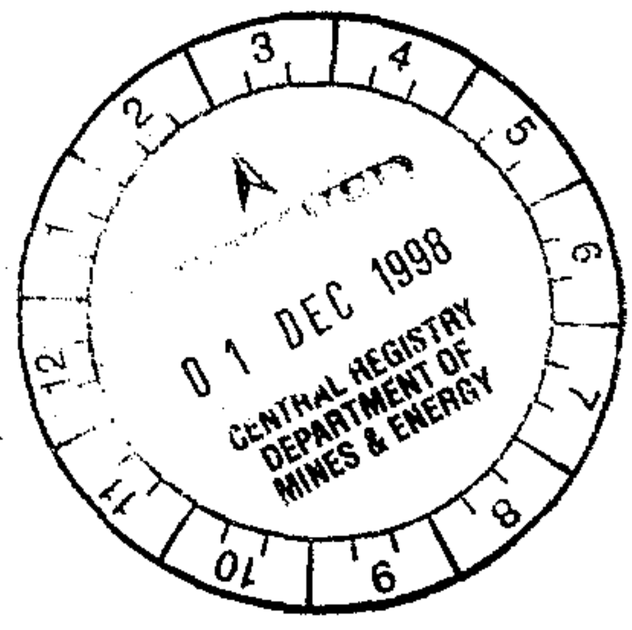
AFMECO MINING AND EXPLORATION PTY LTD

Exploration Licence 3590

Arnhem Land, Northern Territory

ERRE JOINT VENTURE

FIRST ANNUAL REPORT
18/11/97 – 17/11/98



Darwin NT

December 1998

Alligator River
1: 250 000 Sheet

P. Kastellorizos
AFMEX Report 1998/32

CONTENTS

8. LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

SUMMARY

The main targets for exploration on EL 3590 are unconformity style uranium deposits.

One helicopter supported diamond hole has been drilled on the EL. The aim of the drilling program was to obtain information regarding the Kombolgie Formation cover and underlying basement sequence. The basement stratigraphy was found to consist of the Cahill Formation.

1. INTRODUCTION

Exploration Licence 3590 (figure 1) was granted on the 18th of November 1997 for a period of 6 years. The EL lies approximately 250 km east of Darwin in West Arnhem Land, approximately 25 km SW of Myra Camp.

Exploration activities carried out in 1998 were one helicopter supported diamond drill hole. Helicopter operations were based from Jabiru due to the proximity of EL 3590.

The main aim of the program was to locate indications, direct or indirect, of uranium mineralisation in the basement underlying the Kombolgie Formation cover, with a particular focus on the major structural zone.

2. TENURE

EL 3590 was granted on the 18th of November 1997 for a period of six years and occupies a total area of 3.24 square kilometres (1 block). Boundary co-ordinates (Australian Map Grid zone 53, AGD 66) for EL 3590 are as follows:

EL	Longitude E	Latitude S	AMG East	AMG North
NW Corner	133º 03'	12º 32'	288113	8613682
	133º 04'	12º 32'	289924	8613696
	133º 04'	12º 33'	289938	8611852
	133º 03'	12º 33'	288126	8611838

Afmeco Mining and Exploration Pty Ltd is the operator of the Erre joint venture. Interest holders comprise Afmeco Mining and Exploration Pty Ltd 37.5%, SAE Australia Pty Ltd 37.5%, Macapa Pty Ltd 24.5% and Erre Aboriginal Co-operation 2.0%.

3. LOCATION AND ACCESS

EL 3590 is located in Western Arnhem Land (figure 1). Access to the licence area from Darwin is by air to the Jabiru airstrip, thence by helicopter to the tenement. Access from AFMEX's base camp in West Arhnemland (Myra Camp) to EL 3590 is also by helicopter only. No tracks exist for vehicle access into EL 3590.

4. GEOLOGY

4.1 Regional Geology

The oldest metamorphic rocks found in the area are thought to be equivalents of the Palaeoproterozoic Cahill Formation. Recent work by exploration companies in West Arnhem Land have provided an informal sub-division of the Cahill Formation metasediments into four units: the calcsilicate unit (basal), the lower arkosic unit, the amphibolitic unit and the upper arkosic unit (upper). The calcsilicate unit is considered equivalent to the calcareous unit of the Lower Cahill Formation. The Nabarlek uranium deposit is hosted within the amphibolitic unit.

Several post-orogenic granites, with minimum intrusion ages of between 1750 and 1780 Ma have intruded the metamorphic sequences of West Arnhem Land. The very extensive, generally flat-lying gabbroic intrusion, the Oenpelli Dolerite, intruded the Palaeoproterozoic rocks of the region around 1688 Ma. Recent field observations have revealed that the Oenpelli Dolerite has also intruded the Kombolgie Formation cover sequence.

The Kombolgie Formation is a widespread, several thousand metre thick sequence of late Palaeoproterozoic sandstones, which unconformably overlies the older metasediments. A thin basic volcanic member (Nungbalgarri Volcanics) divides the sandstones into two units in West Arnhem Land. The regional stratigraphic relationships are schematically illustrated in figure 3.

4.2 Geology of the Erre Area

The EL 3590 area, is entirely covered by the Kombolgie Formation with no outcropping basement.

4.2.1 Cahill Formation

One hole was drilled through the Kombolgie into the underlying Cahill Formation, which consisted of:

Lower Arkosic Unit – a sequence composed of quartz-mica schists (some garnets, sillimanite and minor graphite), with meta-arkoses and minor amphibolite bands.

4.2.2 Kombolgie Formation

The Kombolgie Formation is dominated by fine to coarse grained, moderately well sorted, locally well-bedded sandstone. Conglomerates and siltstones are common near the unconformity.

4.2.3 Structures

The Bulman Fault is the only dominant structure on EL 3590 and trends in a NW-SE direction. This major structure forms a deformation corridor more than a kilometre wide, suggesting a trans-crustal event. The presence or amount of displacement doing this structural feature is not known.

5. WORK COMPLETED AND RESULTS

5.1 Drilling

The purpose of the helicopter supported drilling program was to check for signs of alteration and mineralisation in both the sandstone cover and basement as well as to determine the basement lithologies.

From the 4th May until 12th May 1998, one NQ diamond drill hole numbered ERR 1 (figure 4) was completed by Century Drilling of Batchelor NT. The rig was a Longyear LF 70 heli-portable diamond drill operated by 4 men working two 12 hour shifts. An overview of the 1998 diamond drilling is in Table 1. The drilling is also summarised in Table 2. A detailed log and summary log are in appendix I. Mason Geoscience Pty Ltd, South Australia, has conducted petrographic studies of drill core samples (Table 3). Petrographic report #2453 is in appendix II. Amdel Ltd conducted X-ray diffraction studies of 7 selected drill core samples (Appendix III) of sandstone. Geochemical analysis for

uranium and other trace elements was performed on the core (Appendix IV). Both the sandstone geochemistry and X-ray diffraction studies were done on samples of core at 50 m intervals, down the hole with 3 evenly spaced samples taken in the last 20 m the unconformity.

A portable infrared mineral analyser (PIMA) was used to identify possible alteration clay minerals in the Kombolgie Formation sandstone. Sandstone samples from diamond drill core were taken at 5 m intervals down the hole until 30 m above the unconformity, whence they were taken every metre to the unconformity. The results are presented in Table 4.

Drill hole orientation was measured every 50 metres with an Eastman deviation probe. Down hole spectrometric logging was conducted with an Auslog probing unit and natural gamma probe. No uranium mineralisation or significant indicator of probable mineralisation was intersected.

Hole ERR 1 (355.0 m deep) was collared in Kombolgie Formation which comprised of fine to medium grained hematitic/illitic sandstone (minor limonite). The last 25 m of sandstone above the unconformity displays strong local chlorite and sericite alteration, with fresh pyrite and dolomite in fractures. Minor vuggy quartz veins and breccias are common. Below the unconformity at 273.1 to the end of the hole 355.0 m, the lower arkosic unit occurs. This consists of an altered sequence of garnet schists, amphibolites, and micaceous meta-arkoses. Graphite was observed in fractures with laminations in the mica schists (details in appendix I). No anomalous/radioactivity was intersected.

Mason Geoscience petrographically describes four samples from drill hole ERR 1. The four samples are listed in Table 3 and the petrography report is at Appendix II.

6. COMMENT ON RESULTS

The lower arkosic unit of the Cahill Formation was intersected in hole ERR 1. The Cahill Formation hosts uranium mineralisation in the region. Furthermore hole ERR 1 displays strong chlorite alteration with some graphitic horizons. It is suggested that prospective units of the Cahill Formation will continue under the sandstone in this area.

7. RECOMMENDATION

It is recommended that detailed structural mapping and lithogechemical sampling of the Bulman Fault be undertaken and further diamond drilling should be carried out.

300 000mE

320 000mE

340 000mE

360 000mE

8 640 000mN

OENPELLI

NABARLEK

Myra Camp

8 620 000mN

EL 3590

East Alligator River

8 600 000mN

LEGEND

Major road

Minor road

River

10km

Scale

MAP LOCATION

KAKADU NATIONAL PARK

ARNHEM LAND ABORIGINAL LAND TRUST

EL 3590

LOCATION MAP

Mapsheet : ALLIGATOR RIVER 1 : 250 000
SD 53-1

Figure 1

288 000mE

290 000mE

8 614 000mN

8 612 000mN

8 610 000mN

Czs

Qa

Ehk

Exm

Pc

BULMAN FAULT

ALLIGATOR RIVER

EL 3590

ERR 1

30

3

5

EL 3590 DRILLING / GEOLOGY

- Qa — Gravel, Sand, Silt; active channel & flood plain deposits
- Czs — Unconsolidated sand: ferruginous and clayey sand
- Ehk — Kombolgie Formation
- Exm — Myra Falls Metamorphics
- Pc — Cahill Formation
- 1998 Heli drill hole
- Fault - accurate
- Fault - approx
- Joint
- Shear
- Creek

N

0 1000

metres

SCALE 1 : 25 000

AMG Zone 53 (AGD 66)

Figure 2

EAST ALLIGATOR RIVER

WEST ARNHEM LAND

MIDDLE PROTEROZOIC (Carpentarian)

UPPER KOMBOLGIE SANDSTONE (650 m)

NUNGBALGARRI VOLCANICS (100 - 200m)

(1700)

LOWER KOMBOLGIE SANDSTONE (300m)

UNCONFORMITY

TOP END OREGENY

(1870 - 1800)

EARLY PROTEROZOIC

OENPELLI DOLERITE (1688 + 13)

NOURLANGIE SCHIST (200m ?)

GRANITES
Nabarlek
Jim Jim
Tin Camp
(1780 - 1732)

NIMBUWAH GRANITOIDS (1870)

ZAMU DOLERITE

CAHILL FORMATION

Upper Cahill Formation (2400m)

Lower Cahill Formation (600m)

U_1

KAKADU GROUP

MUNMARLARY QUARTZITE (200m)

MOUNT BASEDOW GNEISS

Upper Arkosic Unit (600m +)

U_3

Amphibolitic Unit

Lower Arkosic Unit

U_2

Calcsilicate Unit

MYRA FALLS METAMORPHICS

KAKADU GROUP

KUDJUMARNDI QUARTZITE (100 - 150m)

MOUNT HOWSHIP GNEISS (500 - 600m)

UNCONFORMITY ?

ARCHAEAN (Nullaginian)

NANAMBU COMPLEX(2504 + 22)

NIMBUWAH MIGMATITIC COMPLEX

ARCHAEAN

U_1 Ranger (1750 Ma?), Jabiluka (1620 Ma), Koongarra (1650 - 1600 Ma)
U_2 Caramal
U_3 Nabarlek

CORRELATION CHART FOR PROTEROZOIC ROCKS OF THE EAST ALLIGATOR RIVER AREAS

Figure 3

TABLE: 1

EL 3590

ERRE

1998 DIAMOND DRILL HOLE

OVERVIEW

Table 1 : AFMEX J.V - 1998 Diamond Drill Hole Overview.

