

APPENDIX I

EL 9371 MORDOR POUND

Database Codes - CRAE Northern District

Alteration	Code
Albitic	AB
Alunitic	AL
Argillic	AR
Carbonate	CA
Chloritic	CH
Epidotised	EP
Greisen	GS
Hematitic	HM
Kaolinitic	KA
Potassic	PC
Propylitic	PR
Pyritic	PY
Sericitic	SE
Serpentinised	SP
Silicified	SI
Skarn	SK
Zeolitic	ZE

Colour	Code
Banded variable	A
Black	N
Brown	B
Buff	U
Dark	D
Green	V
Grey	G
Light	L
Mottled	M
Orange	O
Pink	K
Purple	P
Red	R
White	W
Yellow	Y
Blue	E
Tan	T

Mineralisation Abundances	Code
Trace	< 1 % TR
Minor	1-3 % MI
Moderate	3-10 % MD
Major	10-20 % MA
Abundant	> 20 % AB

Qualifier	Code
General Qualifier	
Amygdaloidal	AMG
Arenaceous	ARE
Argillic	ARC
Basic	BAS
Bouldery	BLY
Brecciated	BXD
Calcareous	CAC
Carbonaceous	CAN
Cherty	CHY
Conglomeratic	CGC
Crystal	XTL
Cumulate	CUL
Dolomitic	DMT
Feldspathic	FEL
Feldspathoidal	FOI
Ferruginous	FER
Graphitic	GPT
Intermediate	ITM
Laminated	LMN
Lapilli	LPL
Layered	LAY
Leucocratic	LCC
Lithic	LTH
Mafic	MAF
Melanocratic	MEL
Meta	MET
Micaceous	MCA
Muddy	MDY
Mylonitic	MYC
Ortho	ORT
Para	PAR
Pebbly	PBY
Pelitic	PLC
Phosphatic	PHC
Porous	POR
Porphyritic	POP
Potassic	POT
Psammitic	PMC
Pyritic	PYR
Quartzo-feldspathic	QTF
Rhythmic-layered	RYM
Sandy	SDY
Sericitic	SEC
Siliceous	SIL
Silty	SLY
Sulphidic	SUD
Tholentic	THL
Trachy	TCY
Tuffaceous	TFC
Unwelded	UNW
Vitric	VTR
Welded	WEL

Qualifier	Code
Mineral qualifier	
Actinolite	ACT
Albite	ALB
Amphibole	AMP
Andalusite	AND
Anhydrite	ANH
Apatite	APT
Arsenopyrite	APY
Azurite	AZT
Barite	BRT
Beryl	BRL
Biotite	BTI
Bitumen	BIT
Bornite	BNT
Calc-silicate	CSI
Calcite	CAL
Carbonate	CAR
Cassiterite	CST
Celadonite	CEL
Chalcocite	CCT
Chalcopyrite	CCP
Chlorite	CLT
Chloritoid	CLD
Chromite	CHR
Clay mineral	CLM
Clinopyroxene	CPX
Clinozoisite	CZO
Cordierite	CRD
Corundum	COR
Covelite	CVL
Cuprite	CUP
Diopside	DIP
Dolomite	DOL
Epidote	EPD
Feldspar	FSP
Feldspathoid	FPD
Felsic	FLS
Fluorite	FLR
Galena	GLN
Garnet	GNT
Glaucinite	GLT
Glaucophane	GLH
Goethite	GTH
Graphite	GRP
Gypsum	GYP
Haematite	HEM
Halite	HAL
Hornblende	HBL
Illite	ILL
Ilmenite	ILM
K-feldspar	KFS
Kaolinite	KLN
Kyanite	KYN
Magnetite	MGT
Malachite	MAL
Manganese minerals	MAN
Marcasite	MCS
Mica	MIC
Microcline	MCC
Molybdenite	MOL
Monazite	MNZ
Muscovite	MSV
Olivine	OLV
Opal	OPL
Opaque mineral	OPQ
Orthopyroxene	OPX
Phlogopite	PHG
Phosphate	PHS
Plagioclase	PLG
Prehnite	PRH
Pumpellyite	PMP
Pyrite	PYT
Pyroxene	PYX
Pyrrhotite	POH
Quartz	QTZ
Rutile	RTL
Scheelite	SCL
Sericite	SER
Serpentine	SEP
Siderite	SDR
Siegenite	SGN
Sillimanite	SLL
Spessartine	SPS
Sphalerite	SPH
Spinel	SPN
Staurolite	STR
Stibnite	STB
Talc	TLC
Tourmaline	TOR
Tremolite	TRM
Uranium secondary	URS
Vermiculite	VRM
Wollastonite	WOL
Zeolite	ZEO

Qualifier	Code
Mineral qualifier	
Magnetite	MGT
Malachite	MAL
Manganese minerals	MAN
Marcasite	MCS
Mica	MIC
Microcline	MCC
Molybdenite	MOL
Monazite	MNZ
Muscovite	MSV
Olivine	OLV
Opal	OPL
Opaque mineral	OPQ
Orthopyroxene	OPX
Phlogopite	PHG
Phosphate	PHS
Plagioclase	PLG
Prehnite	PRH
Pumpellyite	PMP
Pyrite	PYT
Pyroxene	PYX
Pyrrhotite	POH
Quartz	QTZ
Rutile	RTL
Scheelite	SCL
Sericite	SER
Serpentine	SEP
Siderite	SDR
Siegenite	SGN
Sillimanite	SLL
Spessartine	SPS
Sphalerite	SPH
Spinel	SPN
Staurolite	STR
Stibnite	STB
Talc	TLC
Tourmaline	TOR
Tremolite	TRM
Uranium secondary	URS
Vermiculite	VRM
Wollastonite	WOL
Zeolite	ZEO

Texture	Code	Texture	Code	Texture	Code
Sedimentary		Igneous/Volcanic		General	
Bioturbated	BT	Aphanitic	AF	Matrix Supported	MS
Cemented	CM	Aphyric	AY	Clast Supported	CS
Consolidated	CN	Amygdaloidal	AG	Coarse grained	CG
Coarsening upward	CU	Amorphous	AH	Fine grained	FG
Dessication cracks	DC	Cryptocrystalline	CX	Medium grained	MG
Fossil invertebrates	FI	Devitrified	DV	Very coarse grained	VC
Microfossils	FM	Dyke	DY	Very fine grained	VF
Fossil plants	FP	Equigranular	EQ	Fresh	W0
Fissile	FS	Eutaxitic	EU	Slightly weathered	W1
Trace fossils	FT	Granophyric	GF	Moderately weathered	W2
Fining upward	FU	Glassy	GL	Highly weathered	W3
Fossil vertebrate	FV	Gneissic	GN		
Normal grading	GR	Lapilli	LL	Metamorphic/Structure	
Hard	HD	Migmatitic	MM	Banded	BA
Indurate	IN	Microcrystalline	MX	Broken	BK
Laminated	LA	Megacrystic	MZ	Brecciated	BR
Liesegang	LS	Porphyroblastic	PF	Boudinaged	BU
Micritic	MC	Pegmatitic	PG	Crenulated	CR
Clay/mud rich	MD	Porphyritic	PR	Contorted	CT
Oolitic	OO	Pillowed	PW	Cleaved	CV
Pebbly	PB	Rhythmically layered	RL	Faulted	FA
Peloidal	PE	Recrystallised	RX	Fractured	FC
Porous	PO	Schistose	SC	Folded	FD
Pisolitic	PS	Saccharoidal	SI	Foliated	FO
Parting	PT	Sill	SL	Friable	FR
Reverse grading	RG	Spinifex	SX	Jointed	JO
Ripple marks	RP	Vitric	VI	Kinked	KI
Sandy	SA	Vein	VN	Lineated	LI
Soft sediment deformed	SD	Vesicular	VS	Massive	MS
Stromatolitic	SO	Vuggy	VU	Mylonitic	MY
Stylotitic	ST	Xenocrstic	XC	Sheared	SH
Thinning downward	TD	Xenolith	XE	Slickensided	SL
Thickening upward	TU	Xenolithic	XN		
Wavy bedding	WB				
Cross laminated	XL				
Unconsolidated	UN				
Thick bedded	TK				
Thin bedded	TN				
Medium bedded	ME				
Very thick bedded	VK				
Very thin bedded	VT				
Very angular	R1				
Angular	R2				
Sub angular	R3				
Sub rounded	R4				
Rounded	R5				
Well rounded	R6				
Unsorted	S0				
Very poorly sorted	S1				
Poorly sorted	S2				
Moderately sorted	S3				
Well sorted	S4				
Very well sorted	S5				
Bimodally sorted	SB				

Tectonic domain	Code
Amadeus Basin	AMA
Arafura Basin	ARA
Arnhem Block	ARN
Arunta Orogen	ARU
Birrindudu Basin	BIR
Bonaparte Basin	BON
Carpentaria Basin	CAR
Daly Basin	DAL
Dunmara Basin	DUN
Eromanga Basin	ERO
Georgina Basin	GEO
Granites / Tanami Block	GRA
Halls Creek Zone	HAL
Litchfield Province	LIT
McArthur Basin	MCA
Money Shoal Basin	MON
Murphy Inlier	MUR
Musgrave Block	MUS
Nanambu Inlier	NAN
Ngalia Basin	NGA
Officer Basin	OFF
Ord Basin	ORD
Pedirka Basin	PED
Pine Creek Geosyncline	PCK
Rum Jungle Inlier	RUM
South Nicholson Basin	SNI
Tennant Creek Inlier	TEN
Tertiary Basins	TER
Victoria Basin	VIC
Wiso Basin	WIS

Sample Type	Code
Drainage	
CN leach	CN
Gravel (for Diamonds)	GV
Heavy mineral pan concentrate	PC
Stream sediment	SS
Surface geochemical	
Auger	AU
Lag	LG
Loam (for Diamonds)	LM
Soil	SL
Rock	
Float	RKFLT
Rock chip	RKCHIP
Channel	RKCHAN
Gossan	RKGOSS
Grab	RKGRAB
Drilling	
Air core	AC
Diamond core	DD
Percussion chips	PD
RAB	RAB
RC percussion chips	RC
Miscellaneous	
Geobotanical	GB
Laterite (bauxite)	LT
Palaeontological or palynological	PL
Petrographic - petrology	PT
Polished section	PS
Thin section	TS
Water	WT

Sieve mesh size given if appropriate ie:

-80# SS

-20# +40# SL

-4mm +2mm LG

Igneous / Volcanic Rocks	
Andesite	ANT
Anorthosite	ANS
Aplite	APL
Basalt	BLT
Carbonatite	CBT
Charnockite	CHK
Chromitite	CRT
Dacite	DAC
Diorite	DRT
Dolerite	DLT
Dunite	DUN
Epiclastic	EPC
Fenite	FNT
Foidolite	FDL
Gabbro	GAB
Granite	GRT
Granodiorite	GRD
Hazburgite	HZB
Hornblendite	HBT
Ignimbrite	IGM
Kimberlite	KBL
Lamproite	LPR
Lamprophyre	LPY
Latite	LTT
Monzonite	MZT
Norite	NTR
Obsidian	OBS
Ophiolite	OPH
Peridotite	PER
Picrite	PCT
Porphyry	PHY
Pyroclastic	PYC
Pyroxenite	PRX
Quartz granitoid	QZG
Rhyolite	RHY
Shonkinite	SNK
Spillite	SPL
Syenite	SYN
Tonalite	TNL
Trachyte	TRC
Tuff	TUF
Ultramafic	ULM

Sedimentary rocks	
Arenite	ARN
Argillite	ARG
Arkose	ARK
Boulder	BLD
Carbonaceous rock	CBN
Carbonate rock	CBR
Chalk	CHL
Chert	CHT
Clastic rock	CLR
Clay	CLY
Claystone	CLS
Conglomerate	CNG
Dolomite	DLM
Evaporite	EVP
Gravel	GVL
Greywacke	GYW
Ironstone	IRS
Limestone	LMS
Marl	MAR
Mud	MUD
Mudstone	MDS
Organic sediment	ORS
Pebble	PBL
Peperite	PEP
Phosphorite	PHP
Porcellanite	PCL
Sand	SND
Sandstone	SDS
Shale	SHL
Siltstone	SST
Till	TLL
Travertine	TRV

Metamorphic Rocks	
Amphibolite	AML
Eclogite	EGL
Gneiss	GNS
Granofels	GFL
Greisen	GRS
Granulite	GRN
Hornfels	HFL
Marble	MBL
Migmatite	MIG
Metasomatite	MTS
Mylonite	MYL
Phyllite	PHL
Quartzite	QZT
Quartz rock	QZR
Schist	SCH
Skarn	SKN
Serpentinite	SRP

Regolith / general	
Bauxite	BAU
Breccia	BRX
Calcrete	CLC
Ferricrete	FEC
Grus	GRU
Gossan	GOS
Laterite	LAT
Silcrete	SLC
Rock	RCK

APPENDIX II

EL 9371 MORDOR POUND

Rock Chip Sample Ledgers and Assay Results

CRA EXPLORATION PTY. LIMITED : ROCK SAMPLE LEDGER

EL NAME MORDOR
TENEMENT 9371
PROSPECT BRAVEHEART

1:250,000 MAPSHEET ALICE SPRINGS SF5314
1:100,000 MAPSHEET LAUGHLEN 5751
TECTONIC DOMAIN Arunta Orogen

DATE 24/03/96

SAMPLE	TYPE	GEOL.	EAST	NORTH	ZONE	REG	LITHOLOGY	LITHOLOGY	COLOUR	TEXTURE	ALTERATN	MINERALN	CPS	MAG SUS	COMMENTS
						STRAT		DESCRPT						(S.I. UNITS)	
5487709	RKCHAN	DJL	447580	7405420	53		SNK		BK	PR					Magnetite Shonkinite: very high MGT content in porphyritic SNK; up to 5% malachite in cavities and along selvages; it brown to red-brown gossan in small vugs/cavities.
5487710	RKCHAN	DJL	447575	7405420	53		SNK		BK	PR					Magnetite Shonkinite: more leucocratic, higher feldspar content with MGT interstitial to phenocrysts; phlogopite v.common; up to 2% malachite.
5487711	RKCHAN	DJL	447575	7405415	53		SNK		BK	PR					Magnetite Shonkinite: massive MGT veining (heavy samples); phlogopite common; up to 5% malachite.
5487712	RKCHAN	DJL	447570	7405415	53		SNK		BK	PR					Magnetite Shonkinite: massive MGT in SNK (pervasive); minor QTZ; phlogopite abundant; it brown to red-brown gossan common; 2-3% malachite.
5487749	RKCHAN	DJL	447280	7405215	53		SNK		BK	PR					Common malachite in thin, chloritic veinlet; minor CCP/PYT; hosted by porphyritic SNK; very poor outcrop.
5487750	RKCHAN	DJL	447010	7405180	53		PEG		PI				800		High scint reading in K feldspar-rich part of zoned pegmatite (QTZ-FSP zoning); high MGT content.
5487751	RKCHAN	DJL	446965	7405200	53		PEG		P/WH				2500		Common pale-green mineral in pegmatite (microcline/KSP) recording scint. readings of up to 2500CPS; possibly secondary uranium?
5488051	RKCHAN	DLW	447585	7405417	53		SNK		BK	PR					Porphyritic magnetite shonkinite; feldspar phenocrysts surrounded by a magnetite-rich groundmass; 2-4% malachite.
5488052	RKCHAN	DLW	447580	7405417	53		SNK		BK	PR					Porphyritic magnetite shonkinite; feldspar phenocrysts surrounded by a magnetite-rich groundmass; increased malachite (5%).
5488053	RKCHAN	DLW	447575	7405417	53		SNK		BK	PR					Porphyritic magnetite shonkinite; feldspar phenocrysts surrounded by a magnetite-rich groundmass; increased malachite (5-10%).

