS. AND IN QZ MATRIX AS LATHS.
PY	7%	

REMARKS:

EXTREMELY FINE LAMINATIONS. COMPOSITIONAL LAYERING OVOID SHAPED QTZ AUGENS COMPOSED OF FINE GRAINED AGGREGATES.



HAND SAMPLE DESCRIPTION

SAMPLE NO.: TSSC 10 **HOLE NO.:** RG 85 **LOCATION (FW/HW):** HW

UNIT: SC TUFF + CHT.

COLOR INDEX: 5

TEXTURE: PHYLLITIC

GRAIN SIZE: V.F.G
FABRIC: FOLIATED
SIZE RELATIONS: MICROCRYSTALLINE QTZ + SC.
BEDDING: POSSIBLE REMNANENT
COMPOSITIONAL LAYERING: YES
STRUCTURES:
CONTORTED AND BROKEN FOLDS.

MINERALOGY:	PERCENT	COLOR	G.SIZE
SERICITE:	40%	LIME GREEN	V.F.G
QUARTZ:	40%	LT. GREY	V.F.G
ANKERITE:			
KSPARS:			
CHLORITE:	/		
OTHER: PY	10%		

NAME:

REMARKS:

NOTE INCREASE IN F.G. (1°) QTZ FROM LAST SAMPLE.
DECREASE IN PENETRATIVE FABRIC
INCREASE IN DEFM.

THIN SECTION DESCRIPTION

SAMPLE NO.: TSSC 10

HOLE NO.: RG 85

UNIT: SERICITIC TUFF + CHERT

PHOTOS: CRENULATIONS + GRAINSIZE.

COLOR INDEX: 10

FABRICS:

WELL FOLDED - BUT FRACTURES // TO FOLD
CRENULATED.

MINERALOGY:

MINERAL:	PERCENT:	REMARKS:
QTZ	55%	V. FINE GRAINED >1mm CHERTS. ANHEDRAL.
SC	35%	V. FINE. BANDS 20-40 μm CRENULATED
PY	10%	>1mm SUBHEDRAL QTZ PRESS. SHADOWS.

REMARKS:

OPEN FOLDS - NOT ISOCLINAL - SHEARING ON LIMBS.

ALTERNATING CHERT AND TUFFACEOUS BANDS.

HAND SAMPLE DESCRIPTION

SAMPLE NO.: TSSC 11 **HOLE NO.:** RG 122 **LOCATION (FW/HW):** FW

UNIT: MUDDY TUFF

COLOR INDEX: 70

TEXTURE: BRECCIATED

GRAIN SIZE: C.G. WITH VFG MATRIX
FABRIC: WEAKLY PHYLLITIC
SIZE RELATIONS:
BEDDING: NO
COMPOSITIONAL LAYERING: MINOR.
STRUCTURES:

FLATTENED CHERT PEBBLES

MIXED ROCK FRAGMENTS

MINERALOGY:	PERCENT	COLOR	G.SIZE
SERICITE:	5%		
QUARTZ:	40%	GREY-WHITE	
ANKERITE:	5%		
KSPARS:			
CHLORITE:			
OTHER: BI	20%		
ARAG	5%		
GR	5%		
PY	10%		

NAME:

REMARKS:

THIN SECTION DESCRIPTION

SAMPLE NO.: TSSC 11

PHOTOS: Yes.

HOLE NO.: RG 85

UNIT: MUT

COLOR INDEX: 80

FABRICS: AUGEN TEXT.

MINERALOGY:

MINERAL:	PERCENT:	REMARKS:
QZ	45%	BIMODAL 1° < .1mm BANDS AND OVOID AGGREG. 2° >1mm PORPHYROBLASTS OR PEBBLES. STRONG UNDULOSE
PY	5%	F.G EUHEDRAL
SC	20%	BROKEN LAMMELAE, CRENULATED
BI	15%	PERVASIVE 2°
RUTILE	1-2%	
ARAG	10%	ASSOCIATED w F.G. QTZ NO TWINS. .1-.2mm SUB HEDRAL

REMARKS:

ROCK PROBABLY A <u>FAULT BRECCIA</u>
NOTE BROKEN MATRIX - NOT LAMINAR
QTZ GRAINS 1mm + CHERTY CLASTS.

HAND SAMPLE DESCRIPTION

SAMPLE NO.: T55C 12 **HOLE NO.:** RG 85 **LOCATION (FW/HW):** FW

UNIT: SILICEOUS ARGILLITE

COLOR INDEX: 90

TEXTURE: SLATEY.