HOLE #	EL	EASTING	NORTHING	R.L.	START	FINISH	RC m	NQ *BQ* m	DIP degree	AZIMUTH degree (M)	TOTAL m	U/C	ANOMALOUS RADIOACTIVITY c/s
ERR01	3590	289095	8612714	80.0	04/05/98	12/05/98		355.0	-80	266	355.0	273.0	none

TABLE: 2

EL 3590

ERRE

1998 DIAMOND DRILLING

SUMMARY

Afmeco Mining and Exploration, Western Arnhem Land, NT, Australia
1998 Diamond Drilling Summary

Table: 3

Tenem. **Hole ID**	G. coord. x y z	Date: started finished	Core size	depth/ strike(M)/ dip	unconf x y z	downh logging tool(s)	PIMA XRD Pet. sam.	Geological summary	Ra max cps/m Tot. GT (cutoff 1‰) from/to
EL 3590 **ERR 01**	289080 8612714 81	4/5/98 12/5/98	NQ2	0/267/-80 53/247/-81 101/?/-81 149/?/-80.5 203/?/-81 251/?/-81 300/?/-81 350/251/-79	273.1	A-75	83 7 4	0-4.8m, Sand **4-273.0m, KOMBOLGIE SANDSTONE** 4-83.5m, fine to medium . Weak to mod hematite and illite alteration Friable, with limonite at top 83.5-144.4m, Medium to coarse with gravel and pebble bands. Minor conglomeratic layers. Weak hematitic and illitic alt. 144.4-167.4m, Fine grain, hematitic 167.4-203.1m, Medium grain, gritty or with pebble bands, moderate illite alteration, patchy hematite. Some minor siltstone beds 203.1-212.7m, Fine to med. patchy illitic alteration 211.7-242.8m, Medium to coarse grain, gritty and pebbles bands hematitic in parts 242.8-260m, Medium grain, some zone of chloritic / sericite alteration Minor vuggy quartz veins 242.5- 247.8m silicified 260-268.6m, Medium to coarse, pebbly , zones of strong alteration 268.6-273.1m, Strongly altered sandstone and siltstone. **273.1m, UNCONFORMITY** **273.1-355.0m, LOWER ARKOSIC UNIT** 273.1-282.6m, Strongly altered, hematitic or bleached or chloritised schist and amphibolite. 282.6-294.2m, Strongly altered schist and amphibolite , proximal alteration, quartz removed 294.2-310m, Strongly altered garnet schist with minor amphibolite partial quartz removal. 310-335.2m, Altered garnet schist, mica meta-arkose, graphite horizons 335.2-355m, weak altered garnet schist/meta arkose, some graphite **355.0m, END OF HOLE**	None

TABLE: 3

EL 3590

ERRE

LIST OF SAMPLES FOR

PETROGRAPHY/MINERALOGY

STUDIES

TABLE 3: LIST OF SAMPLES FOR PETROGRAPHY/MINERALOGY STUDIES

Sample No.	Drill Hole	Depth	Co-ordinates		Confer Report
			Easting	Northing	
ERR 1, 248.0	ERR 1	248	289278	8612804	1
ERR 1, 270.8	ERR 1	270.8	289278	8612804	1
ERR 1, 322.0	ERR 1	322	289278	8612804	1
ERR 1, 354.7	ERR 1	354.7	289278	8612804	1

Notes

Report 1 Mason Geoscience Petrographic Report #2453

TABLE: 4

EL 3590

ERRE

PIMA RESULTS FROM

HOLE ERRE 1

TABLE 4: PIMA RESULTS FOR ERR 1

Sample	Depth	Illite	Muscovite	Kaolinite	Halloysite	Silica	Water	Epidote	Chlorite
602057	5		4	96					
602058	10	100							
602059	15	100							
602060	20		74				26		
602061	25		19		81				
602062	30	100							
602063	35	100							
602064	40		14	86					
602065	45	100							
602066	50	100							
602067	55	100							
602068	60	100							
602069	65	100							
602070	70		100						
602071	75	90		10					
602072	80	100							
602073	85	100							
602074	90	91					9		
602075	95	88					12		
602076	100	100							
602077	105	100							
602078	110	100							
602079	115	100							
602080	120	100							
602081	125	100							
602082	130	100							
602083	135	100							
602084	140	100							
602085	145	77		23					

TABLE 4: PIMA RESULTS FOR ERR 1

Sample	Depth	Illite	Muscovite	Kaolinite	Halloysite	Silica	Water	Epidote	Chlorite
602086	150.2	100							
602087	155	100							
602088	160	100							
602089	165	100							
602090	170.1	100							
602091	175	100							
602092	180	100							
602093	185	100							
602094	190	100							
602095	195	100							
602096	200	100							
602097	205	100							
602098	210	100							
602099	215	100							
602100	220	100							
602101	225	100							
602102	230	100							
602103	235	100							
602104	240.2	100							
605261	243	100							
605262	244	100							
605263	245	100							
602105	245	100							
605264	246		65			35			
605265	247		100						
605266	247.8	82					11	8	
602113	248	44						5	50
605267	249	100							
602106	249	100							

TABLE 4: PIMA RESULTS FOR ERR 1

Sample	Depth	Illite	Muscovite	Kaolinite	Halloysite	Silica	Water	Epidote	Chlorite
605268	250		80				20		
605269	251		100						
605270	252		18			82			
605271	253		18			82			
605272	254		D						
605273	255		D						
602107	255		D						
605274	256		D						
605275	257	D							
605276	258	SD	A			SD			
605277	259	D							
602112	259	D				SD			
605278	260	D	Tr			SD			
602108	260.2	D					A		
605279	261	D							
605280	262	D							
605281	263		D						
605282	264	D							
605283	265	D							
602109	265	D							
605284	266	D							
605285	268	D							
602110	270	D							
605286	270.5	A	SD			SD			
602111	270.5	A	D			SD			

Abbreviations

D = Dominant. Used for the component most abundant, regardless of its percentage level

CD = Co-dominant. Used for the two predominating components, judged to be present, in roughly equal amounts

SD = Sub-dominant. Next more abundant components providing its percentage level is judged above 20

A = Components judged to be present between the levels of 5 and 20%

Tr = Trace. Components judged to be below about 5 %

APPENDIX I:

EL 3590

ERRE

DIAMOND DRILL SUMMARY AND DRILL LOG

HOLE 1

AFMECO MINING AND EXPLORATION - DIAMOND DRILLHOLE LOG

E.L. No: 3590. Anomaly: ERRE Hole Number: ERR 01 Logged By: DEWINGTON J. FABRAY.

Easting: 289278 Northing: 8612804 R.L: 80-m Dip: 80° Azimuth: 270°

Precollar: - Total Depth: 355.0 m Start Date: 4 MAY 98. Finish Date: 12/5/98.

Driller: T. OWEN D. ALSOP Rig: CENTURY HELIRIG 32 Hole Size NQ2. Gamma log: ANSLOG.

Depth (m)	Core box #	Recov (%)	S_0/S_1	Geol	Max Gsize	Fractures	Colour	Alteration C Li I K Cy Si H	Minerals Q Ca Tm	U Assay	Samp #	Comments
												NO CORE RECOVERED
1.8 5	SOH.									PIMA	5 XRD	
	90%											KOMBOLGIE SANDSTONE
	20%											
	CL											
	80%											
10										PIMA		

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG

Hole #: ERR61 **Page#:** 2/25

Depth (m)	Core box #	Recov (%)	S_0 / S_1	Geol	Max Gsize	Fractures	Colour	Alteration C Li I K Cy Si H	Minerals Q Ca Tm	U Assay	Samp #	Comments
	2	100%										
		100%										
13·4												
		100%										
15										PIMA		
	3	100%			1		LO					Moderately to highly friable sandstone. Fine grained = massive.
												Minor core loss towards bottom.
19·0		95%										
20		50%			1		LO			PIMA		friable sandstone. Fine grained and massive. Large core loss.
20·5												
21·0					1		GyRPl					Strongly haematised sst. with mottled clay replacement. Mildly friable. Massive. fine grained.
	4	100%										
							LO					Massively bedded sst with occasional
					1		to LRPl					haematite and clay replaced layers. Rare limonite. Mottled clay replacement @ 24·0 m.
25		100%								PIMA		Moderately friable.

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG

Hole #: ERR 01 Page#: 3/25

Depth (m)	Core box #	Recov (%)	S_0 / S_1	Geol	Max Gsize	Fractures	Colour	Alteration (C Li I K Cy Si H)	Minerals (Q Ca Tm)	U Assay	Samp #	Comments
		70%										As ab.
26.5												
		100%	~80°		1	22F 20-80°	lo to					Massive to planar bedded f.g. sst. Pervasive haem and lim. alteration in places.
	5					Ro - L, H, Cy	dRB					Highly fractured, although may not be true fractures, just weathering induced, friable fracturing. Friable sst.
29.7-30										PIMA		
		70%	70-80°		1	17F 20-80°	lo					Less altered sst than above. Fine grained and more friable.
						Ro - Cy.						As ab, the fractures parallel with bedding are more likely caused by friable nature of sst. 1 to 20° F is probably real.
32.7												
							lo					Limonite stained, f.g sst. More highly fractured with low angle fractures esp. @ 34.5 m. and 35.9 m. Slightly friable.
35			~80°		1	24F 10°-80°.	to d40			PIMA		
36.0	6.	100%				Ro - H, L, Cy.						
			70-80°		1	16F 10-80°						Highly fractured and altered zone. Mottled clay alteration, poss. illite.
39.7.						Ro - H, L, I.						Friable, esp. 36.1 - 36.4 m - destroyed core
40										PIMA		

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG

Hole #: ERR01 **Page#:** 4/25

Depth (m)	Core box #	Recov (%)	S_0 / S_1	Geol	Max Gsize	Fractures	Colour	Alteration (C Li I K Cy Si H)	Minerals (Q Ca Tm)	U Assay	Samp #	Comments
	7	100%										Partially altered, f-g sst with rare pebble layers and clasts.
			70°		8	22F 20-80° Ro - Q, I, H.	Lo.					One low angle fracture - remainder ~ parallel with bedding. Low angle fracture partially healed with qtz.
44.2												Massively bedded sst - f-gr. Mildly fractured and mottled haem. zones throughout section.
45			~75°			9F 70-80°	lO			PIMA		
					1.5	RO - H, I						Illite observed along some fracture planes.
45.8												
	8	100%	~75°									as ab. Slightly more fractures and larger max grain size. Mottled haem zones throughout.
					3	11F 70-80° RO - H.	lO					Possibly less clay altered zones and no illite observed on fracture surfaces.
48.5												
												sst as ab. Less pervasive haem alteration.
			~75°		1.5	9F 25°-70° Ro, H, L, Cy	Lo			PIMA	50 xRO	Difference in fracture style. low angle. stylolites observed with possible illite along sty. plane.
50												
50.5												
	9	100%	70°		17	20F 70°-80°	Lo.					sst as ab. More pervasive haem. alteration, and distinctive clay (illite) altered horizons at 53.9 and 54.4 m. Rare large qtz pebbles up to 17 mm in diameter.
						Ro, H, L, Cy. 1F 20°	to R.					
55.0						Ro, H.				PIMA		

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG — **Hole #:** ERR 01 — **Page#:** 5/25

Depth (m)	Core box #	Recov (%)	S_0 / S_1	Geol	Max Gsize	Fractures	Colour	Alteration (C Li I K Cy Si H)	Minerals (Q Ca Tm)	U Assay	Samp #	Comments
	9.											
						30 F 20-80°	Lo					F-g sst with mottled clay replacement of clasts @ 57.2 m. Extensive clay (illite)
			~70°		1	Ro - I, L, H. Q.	to RB					coatings on fracture planes. Friable at top of section - less
	10	100%										friable towards bottom. Core destruction @ 55.3 - 55.5 m.
59.8 60										PIMA		
			60-									Trough cross bedded sst - f-g. Pervasive illite alteration throughout
			80°		1	22 F 10-70° Ro - I, H, L.	Lo					section, with minor haem. alteration. Dominant low angle fractures (10-30°)
63.0		100%										with illite clay fract. planes.
												Minor silicification observed for first time in core. F.g. sst with
65		70%	70 to 80°		1		Lo					pervasive haem. alteration increasing towards base of section. Minor illite alteration
65.8	11	100%										clay altered clast at 65.6 m.
						10F 40-80° Ro - H, I.	dRPl					Extensively altered haem. sandstone with pervasive illite alteration throughout.
67.3		80%										
			70°		2	31 F 15-80°	Lo					Highly fract. sst from 68.4-69.7 m and 71.0 - 71.5 m. sst more friable than
70		100%	80°			Ro - I				PIMA		above. Very minor haem. alteration.

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG

Hole #: ERRØ1 **Page#:** 6/25

Depth (m)	Core box #	Recov (%)	S_0 / S_1	Geol	Max Gsize	Fractures	Colour	Alteration C Li I K Cy Si H	Minerals Q Ca Tm	U Assay	Samp #	Comments
71.5	12	100%										
			65-80°		7	26F 5°-80°. Ro-I,H.						F-g to v-c grained sst. Mild haem alteration throughout section. Illite alteration pervasive at base of ~~section~~ and along fracture planes.
75.0										PIMA		
75.4			70-90°		1	6F 20-90° Ro HI	GRPl					Highly altered (H+I) zone - vf grained ~~Replacement clay~~ fractures
	13	100%				20F 20-80°						F-m gr sandstone with planar bedding. Moderately fractured and altered in places.
			65°		2.	Ro H,I,Q. L.	Lo.					Some healed fracture evident. (qtz-filled).
79.5												
80										PIMA		
			65-80°				Lo					As ab. More pervasive haem + illite alteration throughout grey rock darker red colour than above. More healed fractures and stylolites.
					8	16F 30-80° Ro H,L,Q.I	Lo to OR.					SST predominantly f-m grained, except for one clast in lower portion of section
	14	100%										
83.5												MAR qtz veinlets
85										PIMA		

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG Hole #: ERR01 Page#: 7/25

Depth (m)	Core box #	Recov (%)	S_0 / S_1	Geol	Max Gsize	Fractures	Colour	Alteration C Li I K Cy Si H	Minerals Q Ca Tm	U Assay	Samp #	Comments
			70-80°		12	28 F 10-80° Ro - I, H, Q.						Poorly sorted sst up to pebble size clasts.
86.9												
			60-80°		23	23 F 10-80° Ro - H, I, L.	Lo.					f-g to cobble clast - sst.
90	15.	100%								PIMA		
90.6.												
												Poorly sorted f-g to v.c grained sst. (? microconglomerate).
			60-80°		20.	15 F 20-80° Ro - H, I, L	OP to R.					Possible gr. up. sequence.
												Minor pervasive haem. alteration throughout.
95										PIMA		Illite replaces clasts in places, but overall illite alteration minor.
95.3	16	100%										
												Massive bedded, poorly sorted, f-g to v-c grained sst.
			~70°		10.	9 F 70-80° Ro - H, I	GRPL					Strong haem. alteration throughout.
												Minor illite alteration throughout.
												Regular development of stylolites, esp.
100										PIMA	100 XRD	98 m and 99.5 m