SAMPLE	TYPE	GEOL.	EAST	NORTH	ZONE	REG STRAT	LITHOLOGY	LITHOLOG DESCRPT	COLOUR	TEXTURE	ALTERATN	MINERALN	CPS	MAG SUS (S.I. UNITS)	COMMENTS
5488054	RKCHAN	DLW	447570	7405417	53		SNK		BK	PR					Porphyritic magnetite shonkinite; feldspar phenocrysts surrounded by a magnetite-rich groundmass; increased malachite (5-10%).
5488055	RKCHAN	DLW	447565	7405417	53		SNK		BK	PR					Porphyritic magnetite shonkinite; feldspar phenocrysts surrounded by a magnetite-rich groundmass; increased malachite (5%).
5488056	RKCHAN	DLW	447560	7405417	53		SNK		BK	PR					Porphyritic magnetite shonkinite; feldspar phenocrysts surrounded by a magnetite-rich groundmass; 2-4% malachite content.
5488057	RKCHAN	DLW	447550	7405417	53		SNK		BK	PR					Porphyritic shonkinite; feldspar phenocrysts surrounded by a phlogopite-rich groundmass; minor magnetite and trace malachite (1-2%).
5488058	RKCHAN	DLW	447540	7405417	53		SNK		BK	PR					Porphyritic shonkinite; feldspar phenocrysts surrounded by a phlogopite-rich groundmass; trace magnetite content.
5488059	RKCHAN	DLW	447560	7405427	53		SNK		BK	EQ					Medium-grained, equigranular shonkinite; phlogopite-dominated containing lesser feldspar and pyroxene; trace magnetite.
5488060	RKCHAN	DLW	447530	7405417	53		SNK		BK	EQ					Medium-grained, equigranular shonkinite; phlogopite-dominated containing lesser pyroxene and feldspar; trace magnetite.
5488061	RKCHAN	DLW	447575	7405410	53		SYN		BR	PR					Porphyritic melanocratic syenite; common magnetite; malachite present in small amounts (2%).
5488062	RKCHAN	DLW	447585	7405410	53		SYN		BR	PR					Porphyritic melanocratic syenite; common magnetite; malachite present in small amounts (2%).
5488063	RKCHAN	DJL	450200	7407200	53		SST/IRS		BR						Gossanous iron-altered siltstone taken from the vicinity of the NE GEOTEM anomaly; taken from float-no outcrop.
5488064	RKCHAN	DJL	450200	7407200	53		SST/IRS		BR						Gossanous iron-altered siltstone taken from the vicinity of the NE GEOTEM anomaly (north side of creek); taken from float-no outcrop; limonitic/goethitic; pitted/boxwork textures present.
5488065	RKCHAN	DJL	450250	7407200	53		QZT/IRS		BR						Rock chip samples collected from quartzite of Heavytree Quartzite Formation (possibly shear near the basement contact); silicified and ferruginous quartzite and siltstone zone with a N-S trend; south of GEOTEM anomaly and south of creek.

CRA EXPLORATION PTY. LIMITED : ROCK SAMPLE ASSAY RESULTS

ELNAMEMORDOR
ELNUMBER9371
PROSPECTBRAVEHEART

250,000 SHEETSF5314
100,000 SHEET5751

SAMPLED BYDJL
DPQ81926

DATE24/03/96
LABAmdel

SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
5487709	2.6	8	-0.01	2300	24	7600	0.2	120	48	3100	561000	16100	9100	3100	1.2	2400	740	2300	22.5	0.03	0.02	3	3.1	1100	310
5487710	3.1	3	0.18	5600	36	16000	0.4	290	54	7300	422000	28800	18100	2500	1.5	10100	2100	4100	170	0.089	0.11	11	5.5	540	280
5487711	2.9	11	0.06	2400	63	7300	0.2	140	74	3400	592000	17400	14100	2700	1.9	600	1600	3400	12	0.066	0.03	3	2.9	660	320
5487712	2.9	-0.5	0.04	2400	94	11600	0.2	200	100	6900	854000	19400	15900	4200	3.7	820	2200	4300	21	0.041	0.015	8	7	1100	480
5487749	0.7	3	-0.01	2100	1	33800	0.1	28	82	4100	78600	18600	27300	960	0.5	2400	54	1500	18	-0.001	-0.005	5	2	185	95
5487750	1.1	2.5	-0.01	310	0.5	27100	1.1	6	50	43	60100	10600	1300	290	0.6	61800	5	980	83	-0.001	-0.005	600	310	185	20
5487751	-0.1	1	-0.01	700	1.3	8100	0.5	-2	30	30	11200	16100	1100	250	1.5	63600	4	480	57	-0.001	-0.005	1100	2000	45	10
5488051	1.8	2.5	0.18	4200	27	16800	0.9	175	34	4400	386000	26600	12100	1900	3.3	6600	1300	2900	100	0.02	0.1	6	2.2	640	230
5488052	1.3	2.5	0.12	4100	30.5	10300	0.9	155	29	3500	414000	19700	9600	1700	1.5	3300	1000	2400	73	0.019	0.1	3	1.75	260	220
5488053	1.5	2	0.1	6700	28	15900	1.1	150	36	5600	373000	25600	16800	1800	3.2	3200	1400	4000	100	0.029	0.1	5	3.3	260	270
5488054	1.6	1	0.12	2900	36	4400	1.3	88	37	2800	332000	16400	9200	1800	2.3	1000	940	2600	15	0.09	1.9	4	1.55	400	300
5488055	1.3	1.5	0.51	3600	50	4800	1.1	110	43	4700	462000	14400	7400	2100	1.8	760	1400	1900	20	0.044	0.1	5	1.4	540	300
5488056	1.1	1.5	0.03	1900	46.5	5800	1.3	130	35	2400	521000	10600	7600	2400	1.8	370	1100	2200	15.5	0.022	0.1	3	1.5	540	320
5488057	0.5	4.5	0.05	9700	1.1	35600	0.2	43	33	4000	63000	22900	21600	800	0.7	12800	210	3800	120	0.016	0.1	22	2.1	180	85
5488058	0.5	3.5	0.02	9000	1.9	40200	0.1	28	33	560	63900	50400	24200	820	0.5	14700	37	4800	150	0.005	-0.005	16	1.25	210	85
5488059	0.5	1.5	-0.01	10000	-0.2	93500	0.1	68	92	250	88600	32600	64000	1000	0.5	4700	96	13200	35.5	0.002	-0.005	17	1.3	360	80
5488060	0.4	-0.5	-0.01	8600	-0.2	86600	0.2	59	250	175	84900	29300	63400	1200	0.5	5700	105	10100	48.5	-0.001	-0.005	17	1.55	310	90
5488061	1.3	5.5	0.06	9000	3.3	38600	0.4	33	44	1900	73200	28600	24600	860	0.6	13800	115	5500	440	0.015	0.1	19	1.75	230	105
5488062	1.9	2	0.07	9600	6.5	32900	0.3	30	34	2000	72400	37400	20100	760	0.6	15700	180	4400	600	0.018	0.1	22	2.1	200	100
5488063	0.5	22	-0.01	170	0.3	920	0.4	86	125	1200	397000	11900	3300	270	1	270	160	940	200	-0.001	-0.005	27	56	300	2200
5488064	0.6	10	-0.01	190	-0.2	760	0.3	110	73	430	408000	14700	4600	350	0.2	260	190	800	350	-0.001	-0.005	21	9.5	155	3600
5488065	0.1	13	-0.01	420	-0.2	260	-0.1	37	130	51	382000	16700	1500	140	5	115	160	4200	15	-0.001	-0.005	18	8.5	94	280

APPENDIX III

EL 9371 MORDOR POUND

Stream Sediment Sample Ledgers and Assay Results

SAMPLE	GEOL	EAST	NORTH	ZONE	FRACTION	OUTCROP LITHOLOGY	REGIONAL STRATIGRAPHY	FLOAT1	FLOAT2	FLOAT3	FLOAT4	SAMPLE QUALITY	COMMENTS
5487768	DLW	447205	7405185	53	-80#	DATA LOST	ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487769	DLW	447065	7405155	53	-80#	SNK	ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487770	DLW	447100	7405430	53	-80#	SNK	ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487771	DLW	447140	7405410	53	-80#	SNK	ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487772	DLW	447280	7405620	53	-80#	SNK	ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487773	DLW	447625	7405600	53	-80#	SNK	ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487774	DLW	447650	7405620	53	-80#	SNK	ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487775	DLW	447675	7405600	53	-80#	SNK	ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487776	DLW	447685	7405800	53	-80#	PEG	ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487777	DLW	447675	7405820	53	-80#	PEG	ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487778	DLW	447450	7405855	53	-80#	PEG	ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487779	DLW	447675	7405955	53	-80#	PEG	ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487780	DLW	447750	7406085	53	-80#	SNK GRT	ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487781	DLW	447755	7406160	53	-80#	SNK	ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487782	DLW	447725	7406180	53	-80#	SNK	ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487783	DLW	447905	7406480	53	-80#	PEG	ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487784	DLW	447880	7406480	53	-80#		ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487785	DLW	447615	7406410	53	-80#	SNK	ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487786	DLW	446900	7405930	53	-80#	SNK GRT	ARUNT	DATA LOST					DATA LOST IN PALMTOP LOGGER
5487787	DLW	447091	7406160	53	-80#		ARUNT	PEG					
5487788	DLW	447220	7406145	53	-80#		ARUNT	PEG					
5487789	DLW	446885	7404830	53	-80#	GNS	ARUNT	GNS	PEG				GNS HAS ABD AUGEN
5487790	DLW	446770	7405125	53	-80#	SNK CLC	ARUNT	SNK	CLC				
5487791	DLW	446765	7405525	53	-80#	GRT SNK	ARUNT	PEG	SNK	GRT			
5487792	DLW	446780	7405570	53	-80#	SNK	ARUNT	SNK	PEG				
5487793	DLW	446730	7405580	53	-80#	PEG/GRT	ARUNT	PEG	GRT				
5487794	DLW	446785	7405750	53	-80#	SNK GRT BX	ARUNT	SNK	GRT				
5487795	DLW	446920	7405935	53	-80#	SNK CLC	ARUNT	SNK	CLC				
5487796	DLW	446915	7406035	53	-80#	PEG	ARUNT	PEG					
5487797	DLW	446885	7406040	53	-80#	PEG	ARUNT	SNK	CLC				PEG
5487798	DLW	446900	7406400	53	-80#	PEG	ARUNT	PEG	SNK	CLC			CLC
5487799	DLW	446875	7406420	53	-80#	SNK	ARUNT	SNK	CLC				
5487800	DLW	447055	7406500	53	-80#	SNK PEG	ARUNT	SNK	CLC				PEG

SAMPLE	GEOL	EAST	NORTH	ZONE	FRACTION	OUTCROP LITHOLOGY	REGIONAL STRATIGRAPHY	FLOAT1	FLOAT2	FLOAT3	FLOAT4	SAMPLE QUALITY	COMMENTS
5487801	DJL	447750	7408340	53	-80#	SNK	ARUNT	PEG	SNK				
5487802	DJL	447820	7408420	53	-80#	SNK	ARUNT	PEG	GNS	SST			
5487803	DJL	447860	7408775	53	-80#		ARUNT	SDS/QZT	PEG	SNK			
5487804	DJL	447880	7408775	53	-80#	PEG	ARUNT	SDS/QZT	PEG	SNK			
5487805	DJL	447650	7408800	53	-80#		ARUNT	SDS/QZT	PEG	QZT			
5487806	DJL	447590	7408910	53	-80#		ARUNT	SDS/QZT	PEG				
5487807	DJL	447575	7408895	53	-80#	PEG	ARUNT	SDS/QZT	PEG	SNK			
5487808	DJL	447520	7408865	53	-80#	SYN	ARUNT	SYN	PEG	PEG			
5487809	DJL	447385	7408970	53	-80#		ARUNT	SDS/QZT	PEG				
5487810	DJL	447340	7409100	53	-80#	SYN	ARUNT	SDS/QZT	PEG	SYN			
5487811	DJL	447075	7409090	53	-80#	SYN	ARUNT	SYN	PEG				
5487812	DJL	447075	7409120	53	-80#	SYN	ARUNT	PEG	SYN	QZT			
5487813	DJL	447050	7409270	53	-80#	SYN	ARUNT	SDS/QZT	PEG	SYN			
5487814	DJL	447000	7409305	53	-80#		ARUNT	SDS/QZT	PEG				
5487815	DJL	446990	7409295	53	-80#		ARUNT	SDS/QZT	PEG				
5487816	DJL	446670	7409235	53	-80#	SYN	ARUNT	PEG	QZT	QZT			
5487817	DJL	447385	7408385	53	-80#	SYN	ARUNT	SYN	PEG				
5487818	DJL	447405	7408340	53	-80#	SYN	ARUNT	SYN	PEG	SNK			
5487819	DJL	447315	7408430	53	-80#		ARUNT	SYN	PEG				
5487820	DJL	447260	7408540	53	-80#	SYN/SNK	ARUNT	SYN	PEG	SNK			
5487821	DJL	447220	7408585	53	-80#	SYN	ARUNT	SYN	PEG				
5487822	DJL	447030	7408550	53	-80#	SNK/PYX	ARUNT	PEG	SYN	SNK			
5487823	DJL	447030	7408565	53	-80#	SNK	ARUNT	PEG	SYN	SNK			
5487824	DJL	446950	7408760	53	-80#	PEG	ARUNT	PEG					
5487825	DJL	446900	7408700	53	-80#	SYN	ARUNT	PEG	SYN				
5487826	DJL	446815	7408810	53	-80#	SYN	ARUNT	PEG	SYN				
5487827	DJL	446805	7408795	53	-80#	SYN	ARUNT	PEG	SYN	SNK			
5487828	DJL	446540	7408828	53	-80#	SYN	ARUNT	SYN	PEG				
5487829	DJL	446525	7408829	53	-80#	SYN	ARUNT	SYN	PEG				
5487830	DJL	448075	7408280	53	-80#	SNK	ARUNT	QZT/SDS	PEG	SNK			
5487831	DJL	447905	7408050	53	-80#	SNK	ARUNT	PEG	SNK				
5487832	DJL	447910	7408030	53	-80#	SNK	ARUNT	PEG	SNK				
5487833	DJL	448060	7408020	53	-80#	SNK/SYN	ARUNT	SNK	SDS	PEG	SYN		