GRAIN SIZE: V.F.G.
FABRIC: WEAK FOLN
SIZE RELATIONS: ALL F.G.
BEDDING: POSS
COMPOSITIONAL LAYERING: POSS.
STRUCTURES:

LAMINAR FABRIC

QTZ STRINGERS

MINERALOGY:	PERCENT	COLOR	G.SIZE
SERICITE:	5%		
QUARTZ:	40%		
ANKERITE:			
KSPARS:			
CHLORITE:			
OTHER: GR	30%		
BI	20%		

NAME:

REMARKS:

ABSENCE OF CARBONATES.

THIN SECTION DESCRIPTION

SAMPLE NO.: TSSC 12 **PHOTOS:**

HOLE NO.: RG 85

UNIT: SILICIFIED ARGILLITE

COLOR INDEX: 80

FABRICS: SLATEY CLVG.

MINERALOGY:

MINERAL:	PERCENT:	REMARKS:
QTZ	35%	F.G RODS IN MATRIX
	15%	M.G QZ STRINGERS.
Sc	5%	
BI	20%	LAMINAR
Gr	15%	FOLn SETS.
Py	5%	DISSEM. EUHED.
RUTILE	1-2%	

REMARKS:

FINE QZ STRINGERS (<,1mm) SUB// TO FOLIATION

NOTE GR. SELVAGE ON STRINGERS.

HAND SAMPLE DESCRIPTION

SAMPLE NO.: TSSC 13 **HOLE NO.:** 85 **LOCATION (FW/HW):**

UNIT: MUT

COLOR INDEX: 60-70 - GREY

TEXTURE: LAMINATED - PHYLLITIC

GRAIN SIZE:
FABRIC: AUGEN
SIZE RELATIONS: ALL F.G
BEDDING: NONE
COMPOSITIONAL LAYERING: MINOR
STRUCTURES:

AUGEN TEXT.

MINERALOGY:	PERCENT	COLOR	G.SIZE
SERICITE:	5%		
QUARTZ:	55%	GREY	F.G. LAMINAR
ANKERITE:			
KSPARS:			
CHLORITE:	/		
OTHER: PY	10%	/	
Gr	1-2%		
BI	15%		

NAME:

REMARKS:

NOTE PRESENCE OF BIOTITE AND ABUNDANCE OF QTZ

THIN SECTION DESCRIPTION

SAMPLE NO.: TSSC 13

PHOTOS:

HOLE NO.: RG 85.

UNIT: MUT

COLOR INDEX: 25

FABRICS: AUGEN TEXT.

MINERALOGY:

MINERAL:	PERCENT:	REMARKS:
Qz	60 - 70%	F.G. LAMINAR RODS AND AGGREGATES MINOR PRE DEFM STRINGERS
Sc	20%	BANDS
Bt.	5%	FOLIATION SETS
RUTILE	1-2%	ANHEDRAL
Py	7%	EUHEDRAL .5mm
GR	5%	

REMARKS:

NOTE STRONG PREFERRED ORIENTATION OF QUARTZ SHARDS, AND PHENOS

HAND SAMPLE DESCRIPTION

SAMPLE NO.: TSSC 14 **HOLE NO.:** R685 **LOCATION (FW/HW):** FW

UNIT: MUT.

COLOR INDEX: 70

TEXTURE: WK PHYLLITIC

GRAIN SIZE: F.G
FABRIC: PHYLLITE
SIZE RELATIONS: ALL F.G
BEDDING: NONE
COMPOSITIONAL LAYERING: WK QZ
STRUCTURES:

WK LAMINATED

AUGEN TEXT.

MINERALOGY:	PERCENT	COLOR	G.SIZE
SERICITE:	5%		
QUARTZ:	60%	GREY	VF.G
ANKERITE:			
KSPARS:			
CHLORITE:			
OTHER: GR	10%		
PY	15%		

NAME:

REMARKS:

MINOR QZ STRINGERS

THIN SECTION DESCRIPTION

SAMPLE NO.: TSSC 14

PHOTOS:

HOLE NO.: RG 85

UNIT: MUT (PY)

COLOR INDEX: 30

FABRICS: AUGEN TEXT.
PHYLLITIC.

MINERALOGY:

MINERAL:	PERCENT:	REMARKS:
QZ	60%	BIMODAL 40% V.F.G 15% F.G.
SC	20%	BROKEN LAMINAE.
PY	10%	F.G. EUHEDRAL
RUTILE	1-2%	

REMARKS:

FINE GRAINED QZ RICH GROUNDMASS.

HAND SAMPLE DESCRIPTION

SAMPLE NO.: TSSC 15 **HOLE NO.:** RG 85 **LOCATION (FW/HW):** FW

UNIT: MUT, (PY)

COLOR INDEX: 20

TEXTURE: PYRITIC F.G.