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG

Hole #: ERR01 Page#: 8/25

Depth (m)	Core box #	Recov (%)	S_0 / S_1	Geol	Max Gsize	Fractures	Colour	Alteration C Li I K Cy Si H	Minerals Q Ca Tm	U Assay	Samp #	Comments
												as above.
101.4	17	100%										
												Poorly sorted SST - pervasively altered over most of the section. Large ($\frac{3}{4}$") clasts
		~75°			20.	10F - 80°	dRB					of up to 20mm are mixed with fine to coarse grained sst. Planar bedding evident in base of section, however
105						Ro - H, I, Q.	to CRO.			PIMA		most of section massively bedded. Base of section moderately sorted.
106.6												
108.0	18	100%			7	SF -25-70° Ro - H, Q.	RO.					Poorly sorted SST as ab. Less altered than section ab.
110										PIMA		
			~75		9	17F - 25-80	GO to					Poorly to moderately sorted sst. Obvious clay replacement (illite?) in
						Ro - H, Q, I.	GRPL.					groundmass.
	19	100%										
114.2 115										PIMA		

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG

Hole #: ERR 01 Page#: 9/25

Depth (m)	Core box #	Recov (%)	S_0 / S_1	Geol	Max Gsize	Fractures	Colour	Alteration C Li I K Cy Si H	Minerals Q Ca Tm	U Assay	Samp #	Comments
			70°-80°		11	8F, 70-80°	GRPL					Poorly sorted, f-g to v.c grained sst with some pebble clasts.
						Ro. - H, I-						Dominantly massive bedded.
118-3												
												Poorly sorted, occasionally bedded, m-g to v.c. grained sst. Common pebble clasts.
120	20	100%	70-80°		20	17F 40°-80° Ro - I, H.	OR to GRPL			PIMA		Similar to above.
123-7												
125										PIMA		Moderately sorted m-g to v.c. sst. Some evidence of planar bedding, however predominantly massive
			70-80°		10	21F 30-80° Ro, I, H, Q.	Lo to GRPL					Few qtz healed fractures - generally low angle fractures (~40-50°).
	21	100%										
128-2												M-g to cobble sst. Strongly haem alteration with pervasive illitic alteration.
			~80°		7 50 (clast)	11F 25°-80° Ro - H, I	GRPL					Large qtz cobble @ 130.6 m. as well as pebble size qtz clasts regularly throughout section
130										130.25 PIMA		

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG — **Hole #:** ERR 01 — **Page#:** 10./25

Depth (m)	Core box #	Recov (%)	S_0 / S_1	Geol	Max Gsize	Fractures	Colour	Alteration C Li I K Cy Si H	Minerals Q Ca Tm	U Assay	Samp #	Comments
												see ab.
132.0												
	22	100%										poorly sorted m-g to vc-grained sst. Occasional pebble clasts.
			~70°-		12	4F 60-80°	OR to					~~Stron~~ Uneven haem. alteration throughout section giving sst 'banded' appearance.
135			80°.			Ro - H, I.	GRPL			PIMA		Pervasive ~~little~~ alteration. Minor evidence of bedding, however mostly massively bedded.
136.3		85%										
			80°		11.	2F 0-5° Ro - H, L, I	Lo to					Poorly sorted m-g to v.c.g sst; as ab. Very low angle to parallel fractures.
138.7	23	100%				2F - 70° Ro. I	OR.					
140										PIMA		
												Poorly to moderately sorted m-g & v.c.gr. sst. Mild hematitic alteration and illitic. alteration.
			70°.		10.	13 F 60-80° Ro - H, I, L.	Lo to					
							RB.					
144.4 145										144.9 PIMA		

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG

Hole #: ERR05 Page#: 11/25

Depth (m)	Core box #	Recov (%)	S_0 / S_1	Geol	Max Gsize	Fractures	Colour	Alteration C Li I K Cy Si H	Minerals Q Ca Tm	U Assay	Samp #	Comments
	24	100%				8F 70-80°	LOP					m-g. to v.c. grained moderately sorted sst. Very dark brown haem. alteration
			80°		3.	Ro - I, H	to dGB.					and pervasive illite alteration — Mild silicification.
147.8												
150										150.2 PIMA	150XRD	f-g to m.g sst. Banded appearance due to pervasive haem. alteration throughout.
	25	100%	80°		3.	14 F 80°.	dGB.					Number of haem. stained stylolites
			to 85°			Ro - I, H.						Minor silicified bands throughout core.
						1 F 10°. Ro - H.						
154.2 155										PIMA		
	26	100%	80°		3.	21 F 70-80°	GO to					f-g to med. gr. sst. As ab.
						Ro - I, H, L.	dGB.					Haem., Illite and mild silicification alteration throughout section.
						2 F 30° Ro - H.						Low angle fracture partially healed network fracturing developed in low angle fracture @ 157.0 m
160										PIMA		

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG

Hole #: ERR01 Page#: 12/25

Depth (m)	Core box #	Recov (%)	S_0 / S_1	Geol	Max Gsize	Fractures	Colour	Alteration C Li I K Cy Si H	Minerals Q Ca Tm	U Assay	Samp #	Comments
160.6												
			75-		2	16F 70-80°	GgP to					f-g to m-g moderately sorted sst. Pervasive haem + illite alteration throughout
	27	100%	80°			Ro - I, H.	Gg.					Mild silicification.
165										PIMA		
165.9												
												m-g to vc-g sst. Poorly to moderately sorted. Intense haem alteration. with moderate illite alteration.
			80-85°		5	5F 80° Ro - I, H	GRPl					
167.4	28	100%										
												Distinctly yellow-green tinge to sst indicating moderate to high illite alteration. Two thin siltstone beds, haem. altered. @ 168.0 and 169.0 m.
170			70-80°		7.	19F 0-85° Ro - I, Q, H.	Gr4 to Gg1 to GRPl.			170.1 PIMA		0° fracture @ 168.8 - 169.0 m extensional with ~~quartz~~ comb textured qtz infilling fracture
171.5												
			70-80°		7	4F 60-80 Ro - I, H.	GRPl.					m-g to v-c grained SST - moderately sorted. Pervasive strong haem. alteration throughout. Less illite alteration than ab.
173.8												
175										PIMA		

16

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG

Hole #: ERR01 Page#: 13/25

Depth (m)	Core box #	Recov (%)	S_0 / S_1	Geol	Max Gsize	Fractures	Colour	Alteration C Li I K Cy Si H	Minerals Q Ca Tm	U Assay	Samp #	Comments
							mYB					poorly sorted m-g to c-g sst with occasional pebble sized clasts.
	29	100%		70-80°	12	13F 50-80° Ro-H,I.	to BBk.					'Banded' appearance due to repetitive haem, illite, and silica alteration.
179.6										PIMA		
180												
	30	100%	70° to 80°		10.	10F 10-80° Ro - I,Q,H.	mBBk					Poorly sorted m-g to v.c. grained sst with common pebble clasts. Possible mild silicification.
185										PIMA		
185.7												
							Gp to BGy					Poorly sorted sst - m-g to vc-g with occasional pebble and cobble clasts.
	31	100%	80°		16.	15F 80° Ro. I,H.						
190										PIMA		Illite altered siltstone bed at 189.1m. 'Banded' appearance. Healed fracture @ 188.8m

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG — **Hole #:** ERR01 — **Page#:** 14/25

Depth (m)	Core box #	Recov (%)	S_0 / S_1	Geol	Max Gsize	Fractures	Colour	Alteration C Li I K Cy Si H	Minerals Q Ca Tm	U Assay	Samp #	Comments
												see above
193.0												
												sst as ab. m-g to vc-g sst. Moderately sorted.
195	32	100%	70-80°		7.	6F 40-80° Ro - I, H.	Lo to GB.			PIMA		Moderate illite alteration.
195.6.												
												Poorly sorted m-g - vc. gr sst. cannon pebble and cobble clasts. Extensive illite alteration at top of section, lessening towards base.
			70°		13	16F 40-85°						
			80°			Ro - I, H.						
200										PIMA	200 XRD	
	33	100%										
			70°		7	5F 40-80° Ro - I, Q, H	Lo.					Poorly sorted, m-g to v.c. grained sst.
												Haem. staining clay fracture plane at 202.7m
203.1			80°		4	8F - 30-80° Ro - I, Q.	Lo to OR.		Q veinlet @ 203.5 m.			f-g to m-g sst. moderately sorted.
205										PIMA		

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG

Hole #: ERR #1 **Page#:** 15/25

Depth (m)	Core box #	Recov (%)	S_0 / S_1	Geol	Max Gsize	Fractures	Colour	Alteration C Li I K Cy Si H	Minerals Q Ca Tm	U Assay	Samp #	Comments
206.0									3 veinlet at 205.8 m.			see above.
	34	100%										Moderately sorted f-g - v.c grained sst.
			70°		10.	13 F 50-80° Ro - I, H, L.	Lo to					Strong illitic alteration at top of section decreasing downhole.
						Strongly fractured Ro - L, I	dGy.					Strongly fractured zone from ~208.3 - 209.4m. Apparently no core lost.
210						4 F 80° Ro, I, H.				PIMA		
210.2												Moderately sorted f-g to vc-g sst.
			70 to		3.	12 F 20-80° Ro - I, L, H.	Lo.					Similar to above.
212.7	35	100%	80°									21
215										PIMA		Poorly sorted, m-g to vc grained sst
			70° to 80°		11	18 F 60-80° Ro - I, H.	mdGy					with minor pebble clasts.
218.4	36	100%										
220										PIMA		see below

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG — Hole #: ERR01 — Page#: 16/25

Depth (m)	Core box #	Recov (%)	S_0 / S_1	Geol	Max Gsize	Fractures	Colour	Alteration (C Li I K Cy Si H)	Minerals (Q Ca Tm)	U Assay	Samp #	Comments
			70°		16	8F 30-80°	Lo to					Poorly sorted m-g to vc-g sst with common pebble clasts. Moderate
			to 80°			Ro - I, H.	GyRPl					illite alteration throughout. Low angle healed fracture @ 223.0m.
	37	100%										showing offset of haem. stained bedding planes. - ∅ apparent normal offset.
224.2 225										PIMA		Similar to above. Poorly sorted, mg to vc.g sst.
			70°			8F 40-80° Ro - I.	GyRPl					Larger mean gr-size towards base of section ⇒ c-vc-grained.
227.5												
												More intensely illite altered sst giving it green-yellow colour in places.
230	38	100%	70°		24	8F 50-80° Ro - I.	mGrY to			PIMA		Similar sst to above mag to vc-g sst with common pebble clasts and rare cobble clasts.
			to 80°				GyRPl					
												Moderate illite alteration and mild haem. alteration. M-g to v.c. gr sst with rare cobble clasts.
					30.	3F 70-80°	GyO to					
235	39.	100%				Ro - I.	lGyRPl			PIMA		

JF Continues down to EOH.

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG — Hole #: ERR 01 — Page#: 17/25

Depth (m)	Box #	Core rec %	S_0/S_1	Geol	Max Gsize	Fractures	Colour	Alteration (C H Si Cy I Se)	Minerals (Q)	Comments (LOGGED BY: JF.)	Samp #
			?75		10	4F -80 Ro - H, Cy				KOMBOLGIE SANDSTONE.	
					5	1F - 80 Ro - H, Cy					
	39				7	0	Gy0			MEDIUM TO COARSE GRAINED PEBBLY SANDSTONE. MINOR SILTSTONE HORIZON AT 241.9m. SOME PEBBLES UP TO 45m. SMALL CONGLOMERATIC BED AT BASE OF UNIT. PATCHY MODERATE HEMATITISATION. PERVASIVE WEAK/MODERATE ILLITIC ALTERATION.	
					10	2F 80 Ro - H, Cy	%				
					35	7F 30-80 Ro - Cy	dRPl				2H0.2 PIMA
240					30	2F 60 Ro - Cy					
					30	2F 80 Lo, Sm - Cy					
		100	80		45	6F 35-80 Ro, Sm - Cy					
242.8	40		80		5	5F 30-70 Ro - Cy.	Gy0 to PRBr			MEDIUM / COARSE GRAINED SANDSTONE WITH A FEW PEBBLES. PATCHY HEMATITIC AND ILLITIC ALTERATION.	
					20	2F 80 Ro - Cy.					PIMA
245			80		2	6F 5-80 Ro - Cy, Q					
245.2			80		3	1F 80 Ro - Cy	Gy0			SILICIFIED MEDIUM / COARSE GRAINED SANDSTONE. WEAK PATCHY HEMATITE ALTERATION. MINOR CHLORITE ON FRACTURES. FEW STYLOLITES.	
			80		4	3F 30-80 Ro - Cy, Q.					
247.8	41		?		5	8F 15-80 Ro - C, H	dGn Cy Or Gy			HEMATITE - SERICITE - CHLORITE ROCK. POROUS. ? AFTER SST OL ?? VOLCANIC HORIZON * (CHLORITE - QUARTZ ALTERED ? LAMPROPHYRE)	PIMA T.S *
248.8		90	70							249 XRO — SEE BELOW —	PIMA
			80 ? 40		3	10F 30-80 Ro - C, Cy					
250											

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG — **Hole #:** ERR 91 **Page#:** 18/25