SAMPLE	GEOL	EAST	NORTH	ZONE	FRACTION	OUTCROP LITHOLOGY	REGIONAL STRATIGRAPHY	FLOAT1	FLOAT2	FLOAT3	FLOAT4	SAMPLE QUALITY	COMMENTS
5487834	DJL	448260	7407950	53	-80#	SNK	ARUNT	SNK	PEG	SDS			
5487835	DJL	448230	7407955	53	-80#	SNK	ARUNT	QZT/SDS	PEG	SNK			
5487836	DJL	448400	7407970	53	-80#	SNK	ARUNT	SNK	PEG				
5487837	DJL	448670	7407830	53	-80#	GNS	ARUNT	GNS	PEG	SNK	QZT/SDS		
5487838	DJL	448610	7407800	53	-80#	GNS/SNK	ARUNT	PEG	QZT/SDS	SNK	GNS		
5487839	DJL	448570	7407745	53	-80#	SNK	ARUNT	SNK	PEG	SYN	GNS		
5487840	DJL	448390	7407340	53	-80#	SNK	ARUNT	PEG	SNK				
5487841	DJL	448370	7407350	53	-80#	SNK	ARUNT	PEG	SNK				
5487842	DJL	448525	7407000	53	-80#	GNS/SNK	ARUNT	PEG	SNK	GNS			
5487843	DJL	448500	7406980	53	-80#	GNS/SNK	ARUNT	PEG	SNK				
5487844	DJL	448410	7406630	53	-80#	GNS	ARUNT	PEG	SNK	GNS			
5487845	DJL	448140	7407125	53	-80#	PEG/SNK	ARUNT	PEG	SNK				
5487846	DJL	448135	7407110	53	-80#	PEG/SNK	ARUNT	PEG	SNK				
5487847	DJL	448010	7407280	53	-80#	PEG/SNK	ARUNT	PEG	SNK				
5487848	DJL	448010	7407260	53	-80#	SNK/PYX	ARUNT	PEG	SNK/PYX				
5487849	DJL	447805	7407575	53	-80#	PYX	ARUNT	SNK	PYX	PEG			
5487850	DJL	447565	7407850	53	-80#	SNK PEG	ARUNT	SNK	CLC	PEG			
5487851	DLW	447035	7406520	53	-80#	SNK	ARUNT	SNK	CLC				
5487852	DLW	446260	7405025	53	-80#		ARUNT	PEG	SNK				
5487853	DLW	446260	7404945	53	-80#		ARUNT	PEG					
5487854	DLW	446300	7404735	53	-80#		ARUNT	PEG					
5487855	DLW	446450	7404465	53	-80#	SNK GRT	ARUNT						
5487856	DLW	446200	7404350	53	-80#	GNS	ARUNT	PEG	SNK				MINZD PEG IN FLOAT
5487857	DLW	446150	7404370	53	-80#		ARUNT	GNS					
5487858	DLW	445995	7404350	53	-80#	GNS	ARUNT	GNS	CLC				
5487859	DLW	445950	7404400	53	-80#	SNK CLC	ARUNT	CLC	PEG	SNK			
5487860	DLW	445860	7404530	53	-80#	SNK	ARUNT	SNK					
5487861	DLW	446390	7405165	53	-80#	SNK	ARUNT	SNK					
5487862	DLW	446390	7405185	53	-80#	SNK	ARUNT	PEG					
5487863	DLW	446620	7408220	53	-80#	CLC PEG	ARUNT	CLC	SNK				
5487864	DLW	446950	7408335	53	-80#	SNK CLC	ARUNT	CLC					
5487865	DLW	446950	7408365	53	-80#	PEG	ARUNT	PEG					
5487866	DLW	446700	7408575	53	-80#	SYN	ARUNT						

SAMPLE	GEOL	EAST	NORTH	ZONE	FRACTION	OUTCROP LITHOLOGY	REGIONAL STRATIGRAPHY	FLOAT1	FLOAT2	FLOAT3	FLOAT4	SAMPLE QUALITY	COMMENTS
5487867	DLW	446500	7408860	53	-80#	PEG QTZDYK	ARUNT	QTZ	PEG				
5487868	DLW	446180	7407735	53	-80#	SNK	ARUNT	CLC					
5487869	DLW	445900	7407435	53	-80#	SNK	ARUNT						
5487870	DLW	445900	7407475	53	-80#	SNK BXA PE	ARUNT	SNK	BXA	PEG			
5487871	DLW	445855	7407400	53	-80#		ARUNT	SNK	PEG	CLC			
5487872	DLW	445900	7407580	53	-80#	SNK	ARUNT	SNK	BXA	CLC			
5487873	DLW	445880	7407580	53	-80#	SNK	ARUNT	SNK	PEG	BXA/CLC			
5487874	DLW	445900	7407935	53	-80#	SNK SYN PE	ARUNT	PEG					
5487875	DLW	445500	7408090	53	-80#	SNK PEG	ARUNT	PEG	SNK				
5487876	DLW	445675	7408330	53	-80#	SYN	ARUNT	PEG	CLCBXA				
5487877	DLW	446060	7407105	53	-80#	SNK	ARUNT	CLC	SNK				
5487878	DLW	446140	7406860	53	-80#	SNK	ARUNT	SNK	CLC				
5487879	DLW	446250	7406855	53	-80#	SNK	ARUNT	SNK CLC	CLC				
5487880	DLW	446210	7406855	53	-80#	SNK	ARUNT	SNK CLC	CLC				
5487881	DLW	446200	7406450	53	-80#	SNK	ARUNT	SNK	PEG	CLC			
5487882	DLW	446170	7406425	53	-80#	SNK	ARUNT	SNK	PEG	CLC			
5487883	DLW	446335	7406300	53	-80#	PEG SNK	ARUNT	PEG	SNK	CLC			
5487884	DLW	446445	7406070	53	-80#	PEG SNK	ARUNT	PEG	SNK	CLC			
5487885	DLW	446500	7406080	53	-80#	SNK	ARUNT	SNK	PEG	CLC			
5487886	DLW	446900	7406615	53	-80#	SNK PEG	ARUNT	PEG	SNK	CLC			
5487887	DLW	445755	7406790	53	-80#	SNK CLC	ARUNT	SNK	PEG	CLC			
5487888	DLW	445635	7406785	53	-80#	SNK	ARUNT	SNK	CLC				
5487889	DLW	445630	7407020	53	-80#	SNK	ARUNT	SNK	CLC				
5487890	DLW	445665	7407150	53	-80#	SYN	ARUNT	SNK	CLC				
5487891	DLW	445360	7408515	53	-80#	SYN	ARUNT	SYN					
5487892	DLW	445290	7408215	53	-80#	SYN	ARUNT	PEG	CLC				
5487893	DLW	445265	7408225	53	-80#		ARUNT	PEG					
5487894	DLW	445200	7408030	53	-80#	SYN	ARUNT	SYN	PEG				
5487895	DLW	445115	7407920	53	-80#	SYN	ARUNT	SYN					
5487896	DLW	445200	7407650	53	-80#	SYN	ARUNT	SYN					
5487897	DLW	444975	7407310	53	-80#	SYN	ARUNT	SYN					
5487898	DLW	444900	7408835	53	-80#	SYN	ARUNT	PEG	SYN				ABD MAGNETITE IN CREEK
5487899	DLW	444950	7408880	53	-80#		ARUNT	SYN					ABD MAGNETITE IN CREEK

SAMPLE	GEOL	EAST	NORTH	ZONE	FRACTION	OUTCROP LITHOLOGY	REGIONAL STRATIGRAPHY	FLOAT1	FLOAT2	FLOAT3	FLOAT4	SAMPLE QUALITY	COMMENTS
5487900	DLW	445425	7409220	53	-80#	CLC SYN	ARUNT	SYN					
5487901	DJL	447215	7407380	53	-80#	SNK	ARUNT	SNK	PEG				
5487902	DJL	447240	7407380	53	-80#	SNK	ARUNT	SNK	PEG				
5487903	DJL	447295	7407090	53	-80#	SNK	ARUNT	SNK	PEG				
5487904	DJL	447265	7407085	53	-80#	SNK	ARUNT	SNK	PEG				
5487905	DJL	447180	7406930	53	-80#	SNK	ARUNT	SNK	PEG				
5487906	DJL	447160	7406935	53	-80#	SNK	ARUNT	SNK	PEG				
5487907	DJL	447220	7406855	53	-80#	SNK	ARUNT	SNK	PEG				
5487908	DJL	447105	7406785	53	-80#	SNK	ARUNT	SNK	PEG				
5487909	DJL	447080	7407070	53	-80#	SNK	ARUNT	SNK	PEG				
5487910	DJL	447105	7407180	53	-80#	SNK	ARUNT	SNK	PEG				
5487911	DJL	447050	7407140	53	-80#	SNK	ARUNT	SNK	PEG				
5487912	DJL	446925	7407315	53	-80#	SNK	ARUNT	SNK					
5487913	DJL	447185	7407690	53	-80#	SNK	ARUNT	SNK	PEG				
5487914	DJL	446950	7407800	53	-80#	PYX/SNK	ARUNT	PYX	SNK				
5487915	DJL	446775	7407955	53	-80#	SYN/SNK	ARUNT	SYN	PEG	SNK			
5487916	DJL	447110	7408085	53	-80#	SYN	ARUNT	SYN					
5487917	DJL	446045	7404995	53	-80#	SNK	ARUNT	PEG	SNK				
5487918	DJL	445990	7404990	53	-80#	SNK	ARUNT	PEG	SNK				
5487919	DJL	445940	7404625	53	-80#	SNK	ARUNT	SNK	PEG	GNS			
5487920	DJL	446300	7405250	53	-80#	SNK	ARUNT	SNK	PEG				
5487921	DJL	445940	7405240	53	-80#	SNK	ARUNT	PEG	SNK				
5487922	DJL	445920	7405245	53	-80#	SNK	ARUNT	PEG	SNK				
5487923	DJL	445825	7405195	53	-80#	SNK	ARUNT	PEG	SNK				
5487924	DJL	445780	7405470	53	-80#	SNK	ARUNT	SNK	PEG				
5487925	DJL	445960	7405655	53	-80#	SNK	ARUNT	SNK	PEG				
5487926	DJL	445940	7405645	53	-80#	SNK	ARUNT	SNK	PEG				
5487927	DJL	446070	7405872	53	-80#	SNK	ARUNT	PEG	SNK				
5487928	DJL	446005	7405835	53	-80#	SNK	ARUNT	SNK	PEG				
5487929	DJL	445985	7405810	53	-80#	SNK	ARUNT	SNK	PEG				
5487930	DJL	446310	7405855	53	-80#	SNK	ARUNT	SNK	PEG				
5487931	DJL	446465	7405855	53	-80#	SNK	ARUNT	SNK	PEG				
5487932	DJL	446455	7405835	53	-80#	SNK	ARUNT	SNK	PEG				

SAMPLE	GEOL	EAST	NORTH	ZONE	FRACTION	OUTCROP LITHOLOGY	REGIONAL STRATIGRAPHY	FLOAT1	FLOAT2	FLOAT3	FLOAT4	SAMPLE QUALITY	COMMENTS
5487933	DJL	446350	7405760	53	-80#	SNK	ARUNT	SNK	PEG				
5487934	DJL	446335	7405445	53	-80#	SNK	ARUNT	SNK	PEG				
5487935	DJL	446310	7405435	53	-80#	SNK	ARUNT	SNK	PEG				
5487936	DJL	445410	7406880	53	-80#	SNK	ARUNT	SNK	SYN	PEG	QTZ		
5487937	DJL	445425	7406720	53	-80#	SNK	ARUNT	SNK	SYN				
5487938	DJL	445410	7406715	53	-80#	SNK/SYN	ARUNT	SNK	SYN				
5487939	DJL	445345	7406540	53	-80#	SNK	ARUNT	SNK	SYN	QTZ			
5487940	DJL	445320	7406535	53	-80#	SYN/SNK	ARUNT	SYN	SNK				
5487941	DJL	445340	7406360	53	-80#	SNK	ARUNT	SNK	SYN				
5487942	DJL	445325	7406350	53	-80#	SNK/SYN	ARUNT	SYN	SNK				
5487943	DJL	445460	7406315	53	-80#	SNK	ARUNT	SNK	PEG				
5487944	DJL	445490	7406195	53	-80#	SNK	ARUNT	SNK	PEG				
5487945	DJL	445480	7406175	53	-80#	SNK	ARUNT	SNK	PEG				
5487946	DJL	445535	7406050	53	-80#	SNK	ARUNT	PEG	SNK				
5487947	DJL	445700	7406060	53	-80#	SNK/PXN	ARUNT	PEG	SNK	PXN			
5487948	DJL	445690	7406040	53	-80#	SNK	ARUNT	PEG	SNK				
5487949	DJL	445665	7406310	53	-80#	SNK	ARUNT	PEG	SNK				
5487950	DJL	445610	7406275	53	-80#	SNK	ARUNT	PEG	SNK				
5487951	DLW	445425	7409240	53	-80#	SYN CLC	ARUNT	QTZ	SYN	PEG	CLC		
5487952	DLW	445680	7408950	53	-80#		ARUNT	SYN					
5487953	DLW	445655	7409110	53	-80#	PEG SYN	ARUNT	PEG	SYN				
5487954	DLW	445000	7405625	53	-80#	SNK	ARUNT	SNK	SYN				
5487955	DLW	444990	7405600	53	-80#	SNK	ARUNT	SNK	SYN				
5487956	DLW	445230	7405570	53	-80#	SNK	ARUNT	SNK	CLC				
5487957	DLW	445255	7405410	53	-80#		ARUNT	SYN	SNK				
5487958	DLW	445240	7405400	53	-80#	SNK	ARUNT	SYN	SNK				
5487959	DLW	445360	7405255	53	-80#	SNK	ARUNT						
5487960	DLW	445550	7405390	53	-80#	SNK PEG	ARUNT	SNK	CLC				
5487961	DLW	445220	7405140	53	-80#		ARUNT	SYN	SNK	GRT			
5487962	DLW	445180	7405140	53	-80#	SYN	ARUNT	SYN					
5487963	DLW	445275	7404825	53	-80#	SNK/SYN	ARUNT	SYN	SNK				
5487964	DLW	445315	7404835	53	-80#	SNK	ARUNT	SNK					
5487965	DLW	445360	7404795	53	-80#	SNK	ARUNT	SNK	CLC				