GRAIN SIZE: F.G
FABRIC: LAMINATED, PHYLLITIC
SIZE RELATIONS:
BEDDING: POSS
COMPOSITIONAL LAYERING: POSS.
STRUCTURES:

MINERALOGY:	PERCENT	COLOR	G.SIZE
SERICITE:	15%		
QUARTZ:	65%		F.G.
ANKERITE:			
KSPARS:			
CHLORITE:			
OTHER: PY	20%		

NAME:

REMARKS:

NOTE ALMOST GRANULAR TEXTURE OF THIS SPECIMAN (RECRYSTALLIZED?)

THIN SECTION DESCRIPTION

SAMPLE NO.: TSSC 15

HOLE NO.: RG 85

UNIT: MUT (PY) FW

PHOTOS:

QZ HABIT.

COLOR INDEX: 20

FABRICS: WEAKLY LAMINATED
SULPHIDE RICH (20%)

MINERALOGY:

MINERAL:	PERCENT:	REMARKS:
QZ	65%	LATH SHAPED, STRONGLY UNDULOSE. WELL CEMENTED.
SC	25%	V.F.G. PATCHES INTERSTITIAL TO QZ NETWORK
RUTILE	1-2%	RED, TABULAR PHENOS.
SL	3-5%	I. REFL.
PY	3-5%	.1mm TO 10 um (V.FG)

REMARKS:

QUARTZ ARENITE ?? - SILICEOUS SED

HAND SAMPLE DESCRIPTION

SAMPLE NO.: TSSC 16 **HOLE NO.:** RG 85 **LOCATION (FW/HW):** FW

UNIT: PY MVT (FW

COLOR INDEX: 50

TEXTURE: AUGEN

GRAIN SIZE: F.G
FABRIC: PHYLLITIC
SIZE RELATIONS: ALL F.G.
BEDDING: NONE
COMPOSITIONAL LAYERING: YES. PY, QZ.
STRUCTURES:

AUGEN TEXTURE
MINOR QZ STRING.

MINERALOGY:	PERCENT	COLOR	G.SIZE
SERICITE:	10%		
QUARTZ:	65%	GREY	
ANKERITE:			
KSPARS:			
CHLORITE:			
OTHER: PY	20%		

NAME:
CHERT?

REMARKS:

AMT. OF PY GIVES ROCK DK. GREY COLOUR

THIN SECTION DESCRIPTION

SAMPLE NO.: TSSC 16 **PHOTOS:**

HOLE NO.: RG 85

UNIT:

COLOR INDEX: 50

FABRICS: WEAKLY FOLIATED
AUGEN TEXTURE.

MINERALOGY:

MINERAL:	PERCENT:	REMARKS:
QZ	45%	BIMODAL?(0.2mm - 0.1mm) 1°(.05 - 0.01 mm)
SC	25%	PATCHES AND LATHES INTERSTITIAL TO QZ
PY + SX'S	20%	BANDS // TO FOLN
RUTILE	1-2%	

REMARKS:

ALTERNATING BANDS OF QZ + SC.

F.G QZ

DISCONTINUOUS LAMINAE.

FOLN DEFINED BY SC. - SPACED.

GREY COLOUR DUE TO SX CONTENT.

HAND SAMPLE DESCRIPTION

SAMPLE NO.: TSSC 17 **HOLE NO.:** RG 85 **LOCATION (FW/HW):** FW

UNIT: MUT (PY)

COLOR INDEX: 30

TEXTURE: PHYLLITIC

GRAIN SIZE: F.G
FABRIC: AUGEN
SIZE RELATIONS: N.D.
BEDDING: NONE
COMPOSITIONAL LAYERING: POSS.
STRUCTURES:

PYRITIC BANDS IN SILICEOUS MTX.
AUGEN, PHYLLITIC

MINERALOGY:	PERCENT	COLOR	G.SIZE
SERICITE:	15%		
QUARTZ:	60%	- GREY	
ANKERITE:			
KSPARS:			
CHLORITE:			
OTHER: PY	25%		

NAME:
EXHALITE (CHERT)?!

REMARKS:

GREY COLOUR DUE TO SX'S

THIN SECTION DESCRIPTION

SAMPLE NO.: TSSC 17

HOLE NO.: RG 85

UNIT: PY MUT

COLOR INDEX: 30-40

PHOTOS:

X POLARS
W PLATE FOR AUGENS.

FABRICS: WEAKLY PHYLLITIC, SILICEOUS, AUGEN TEXT.

MINERALOGY:

MINERAL:	PERCENT:	REMARKS:
QZ	40%	BIMODAL
SC	25%	
RUTILE	1-2%	
PY	20%	BANDS EUHEDRAL (L.1mm)

REMARKS:

GREY COLOUR DUE TO SX'S.

APPENDIX 3

APPENDIX 4