Depth (m)	Box #	Core rec %	S_0/S_1	Geol	Max Gsize	Fractures	Colour	Alteration C H Si Cy	Minerals Q	Comments	Samp #
	41	90	40		1	10F 30-80 Ro - C, Cy	O Pk to Gn Gy			SILICIFIED FINE TO MEDIUM GRAINED SANDSTONE WITH ZONES OF BRECCIATION AND REPLACEMENT BY CHLORITE/SERICITE. POSSIBLE DEFORMED ALTERED SILTSTONE HORIZON AT BOTTOM.	
			65		2	8F 40-80 Ro - Cy					
					1	5F 40-70 Ro - C, Cy, Q					
252.9			40								
	42	100	75		1	4F 35-75 Ro - Cy, Q	O Pk to Pk Gy			WEAKLY SILICIFIED AND HEMATISED FINE TO MEDIUM GRAINED SANDSTONE. SOME STYLOLITES. VUGGY QTZ ... VEINS AND FRACTURES WITH SOME INCLUDED CHLORITE.	PIMA
255					1	2F 40-60 Ro - C, Q.					
			75		2	4F 30-80 Ro - Cy, Q.					
256.4					2	3F 70-80 Ro - Cy					
	43	100	75		2	3F 70-80 Ro - Cy	Gy O Pk to Gn Gy			MEDIUM TO COARSE GRAINED ALTERED SANDSTONE. PATCHY WEAK/MODERATE CHLORITIC ALTERATION. MINOR HEMATITE A FEW STYLOLITES. MINOR BRECCIAT-ION. POSSIBLE MINOR ALTERED SILTSTONE AT 258.2m.	259 XRD PIMA
			75		2	3F 60-80 Ro - Cy, Q					
			60		2	6F 60-80 Ro, Sm - Cy, C					
260											260.2 PIMA
260.85	44		80		1	11F 50-80 Sm, Ss - Cy, C	d Gy R to Gy Y Gn			MEDIUM TO COARSE GRAINED ALTERED SANDSTONE WITH SOME ZONES OF STRONG CHLORITE/CLAY ALTERATION AND QUARTZ REMOVAL. PATCHY HEMATITISATION. SILTSTONE BAND OR ? ALTERATION ZONE AT BOTTOM.	
					3	6F 70-80 Ro, Sm - Cy, C					
			75		3	4F 40-80 Ro, Sm - Cy, C					
					4	7F 70-80 Ro, Sm - Cy					
264.5			80		5	7F 60-80 Ro, Sm - Cy, H				SEE BELOW.	PIMA
265											

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG — **Hole #:** EKR 01 — **Page#:** 19/25

Depth (m)	Box #	Core rec %	S_0/S_1	Geol	Max Gsize	Fractures	Colour	Alteration (C H Si Cy)	Minerals (Q Gn)	Comments	Samp #
	44		80		3	5F 30-80 Ro - Cy.	dGyR			HEMATITIC MEDIUM/COARSE GRAINED SANDSTONE WITH SOME PEBBLE BANDS. WEAK CLAY ALTERATION ADJACENT TO FRACTURES.	
					9	11F 60-80 Ro - Cy.					
267.5			50		10	8F 80-70 Ro - Cy.					
			75				dRBr to OPk.			ALTERED MEDIUM/COARSE SANDSTONE AND CHLORITE/HEMATITE ROCK ? AFTER SANDSTONE OR SILTSTONE. MICACEOUS IN PART.	
268.6			70		3	17F 5-80 Ro,Sm-Cy,H					
					1	14F 5-80 Sm - Cy,H.	dRBr to GnGy			STRONGLY ALTERED SANDSTONE AND SILTSTONE WITH MINOR REMNANT SANDSTONE. STRONG HEMATITE AND CHLORITE/CLAY ALTERATION. SOME ZONES OF BRECCIATION AND SHEARING. * (SERICITE-HEMATITE ALTERED SHALE)	PIMA 270.5 PIMA 270.5 XRD T.S *
270			75		7	8F 30-80 Sm - Cy-H					
	45	100%			<1	24F 60-80 Sm,Ss - Cy,H					
272.1			30		<1	13F 30-80 Sm,Ss - Cy,H	dRBr to GnGy		UNCONFORMITY.	SHEARED AND BRECCIATED STRONGLY ALTERED SILTSTONE AND ? SANDSTONE. MICACEOUS IN PART.	
273.1			75		-	STRONGLY BROKEN Sm - Cy,C.	GnGy to GyR.			HEMATITE - CHLORITE - MICA SCHIST. STRONGLY ALTERED. NO QUARTZ REMAINS. SHEARED.	
274.3			40			17F 30-70 Ro,Sm - C,H	dRBr to dGnGy			BANDED HEMATITE - CHLORITE ROCK AFTER AMPHIBOLITE AND MINOR HEMATITE - CHLORITE - MICA SCHIST. MINOR ZONES OF BRECCIATION. QUARTZ REMOVED.	
275			45								
276.3	46		50.			STRONGLY BROKEN Ro,Sm - C,H	GyR to dGnGy			HEMATITE - CHLORITE - MICA SCHIST WITH MINOR ALTERED AMPHIBOLITE BANDS. SOME HEMATITE 'SPOTS' AFTER GARNET. SHEARED.	
277.7			45			28 F 30-70 Ro,Sm - C,H	GyR to GnGy			HEMATITE - CHLORITE - MICA SCHIST AND STRONGLY ALTERED MICACEOUS META-ARKOSE HEMATITE 'SPOTS' AFTER GARNET. PARTIAL REPLACEMENT OF QUARTZ.	
279.6	47		40							— SEE BELOW —	
280											

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG — **Hole #:** ERR 01 — **Page#:** 20/25

Depth (m)	Box #	Core rec %	S_0/S_1	Geol	Max Gsize	Fractures	Colour	Alteration (C H Si Cy)	Minerals (Q Gm)	Comments	Samp #
	47		45 45			31 F 30-70 Ro,Sm – C,H	Gyk to Gy			ALTERED MICACEOUS MELTH – ARKOSE AND CHLORITE – HEMATITE – QUARTZ – MICA SCHIST 80:20. HEMATITE 'SPOTS' AFTER GARNET THROUGHOUT. MINOR SHEARING.	
282.6			20 40			14 F 20-80 Ro,Sm – C,H	Gyk to dGnGy			HEMATITE – CHLORITE – MICA SCHIST, WITH 'GARNET' SPOTS. STRONGLY ALTERED – NO QUARTZ REMAINS. SHEARED	
283.9			40 35			10 F 40-70 Sm,Ss – H,C	dRBr to GnGy			CHLORITE – HEMATITE ROCK. BANDED. AFTER AMPHIBOLITE. NO QUARTZ PRESENT.	
285 285.2	48		30 10 30			53 F 20-80 Ro,Sm – C,H.	dRBr to dGnGy			CHLORITE – HEMATITE – MICA SCHIST WITH MINOR HEMATITE – CHLORITE ROCK AFTER AMPHIBOLITE. PATCHY MINOR 'GARNET' SPOTS. SHEARED AND DEFORMED. NO QUARTZ PRESENT, EXCEPT REMNANTS AT BOTTOM.	
289.0			25			STRONGLY BROKEN Ro,Sm – C	dGnGy			CHLORITE – MICA SCHIST. STRONGLY SHEARED. NO QUARTZ PRESENT.	
290 290.4	49		25 15 10 15			25 F 10-50 Sm,Ro – C,H	dRBr to dGnGy			HEMATITE – CHLORITE ROCK. BANDED. AFTER AMPHIBOLITE. STRONGLY ALTERED – NO QUARTZ REMAINS. SHEARED.	
294.2 295										SEE BELOW	

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG

Hole #: ERR 01 Page#: 21/25

Depth (m)	Box #	Core rec %	S_0 / S_1	Geol	Max Gsize	Fractures	Colour	Alteration C H Si Cy	Minerals Q Gn	Comments	Samp #
	49		40			58 F 30-70	dGnGy			(QUARTZ)- CHLORITE-MICA SCHIST WITH MINOR CHLORITIC BANDS AFTER AMPHIBOLITE OR META-ARKOSE. STRONG ALTERATION WITH SOME REMNANT QUARTZ PATCHES. PATCHY HEMATITISATION. SHEARED. SOME CHLORITE PSEUDOMORPHS AFTER GARNET.	
			40			Ro,Sm - C,H	to GyR				
298.9	50		60								
			80			42F 40-80	dGnGy			(QUARTZ) - CHLORITE - MICA SCHIST WITH CHLORITE ROCK BANDS AFTER AMPHIBOLITE. CHLORITE 'SPOTS' AFTER GARNET IN SCHISTS- STRONG ALTERATION LITTLE QTZ PRESENT.	
300		100%				Ro,Sm Ss - C,H					
301.9			65								
			60			6F 50-70 Ro,Sm - C,H	dGnCy GnBk			CHLORITE ROCK AFTER AMPHIBOLITE WITH MINOR CHLORITE-MICA SCHIST. SOME HEMATITE	
302.8			70			10F 50-70 Ro,Sm - C,H	dGnCy to GyR.			QUARTZ - CHLORITE-MICA SCHIST AND HEMATITE -CHLORITE ROCK AFTER AMPHIBOLITE. 70:30 PARTIAL QUARTZ REMOVAL. GARNET 'SPOTS'	
304.1											
305	51		70			22F 50-70 Ro,Sm - C,H	GyR to GnCy			QUARTZ - HEMATITE - CHLORITE - MICA SCHIST. MODERATE / STRONG ALTERATION. GARNET 'SPOTS' SOME MOBILISATE VEINS / SEGREGATES.	
306.0			60			13F 40-70 Ro,Sm - C,H	dGnCy to dGyR			(QUARTZ) - CHLORITE-MICA SCHIST WITH SOME BANDS OF HEMATITE - CHLORITE ROCK ? AFTER BIOTITE SCHIST OR AMPHIBOLITE. GARNET 'SPOTS' THROUGHOUT. PARTIAL QUARTZ REMOVAL. SHEARED IN PART.	
308.7	52		70			13 F 50-70 Ro,Sm - C,H	dGnCy to dGyR			CHLORITE - MICA SCHIST AND HEMATITE - CHLORITE ROCK. NO QUARTZ REMAINS. GARNET 'SPOTS'	
310			70								

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG

Hole #: ERR 01 **Page#:** 22/25

Depth (m)	Box #	Core rec %	S_0 / S_1	Geol	Max Gsize	Fractures	Colour	Alteration C H Si Cy Se	Minerals Q Gn Gp	Comments	Samp #
310·1											
	52		60			19F 50-80 Ro,Sm-C,H	Gy to GnGy			ALTERED GARNET-MICA-QUARTZ SCHIST TO MICACEOUS META-ARKOSE. MODERATE CHLORITIC ALTERATION. PATCHY HEMATITE. SOME SHEARING.	
312·8			60			13F 40-75 Ro,Sm-C,Se	Gy to dGyYGn			ALTERED GARNET-QUARTZ-MICA SCHIST AND ALTERED · BIOTITE-QTZ-SERICITE ROCK · 70:30	
313·8			50								
315			60			36F 40-80 Ro,Sm-C,H	Gy to GnGy			ALTERED GARNET-QUARTZ-MICA · SCHIST AND MICACEOUS META-ARKOSE · MODERATE CHLORITIC ALTERATION. PATCHY HEMATITISATION OVERPRINTS CHLORITE. SHEARED IN PART · QTZ VEIN AT TOP	
	53	100%	50								
317·6			60			10F 25-80 Ro,Sm (ss) - C,Se	dGyYGn			ALTERED QUARTZ-BIOTITE-CHLORITE-SERICITE ROCK. POSSIBLY ORIGINALLY A BIOTITIC GNEISS OR AMPHIBOLITE??	
319·2			60								
320											
	54		60			35F 40-70 Ro,Sm-C,Se	Gy to GnGy			SEQUENCE OF ALTERED GARNET-QUARTZ-MICA SCHISTS AND MICACEOUS META-ARKOSES, WITH SOME THIN BANDS OF QUARTZ-BIOTITE-CHLORITE/SERICITE ROCK. GARNETS ALTERED TO CHLORITE. MINOR SHEARING. SPARSE GRAPHITIC HORIZONS. *(ALTERED MUSCOVITE-'BIOTITE'-GARNET-STAUROLITE GNEISS)	*T·S →
			60								
325											

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG Hole #: ERR 01 Page#: 23/25

Depth (m)	Box #	Core rec %	S_0/S_1	Geol	Max Gsize	Fractures	Colour	Alteration C H Si Cy Sc	Minerals Q Gn Gp	Comments	Samp #
325.4	54									— AS ABOVE —	
			60			32F 40-70 Ro,Sm-C,Sc.	Gy to GnGy			ALTERED GARNET-MICA-QUARTZ SCHIST TO MICACEOUS META-ARKOSE MOST GARNET ALTERED TO CHLORITE - SPARSE FRESH PINK GARNETS. MINOR DISSEMINATED GRAPHITE. AT 327.9m MINOR VUGGY PYRITE-QUARTZ VEIN.	
			65								
	55										
329.8			60								
330						9F 40-70 Ro,Sm-C,Sc	Gy to GnGy			ALTERED GARNET-QUARTZ-MICA SCHIST DEFORMED WITH QUARTZ-CHLORITE SWEAT VEINS	
330.9			55								
		100%	60			25F 50-70 Ro,Sm-C,Sc	Gy to GnGy			ALTERED GARNET-MICA-QUARTZ SCHIST AND MICACEOUS META-ARKOSE. GARNET ALTERED TO CHLORITE. SPARSE DISSEMINATED GRAPHITE. MINOR FOLDING AND SHEARING.	
			60								
335											
335.2	56		65			15F 40-70 Ro,Sm-C,Sc	Gy to GnGy			ALTERED GARNET-QUARTZ-MICA SCHIST TO MICACEOUS META-ARKOSE. GARNETS PARTIALLY ALTERED TO CHLORITE. SPARSE DISSEMINATED GRAPHITE.	
			55								
338.3											
	57		60			SEE BELOW	Gy to GnGy			ALTERED MICACEOUS META-ARKOSE AND GARNET-QTZ-MICA SCHIST. GARNET PARTLY ALTERED TO CHLORITE	
340											

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG

Hole #: ERR 01 · **Page#:** 24/25

Depth (m)	Box #	Core rec %	S_0/S_1	Geol	Max Gsize	Fractures	Colour	Alteration C H Si Cy Se	Minerals Q Gn Gp St	Comments	Samp #
	57		60 – 65			19F 50-70 Ro,Sm-C,Se				SPARSE DISSEMINATED GRAPHITE THROUGHOUT. MINOR SHEARING AND FOLDING.	
342.2			60			5F 50-70 Ro,Sm-C,Se	Gy to Gn Gy			STAUROLITE-GARNET-MICA-QUARTZ SCHIST TO META-ARKOSE. WEAK/MOD CHLORITIC ALTERATION. MINOR GRAPHITE & PYRITE	
343.5			60			20F 50-70 Ro,Sm-C,Se	Gy to Gn Gy			SHEARED MICACEOUS META-ARKOSE WITH MINOR GARNET-MICA-QUARTZ SCHIST & WEAKLY CHLORITIC/SERICITIC. SPARSE DISSEMINATED GRAPHITE.	
345											
346.0	58	100%	65 – 60			8F 30-70 Ro,Sm-C,Py	Gy to dGyBr			MICA-QUARTZ-BIOTITE SCHIST AND GARNET-MICA-QUARTZ SCHIST. 70:30. PATCHY WEAK ALTERATION. FOLDED.	
347.9			60 – 65		FT.	9F 50-70 Ro,Sm-C,Se	Gy to Gn Gy			STAUROLITE-GARNET-MICA-QUARTZ SCHIST PARTIAL ALTERATION OF PORPHYROBLASTS TO CHLORITE. MINOR DISSEMINATED GRAPHITE MINOR SHEARING AND FOLDING. SPARSE CHALCOPYRITE AT 350.2m.	
350											
351.4	59		60		FT.	1Ft 30 Sm-Se,Q,Ca 8F 50-70 Ro,Sm-C,Se	l Ol			QUARTZ-BIOTITE-SERICITE (FELDSPAR) GNEISS. ALTERED. FAULT ZONE AT 351.9m WITH QTZ-CALCITE VEINS.	
352.8			60			18F 50-70 Ro,Sm-C,Se	Gy to Gn Gy			GARNET-MICA-QUARTZ SCHIST AND MICACEOUS META-ARKOSE. PARTIAL ALTERATION OF GARNET TO CHLORITE. MINOR DISSEMINATED GRAPHITE. * (MUSCOVITE-BIOTITE-GARNET GNEISS)	* T.S →
355.0										END OF HOLE.	