SAMPLE	GEOL	EAST	NORTH	ZONE	FRACTION	OUTCROP LITHOLOGY	REGIONAL STRATIGRAPHY	FLOAT1	FLOAT2	FLOAT3	FLOAT4	SAMPLE QUALITY	COMMENTS
5488001	DJL	445560	7409425	53	-80#	SYN	ARUNT	SYN					
5488002	DJL	445535	7409425	53	-80#	SYN	ARUNT	SYN					
5488003	DJL	445280	7409265	53	-80#	SNK/SYN	ARUNT	SYN	PEG				
5488004	DJL	445280	7409240	53	-80#	SYN	ARUNT	SYN	PEG				
5488005	DJL	445000	7409370	53	-80#	SYN	ARUNT	SYN	PEG	SNK			
5488006	DJL	444685	7409480	53	-80#	SYN	ARUNT	SYN	PEG	SNK			
5488007	DJL	444660	7409490	53	-80#	SYN	ARUNT	SYN	QZT/SDS	PEG			
5488008	DJL	444900	7409580	53	-80#	SYN	ARUNT	SNK					
5488009	DJL	445120	7409770	53	-80#	SYN	ARUNT	QZT/SDS	SYN				
5488010	DJL	445105	7409785	53	-80#	SYN	ARUNT	QZT/SDS	SYN				
5488011	DJL	445540	7410080	53	-80#	SYN/GNS	ARUNT	QZT/SDS	SYN	GNS			
5488012	DJL	445575	7410130	53	-80#		ARUNT	QZT/SDS	SYN				
5488013	DJL	445555	7410125	53	-80#	SYN	ARUNT	QZT/SDS	SYN				
5488014	DJL	445740	7410225	53	-80#	SYN	ARUNT	QZT/SDS	SYN				
5488015	DJL	445730	7410240	53	-80#	SNK	ARUNT	QZT/SDS	SNK	SYN			
5488016	DJL	445470	7410365	53	-80#	SYN	ARUNT	QZT/SDS	SYN				
5488017	DJL	445255	7410435	53	-80#	SYN	ARUNT	QZT/SDS	SYN				
5488018	DJL	445005	7410560	53	-80#	SYN	ARUNT	QZT/SDS	SYN	GNS	SNK		
5488019	DJL	444860	7410700	53	-80#	GNS/SYN	ARUNT	QZT/SDS	GNS	SYN			
5488020	DJL	444515	7410640	53	-80#	GNS/SYN/SN	ARUNT	QZT/SDS	GNS	SYN			
5488021	DJL	444620	7410300	53	-80#	SYN/GNS	ARUNT	QZT/SDS	GNS	SYN			
5488022	DJL	444660	7410280	53	-80#	GNS/SYN	ARUNT	QZT/SDS	SYN	GNS			
5488023	DJL	444830	7410400	53	-80#	SYN	ARUNT	QZT/SDS	SYN	GNS			
5488024	DJL	444815	7410420	53	-80#	SYN/GNS	ARUNT	QZT/SDS	SYN	GNS			
5488025	DJL	444010	7410205	53	-80#	SYN/GNS	ARUNT	SYN	GNS	QZT/SDS			
5488026	DJL	445240	7410220	53	-80#	SYN	ARUNT	QZT/SDS	SYN				
5488027	DJL	445210	7410220	53	-80#	SYN	ARUNT	QZT/SDS	SYN				
5488066	DLW	450150	7407050	53	-80#		ARUNT	QZT	IRS				
5488067	DLW+DJL	445700	7404965	53	-80#	MELSYN-SNK	ARUNT	CLC	GRT	SYN			
5488068	DLW+PFK	445140	7404430	53	-80#	GNS/CLC	ARUNT	GNS	CLC				
5488069	DLW+PFK	445070	7404410	53	-80#	GNS	ARUNT	PEG	GNS				
5488070	DLW+PFK	441958	7405355	53	-80#	SYN	ARUNT	SYN					
5488071	DLW+PFK	443325	7405820	53	-80#	SYN	ARUNT	SYN					

STREAM DRAINING GEOTEM ANOMALY

SAMPLE	GEOL	EAST	NORTH	ZONE	FRACTION	OUTCROP LITHOLOGY	REGIONAL STRATIGRAPHY	FLOAT1	FLOAT2	FLOAT3	FLOAT4	SAMPLE QUALITY	COMMENTS
5488072	DLW+PFK443725	7406175	53	-80#	SYN	ARUNT	SYN	SYN					
5488073	DLW+PFK444290	7405760	53	-80#	SYN	ARUNT	SYN	SYN					
5488074	DLW+PFK444875	7406227	53	-80#	SYN	ARUNT	SYN	SYN					
5488075	DLW+PFK442410	7406352	53	-80#	SYN	ARUNT	SYN	SYN					
5488076	DLW+PFK442415	7406320	53	-80#	SYN	ARUNT	SYN	SYN					
5488077	DLW+PFK441700	7406210	53	-80#	SYN	ARUNT	SYN	SYN					
5488078	DLW+PFK441650	7406210	53	-80#	SYN	ARUNT	SYN	SYN					
5488079	DLW+PFK441715	7407570	53	-80#	SYN	ARUNT	SYN	SYN					SYN:ANGNS
5488080	DLW+PFK441705	7407630	53	-80#	N/O	ARUNT	GNS	GNS					GNS:granitic
5488081	DLW+PFK442200	7407426	53	-80#	SYN	ARUNT	SYN	SYN					
5488082	DLW+PFK443000	7407980	53	-80#	SYN	ARUNT	SYN	SYN					
5488083	DLW+PFK442960	7408000	53	-80#	N/O	ARUNT	SYN	SYN					
5488084	DLW+PFK443488	7407340	53	-80#	SYN	ARUNT	SYN	SYN					
5488183	DJL 444325	7404775	53	-80#	GNS	ARUNT	PEG	GNS					
5488184	DJL 442675	7405645	53	-80#	SYN/GNS	ARUNT	SYN	GNS					
5488185	DJL 442675	7405610	53	-80#	SYN/GNS	ARUNT	SYN	GNS					
5488186	DJL 443310	7405350	53	-80#	SYN/GNS	ARUNT	SYN	SYN					
5488187	DJL 444815	7405220	53	-80#	GNS	ARUNT	PEG	GNS			SYN		
5488188	DJL 444755	7405705	53	-80#	GNS/SYN	ARUNT	SYN	GNS					
5488189	DJL 443180	7406440	53	-80#	SYN	ARUNT	SYN	SYN					
5488190	DJL 443160	7406410	53	-80#	SYN	ARUNT	SYN	SYN					
5488191	DJL 442295	7406430	53	-80#	SYN/GNS	ARUNT	SYN	GNS					
5488192	DJL 441600	7406500	53	-80#	GNS/SYN	ARUNT	GNS	SYN					
5488193	DJL 441640	7406440	53	-80#	SYN/GNS	ARUNT	SYN	GNS					
5488194	DJL 442435	7407590	53	-80#	SYN	ARUNT	SYN	SYN					
5488195	DJL 442615	7407515	53	-80#	SYN	ARUNT	QZT/SDS	SYN					
5488196	DJL 442640	7407490	53	-80#	SYN	ARUNT	SYN	SYN					
5488197	DJL 443100	7407215	53	-80#	SYN	ARUNT	SYN	SYN					
5488198	DJL 443070	7407190	53	-80#	SYN	ARUNT	SYN	SYN					
5488199	DJL 442660	7406750	53	-80#	SYN	ARUNT	SYN	SYN					
5488200	DJL 444195	7407325	53	-80#	SYN	ARUNT	SYN	PEG					
5488201	DJL 444175	7407300	53	-80#	SYN	ARUNT	SYN	SYN					
5488202	DJL 443810	7406440	53	-80#	SYN	ARUNT	SYN	SYN					

SAMPLE	GEOL	EAST	NORTH	ZONE	FRACTION	OUTCROP LITHOLOGY	REGIONAL STRATIGRAPHY	FLOAT1	FLOAT2	FLOAT3	FLOAT4	SAMPLE QUALITY	COMMENTS
5488203	DJL	444710	7408550	53	-80#	SYN	ARUNT	SYN	QTZ				
5488204	DJL	444180	7408700	53	-80#	SYN	ARUNT	SYN					
5488205	DJL	442945	7409120	53	-80#	SYN	ARUNT	QZT/SDS	SYN				
5488206	DJL	443070	7408530	53	-80#	SYN	ARUNT	SYN					
5488207	DJL	443450	7409480	53	-80#	SYN	ARUNT	QZT/SDS	SYN	QTZ			
5488208	DJL	443475	7409485	53	-80#	SYN	ARUNT	SYN	QZT				
5488209	DJL	444260	7409700	53	-80#	SYN	ARUNT	QZT/SDS	SYN				
5488210	DJL	444285	7409705	53	-80#	SYN	ARUNT	QZT/SDS	SYN	QTZ			
5488211	DJL	443985	7410560	53	-80#	GNS/PEG	ARUNT	QZT/SDS	GNS	PEG			

CRA EXPLORATION PTY. LIMITED : STREAM SEDIMENT SAMPLE RESULTS

DATE 16/05/96
TENEMENT 9371
PROSPECT

LAB USED AMDEL
ZONE 53

1:250,000 SHEET SF5314
1:100,000 SHEET 5751

SAMPLE	EAST	NORTH	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Th	Ti	U	Zn
5475266	443500	7407315	0.9	2 -0.001			0.2	21000	0.1	17	100	35.5	51300	28600	230	13900	540	0.4	7100	34	3800	36	0.3	22.5	5400	1.7	135
5475267	443735	7408450	0.4	3 -0.001			0.2	17500	-0.1	10	100	20	43400	25500	145	9000	380	0.3	4500	15	4000	17.5	-0.2	13.5	5800	1.4	82
5475268	444630	7407785	0.45	2 -0.001			0.5	42700	0.1	22	350	43.5	63100	22600	125	27500	620	-0.2	4100	105	8200	21.5	-0.2	16.5	5600	1.3	85
5475269	444160	7408766	0.85	2 -0.001			0.2	15000	-0.1	11	96	23.5	40900	25300	110	10300	390	0.3	4400	22	3200	19.5	0.2	15.5	5700	1.45	84
5475270	443430	7408507	0.35	1 -0.001			0.2	13500	-0.1	8.5	84	17	39300	20800	120	7700	350	0.2	5100	12	2900	18	0.2	12.5	4800	1.15	75
5475271	443385	7408640	0.45	2 -0.001			0.1	15600	-0.1	11	110	20.5	45300	24500	110	10200	520	0.4	7100	14	2400	17	0.2	15.5	5500	1.55	98
5475272	443850	7408980	0.95	1 -0.001			0.2	20300	-0.1	9.5	79	18.5	38700	20800	110	7300	460	0.5	8600	12	1900	21.5	-0.2	28.5	6500	2.9	95
5475273	443825	7409014	0.6	2 -0.001			0.2	20500	-0.1	12.5	120	24.5	52400	23400	120	9700	490	0.4	6700	15	3400	20	-0.2	20.5	5600	2.1	99
5475274	443785	7409070	0.5	-1 -0.001			0.1	30000	-0.1	9	59	13	142000	21200	280	6400	540	-0.2	5400	4	5700	20	-0.2	27.5	6100	2	105
5475275	444385	7409400	0.45	2 -0.001			0.2	23300	-0.1	13	150	22.5	72000	27200	135	11600	560	0.4	5400	18	4800	20.5	-0.2	18.5	6500	1.55	100
5475276	443820	7410069	2.5	1 -0.001			0.3	30100	0.1	12	175	24.5	70600	19800	210	6200	640	1.3	7500	11	2200	24	0.2	63	10400	8.5	120
5475277	444187	7410405	0.9	2 -0.001			0.2	15700	-0.1	9	200	17.5	32300	22500	55	6200	480	0.5	8300	9	960	15.5	-0.2	23	5600	2.5	85
5487752	446500	7407750	0.4	3 0.002	2900		0.3	81400	0.3	46	580	73	179000	12100	155	35300	1000	-0.2	2600	115	17000	13.5	-0.2	17	8900	1.25	155
5487753	446440	7407450	0.3	4 0.002	3000		0.2	84200	0.3	49	700	72	163000	12300	125	47600	960	-0.2	2300	165	15700	12.5	-0.2	14	7500	0.99	150
5487754	446420	7407450	0.3	2 -0.001	3700		0.2	80500	0.3	45	410	89	129000	17800	145	41900	940	-0.2	2800	125	17400	14.5	-0.2	12.5	9400	0.93	145
5487755	446350	7407510	0.25	-1 -0.001	2300		0.1	77400	0.3	49	470	71	273000	11100	165	25800	1100	-0.2	1800	97	20300	11	-0.2	15.5	9400	0.98	200
5487756	446370	7407525	0.3	-1 -0.001	3200		0.3	87800	0.3	49.5	520	84	178000	12600	160	38900	1100	-0.2	2500	130	18900	14	-0.2	17.5	9300	1.1	150
5487757	447660	7405445	0.3	12 0.004	2100		1.3	98500	0.3	37.5	130	200	118000	14400	290	22200	860	0.9	4300	92	23700	52	-0.2	40.5	11200	4.6	105
5487758	447660	7405445	0.15	4 0.009	9000		1.1	47800	0.3	54	105	280	127000	20900	86	41000	1100	0.3	6900	140	6500	82	-0.2	10	10800	1.3	160
5487759	447505	7405365	0.05	3 0.003	1800		1	105000	0.3	38	140	135	129000	14500	290	20700	880	1.4	4000	72	25500	37.5	-0.2	56	15900	6.5	200
5487760	447505	7405365	0.3	3 -0.001	6400		0.7	75600	0.3	49.5	96	145	116000	19300	175	35400	1000	0.6	6500	85	16100	50	-0.2	25	12800	3	135
5487761	447495	7405375	0.05	4 -0.001	1000		0.4	49400	0.4	38.5	600	62	327000	7700	115	14500	1100	0.5	2300	77	11600	14.5	-0.2	27	12000	2.8	210
5487762	447495	7405375	0.25	-1 -0.001	3000		0.4	62700	0.3	46.5	490	64	249000	14100	105	30300	1700	0.4	4500	91	10200	18.5	-0.2	16	16700	1.75	185
5487763	447370	7405320	3.1	3 -0.001	2000		0.3	51500	0.3	28	200	54	88600	12700	115	25400	780	0.4	4900	59	9600	14.5	-0.2	19.5	8800	2	120
5487764	447370	7405320	0.1	3 -0.001	5200		0.3	54300	0.3	41	390	56	167000	18500	72	35700	1500	0.2	6900	83	5700	24.5	-0.2	8.5	13800	1.45	170
5487765	447350	7405330	0.25	2 -0.001	1700		0.6	88700	0.3	30	195	34.5	150000	14000	330	24500	1100	0.6	4400	50	21100	17.5	-0.2	34	13800	3.8	94
5487766	447350	7405330	0.1	4 -0.001	6100		0.2	58100	0.3	47.5	160	69	145000	15500	115	40100	1500	0.3	7600	56	5700	26	-0.2	9.5	12800	1.1	160
5487767	447221	7405173	0.25	5 0.002	2000		0.3	54500	0.3	30	140	52	70800	18000	135	25600	740	0.3	5200	51	10500	19	-0.2	21	8600	2.3	115
5487768	447205	7405185	0.25	4 0.004	2100		0.5	41100	0.3	30	135	62	63200	19700	120	27000	740	0.4	4700	62	6500	19	-0.2	19.5	7800	1.8	130

SAMPLE	EAST	NORTH	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Th	Ti	U	Zn
5487769	447065	7405155	0.3	1	0.002	2000	0.5	85900	0.5	42.5	220	48182000	12100	230	24000	1100	0.4	3600	53	21100	18.5	-0.2	26	11100	2.9	145	
5487770	447100	7405430	0.2	5	0.002	2400	0.3	67800	0.4	33.5	135	55	94400	17100	185	28100	920	0.3	4400	45	14600	16.5	-0.2	20	9600	1.9	130
5487771	447140	7405410	0.2	5	0.002	1900	0.3	61100	0.3	43.5	260	52223000	12400	190	20300	960	0.3	3000	55	14400	19	-0.2	23.5	9800	2.1	165	
5487772	447280	7405620	0.1	10	0.002	2400	0.2	75300	0.3	37	160	54131000	14600	210	25500	940	-0.2	3600	51	18700	15	-0.2	18.5	9200	1.9	130	
5487773	447625	7405600	0.1	5	-0.001	1800	0.4	70400	0.3	40	190	61132000	14300	180	21600	940	0.7	4100	46	17000	17	-0.2	30	13000	3.1	155	
5487774	447650	7405620	0.25	3	-0.001	1600	0.3	60500	0.3	36	500	57248000	10500	155	21000	980	0.4	3000	78	13900	13.5	-0.2	27.5	10500	2.4	155	
5487775	447675	7405600	0.05	-1	-0.001	880	0.9	75200	0.6	34.5	200	71147000	12300	165	14300	820	2.7	4500	32	16100	19.5	0.3	52	20900	9	270	
5487776	447685	7405800	0.15	-1	-0.001	2700	0.3	76400	0.3	31.5	125	51	87600	15100	210	27200	900	0.3	4600	46	18100	17.5	-0.2	25.5	9600	3	130
5487777	447675	7405820	0.15	3	-0.001	1800	0.5	69300	0.3	40	470	61203000	11100	170	24200	1100	0.5	3400	83	16600	15.5	-0.2	23.5	11400	2.5	165	
5487778	447450	7405855	0.1	12	-0.001	1500	0.3	57000	0.3	52	540	58398000	4700	170	11000	1200	0.3	1300	75	16300	12	-0.2	20.5	11400	2.2	195	
5487779	447675	7405955	0.25	-1	-0.001	3100	0.3	92500	0.3	44	230	56145000	13000	195	28700	1000	0.5	4000	57	22100	18	-0.2	24.5	10200	3.1	120	
5487780	447750	7406085	0.05	5	-0.001	1600	0.5	66600	0.4	28.5	130	54	89800	13600	160	22200	820	0.8	5300	39	15000	18.5	-0.2	27.5	11800	4.4	130
5487781	447755	7406160	0.25	-1	-0.001	2100	0.2	63600	0.2	36	350	48147000	14900	145	28200	920	-0.2	3800	84	13800	15	-0.2	24	8700	2.1	125	
5487782	447725	7406180	0.2	-1	-0.001	2400	0.3	79200	0.3	50	420	74121000	14000	185	35300	960	0.4	3700	105	17700	20.5	-0.2	22.5	8500	2.7	125	
5487783	447905	7406480	0.35	-1	-0.001	2000	0.3	61700	0.2	38	230	55141000	14500	160	23800	900	0.3	3800	58	14900	16.5	-0.2	27	9500	2.9	135	
5487784	447880	7406480	0.15	9	-0.001	1800	0.3	79000	0.3	36	490	58178000	11400	175	27500	1100	-0.2	3100	97	20200	14.5	-0.2	21	9300	2.5	160	
5487785	447615	7406410	0.2	3	-0.001	1200	0.3	53100	0.3	54	1100	64364000	6100	140	19600	1200	-0.2	1700	135	13400	21.5	-0.2	27	9500	2.2	220	
5487786	446900	7405930	0.25	2	-0.001	2600	0.2	67800	0.2	47.5	490	89197000	13800	145	35000	1000	0.2	2600	115	14800	14.5	-0.2	13	9600	1.3	185	
5487787	447091	7406160	0.2	7	-0.001	2100	0.3	92100	0.3	46.5	740	71183000	11000	200	33800	1100	-0.2	2700	145	23500	15	-0.2	22	8300	2.1	150	
5487788	447220	7406145	0.2	-1	-0.001	2100	0.3	82900	0.3	46.5	380	64168000	13500	195	28700	1000	0.2	3000	90	21700	16	-0.2	21	9300	2.4	155	
5487789	446885	7404830	0.3	4	-0.001	2700	0.2	54700	0.3	30.5	220	77	69000	20500	120	35400	780	0.3	4700	85	9900	16.5	-0.2	17.5	8300	1.65	110
5487790	446770	7405125	0.3	-1	-0.001	2700	0.2	79200	0.2	50	300	71110000	16000	170	37400	920	-0.2	3600	95	17400	15.5	-0.2	16.5	8900	1.8	125	
5487791	446765	7405525	0.3	-1	-0.001	3100	0.2	57400	0.3	47	320	85108000	18500	115	38100	880	-0.2	3300	110	10800	15.5	-0.2	13.5	8800	1.2	150	
5487792	446780	7405570	0.15	8	-0.001	2200	0.4	81200	0.4	51	270	60202000	11800	220	23200	1000	0.6	3600	55	20500	14.5	-0.2	25.5	12500	3.2	150	
5487793	446730	7405580	0.25	-1	-0.001	2600	0.2	73000	0.3	36	110	58	80000	17200	195	28700	800	0.2	3500	45	17100	13.5	-0.2	20	7400	1.85	100
5487794	446785	7405750	0.25	-1	-0.001	3200	0.2	56500	0.3	43	330	77	99400	18600	120	39800	820	-0.2	3300	115	10700	16.5	-0.2	14.5	8300	1.25	135
5487795	446920	7405935	0.25	4	-0.001	2900	0.2	42300	0.3	35.5	180	96	80800	21900	140	34600	880	0.3	3600	81	7200	19.5	-0.2	12.5	7900	1.35	165
5487796	446915	7406035	0.3	3	0.003	2500	0.2	81900	0.2	25	380	43.5	125000	15400	180	37600	960	-0.2	3100	110	18900	15.5	-0.2	26	7900	2	73
5487797	446885	7406040	0.2	9	0.002	3400	0.2	58900	0.3	54	290	69	77100	19400	115	41400	780	-0.2	3300	115	11100	18.5	-0.2	13	8400	1.35	130
5487798	446900	7406400	0.25	3	0.002	2400	0.2	60000	0.3	51	620	77246000	12200	125	30000	1100	-0.2	2300	120	13600	14	-0.2	15	9400	1.15	180	
5487799	446875	7406420	0.25	5	-0.001	3300	0.2	71300	0.3	43	270	74	93900	18400	140	40200	840	-0.2	3100	94	14900	14.5	-0.2	15.5	8100	1.05	125
5487800	447055	7406500	0.3	3	-0.001	2900	0.2	71300	0.3	54	500	82144000	15600	140	40700	1000	-0.2	3000	130	14900	15.5	-0.2	16.5	8800	1.35	145	
5487801	447750	7408340	0.3	-1	-0.001	2300	0.3	65100	0.2	34.5	500	61	98700	16900	155	35700	820	0.2	3600	130	13600	20.5	-0.2	24	6600	2.2	100
5487802	447820	7408420	0.3	-1	-0.001	2400	0.3	23200	0.2	23	195	31	49800	22600	97	18900	480	0.4	3600	66	3700	21	-0.2	13	4700	1.45	68

SAMPLE	EAST	NORTH	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Th	Ti	U	Zn
5487803	447860	7408775	0.2	4	-0.001	1100	0.5	32000	0.2	30	400	45.5	38500	13800	53	31200	540	0.2	3200	140	1700	21	-0.2	15	3600	1.4	57
5487804	447880	7408775	0.1	3	-0.001	1600	0.4	36900	0.3	28.5	350	44	49900	14700	92	25600	580	0.3	2700	92	5100	18.5	-0.2	17.5	4800	1.7	76
5487805	447650	7408800	0.15	4	-0.001	1200	0.2	13600	0.3	13	125	21	88400	13500	80	6900	340	0.4	1900	23	2100	19	-0.2	30	4300	1.95	70
5487806	447590	7408910	0.15	2	-0.001	1800	0.2	9200	0.2	8	70	16	36900	22800	61	4900	290	0.2	3200	11	2100	17	-0.2	13	3900	1.2	53
5487807	447575	7408895	0.05	4	-0.001	2400	0.3	18400	0.2	16.5	125	30	63000	23900	105	12100	490	0.3	3700	29	3800	24	0.2	15.5	5100	1.7	88
5487808	447520	7408865	0.2	6	-0.001	2100	0.2	45700	0.2	33	430	43.5	63100	17200	110	40300	720	0.3	3700	130	7000	16.5	-0.2	14.5	5000	1.45	94
5487809	447385	7408970	0.15	4	-0.001	1900	0.4	22500	0.2	15.5	93	20	147000	18700	110	6900	720	-0.2	3200	17	5600	17	-0.2	23.5	6300	1.75	115
5487810	447340	7409100	0.15	3	-0.001	2500	0.2	16700	0.2	18	58	24	54000	23400	115	7800	400	0.2	3300	12	3900	21.5	-0.2	15.5	4600	1.55	77
5487811	447075	7409090	0.1	5	-0.001	2400	0.2	31700	0.2	22.5	71	33	51100	23700	155	16300	540	-0.2	4500	23	8100	19.5	-0.2	15	5700	1.7	89
5487812	447075	7409120	0.2	-1	-0.001	3000	0.3	22900	0.2	13.5	65	21.5	65300	24900	91	8600	440	0.3	3800	12	5500	19	-0.2	18	5900	1.7	71
5487813	447050	7409270	0.15	5	-0.001	1900	0.3	23200	0.2	19	74	18.5	192000	16500	115	6400	520	0.4	2300	10	6000	17.5	-0.2	23.5	6200	1.7	100
5487814	447000	7409305	0.1	2	-0.001	1900	0.4	11300	0.2	8.5	99	15	63400	23000	75	4500	350	0.3	2900	11	3000	20.5	-0.2	17.5	4200	1.65	69
5487815	446990	7409295	0.35	2	-0.001	2300	0.3	11800	0.2	13.5	47	16	52600	25700	75	5700	360	0.4	3000	12	3000	19.5	-0.2	14	4400	1.45	50
5487816	446670	7409235	0.2	2	-0.001	2700	0.3	15300	0.2	14.5	65	22.5	56100	25500	82	7300	400	0.3	3500	13	3500	22.5	-0.2	18	5400	1.65	84
5487817	447385	7408385	0.25	-1	-0.001	2400	0.2	60600	0.3	44.5	440	95	96800	17800	155	35800	800	-0.2	3200	130	11700	19.5	-0.2	19.5	6900	1.7	100
5487818	447405	7408340	0.25	6	-0.001	2300	0.3	48400	0.3	35.5	420	41.5	94900	16700	115	29400	760	-0.2	3500	115	10500	18.5	-0.2	18	6600	1.8	99
5487819	447315	7408430	0.25	-1	-0.001	1700	0.3	60700	0.3	38.5	560	53	70500	15900	125	37400	800	0.3	4200	140	10300	20.5	-0.2	23	8300	2.7	81
5487820	447260	7408540	0.25	11	-0.001	1700	0.2	62500	0.3	40.5	580	100	113000	14400	150	44500	940	-0.2	3100	165	12500	12.5	-0.2	20.5	6100	1.6	140
5487821	447220	7408585	0.25	4	-0.001	2500	0.3	39700	0.2	39.5	330	54	75900	22700	100	31000	760	-0.2	4200	130	8000	21.5	-0.2	15	6900	1.5	110
5487822	447030	7408550	0.25	4	-0.001	2200	0.4	43600	0.3	37	240	48.5	186000	17200	155	17800	900	0.3	3000	60	11900	19.5	-0.2	24.5	7900	2.1	155
5487823	447030	7408565	0.25	6	-0.001	1500	0.4	49200	0.3	48	1200	49.5	96800	13800	110	45600	920	-0.2	3000	280	7900	25	-0.2	22	6100	2	115
5487824	446950	7408760	0.2	4	-0.001	1800	0.3	36400	0.2	30	240	40.5	95000	18300	130	23900	660	-0.2	4300	70	8100	16	-0.2	18.5	5800	1.6	115
5487825	446900	7408700	0.15	-1	-0.001	1500	0.4	39600	0.2	35	250	43.5	279000	11800	170	8300	1100	0.4	1900	43	12200	18	-0.2	38.5	10800	2.7	185
5487826	446815	7408810	0.25	3	-0.001	2300	0.3	41900	0.3	32.5	135	39.5	143000	16800	220	14600	840	0.2	3700	27	11900	19	-0.2	24	7900	2.4	145
5487827	446805	7408795	0.2	-1	-0.001	2900	0.4	58600	0.3	38	180	46.5	106000	20100	190	19200	760	0.4	3500	54	16500	22.5	-0.2	27.5	8800	2.8	100
5487828	446540	7408828	0.3	6	-0.001	2600	0.2	30300	0.3	28.5	83	42	119000	19900	170	12300	700	0.5	3500	18	8600	20.5	-0.2	26.5	7200	2	135
5487829	446525	7408929	0.25	2	-0.001	4000	0.2	39600	0.3	25.5	89	41	80400	21500	155	14600	540	0.5	3600	36	10400	16	-0.2	18.5	8400	1.6	88
5487830	448075	7408280	0.35	-1	-0.001	1300	0.3	30700	0.2	24	210	33.5	46800	15700	120	20800	560	0.3	4800	63	5300	18	-0.2	16.5	6800	1.4	77
5487831	447905	7408050	0.25	-1	-0.001	3200	0.2	66400	0.3	48.5	200	110	72200	20600	145	41200	860	0.2	3500	105	14500	22	-0.2	17.5	8600	1.55	130
5487832	447910	7408030	0.3	-1	-0.001	2300	0.2	52500	0.3	37	450	78	86600	18400	120	41300	880	-0.2	3800	130	8600	16	-0.2	11.5	7900	1.15	105
5487833	448060	7408020	0.35	2	-0.001	1800	0.2	28300	0.2	24	220	73	47100	19400	115	22900	560	0.4	4000	78	3900	17	-0.2	14	5900	1.3	105
5487834	448260	7407950	0.2	2	-0.001	2600	0.3	61000	0.3	39	270	77	71300	19500	160	36500	900	-0.2	5100	87	11100	22.5	-0.2	18	8600	1.95	115
5487835	448230	7407955	0.2	-1	-0.001	2300	0.2	32200	0.3	28	280	46.5	58900	20700	120	25200	620	0.4	3900	94	5700	19	-0.2	14	5900	1.35	94
5487836	448400	7407970	0.15	-1	-0.001	2900	0.4	67200	0.3	48	290	79	79400	17500	180	40200	980	0.4	5000	93	11700	21.5	-0.2	21.5	8500	2.1	130