AFMECO MINING AND EXPLORATION DIAMOND DRILLHOLE LOG Hole #: ELR 01 Page#: 25/25

Depth (m)	Box #	Core rec %	S_0 / S_1	Geol	Max Gsize	Fractures	Colour	Alteration C H Si Cy	Minerals Q	Comments	Samp #

EASTMAN CAMERA SURVEYS.

0 m	−80°	270° M
53.5m	−81°	247° M
101.5m	−81°	336° M *
149.5m	−80.5°	212° M *
203.5m	−81°	29° M *
251.5m	−81°	214° M *
300.5m	−81°	356° M*
350.5m	−79°	251° M

* AZIMUTHS SUSPECT.

NO ORIENTATION SURVEYS WERE DONE BECAUSE OF A MISUNDER-STANDING WITH DRILLERS.

APPENDIX II:

EL 3590

ERRE

MASON GEOSCIENCE PTY. LTD.

PETROGRAPHIC REPORT

2453

COPY 1 DWN ✓

COPY 2 MYRA

Mason Geoscience Pty. Ltd.

ACN 063 539 686

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REPORT TITLE	**Petrographic Descriptions for Four Drill Core Rock Samples (EL3590, Northern Territory)**
REPORT #	2453
CLIENT	AFmeco Mining and EXploration Pty Ltd
ORDER NO.	3583
CONTACT	Mr Daniel Alonso
REPORT BY	Dr Douglas R. Mason

SIGNED

Doug Mason

for Mason Geoscience Pty. Ltd.

DATE 13 July 1998

Petrographic Descriptions for Four Drill Core Rock Samples (EL3590, Northern Territory)

SUMMARY

1. Rock Samples

- Four drill core rock samples from EL3590 (Northern Territory) have been studied using petrographic and staining methods. X-ray diffraction methods were used to obtain mineral identifications for two samples.

2. Brief Results

- Rock names and mineralogy are summarised in TABLE 1.

- Two samples represent unmetamorphosed but altered primary rocks:

  - Sample ERR01 (248) represents a massive ?lamprophyric intrusive igneous rock that has suffered pervasive chlorite-quartz-carbonate alteration. Dissolution during alteration has generated a porous texture. Mineralogy by XRD confirms the presence of Fe-chlorite, quartz, dolomite, hematite, siderite and mica.

  - Sample ERR01 (270.8) represents a shaly sediment composed of clastic muscovite flakes in an altered matrix of sericite + opaques (hematite) + chlorite. Uncommon discontinuous veinlets of sericite + carbonate (dolomite) + apatite cut the rock. Mineralogy by XRD confirms the presence of two types of white mica (well-crystallised 2M1-type muscovite, and poorly-crystallised 1M-type sericite) and hematite.

- Two samples represent pelitic meta-sedimentary rocks that have recrystallised in response to regional metamorphism in the amphibolite facies:

  - Sample ERR01 (322) recrystallised to the assemblage quartz + muscovite + biotite + garnet + staurolite + trace tourmaline + opaques (?ilmenite). Low-grade alteration has resulted in complete selective replacement of biotite and garnet by chlorite, and partial replacement of staurolite by sericite.

  - Sample ERR01 (354.7) recrystallised to the assemblage quartz + muscovite + biotite + garnet + trace tourmaline + plagioclase + opaques + apatite. Weak selective alteration generated minor chlorite + leucoxene after biotite, and a trace of sericite after uncommon plagioclase.

TABLE 1: SUMMARY OF ROCK NAMES AND MINERALOGY

SAMPLE	ROCK NAME	MINERALOGY*		
		Primary**	Metamorphic/alteration***	Vein
ERR01, 248	Chlorite-quartz altered ?lamprophyre	Bio,apa	Chl,qtz,dol,opq(hem),sid	-
ERR01, 270.8	Sericite-hematite altered shale	Mus,zir	Ser,chl	Ser,dol,apa
ERR01, 322	Chlorite-altered muscovite-'biotite'-garnet-staurolite gneiss	-	Qtz,mus,stau,tou,opq; Chl,ser,leu	-
ERR01, 354.7	Muscovite-biotite-garnet gneiss	-	Qtz,mus,bio,gar,pla,tou,opq,apa; Chl,leu,ser	-

NOTES:
*: Minerals are listed in each parageneses according to approximate decreasing abundance.
**: Only primary minerals currently present in the rock are listed. Others may have been present, but are altered.
***: Earlier parageneses are separated from later parageneses by a semicolon.

Mineral abbreviations: Apa = apatite; bio = biotite; chl = chlorite; dol = dolomite; gar = garnet; hem = hematite; leu = leucoxene; mus = muscovite; opq = undifferentiated opaques; pla = plagioclase; qtz = quartz; ser = sericite; sid = siderite; stau = staurolite; tou = tourmaline; zir = zircon.

1. INTRODUCTION

A collection of four drill core rock samples was received from Mr Daniel Alonso (AFmeco Mining and EXploration Pty Ltd, Darwin, Northern Territory) on 17 June 1998.

It was indicated that the samples originate from EL3590 in Arnhem Land, Northern Territory. Two samples are considered to originate from the base of the Kombolgie Sandstone, and two samples from the Lower Cahill Formation.

Particular requests were:

i) To prepare a thin section and routine petrographic description for each sample.

ii) To stain basement offcuts for K-feldspar.

iii) To obtain mineral identifications by X-ray diffraction (XRD) methods for two samples (ERR01, 248 and ERRO1, 270.8).

Preliminary results were provided by facsimile to Mr. Alonso at the Darwin office of AFMEX on 3 July 1998. This report contains the full results of this report.

2. METHODS

The drill core samples were examined in hand specimen and marked for section preparation. Thin sections were obtained from an external commercial laboratory (Amdel Limited, Thebarton, South Australia). Whole-rock mineral identifications were also obtained for two specified samples from Amdel Limited (see Appendix 1 for results).

At Mason Geoscience Pty Ltd, conventional transmitted polarised light microscopy was used to prepare the routine petrographic descriptions.

For confirmation of the presence or absence of K-feldspar, section offcuts of all samples were stained for K-feldspar using the conventional sodium cobaltinitrite method. Each offcut was etched in HF for ~10 seconds, rinsed in water, covered with freshly made saturated solution of sodium cobaltinitrite for ~30 seconds, and finally rinsed. This procedure generates a bright yellow stain where K-feldspar occurs in the rock. The results are provided in TABLE 2, and are also given under Hand Specimen description in the individual petrographic descriptions.

TABLE 2: RESULTS OF STAINING FOR K-FELDSPAR

SAMPLE	RESULT*	COMMENT
ERR01, 248	Negative	K-feldspar absent
ERR01, 270.8	Negative	K-feldspar absent
ERR01, 322	Negative	K-feldspar absent
ERR01, 354.7	Negative	K-feldspar absent (but note pale yellow false positive stain in sparsely scattered altered small plagioclase grains)

*: Positive = Yellow stain for K-feldspar observed under binocular microscope.
Negative = No yellow stain for K-feldspar observed under binocular microscope.

3. PETROGRAPHIC DESCRIPTIONS

The petrographic descriptions are provided in the following pages. Macrophotographs of offcuts and photomicrographs are included at the beginning of each sample description.

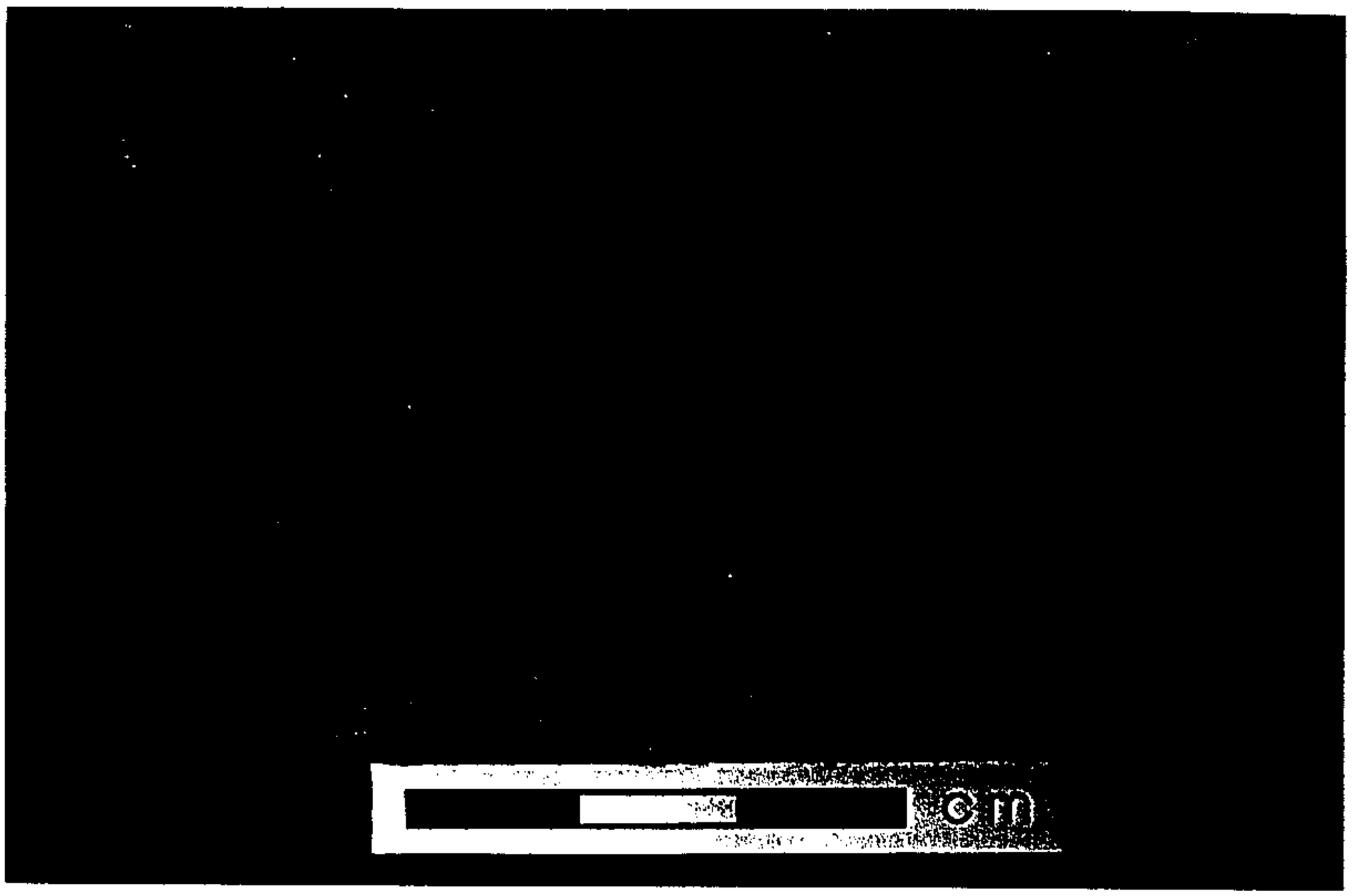

PLATE 1: SAMPLE ERR01, 248 (Macrophotograph of sawn core, wet, bar for scale; Film 1 Frame 20). This altered massive rock (probably a lamprophyre) displays its massive (non-foliated, non-layered) texture. It is composed mainly of chloritised biotite flakes, quartz and carbonate. Scattered through the rock are uncommon subrounded to elongate pale patches (altered ?phenocrysts, bottom right, top left).