SAMPLE	EAST	NORTH	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Th	Ti	U	Zn
5487837	448670	7407830	0.05	4	-0.001	1200	0.4	30600	0.4	25	220	41.5	55300	25000	130	18700	680	0.9	8400	48	3600	24.5	0.2	19	8400	2.3	115
5487838	448610	7407800	0.35	-1	-0.001	2100	0.2	31400	0.2	23	230	48	55400	21800	110	24800	620	0.3	4300	79	5200	18.5	-0.2	13.5	6100	1.35	95
5487839	448570	7407745	0.3	3	-0.001	1500	0.3	37100	0.3	35	200	46.5	151000	17100	155	16500	800	0.3	4100	44	8500	20.5	-0.2	25.5	7300	2	120
5487840	448390	7407340	0.05	3	-0.001	1200	0.5	24800	0.5	23.5	155	40.5	75700	24600	150	11800	580	0.6	5400	28	5600	23	-0.2	61	6100	4.5	100
5487841	448370	7407350	0.25	-1	-0.001	2300	0.2	48600	0.3	48.5	185	81.1	10000	20700	195	27000	900	0.5	4400	62	11800	19.5	-0.2	23.5	8200	2.1	130
5487842	448525	7407000	0.15	7	-0.001	1600	0.5	25400	0.3	22.5	105	62	63200	25600	150	16500	680	0.5	5500	33	5900	29	-0.2	35.5	6200	3.2	115
5487843	448500	7406980	0.2	-1	-0.001	1700	0.2	46800	0.3	48.5	520	63	131000	17500	120	31800	920	0.3	4000	120	8800	19.5	-0.2	23.5	7000	2.1	130
5487844	448410	7406630	0.25	5	-0.001	1000	0.4	48900	0.3	33	290	42.2	15000	13800	160	11500	860	0.6	3600	47	13900	17	-0.2	41	9200	4.6	140
5487845	448140	7407125	0.3	2	-0.001	2200	0.2	48300	0.3	53	350	57	68800	18500	135	40200	840	0.3	4000	140	8000	17.5	-0.2	14	7000	1.35	90
5487846	448135	7407110	0.3	3	-0.001	1700	0.2	48900	0.3	44	500	80	136000	15200	180	28800	920	0.2	3300	125	10400	17	-0.2	26.5	7300	1.9	155
5487847	448010	7407280	0.2	6	-0.001	1600	0.3	64400	0.3	54	800	66	167000	12300	170	36300	1100	0.2	3100	160	13000	20.5	-0.2	29	8100	2.4	165
5487848	448010	7407260	0.05	-1	-0.001	2000	0.4	54000	0.2	38.5	420	89	72800	16600	140	38100	820	0.5	3900	135	10100	17	0.3	20	6800	1.6	200
5487849	447805	7407575	0.25	5	-0.001	2100	0.2	56200	0.1	38.5	540	80	134000	14800	150	33500	920	0.4	3100	135	12100	10	0.2	23	7100	1.7	180
5487850	447565	7407850	0.05	-1	-0.001	1300	0.1	42800	0.1	36	760	68	331000	8200	89	16900	840	0.4	1600	115	11000	7	0.3	14.5	6400	1.15	220
5487851	447035	7406520	0.1	-1	-0.001	3300	0.2	108000	-0.1	37	115	53	91100	14400	165	31500	920	0.4	3000	53	28300	6	0.3	17	7700	0.64	125
5487852	446260	7405025	0.05	5	-0.001	3300	0.2	56900	0.1	36.5	250	92	74400	19800	170	37100	720	0.4	4000	105	10900	11.5	0.3	15	8000	1.9	195
5487853	446260	7404945	0.05	-1	-0.001	3000	0.1	65400	0.1	36.5	210	77	79800	18300	110	36200	800	0.4	4200	86	13200	8	0.3	13.5	8400	1.4	185
5487854	446300	7404735	0.05	-1	-0.001	1400	0.3	48300	0.3	28	83	77	55700	16200	130	17100	640	1.1	6600	25	9800	9.5	0.3	22.5	9200	3.2	250
5487855	446450	7404465	1	5	-0.001	540	0.3	16800	0.3	18	73	69	39900	18900	46.5	8100	520	1.1	9800	14	1300	13	0.2	30.5	7500	3.9	240
5487856	446200	7404350	0.05	6	-0.001	680	0.2	18300	0.3	19	62	70	39900	18200	58	10200	540	1.1	9100	20	1300	13	0.2	24.5	7100	3.4	230
5487857	446150	7404370	0.45	9	-0.001	2200	0.2	53700	0.2	36	195	78	78900	19300	145	28700	740	0.6	5300	66	10500	10	0.3	23	7500	2.6	200
5487858	445995	7404350	0.05	6	-0.001	780	0.2	21300	0.2	21.5	66	58	44400	18700	280	11900	500	0.7	10300	16	2600	19.5	-0.2	47.5	5600	2.2	195
5487859	445950	7404400	1	6	-0.001	1400	0.2	64200	0.2	40	130	68	90700	17300	96	24700	840	0.7	5400	40	11800	9.5	0.3	34.5	8200	3	210
5487860	445860	7404530	0.05	3	-0.001	1300	0.2	50400	0.1	28.5	100	64	71200	19200	150	22200	780	0.7	6200	31	9800	9.5	0.3	29	8400	3.2	190
5487861	446390	7405165	0.05	7	-0.001	1700	0.2	59300	0.2	33	370	79	253000	11300	185	19800	980	0.6	3100	58	14000	4.9	0.3	21.5	10300	1.2	260
5487862	446390	7405185	0.05	13	-0.001	2300	0.2	84500	-0.1	35	130	46.5	104000	14900	180	28500	900	0.4	3700	51	20000	6	0.3	19	7200	1.85	105
5487863	446620	7408220	0.55	-1	-0.001	1500	0.4	81200	0.2	37	880	74	54000	11200	78	60500	900	0.5	4100	230	13100	17	0.2	23	6900	1.6	165
5487864	446950	7408335	0.45	-1	-0.001	1600	0.4	64500	0.2	37	740	100	51600	13000	96	54600	820	0.6	3900	220	9000	18	0.2	16.5	5600	1.65	170
5487865	446950	7408365	0.05	5	-0.001	1800	0.4	46500	0.1	19	310	47.5	71900	20400	86	22500	580	0.6	5500	69	8200	12	0.3	18.5	8600	3.8	145
5487866	446700	7408575	0.05	-1	-0.001	1100	0.4	81200	0.3	44.5	1500	49.5	86000	8500	130	67600	980	0.6	2900	320	11500	12.5	0.3	14	4200	1.3	130
5487867	446500	7408960	0.5	2	-0.001	2300	0.4	47300	0.2	32	370	74	51100	17700	70	37600	700	0.4	3400	145	9100	16.5	0.3	16.5	5100	1.25	140
5487868	446180	7407735	0.15	7	-0.001	2600	0.3	73100	0.2	41.5	580	96	70200	16700	115	51100	800	0.3	3600	185	13600	13	-0.2	15	6400	1.2	155
5487869	445900	7407435	0.05	-1	-0.001	1200	0.2	59800	0.1	38	1200	67	303000	5600	135	23200	1000	0.3	1400	145	13700	9	0.2	26.5	6500	1.4	190
5487870	445900	7407475	0.05	-1	-0.001	2400	0.3	95400	0.2	34	720	76	251000	6300	155	28400	840	0.4	1800	110	25600	14.5	0.3	17	8200	1.3	180

SAMPLE	EAST	NORTH	Ag	As	Au	Ba	Bl	Ca	Cd	Co	Cr	Cu	Fe	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Th	Ti	U	Zn
5487871	445855	7407400	0.15	13	-0.001	3000	0.2	82300	0.2	41	500	100	64900	15600	83	52100	780	0.4	3300	180	16600	11	0.2	12.5	6900	0.99	150
5487872	445900	7407580	0.05	-1	-0.001	3500	0.5	130000	-0.1	29	300	54	74700	11600	220	41100	700	0.4	3000	97	31900	11	0.4	11.5	3800	2.6	71
5487873	445880	7407580	0.1	-1	-0.001	2800	0.4	97300	-0.1	36	700	81	190000	9400	185	35600	860	0.4	2600	130	24200	19.5	0.2	24.5	8900	1.9	185
5487874	445900	7407935	0.15	4	-0.001	2700	0.5	118000	-0.1	37	360	60	128000	9300	125	36300	780	0.5	2700	94	28300	17	0.4	18.5	4800	1.9	100
5487875	445500	7408090	0.2	10	-0.001	1800	0.2	92000	-0.1	32	440	66	59200	12600	100	48700	740	0.3	3200	135	19200	11.5	0.2	23.5	5200	1.2	97
5487876	445675	7408330	0.1	-1	-0.001	1200	0.3	67300	0.1	37.5	900	66	55100	10400	85	64700	860	0.4	3000	300	9200	12.5	0.2	11	4700	0.97	135
5487877	446060	7407105	0.05	8	-0.001	3700	0.1	87000	-0.1	37	420	80	115000	16300	155	44100	860	0.3	2700	125	19400	8	0.2	9	8500	1.45	180
5487878	446140	7406360	0.05	-1	-0.001	3400	0.1	76000	0.1	32	350	73	88800	13800	160	37300	720	0.3	2400	105	16800	6	0.2	6.5	6900	0.89	135
5487879	446250	7406855	0.2	-1	-0.001	3600	0.2	81400	0.2	40.5	480	72	83900	14900	155	43300	840	0.4	3200	125	19100	9.5	0.3	15	8400	0.82	155
5487880	446210	7406855	0.2	-1	-0.001	3500	0.2	78300	0.1	39.5	400	95	86300	18000	155	46500	860	0.3	2900	130	15000	8.5	-0.2	12.5	7600	0.83	185
5487881	446200	7406450	0.05	2	-0.001	3700	0.1	70700	0.1	41.5	340	91	88900	15600	145	40400	800	0.4	3000	110	14300	8	0.2	8	8100	0.98	190
5487882	446170	7406425	0.5	7	-0.001	3500	0.2	77000	0.1	34	410	88	90100	18500	115	44900	840	0.3	3500	135	15500	11	-0.2	22	7900	1.55	170
5487883	446335	7406300	0.15	3	-0.001	3600	0.1	95600	-0.1	35.5	160	61	97000	18100	185	37700	880	0.3	3100	72	22700	7	-0.2	15	7100	1.1	135
5487884	446445	7406070	0.3	3	-0.001	3400	0.2	82300	0.1	39.5	340	85	106000	15300	115	41200	840	0.3	3100	115	17500	9	-0.2	16.5	7800	0.99	175
5487885	446500	7406080	0.35	5	-0.001	3200	0.2	73500	0.1	40	310	100	135000	14100	175	35700	940	0.3	3000	105	16500	8.5	-0.2	19.5	8500	1.1	195
5487886	446900	7406615	0.3	8	-0.001	3700	0.2	80900	-0.1	39	350	96	75000	20600	145	46300	780	0.4	3700	125	15500	13	-0.2	15	8100	1.3	170
5487887	445755	7406790	0.05	6	-0.001	3800	0.1	71600	-0.1	36.5	260	94	92400	18800	190	38600	780	0.5	3400	100	15200	8.5	-0.2	10.5	8000	1.2	185
5487888	445635	7406785	0.5	7	-0.001	3300	0.2	88700	-0.1	35.5	440	82	116000	17200	96	43700	840	0.2	3300	125	18400	13.5	-0.2	28	7800	1.75	165
5487889	445630	7407020	0.05	4	-0.001	4700	0.1	94900	0.1	37	210	83	150000	21200	150	39500	820	0.3	2900	75	21400	9	-0.2	10	8500	1	175
5487890	445665	7407150	0.1	1	-0.001	3700	0.2	84100	0.1	42.5	580	99	84000	18500	185	53600	940	0.4	3300	175	15500	12	-0.2	18	7900	1.95	175
5487891	445360	7408515	0.3	6	-0.001	1900	0.3	48900	0.1	25	440	60	98400	17900	105	21500	700	0.4	2800	90	12200	18	0.2	40	7400	2.1	160
5487892	445290	7408215	0.25	5	-0.001	1600	0.3	51000	0.1	33	780	79	69400	17900	84	42600	840	0.4	3200	220	8300	13.5	-0.2	19.5	6700	1.15	165
5487893	445265	7408225	0.25	7	-0.001	1900	0.3	42500	-0.1	22.5	380	59	59000	20100	91	24500	620	0.5	3200	100	9300	15	0.3	21	5900	1.65	135
5487894	445200	7408030	0.05	2	-0.001	1700	0.3	80800	-0.1	31.5	500	80	79400	15400	200	42000	760	0.4	3400	135	16800	20	0.2	16.5	5900	2.2	140
5487895	445115	7407920	0.05	5	-0.001	1600	0.2	34700	0.2	21	300	69	48600	20600	89	28300	560	0.3	4400	115	5600	11	-0.2	9	5700	0.65	145
5487896	445200	7407650	0.05	4	-0.001	1100	0.2	22700	0.1	10.5	90	44.5	41400	23600	185	10600	470	0.3	6600	27	3300	15.5	-0.2	20	6400	1.6	140
5487897	444975	7407310	0.05	3	-0.001	1200	0.2	22100	0.1	10	72	38	71100	23100	220	7000	560	0.4	7600	10	2700	22	-0.2	30	6600	2.9	145
5487898	444900	7408835	0.35	1	-0.001	2900	0.2	28100	-0.1	16.5	86	48.5	78700	24300	81	8300	470	0.6	3100	20	7400	11	0.3	21	8000	1.5	150
5487899	444950	7408880	0.05	4	-0.001	2800	0.2	44300	-0.1	22.5	155	51	128000	19000	135	12800	580	0.4	2900	28	12100	8.5	0.2	15.5	7800	1.35	160
5487900	445425	7409220	0.05	4	-0.001	3400	0.2	31900	-0.1	17.5	82	38.5	56200	22300	77	11800	440	0.3	3600	19	7300	10.5	0.2	12.5	6200	0.86	115
5487901	447215	7407380	0.15	10	-0.001	3100	0.3	76600	0.2	45	220	87	99600	18100	210	37100	960	0.4	3600	81	17300	23.5	-0.2	20	8600	1.8	210
5487902	447240	7407380	0.05	11	-0.001	2700	0.2	76400	0.1	44	720	77	153000	14100	155	41700	960	0.4	2700	150	15500	12	0.2	14.5	7300	2	190
5487903	447295	7407090	0.05	-1	-0.001	2700	0.3	97300	-0.1	41	410	76	175000	12700	240	31000	1100	0.5	3300	93	23900	8	0.2	12.5	10200	2	210
5487904	447265	7407085	0.05	6	-0.001	2800	0.2	66100	0.1	38	600	80	166000	15500	195	37900	900	0.3	2800	130	13300	13	-0.2	13	8300	1.7	195