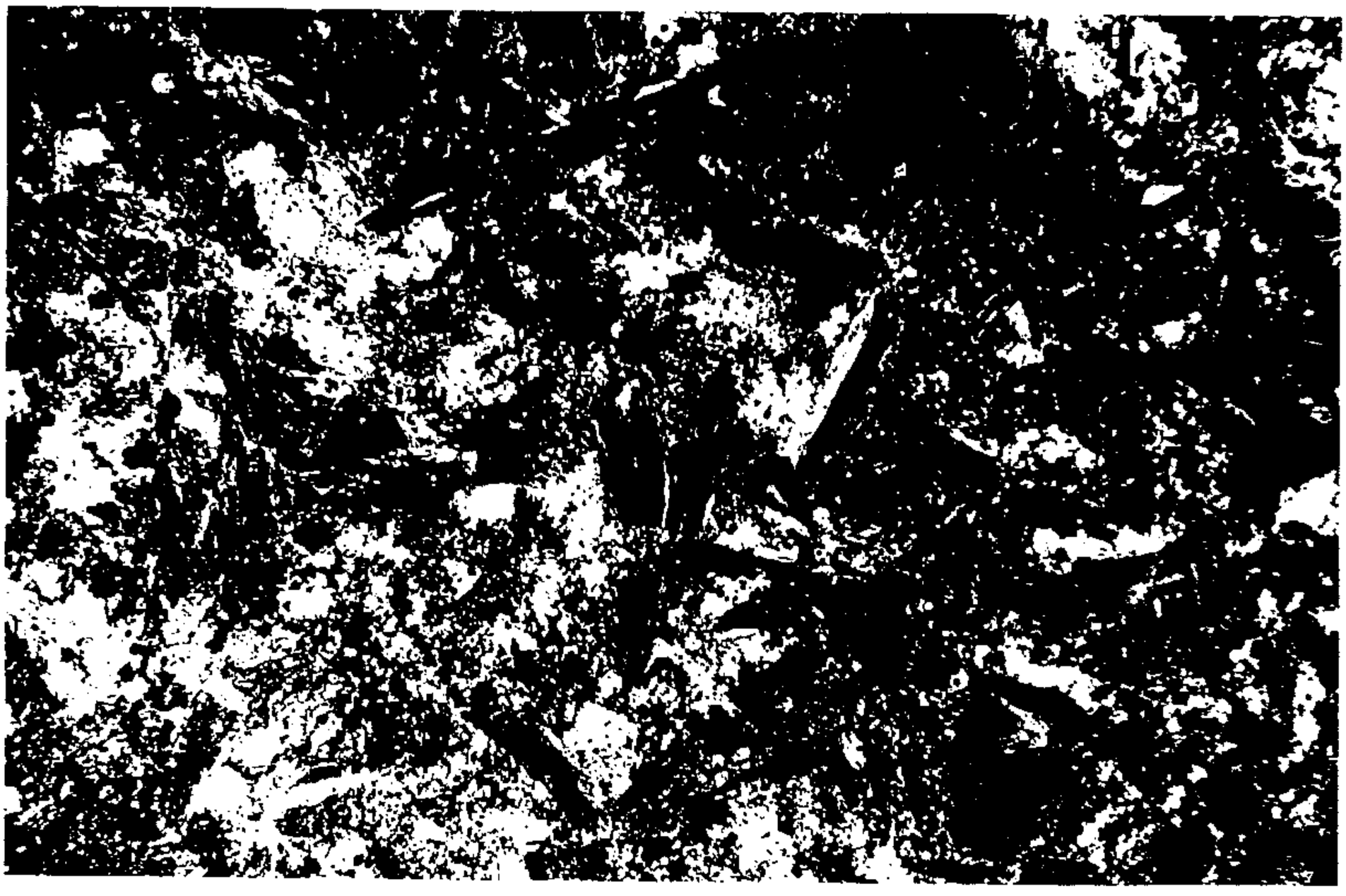

PLATE 2: SAMPLE ERR01, 248 (Transmitted plane polarised light, x5, Film 2 / Frame 19).
In this altered ?lamprophyre, randomly oriented biotite flakes (drab brown) are partly altered, and lie in a matrix of alteration quartz (colourless), chlorite (very pale green patches), and hematite (dark spots, probably after magnetite). Blue patches represent coloured cementing medium that fills dissolution void spaces formed during alteration.

SAMPLE : ERR01, 248 (Lower Kombolgie Sandstone, NT)

SECTION NO. : ERR01, 248

HAND SPECIMEN : The drill core sample represents a fine-grained, massive, drab greenish grey rock that is quite porous. Uncommon subrounded to tabular structures (altered phenocrysts) are present, and appear to be replaced by white minerals.

The section offcut failed to accept the stain for K-feldspar, confirming it is absent.

ROCK NAME : **Chlorite-quartz altered ?lamprophyre**

PETROGRAPHY :

A visual estimate of the modal mineral abundances gives the following:

Mineral	**Vol.%**	**Origin**
Biotite (incl. chlorite)	20	Relict igneous (incl. alteration)
Apatite	Tr	Relict igneous
Chlorite	25	Alteration
Quartz	15	Alteration
Opaques (incl. hematite)	3	Alteration
Carbonate (dolomite)	15	Alteration
Carbonate (?siderite)	Tr	Alteration
Voids	20	Solution cavities

[XRD has identified Fe-rich chlorite, quartz, dolomite, hematite, siderite and ?mica]

In thin section, this sample displays a relict massive crystalline igneous texture with indistinct phenocrysts, modified by moderately strong pervasive alteration.

Biotite was relatively abundant, occurring as randomly oriented flakes ~0.4 mm long. They are distributed uniformly throughout the rock, but most have suffered incipient alteration effects including bleaching and replacement by chlorite. Chlorite also occurs as aggregates of fine-grained pleochroic pale green flakes in the altered interstitial areas.

Quartz occurs in significant amount, mostly as fine-grained microgranular alteration mosaics in the interstitial areas. A small amount of quartz also occurs as fibrous to microgranular fillings in completely altered large stumpy terminated crystals (ferromagnesian phase such as ?pyroxene, ?olivine).

Carbonate occurs in two types:

i) Most occurs as very fine-grained diffuse alteration aggregates scattered through the rock. This appears to be dolomite. Some also occurs as ragged aggregates in quartz-carbonate altered rare prismatic phenocryst sites.

ii) A trace amount of carbonate occurs as fine-grained microgranular aggregates that display a pale brown colour and high relief. This appears to be siderite.

Opaques occur as small cubic crystals sprinkled through the rock. Their cubic morphology suggests magnetite, but the deep red colour of some grains suggests they have suffered replacement by hematite.

PLATE 3: SAMPLE ERR01, 248 (Transmitted light, crossed polarisers with condenser, x5, Film 2 Frame 20). A large terminated prismatic crystal (probably a ferromagnesian phenocryst) has suffered complete replacement by fine-grained quartz (white) and carbonate (ragged grains of high pastel colours)

Apatite occurs in minor amount as small subhedral stumpy prismatic crystals which appear to have formed in the groundmass between the biotite flakes. Their pitted, porous appearance suggests that they have suffered alteration.

INTERPRETATION:

This sample is interpreted to represent a shallow intrusive igneous rock of broadly lamprophyric composition. It was originally composed of abundant randomly oriented biotite and other phases including accessory apatite. Large ferromagnesian phenocrysts (?pyroxene, ?olivine) were present in minor amount. Invasion by low-temperature hydrothermal fluids resulted in strong pervasive alteration, generating quartz + dolomite + chlorite + minor siderite + hematite. The large phenocrysts were completed replaced by quartz + carbonate. Some biotite flakes were partly preserved. During alteration, dissolution of some rock components produced a porous structure.

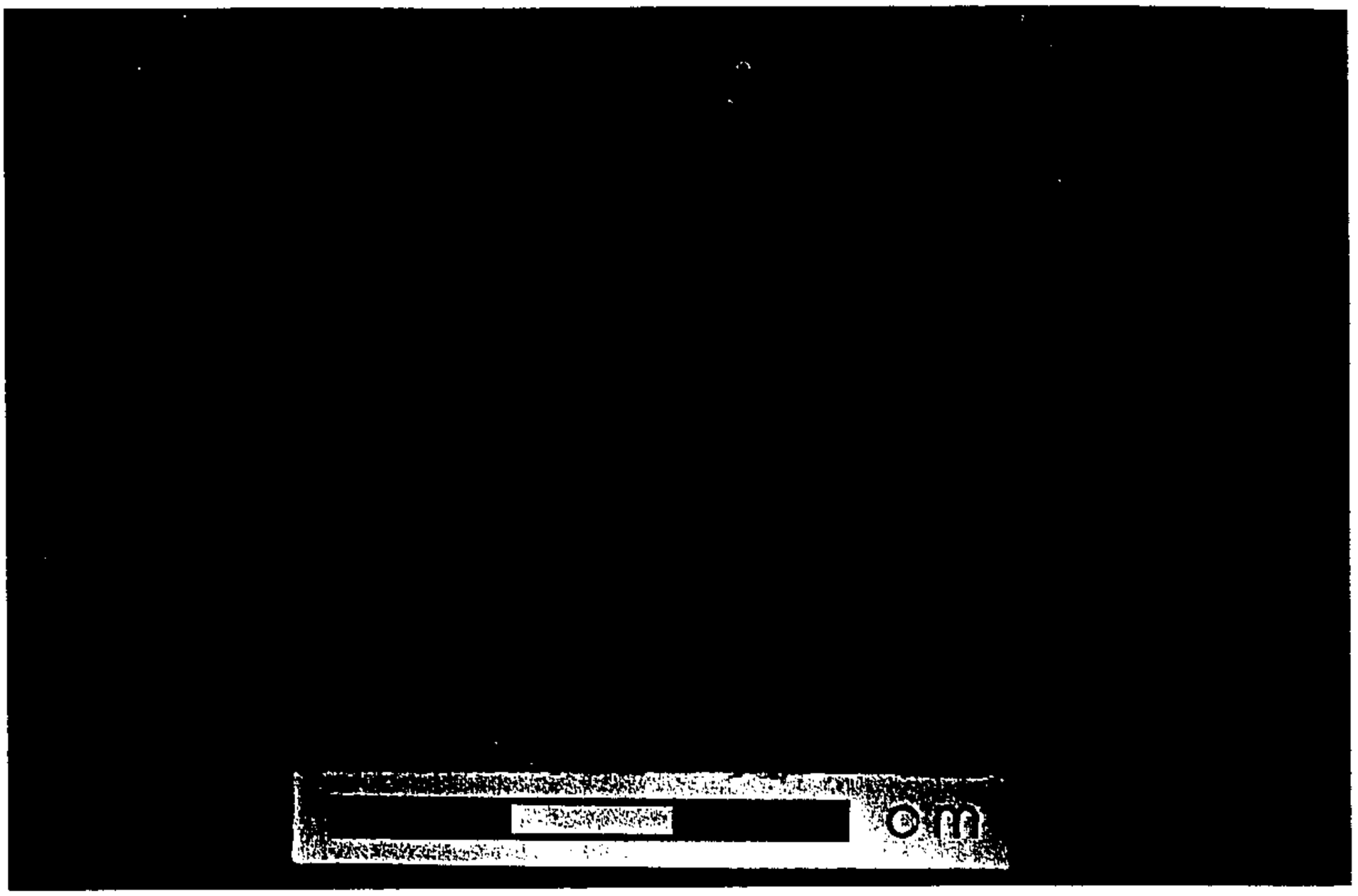

PLATE 4: SAMPLE ERR01, 270.8 (Macrophotograph of sawn core, wet, bar for scale; Film 1 / Frame 21). In this altered shale, most of the rock is composed of sericite (paler yellowish colour) and chlorite (duller green colour).

PLATE 5: SAMPLE ERR01, 270.8 (Transmitted light, crossed polarisers, x5, Film 2 / Frame 21). In this altered shale, flakes of clastic muscovite (pink, green) are aligned in the trace of the bedding plane (oriented NW-SE). They lie in a matrix of very fine alteration sericite (yellows) and small ragged opaque grains (hematite).

SAMPLE : ERR01, 270.8m (Lower Kombolgie Sandstone, NT)

SECTION NO. : ERR01, 270.8

HAND SPECIMEN : The drill core sample represents a uniformly fine-grained schistose rock, mostly drab green in colour with yellowish tinge in indistinct bands of centimetre thickness. Small darker green bands and spots are irregularly scattered through the rock.

The section offcut failed to accept the stain for K-feldspar, confirming it is absent.

ROCK NAME : **Sericite-hematite altered shale**

PETROGRAPHY :

A visual estimate of the modal mineral abundances gives the following:

Mineral	Vol.%	Origin
Muscovite	15	Relict clastic flakes
Zircon	Tr	Clastic particles
Sericite	75	Alteration / veinlet filling
Opaques (hematite)	5	Alteration
Chlorite	3	Alteration
Carbonate (dolomite)	Tr	Veinlet filling
Apatite	Tr	Veinlet filling

[XRD has identified 2M1-type muscovite, 1M-type muscovite, and hematite]

In thin section, this sample displays a poorly preserved clastic sedimentary texture, modified by pervasive low-grade alteration.

Two types of white mica are identified:

i) Muscovite (well-crystallised 2M1-type muscovite by XRD) occurs in significant amount as well-crystallised flakes ~0.2-0.4 mm long. Their preferred orientation defines a structure through the rock, which most likely is primary sedimentary layering. This is supported by the nature of the flakes: some display weak kinking or bending (a sedimentary loading structure), and some are misoriented with respect to the principal structure (bedding plane orientation).

ii) A very fine-grained white mica (sericite; poorly-crystallised 1M-type muscovite by XRD) occurs abundantly as poorly-formed minute flakes, intimately intergrown in a fine massive matrix throughout the rock.

Opaques occur in moderate amount as small ragged grains ~0.1 mm in size, distributed uniformly through the rock. They tend to be aligned in the trace of the layering. Some display the deep red absorption colour characteristic of hematite (note hematite identified by XRD).

Chlorite occurs in minor amount as very fine-grained diffuse dull green patches scattered irregularly through the fine sericitic matrix.

Zircon occurs as rare small subrounded grains.

Cutting the rock is a single discontinuous veinlet which displays diffuse margins against wall rock and is irregular (non-planar) in shape. It is filled by very fine-grained sericite as observed in the matrix of the wall rock, as well as small ragged carbonate grains (probably dolomite from significant double refraction) and rare small stumpy apatite aggregates (colourless, moderate relief, low first order birefringence, parallel extinction).

INTERPRETATION:

This sample represents a fine clastic sediment of shaly nature. It was originally composed of small muscovite flakes and rare zircon grains, in a fine clay matrix. Pervasive low-grade alteration has generated abundant fine-grained sericite + minor hematite + chlorite throughout the matrix. Clastic muscovite and zircon were preserved. At this time, indistinct discontinuous veinlets were filled by sericite + trace dolomite + apatite.

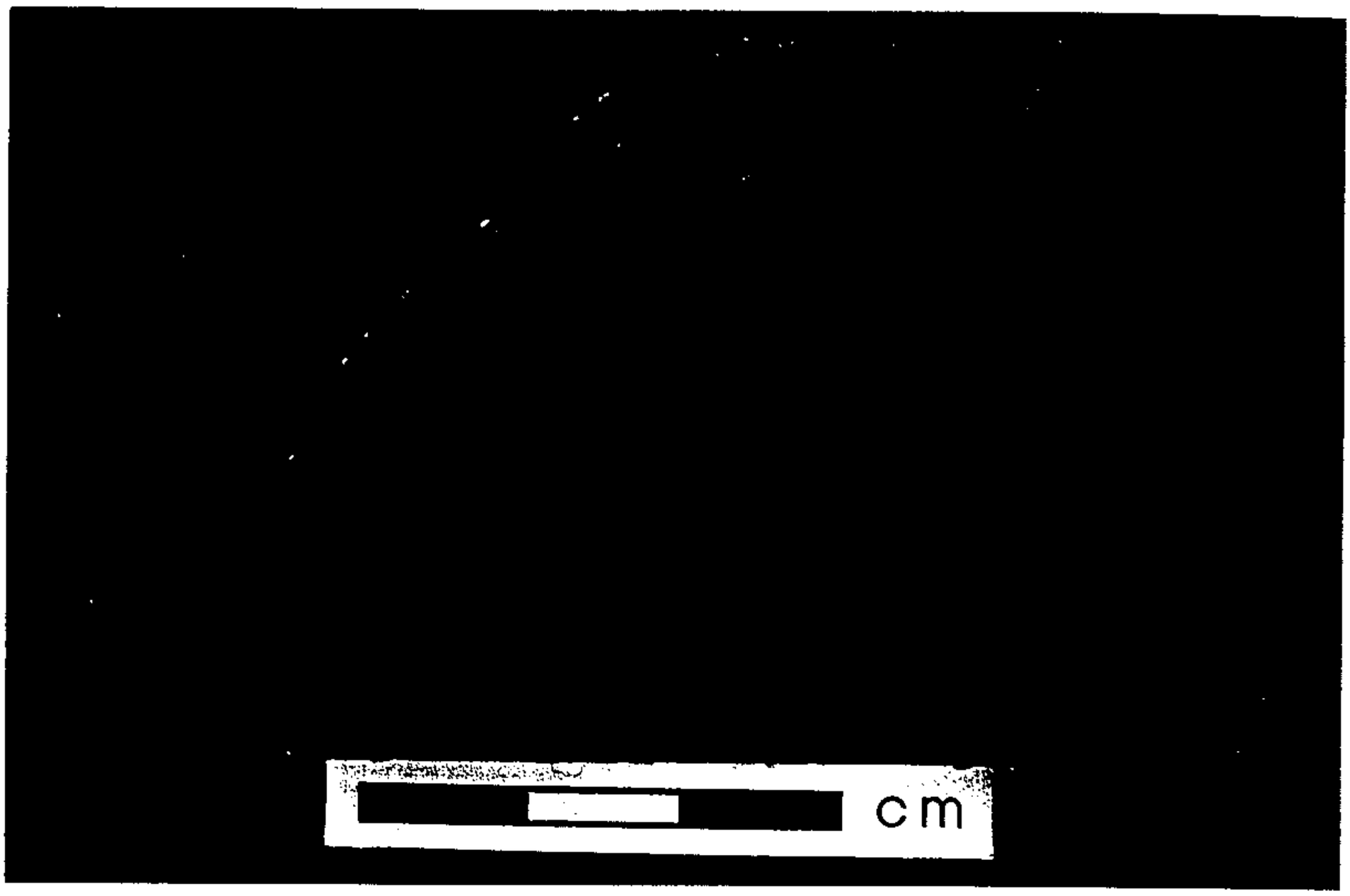

PLATE 6: SAMPLE ERR01, 322 (Macrophotograph of sawn core, wet, bar for scale; Film 1 / Frame 22). In this pelitic gneiss, foliation and indistinct mineralogical banding is oriented NE-SW.

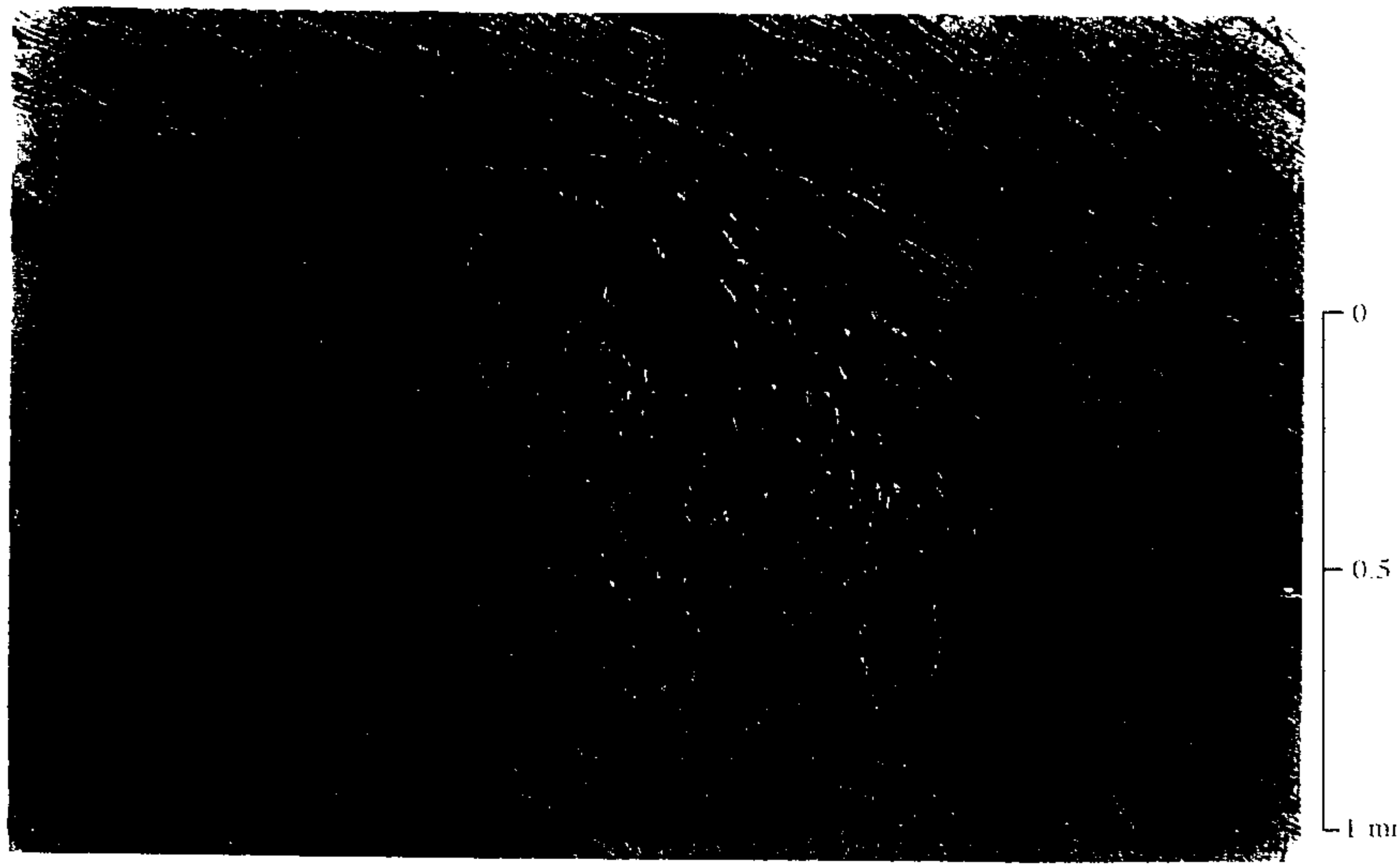

PLATE 7: SAMPLE ERR01, 322 (Transmitted plane polarised light, x5, Film 2 / Frame 22).
In this altered pelitic gneiss, chlorite (drab green) has completely replaced an equant garnet porphyroblast (centre, with small white quartz inclusions), and it also has replaced biotite flakes interleaved with muscovite flakes (colourless, oriented NW-SE).

SAMPLE : ERR01, 322 (Lower Cahill Formation, NT)

SECTION NO. : ERR01, 322

HAND SPECIMEN : The drill core sample represents a strongly foliated dull grey gneissic rock with scattered equant dark green grains (altered garnet). A centimetre-thick quartz-rich band lies in the trace of the foliation.

The section offcut failed to accept the stain for K-feldspar, confirming it is absent.

ROCK NAME : **Chlorite-altered muscovite-'biotite'-garnet-staurolite gneiss**

PETROGRAPHY :

A visual estimate of the modal mineral abundances gives the following:

Mineral	Vol.%	Origin
Quartz	70	Metamorphic
Muscovite	20	Metamorphic
Tourmaline	<1	Metamorphic
Opaques	Tr	Metamorphic
Biotite	Tr	Relict metamorphic
Staurolite (incl . sericite)	<1	Relict metamorphic (incl. alteration)
Chlorite	3	Alteration (after garnet)
Chlorite (incl. leucoxene)	5	Alteration (after biotite)

In thin section, this sample displays a well-preserved foliated granoblastic metamorphic texture with local porphyroblasts and thick quartz banding, modified by weak selective alteration.

Quartz is abundant, and occurs in two sites:

i) Most occurs as equant anhedral grains ~0.2-0.4 mm in size, distributed in granoblastic mosaic through the rock. They tend to occur between the larger muscovite flakes and foliae, and some display mild elongation in the trace of the foliation (aspect ratios up to ~2:1).

ii) Some occurs as large anhedral grains ~4-8 mm in size, forming a coarse granoblastic mosaic in the quartz-rich band.

Muscovite is moderately abundant, forming well-crystallised flakes ~0.2-1.0 mm long. They tend to be concentrated in foliae or laminae, and the strong preferred orientation of the flakes and the foliae/laminae defines a strong foliation through the rock.

Biotite was moderately abundant, forming well-crystallised flakes similar in size to the muscovite. All of the biotite flakes have suffered complete pseudomorphous replacement by pleochroic green chlorite and associated minor dark leucoxene granules. Rare tiny biotite flakes (pleochroic in reddish browns) are preserved where enclosed within a quartz grain.

Garnet formed large equant euhedral crystals ~1-2 mm in size. They have suffered complete pseudomorphous replacement by massive mats of pleochroic green chlorite, but small quartz inclusions are preserved. No garnet is preserved.

PLATE 8: SAMPLE ERR01, 322 (Transmitted light, crossed polarisers, x5, Film 2 / Frame 23).
A large staurolite porphyroblast (pale yellow, upper right) is partly replaced by alteration sericite (microveinlet network of tiny yellowish flakes). Foliated muscovite (bright yellow, bottom left) and quartz (grey, upper left) remain fresh.

Staurolite formed uncommon large anhedral grains up to ~5 mm in size. They have suffered partial replacement around margins and along cleavages by fine-grained sericite, leaving relict pleochroic yellow staurolite.

Tourmaline occurs in trace amount as small euhedral equant crystals, pleochroic in drab greens, scattered sparsely through the quartz-muscovite-biotite areas of the rock.

Opaques occur in trace amount as small euhedral lath-like crystals (probably ilmenite).

INTERPRETATION:

This sample is interpreted to represent a pelitic sedimentary rock. It has suffered complete recrystallisation in response to regional metamorphism in the amphibolite facies, generating the strong foliated granoblastic porphyroblastic assemblage of quartz + muscovite + biotite + garnet + staurolite + trace tourmaline + opaques (?ilmenite).

Subsequent low-grade alteration resulted in complete selective replacement of biotite and garnet by chlorite, and partial replacement of staurolite by sericite.