SAMPLE	EAST	NORTH	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Th	Ti	U	Zn
5487905	447180	7406930	0.05	8	-0.001	3100	0.2	66400	0.2	40.5	400	99 101000	19400	135 41900	860	0.4	3600	120 12700	11	-0.2	17	8500	1.55	220			
5487906	447160	7406935	0.25	-1	-0.001	3000	0.2	82800	0.1	38	390	97 106000	15400	150 42300	920	0.4	3000	110 17400	9	-0.2	14.5	8300	0.99	195			
5487907	447220	7406855	0.05	5	-0.001	2600	0.2	77000	0.2	40	410	79 130000	17800	165 35700	1000	0.4	3500	100 16700	5.5	-0.2	15	8500	1.35	195			
5487908	447105	7406785	0.05	11	-0.001	2300	0.3	90700	-0.1	43	200	62 226000	14100	190 26000	1100	0.3	3200	54 22300	11	-0.2	14.5	9500	3.1	190			
5487909	447080	7407070	0.05	-1	-0.001	1700	0.1	65900	-0.1	36	820	65 290000	9500	220 21500	940	0.4	2000	84 16800	7.5	-0.2	20	7000	1.3	195			
5487910	447105	7407180	0.1	2	-0.001	3000	0.2	88000	0.1	47.5	470	89 94300	15100	160 49600	840	0.4	3000	130 16800	10	0.2	11.5	7100	1.25	165			
5487911	447050	7407140	0.1	10	-0.001	2800	0.2	107000	-0.1	35	460	81 199000	9000	145 34700	1100	0.3	2200	99 27300	7	-0.2	16.5	11800	1.1	210			
5487912	446925	7407315	0.15	12	-0.001	2500	0.2	109000	-0.1	44	680	68 99600	10300	120 56000	980	0.3	2600	150 20900	7.5	-0.2	17.5	6500	1.5	130			
5487913	447185	7407690	0.25	7	-0.001	2100	0.2	105000	-0.1	46	960	70 141000	9100	180 49900	1100	0.3	2400	175 22100	12	-0.2	23	6700	2	155			
5487914	446950	7407800	0.1	-1	-0.001	1600	0.3	85300	-0.1	52	1500	88 166000	9500	165 52400	1100	0.5	2400	230 14600	11	0.2	19.5	6400	1.6	185			
5487915	446775	7407955	0.25	6	-0.001	2700	0.2	65300	0.1	45.5	780	105 84600	16200	110 49600	920	0.3	3200	190 10300	11.5	0.2	17	6300	1.15	165			
5487916	447110	7408085	0.05	6	-0.001	2900	0.2	65200	0.1	44	430	115 78500	16600	140 48100	880	0.4	3900	170 11000	11.5	-0.2	13.5	7300	0.84	170			
5487917	446045	7404995	0.2	-1	-0.001	2000	0.2	87400	0.1	36	160	68 116000	14900	220 27900	980	0.6	5000	47 19500	9	0.2	25	10000	2.2	185			
5487918	445990	7404990	0.1	8	-0.001	1700	0.2	80400	0.1	38	185	66 118000	15000	155 25000	1000	0.5	4700	52 19300	8	0.3	24	8500	1.85	185			
5487919	445940	7404625	0.05	4	-0.001	2700	0.2	72300	0.1	37.5	210	77 76300	12900	150 34800	800	0.5	4400	74 13900	11	-0.2	15	7100	2.6	160			
5487920	446300	7405250	0.05	19	-0.001	3200	0.2	68800	-0.1	37.5	240	90 70100	16500	185 41500	820	0.3	4900	98 13400	15	-0.2	16.5	8000	2.3	170			
5487921	445940	7405240	0.05	5	-0.001	1800	0.3	48800	0.1	27.5	87	63 53900	13200	89 24100	680	0.4	5800	33 7500	9.5	0.2	13	7100	1.3	165			
5487922	445920	7405245	0.05	-1	-0.001	2200	0.2	67400	-0.1	40	130	81 79500	14000	170 28400	840	0.5	4300	48 14400	12	0.2	21.5	7200	2.4	170			
5487923	445825	7405195	0.05	9	-0.001	2500	0.2	90200	0.1	42.5	260	71 98500	14400	190 35800	900	0.4	3700	86 21700	9.5	0.2	22.5	7400	1.7	160			
5487924	445780	7405470	0.2	8	-0.001	2800	0.1	78800	-0.1	43	250	58 77800	12500	130 35700	820	0.3	3700	92 16600	9	-0.2	14	4800	2.2	120			
5487925	445960	7405655	0.05	9	-0.001	2600	0.2	54100	-0.1	34.5	230	80 80900	17400	220 31200	760	0.4	7100	74 10600	17	-0.2	27.5	7200	2.5	170			
5487926	445940	7405645	0.1	5	-0.001	2400	0.2	60000	-0.1	42	150	78 72300	16800	135 31000	840	0.5	4100	65 12300	11.5	-0.2	16	7300	2.2	175			
5487927	446070	7405872	0.65	2	-0.001	2900	0.2	56400	0.1	42.5	195	115 76900	18700	85 36900	920	0.4	4900	79 9500	7	0.2	18.5	9200	1.3	250			
5487928	446005	7405835	0.7	-1	-0.001	3400	0.2	53800	0.2	46	190	120 71100	17300	110 31900	740	0.6	4000	73 10200	8.5	0.2	19	7800	1.55	240			
5487929	445985	7405810	0.25	1	-0.001	2700	0.2	49600	0.1	32	190	78 70400	17700	195 29400	680	0.4	7100	66 9400	15.5	-0.2	38.5	7000	1.55	175			
5487930	446310	7405855	0.3	5	-0.001	3500	0.1	87500	-0.1	44	320	81 74200	12400	120 41200	840	0.3	3400	105 19200	5	-0.2	15	7900	1.5	170			
5487931	446465	7405855	0.1	3	-0.001	3300	0.2	79900	-0.1	40.5	300	81 92400	16300	150 42100	860	0.3	3400	105 17400	10	-0.2	16.5	8000	1.65	155			
5487932	446455	7405835	0.05	-1	-0.001	2500	0.2	78700	0.1	37	210	73 166000	14600	210 29300	960	0.4	3900	54 18700	7	0.2	15	9600	1.9	210			
5487933	446350	7405760	0.05	-1	-0.001	2300	0.2	90000	0.1	40.5	200	75 112000	16200	250 32300	1000	0.6	3600	55 22400	7	0.2	17	8200	1.7	185			
5487934	446335	7405445	0.3	2	-0.001	3300	0.2	87700	-0.1	41.5	290	98 82600	17100	115 45400	900	0.4	3700	110 18900	8.5	-0.2	17	8000	1.2	190			
5487935	446310	7405435	0.45	-1	-0.001	2500	0.2	50500	0.1	36.5	240	82 90900	15900	230 29900	760	0.4	6100	73 9900	16.5	-0.2	42.5	7500	1.75	200			
5487936	445410	7406880	0.3	-1	-0.001	1800	0.2	55900	0.1	36.5	320	90 66400	16700	290 33700	680	0.6	6400	105 10000	18	-0.2	31.5	6600	2	175			
5487937	445425	7406720	0.15	-1	-0.001	2800	0.2	97900	0.1	45	520	74 225000	16400	220 36900	1000	0.5	3900	120 23900	9	0.2	24.5	8100	0.67	175			
5487938	445410	7406715	0.3	8	-0.001	1500	0.2	32100	0.2	26	145	69 70900	16000	380 18200	720	0.4	10000	33 5800	22.5	-0.2	105	6500	1.95	185			

SAMPLE	EAST	NORTH	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Th	Ti	U	Zn
5487939	445345	7406540	0.45	17	-0.001	3300	0.2	71500	0.1	43	300	92	96300	22500	250	41100	860	0.4	5600	110	15300	21.5	-0.2	44	8700	3.1	200
5487940	445320	7406535	0.1	6	-0.001	760	0.1	19200	0.1	12	93	37.5	109000	28800	330	7500	620	0.5	11700	8	2700	21	-0.2	82	5800	1.8	155
5487941	445340	7406360	0.05	-1	-0.001	2400	0.2	78100	0.2	43.5	360	762	11000	17200	340	29700	960	0.4	4400	84	18100	13.5	0.2	35.5	7700	2.3	195
5487942	445325	7406350	0.05	7	-0.001	780	0.2	15700	0.2	10.5	105	36.5	56300	26200	350	7000	500	0.6	12300	7	1900	27	-0.2	60	5000	2.2	135
5487943	445460	7406315	0.3	-1	-0.001	3600	0.2	65900	-0.1	42.5	270	81	74000	16100	115	41500	840	0.4	4100	100	13400	10.5	0.2	21	8700	1.15	195
5487944	445490	7406195	0.1	7	-0.001	2500	0.2	51000	0.3	28	200	52	76000	27600	230	27200	700	0.2	7900	62	10100	17.5	-0.2	22	7300	1	105
5487945	445480	7406175	0.05	4	-0.001	3600	0.2	66600	0.2	33	210	50	87500	24600	130	34800	880	-0.2	6000	70	14500	15	-0.2	14.5	9200	0.82	105
5487946	445535	7406050	0.2	12	-0.001	2600	0.1	61200	0.2	33.5	170	60	82000	20100	96	30800	800	-0.2	4300	63	14700	15.5	-0.2	17	8400	0.92	115
5487947	445700	7406060	0.2	-1	-0.001	2800	0.2	53900	0.2	37.5	310	84	70000	21200	100	38600	760	-0.2	4300	115	9700	15.5	-0.2	19.5	7900	0.96	110
5487948	445690	7406040	0.05	6	-0.001	2400	0.2	48100	0.3	26	230	55	94800	21200	145	27100	760	-0.2	6500	69	9400	19	-0.2	23	7600	0.98	100
5487949	445665	7406310	0.05	-1	-0.001	3000	0.1	94400	0.2	38.5	280	66	79500	16400	87	35600	720	-0.2	3200	83	22100	10.5	-0.2	13	8600	1.05	105
5487950	445610	7406275	0.05	5	-0.001	3000	0.1	63600	0.2	33	320	64	70300	18700	115	38400	780	-0.2	3500	105	12900	15	-0.2	13	7900	0.92	99
5487951	445425	7409240	0.3	2	-0.001	3700	0.3	25200	0.2	19	110	40.5	91000	22300	21	10200	490	0.5	3400	20	6200	14	0.2	17	7900	1.25	100
5487952	445680	7408950	0.05	3	-0.001	2900	0.3	20800	0.1	15.5	145	32.5	49500	26600	30.5	11700	450	0.3	3800	30	4900	19.5	0.3	12	8200	0.97	88
5487953	445655	7409110	0.3	1	-0.001	4400	0.3	22900	0.2	19	130	34.5	86700	21100	61	10400	470	0.4	3400	25	5400	11	0.3	15	7800	0.64	97
5487954	445000	7405625	0.35	2	-0.001	640	0.2	17000	0.2	9	88	25	60600	25300	200	7200	540	0.4	12100	8	2300	27.5	-0.2	97	6100	2.6	93
5487955	444990	7405600	0.4	4	-0.001	1400	0.3	39000	0.4	26	115	45	111000	21200	75	15400	840	0.8	9400	20	7100	23	-0.2	49	9300	3	135
5487956	445230	7405570	0.15	2	-0.001	2700	0.1	82200	0.3	41	155	65	83100	19800	155	33200	920	-0.2	4400	64	20500	10.5	-0.2	18.5	8400	0.86	100
5487957	445255	7405410	0.45	4	-0.001	800	0.2	22200	0.3	11	77	28.5	59800	29200	210	9100	560	0.4	12600	10	3700	29	-0.2	72	6400	2.2	93
5487958	445240	7405400	0.5	4	-0.001	1200	0.2	41000	0.3	22	135	42	82500	24300	180	15000	760	0.6	10900	26	7000	18.5	-0.2	43.5	9000	2.4	120
5487959	445360	7405255	0.1	-1	-0.001	2000	0.2	98000	0.2	43	220	70	131000	12700	170	27600	1000	-0.2	3300	78	27200	11	-0.2	23.5	9100	1.85	115
5487960	445550	7405390	0.05	-1	-0.001	2500	0.2	63400	0.2	36	165	64	69300	17900	210	29100	760	-0.2	4000	60	13400	15	-0.2	4.9	7300	1.3	90
5487961	445220	7405140	0.1	5	-0.001	470	0.2	21600	0.4	17	135	35	297000	15400	260	6400	840	0.7	6200	20	4200	23.5	-0.2	70	7400	4.2	165
5487962	445180	7405140	0.1	4	-0.001	540	0.2	16400	0.3	11	120	27	67100	19500	125	6500	560	0.5	11400	10	1100	20	-0.2	47	7000	1.5	110
5487963	445275	7404825	0.55	2	-0.001	840	0.2	24900	0.4	12.5	89	28.5	70600	27600	190	9200	600	0.3	12000	14	4300	32.5	-0.2	77	6200	2.3	85
5487964	445315	7404835	0.1	4	-0.001	1600	0.2	37400	0.3	28	130	53	55900	17500	74	24100	780	0.5	4700	38	6200	16	0.2	10.5	6500	1.6	115
5487965	445360	7404795	0.05	4	-0.001	1000	0.3	78200	0.3	27	260	46	177000	12700	125	21400	1000	0.5	4400	46	17400	15.5	-0.2	22	10700	2.6	125
5488001	445560	7409425	0.05	3	-0.001	2200	0.3	18300	0.2	14	105	30	69600	21100	57	9800	470	0.4	3900	12	4100	14.5	0.3	8.5	6900	0.95	86
5488002	445535	7409425	0.05	3	-0.001	1100	0.3	19000	0.1	11	74	26	58400	28500	145	9300	560	-0.2	4700	11	4600	18	0.2	10.5	6200	0.89	83
5488003	445280	7409265	0.2	4	-0.001	2200	0.2	32100	0.2	15	100	29.5	74300	20800	105	11400	540	-0.2	3800	14	8000	11.5	-0.2	13.5	6900	0.68	86
5488004	445280	7409240	0.1	4	-0.001	3000	0.2	21900	0.2	18	105	39	62200	25500	67	12300	500	0.4	3600	21	4900	13	0.2	9	7500	0.88	97
5488005	445000	7409370	0.1	7	-0.001	3400	0.3	40800	0.2	18.5	115	36.5	76400	27800	130	13200	520	0.3	3800	16	10400	14.5	0.3	12	7100	0.86	89
5488006	444685	7409480	0.05	5	-0.001	2500	0.2	38400	0.1	18	97	32.5	120000	22000	125	11300	580	-0.2	3300	19	10500	18.5	0.2	18	7500	1.15	90
5488007	444660	7409490	0.3	1	-0.001	1200	0.1	28100	0.2	16.5	125	36.5	157000	19800	145	9600	760	0.4	4600	13	6400	12.5	-0.2	22	8400	0.88	115