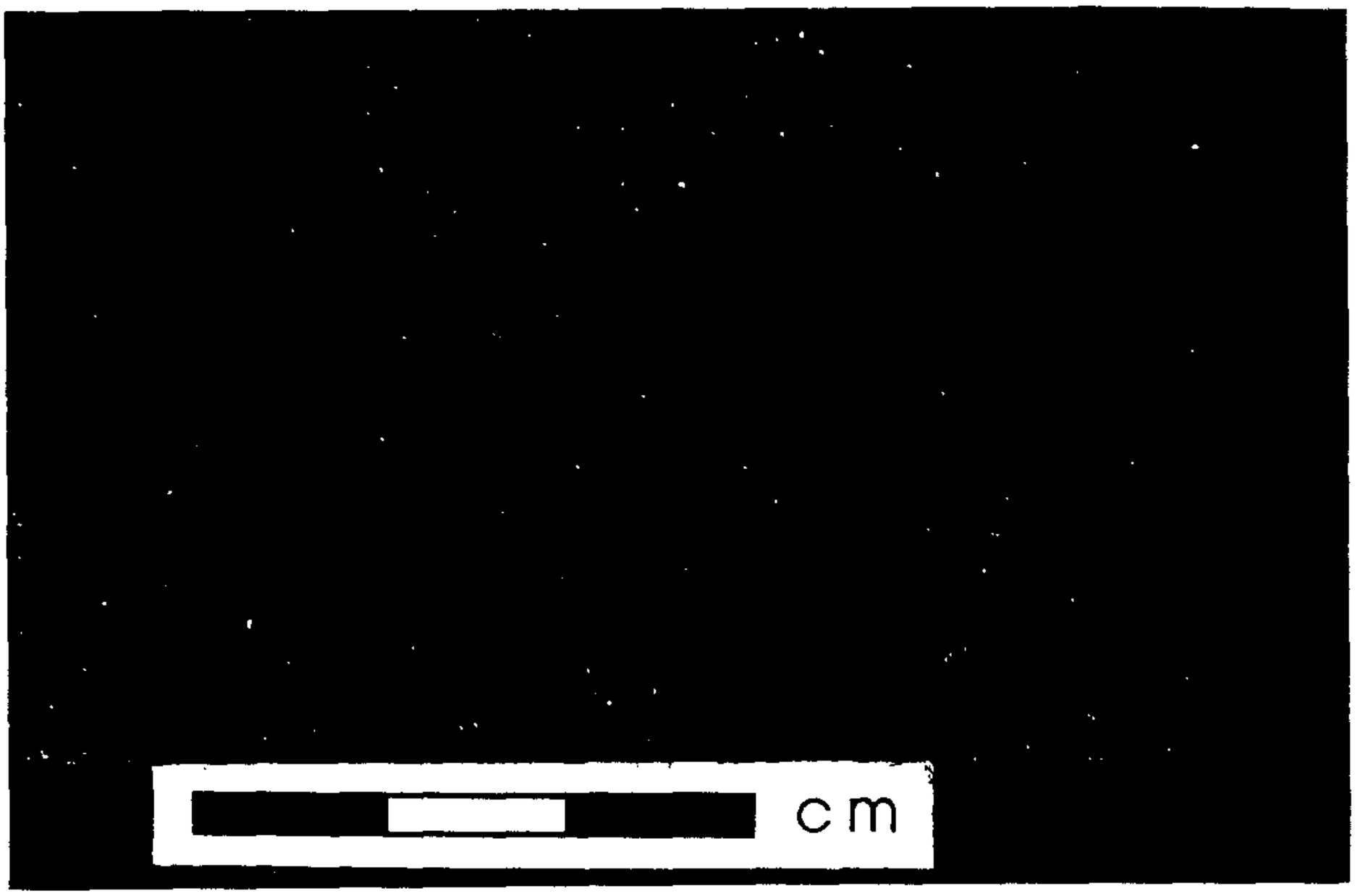

PLATE 9: SAMPLE ERR01, 354.7 (Macrophotograph of sawn core, wet, bar for scale; Film 1 Frame 23). In this pelitic gneiss, small disseminated garnet porphyroblasts (equant pale grains) are distributed through a matrix dominated by quartz, muscovite and biotite.

PLATE 10: SAMPLE ERR01, 354.7 (Transmitted plane polarised light, x5, Film 2 Frame 24)
In this fresh pelitic gneiss, equant garnet porphyroblasts (buff brownish colour, lower right, upper left) lie in a foliated matrix of muscovite (colourless flakes), biotite (brown flakes), and quartz (colourless grains).

SAMPLE : ERR01, 354.7 (Lower Cahill Formation, NT)

SECTION NO. : ERR01, 354.7

HAND SPECIMEN : The drill core sample represents a medium-grained crystalline rock that is grey with scattered small pale pink garnet crystals. A moderately strong foliation is defined by lustrous colourless and dark mica flakes.

The section offcut failed to accept the stain for K-feldspar, confirming it is absent.

ROCK NAME : **Muscovite-biotite-garnet gneiss**

PETROGRAPHY :

A visual estimate of the modal mineral abundances gives the following:

Mineral	Vol.%	Origin
Quartz	60	Metamorphic
Muscovite	20	Metamorphic
Biotite	12	Metamorphic
Garnet	5	Metamorphic
Plagioclase (incl. sericite)	Tr	Metamorphic (incl. alteration)
Tourmaline	Tr	Metamorphic
Opaques	Tr	Metamorphic
Apatite	Tr	Metamorphic
Chlorite (incl. leucoxene)	1	Alteration (after biotite)

In thin section, this sample displays a medium-grained foliated granoblastic metamorphic texture with local porphyroblasts, modified by weak selective alteration.

Quartz is abundant, occurring as equant anhedral grains ~0.2-0.4 mm in size, forming a granoblastic mosaic between foliated mica flakes. Most grains are unstrained (i.e. no shadowy strain extinction or elongation).

Muscovite is moderately abundant, occurring as well-crystallised flakes ~0.2-1.0 mm long. They are distributed throughout the rock, but tend to be concentrated in foliae or laminae. The strong preferred orientation of the individual flakes and the foliae/laminae defines the strong foliation through the rock.

Biotite forms well-crystallised flakes similar in size to muscovite, and commonly is interleaved with the muscovite. It is pleochroic from tan brown to very pale yellow. Most flakes are fresh, but locally some flakes have suffered partial to complete replacement by pleochroic green chlorite with associated minute turbid leucoxene granules.

Garnet builds euhedral equant crystals ~1.0-1.5 mm in size. They are sparsely scattered through the rock, and foliation wraps around them. All contain small ragged quartz inclusions. Turbid brownish incipient alteration patches of unknown nature are developed in the cores of some garnet crystals.

Plagioclase is rare, occurring as small angular anhedral grains in granoblastic relationship with quartz and micas. The grains have suffered partial replacement by small sericite flecks. (Note the tendency for these altered grains to absorb some of the sodium cobaltinitrite stain in section offcut, generating a false stain for K-feldspar).

Tourmaline occurs in trace amount as small equant euhedral crystals, pleochroic in drab brownish greens. They are sparsely sprinkled through the rock.

Opaques occur in trace amount as tiny equant grains sparsely disseminated through the rock.

Apatite is uncommon, forming small equant euhedral crystals with characteristic high relief, lack of colour, and low birefringence.

INTERPRETATION:

This sample represents a pelitic sedimentary rock that has suffered complete recrystallisation in response to regional metamorphism in the amphibolite facies. This generated the observed foliated granoblastic porphyroblastic assemblage of quartz + muscovite + biotite + garnet + trace tourmaline + plagioclase + opaques + apatite.

Subsequent weak selective alteration generated minor chlorite + leucoxene after biotite, and a trace of sericite after uncommon plagioclase grains.

APPENDIX III:

EL 3590

ERRE

AMDEL LTD.

XRD ASSAY RESULTS

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MINERAL CHEMISTRY

Amdel Laboratories Ltd
PO Box 338
Torrensville Plaza SA 5031
ACN 009 076 555

Telephone (08) 8416 5300
Facsimile (08) 8234 0321

Mr Colin Hallenstein
AFmeco Mining and EXploration Pty Ltd
1833 Coonawarra Road
WINNELLIE NT 0801

FINAL ANALYSIS REPORT

Your Order No: 4033

Our Job Number : 8AD2061

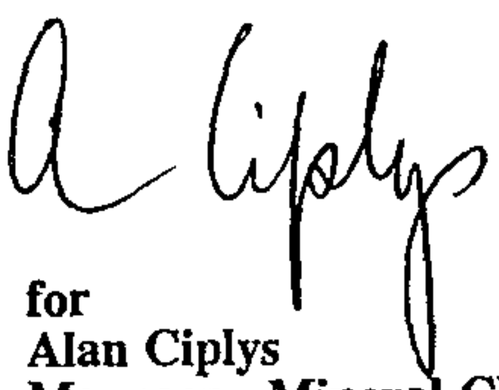
Sample rec'd : 04/08/98

Results reported : 25/09/98

No. of samples : 7

Report comprises a cover sheet and pages 1 to 2

Approved Signature:



for
Alan Ciplys
Manager - Mineral Chemistry

Report Codes:
N.A. - Not Available.
L.N.R. - Listed But Not Received.
I.S. - Insufficient Sample.

Distribution Codes:
CC - Carbon Copy
EM - Electronic Media
MM - Magnetic Media

amdel

MINERALOGY OF 7 SANDSTONE SAMPLES

1. INTRODUCTION

Samples were received from Mr Colin Hallenstein of AFmeco Mining & EXploration Pty Ltd with a request for detailed clay mineralogy determination.

2. PROCEDURE

Weighed, lightly pre-ground subsamples were taken and dispersed in water with the aid of deflocculants and allowed to sediment to produce –2 μm e.s.d. size fractions by the pipette method. The resulting dispersions were used to prepare oriented clay preparations on ceramic plates. Two plates were prepared per sample, both being saturated with Mg^{++} ions, and one in addition being treated with glycerol. When air-dry, these were examined in the X-ray diffractometer.

Finely pulverised subsamples of the bulk material were analysed by X-ray diffraction.

3. RESULTS

The semi-quantitative mineralogies of the samples are given in Table 1. The –2 μm content of the samples is very low, usually less than 2%.

amdel

TABLE 1: SEMI-QUANTITATIVE MINERALOGY OF THE BULK AND –2 µm FRACTION OF 7 SAMPLES

		Quartz	Muscovite	Kaolinite	Other Minerals
ERR-1:50	Bulk	D	Tr	-	-
	-2 µm	Tr	D	Tr	-
ERR-1:100	Bulk	D	Tr	-	-
	-2 µm	Tr-A	D	-	-
ERR-1:150	Bulk	D	Tr	-	Hematite (Tr)
	-2 µm	A	D	-	-
ERR-1:200	Bulk	D	Tr	-	Hematite (Tr-A)
	-2 µm	A	D	-	-
ERR-1:249	Bulk	D	Tr	-	-
	-2 µm	A	D	-	-
ERR-1:259	Bulk	D	Tr	-	Dolomite (Tr-A)
	-2 µm	A	D	-	Chlorite (A)
ERR-1:270.5	Bulk	D	Tr	-	Dolomite (Tr-A)
	-2 µm	A	D	Tr	Dolomite (Tr)

Semi-quantitative Abbreviations

D = Dominant. Used for the component apparently most abundant, regardless of its probable percentage level.

CD = Co-dominant. Used for two (or more) predominating components, both or all of which are judged to be present, in roughly equal amounts.

SD = Sub-dominant. The next most abundant component(s) providing its percentage level is judged above about 20.

A = Accessory. Components judged to be present between the levels of roughly 5 and 20%.

Tr = Trace. Components judged to be below about 5%.

APPENDIX IV:

EL 3590

ERRE

ULTRA TRACE LTD.

SANDSTONE GEOCHEMISTY ASSAY RESULTS

ULTRA TRACE
ANALYTICAL LABORATORIES

ULTRA TRACE Pty. Ltd.
A.C.N. 008 746 585
58 Sorbonne Crescent,
Canning Vale, Western Australia 6155
Telephone (08) 9456 0404
Facsimile (08) 9456 0403

Reference : 13110
Date : 11th August 1998
Order : 3973
Project :
Date Received : 4th August 1998
Number Samples : 7

Analysis of Mineral Samples

for

Afmeco Mining & Exploration Pty Ltd

P.O.Box 2142

Darwin NT 0801

Attention : Mr C Hallenstein

Authorised by : V Eldridge

ULTRA TRACE
ANALYTICAL LABORATORIES

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Telephone (08) 9456 0404
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Reference 13110 Order 3973

	Al2O3 %	B ppm	Fe2O3 %	K2O %	MgO %	P2O5 ppm	Pb ppm	Th ppm	U ppm	UAR ppm
Detn Limit	0.01	10	0.01	0.01	0.01	50	1	0.05	0.05	0.01
ERR-1 50	1.27	10	1.39	0.33	0.03	550	256	4.70	1180.	1200.
ERR-1 100	0.68	10	0.54	0.20	0.02	100	15	3.35	61.1	62.5
ERR-1 150	0.68	10	0.73	0.19	0.03	100	12	3.35	57.0	58.0
ERR-1 200	3.38	20	1.60	1.02	0.10	200	3	8.10	12.4	9.76
ERR-1 249	0.98	<10	0.47	0.30	0.05	100	4	3.00	20.4	17.4
ERR-1 259	1.83	30	0.56	0.48	0.83	100	1	3.60	5.15	3.76
ERR-1 270.5	1.95	30	1.39	0.59	1.13	100	2	7.50	10.2	10.2

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Facsimile (08) 9456 0403

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Unless noted for specific sample batches, our instructions are.....
Excess Residual Material will be held for a total of 30 days of which 30 days will be free of charge. Residues will then be dumped.
Pulps will be held for a total of 60 days of which 60 days will be free of charge. Pulps will then be returned.

The samples have been sorted and dried. Primary preparation has been by crushing the whole sample. The whole sample has then been pulverised in a ring pulveriser.
The sample(s) have been digested with a mixture of Acids including Hydrofluoric, Nitric, Hydrochloric and Perchloric Acids. This digest approaches a "Total" digest for many elements however some refractory oxides are not completely attacked.

Al2O3, Fe2O3, K2O, MgO, P2O5
have been determined by Inductively Coupled Plasma (ICP) Optical Emission Spectrometry.

Pb, Th, U
have been determined by Inductively Coupled Plasma (ICP) Mass Spectrometry.

The samples have been fused with Sodium Peroxide and subsequently the melt has been dissolved in dilute Hydrochloric acid for analysis. Because of the high furnace temperatures, volatile elements are lost. This procedure is particularly efficient for determination of Major element composition (Including Silica) in the samples or for the determination of refactory mineral species.

B
has been determined by Inductively Coupled Plasma (ICP) Optical Emission Spectrometry.

The samples have been digested with Aqua Regia. This is a partial digest though it is quite efficient for extraction of Gold. (It usually will not extract as much as the classical Fire Assay procedure.) Some easily digested elements show good recoveries however others are poorly extracted.

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UAR
has been determined by Inductively Coupled Plasma (ICP) Mass Spectrometry.