SAMPLE	EAST	NORTH	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Th	Ti	U	Zn
5488008	444900	7409580	0.05	4	0.002	1400	0.2	35200	0.2	20.5	100	45.5	87300	20500	140	18600	740	0.3	3800	22	7500	19	0.2	11	6800	0.96	105
5488009	445120	7409770	0.25	3	-0.001	1700	0.2	31100	0.2	14.5	75	36	67300	23100	115	12000	520	-0.2	3700	14	8000	18	-0.2	14	7500	0.95	91
5488010	445105	7409785	0.15	2	-0.001	1700	0.2	31300	0.2	18	78	31.5	75000	23300	185	11800	600	0.3	4100	14	7800	23	0.2	18	6900	1.65	99
5488011	445540	7410080	0.15	2	-0.001	1200	0.2	14400	0.2	12	94	28	90500	21100	91	7900	640	0.3	3900	12	3300	23.5	0.2	15	6900	1.1	100
5488012	445575	7410130	0.05	3	-0.001	2300	0.2	31800	0.2	19	125	36	56200	18700	85	16000	580	0.4	3000	19	7500	35	0.2	10	6300	1.9	110
5488013	445555	7410125	0.3	4	-0.001	1600	0.1	41700	0.2	26.5	130	49.5	136000	16600	130	14000	860	0.4	2800	22	11200	17	-0.2	31	8800	1.4	135
5488014	445740	7410225	0.1	4	-0.001	2200	0.2	23900	0.2	18	130	39	102000	19600	90	10200	560	0.4	2500	18	6600	15.5	0.2	17	7000	0.87	100
5488015	445730	7410240	0.2	7	-0.001	2400	0.1	48100	0.2	29.5	120	61	91100	20500	160	23900	780	-0.2	2900	26	10300	15	-0.2	13.5	7600	0.35	115
5488016	445470	7410365	0.05	5	-0.001	2000	0.3	69600	0.4	33	100	56	99100	21100	230	28800	1000	0.4	3900	26	15500	18.5	0.2	18	9100	1.85	150
5488017	445255	7410435	0.15	1	-0.001	1100	0.2	21700	0.3	15	170	38	61400	22300	105	8400	560	0.6	5000	18	4800	13.5	-0.2	20.5	7400	1.45	110
5488018	445005	7410560	0.25	2	-0.001	500	0.2	8900	0.3	9	130	27.5	41600	17500	79	5300	440	0.5	6500	11	680	16.5	0.2	30.5	5700	1.85	90
5488019	444860	7410700	0.65	4	-0.001	640	0.2	11200	0.3	10.5	115	32.5	38500	24300	73	6300	470	0.6	7200	11	960	19	-0.2	29	5900	1.75	100
5488020	444515	7410640	0.05	3	-0.001	1500	0.2	26700	0.3	18.5	115	39.5	48200	22600	105	13300	580	0.6	7800	16	4600	17.5	0.2	15.5	8200	1.9	120
5488021	444620	7410300	0.25	1	-0.001	640	0.3	21800	0.3	10	130	29	42600	19400	110	6300	500	0.6	7200	11	2400	15.5	-0.2	18.5	7200	2.1	100
5488022	444660	7410280	0.65	4	0.004	580	0.2	12800	0.3	10	130	29.5	40800	21400	64	7300	520	0.6	8000	12	1000	20	-0.2	39.5	6100	2.3	110
5488023	444830	7410400	0.05	2	0.005	520	0.2	7300	0.2	8	140	27.5	31900	24700	85	5200	370	0.5	7100	11	580	17	-0.2	15.5	5000	2.5	86
5488024	444815	7410420	0.35	5	-0.001	740	0.2	13800	0.3	9.5	105	33	37100	24400	78	6400	430	0.4	7300	10	1500	20	0.2	26.5	6300	1.9	100
5488025	444010	7410205	0.25	2	-0.001	640	0.2	17000	0.2	9	95	28.5	116000	19700	220	6300	600	0.5	7200	5	1900	25	-0.2	36.5	8500	2.8	120
5488026	445240	7410220	0.15	2	-0.001	1200	0.2	25400	0.2	16.5	115	43.5	51500	21900	110	11200	600	0.4	5700	16	5400	18	0.2	24	7100	1.55	110
5488027	445210	7410220	0.05	1	-0.001	660	0.2	10000	0.2	7.5	100	24.5	32400	22400	140	5200	380	0.2	5800	10	1400	15	0.2	12.5	4900	1.2	79
5488066	450150	7407050	0.4	2	-0.001	470	0.2	3500	0.2	14.5	140	75	35800	17400	40.5	8100	380	0.5	1900	22	500	14	0.3	16.5	4100	1.25	105
5488067	445700	7404965	0.55	2	-0.001		0.2	85300	-0.1	39.5	240	45	156000	13000	260	25300	1000	0.4	3900	60	21300	16	-0.2	31	9300	3.6	145
5488068	445140	7404430	1.15	-1	-0.001		0.1	19000	-0.1	13	155	18.5	79300	20600	98	8400	660	0.6	10300	18	1000	19	-0.2	49.5	6200	4	100
5488069	445070	7404410	0.85	1	-0.001		0.2	15000	-0.1	12.5	81	20	43900	22800	130	9100	580	0.6	11200	19	960	22.5	-0.2	43	5300	2.4	110
5488070	441958	7405355	0.8	1	-0.001		0.1	13600	0.1	6	70	13	45800	23000	280	5000	440	0.5	10600	5	1300	30	-0.2	64	5000	2.8	84
5488071	443325	7405820	0.8	2	-0.001		0.1	16600	-0.1	6.5	91	14	81300	21000	220	5000	520	0.3	7900	7	2400	24	-0.2	52	5600	3	91
5488072	443725	7406175	0.65	2	-0.001		0.1	11600	-0.1	6.5	72	14	56000	22600	220	4900	520	0.3	7600	6	1200	25.5	-0.2	34	5400	2.2	88
5488073	444290	7405760	0.7	2	-0.001		0.1	11200	-0.1	5.5	94	12.5	39100	20300	270	5300	440	0.2	11900	9	1200	21	-0.2	75	4700	2.3	82
5488074	444875	7406227	1.15	2	-0.001		0.2	16100	-0.1	9.5	65	16	249000	15500	540	3600	860	0.5	5100	6	2600	25	-0.2	130	7200	8.5	165
5488075	442410	7406352	0.4	1	-0.001		0.1	12000	-0.1	5	61	10.5	33100	26300	185	5400	340	0.2	10400	6	1800	20	-0.2	23.5	4400	1.4	71
5488076	442415	7406320	0.55	1	-0.001		0.1	13100	-0.1	5.5	79	14	34800	26000	165	4700	360	0.5	8800	7	1800	23	-0.2	30	4800	1.85	74
5488077	441700	7406210	0.75	1	-0.001		0.1	9800	-0.1	6	74	14	38900	23000	310	4700	380	0.4	10100	8	920	25.5	-0.2	66	4900	2.2	84
5488078	441650	7406210	0.6	-1	-0.001		0.1	12600	-0.1	5.5	81	12.5	45400	25600	185	5000	420	0.3	10200	6	1500	23.5	-0.2	38	5200	2.2	75
5488079	441715	7407570	0.85	1	-0.001		0.1	13400	-0.1	6	105	13.5	49500	24700	170	5700	410	0.5	9700	7	1300	22.5	-0.2	38	5500	2.2	87

SAMPLE	EAST	NORTH	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Th	Ti	U	Zn
5488080	441705	7407630	0.5	2 -0.001			0.1 16500	-0.1	8	71	16 42100	26000	165	7400	380	0.2 7600	13	2800	23	-0.2	19.5	4700	1.65	78			
5488081	442200	7407426	0.4	2 -0.001			0.1 13300	-0.1	6	77	13 40600	25600	210	5500	400	-0.2 9000	8	2000	25.5	-0.2	27.5	4600	1.65	72			
5488082	443000	7407980	0.3	-1 -0.001			0.1 14300	-0.1	7.5	67	16 47600	23200	130	5500	330	0.2 5500	8	2600	21.5	-0.2	14	4500	1.25	73			
5488083	442960	7408000	0.6	1 -0.001			0.2 12000	-0.1	11.5	97	25 38000	23000	125	9900	410	0.4 6800	13	2100	28	-0.2	20	5000	1.75	110			
5488084	443488	7407340	0.3	2 -0.001			0.1 13300	-0.1	7.5	98	17 46200	31900	130	6400	310	0.3 6600	9	2900	26	-0.2	12	4400	1.15	68			
5488183	444325	7404775	1.7	-1 -0.001			0.2 15500	0.2	12.5	105	21 72100	24600	340	6900	580	1 12000	14	1100	30.5	-0.2	120	6700	5.5	120			
5488184	442675	7405645	0.75	1 -0.001			0.1 15900	-0.1	6.5	100	13.5 48400	25200	250	5300	460	0.5 9200	8	2100	25	-0.2	44.5	5500	2.6	88			
5488185	442675	7405610	1	3 -0.001			0.2 14100	-0.1	6	82	15.5 40200	9500	320	5500	480	0.5 11300	4	1200	36.5	-0.2	91	5300	3.4	91			
5488186	443310	7405350	1.55	-1 -0.001			0.1 13800	-0.1	9	120	17 89300	11100	370	4500	660	1.1 11300	9	1200	27	-0.2	110	7100	4.7	115			
5488187	444815	7405220	1.15	2 -0.001			0.2 12300	-0.1	7.5	105	15.5 49800	9800	210	4700	490	0.4 10000	11	660	26.5	-0.2	76	5600	3.5	90			
5488188	444755	7405705	1.15	1 -0.001			0.1 13700	-0.1	6.5	87	15.5 82300	12800	360	4800	540	0.5 10200	9	1300	26.5	-0.2	105	5600	3.7	115			
5488189	443180	7406440	0.5	2 -0.001			0.1 13800	-0.1	6	64	15 41700	8700	200	6000	450	-0.2 8900	8	2200	20.5	-0.2	18	4500	1.45	84			
5488190	443160	7406410	0.85	1 -0.001			0.1 14600	-0.1	6	84	14.5 44500	25900	230	5800	500	0.3 8600	11	1800	33.5	-0.2	38	4700	1.75	88			
5488191	442295	7406430	0.9	1 -0.001			0.1 16600	0.1	6.5	82	14 48700	26300	210	5500	440	0.3 9400	8	2300	32.5	-0.2	38	5600	2.3	81			
5488192	441600	7406500	1.05	1 -0.001			0.1 12400	-0.1	6	62	15 42700	11500	180	4500	470	0.4 9800	10	1000	22.5	-0.2	54	5900	3	84			
5488193	441640	7406440	0.8	-1 -0.001			0.1 15500	0.1	6.5	77	14 57400	9300	210	5000	460	0.5 9100	8	1900	28	-0.2	37.5	5800	2.5	88			
5488194	442435	7407590	0.6	2 -0.001			0.1 16800	-0.1	7	80	15 56800	12400	260	5700	440	0.3 7600	9	2400	28	-0.2	32	5100	1.7	91			
5488195	442615	7407515	0.6	2 -0.001			0.1 15900	-0.1	9	80	19.5 38200	15300	110	8600	420	0.3 6700	13	2500	24	-0.2	15	4600	1.45	90			
5488196	442640	7407490	0.45	1 -0.001			0.1 23100	-0.1	10	120	20 50600	12500	175	10900	460	0.2 6800	26	3900	24	-0.2	16	4900	1.15	78			
5488197	443100	7407215	0.35	-1 -0.001			0.1 22200	-0.1	10	125	19.5 50900	7900	175	10500	440	0.2 6500	28	3900	23	-0.2	18.5	4900	1.45	80			
5488198	443070	7407190	0.7	3 -0.001			0.2 14300	-0.1	7.5	78	18.5 48000	10800	210	6800	430	0.3 8000	13	2200	29.5	0.2	19	4600	1.65	96			
5488199	442660	7406750	0.65	2 -0.001			0.1 15900	-0.1	7	81	14.5 63200	12300	280	5300	460	0.3 8500	8	2500	26.5	-0.2	30	5200	2.3	90			
5488200	444195	7407325	0.5	1 -0.001			0.2 31600	-0.1	13.5	170	29.5 45100	10700	160	17300	480	0.3 5200	60	5300	22.5	-0.2	15.5	5600	1.3	78			
5488201	444175	7407300	0.35	1 -0.001			0.1 16600	-0.1	7	58	13.5 43300	8600	190	7800	440	-0.2 8800	14	2600	21	-0.2	17.5	5100	1.25	73			
5488202	443810	7408440	0.3	-1 -0.001			0.1 16300	0.1	10	84	18 80300	14900	155	5900	410	0.3 4900	10	3700	26	-0.2	15	4800	1.25	77			
5488203	444710	7408550	0.45	2 -0.001			0.3 22500	-0.1	9.5	80	21 59400	10500	220	6200	340	0.6 3100	9	4600	22.5	0.2	20.5	7700	1.9	89			
5488204	444180	7408700	0.4	-1 -0.001			0.2 15900	-0.1	9	71	19 42600	11200	165	7100	370	0.4 4200	12	2900	19	-0.2	16.5	6600	1.4	80			
5488205	442945	7409120	0.85	1 -0.001			0.1 16300	-0.1	8.5	115	15.5 49200	10300	125	5700	450	0.4 7600	9	1600	17	-0.2	27.5	5800	2.9	77			
5488206	443070	7408530	0.65	-1 -0.001			0.2 21100	-0.1	11.5	90	19.5 54600	14600	185	9100	520	0.4 7000	13	3400	18	-0.2	24	6000	1.95	100			
5488207	443450	7409480	0.9	-1 -0.001			0.2 21100	0.1	7	51	17 45900	8700	190	6500	470	0.7 8300	7	2100	29.5	-0.2	28	8100	3.3	96			
5488208	443475	7409485	1.15	1 -0.001			0.3 24300	0.1	9	110	18 39000	13000	125	7200	520	0.6 9100	13	2000	23	-0.2	26.5	6800	3.5	93			
5488209	444260	7409700	0.9	-1 -0.001			0.2 16000	-0.1	9	91	17 35800	9500	110	7700	500	0.5 8600	13	1500	25.5	-0.2	24.5	5500	2.4	98			
5488210	444285	7409705	1.15	2 -0.001			0.3 26400	-0.1	13.5	120	24 52000	10300	155	6800	580	0.7 6400	14	2900	22	-0.2	37	8200	4.5	110			
5488211	443985	7410560	1.25	-1 -0.001			0.2 18900	0.1	11	77	20 34400	9800	61	7100	460	0.6 8300	15	1300	19.5	-0.2	27.5	6000	3.6	100			

APPENDIX IV

EL 9371 Mordor Pound No.2
Soil Sample Ledgers and Assay Results

CRA EXPLORATION PTY. LIMITED : SOIL SAMPLE LEDGER

EL NUMBER 9371 1:250,000 MAPSHEET ALICE SPRINGS SF5314 DATE TECTONIC DOMAIN Arunta Orogen
 EL NAME MORDOR POUND 1:100,000 MAPSHEET LAUGHLEN 57/51 LAB

SAMPLE	EAST	NORTH	ZONE	FRACTION	COLOUR	DEPTH (cm)	OUTCROP LITHOLOGY	REGIONAL STRATIG.	REGOLITH REGIME	REGOLITH MATERIAL	FLOAT	COMMENTS
5487713	446400	7406600	53	-40#								Shonkinite nearby; pegmatite 5m to S
5487714	446400	7406650	53	-40#								No outcrop; micaceous soil
5487715	446400	7406700	53	-40#								Pyroxenite; colluv. 15m to S
5487716	446400	7406750	53	-40#								Pyroxenite
5487717	446400	7406800	53	-40#								Pyroxenite (top of hill)
5487718	446400	7406850	53	-40#								Shonkinite (pyroxenite scree common)
5487719	446400	7406900	53	-40#								Pegmatite and quartz vein outcrop
5487720	446650	7407200	53	-40#								Shonkinite 20m to SW
5487721	446650	7407250	53	-40#								Shonkinite 15m to N
5487722	446650	7407300	53	-40#								Pyroxenite
5487723	446650	7407350	53	-40#								Pyroxenite
5487724	446650	7407400	53	-40#								Pyroxenite
5487725	446650	7407450	53	-40#								Pyroxenite; calcrete along E-W joint/ fracture
5487726	446650	7407500	53	-40#								Pyroxenite; calcrete float common
5487727	446650	7407550	53	-40#								Pyroxenite; just to S; calcrete along E-W joint
5487728	446650	7407600	53	-40#								Pyroxenite (top of hill)
5487729	446650	7407650	53	-40#								Pyroxenite; shonkinite short distance to N
5487730	446650	7407700	53	-40#								Shonkinite; NW-SE dyke 20m to SW
5487731	446400	7406600	53	-80#								Shonkinite nearby; pegmatite 5m to S
5487732	446400	7406650	53	-80#								No outcrop; micaceous soil
5487733	446400	7406700	53	-80#								Pyroxenite; colluv. 15m to S
5487734	446400	7406750	53	-80#								Pyroxenite
5487735	446400	7406800	53	-80#								Pyroxenite (top of hill)
5487736	446400	7406850	53	-80#								Shonkinite (pyroxenite scree common)
5487737	446400	7406900	53	-80#								Pegmatite and quartz vein outcrop
5487738	446650	7407200	53	-80#								Shonkinite 20m to SW
5487739	446650	7407250	53	-80#								Shonkinite 15m to N
5487740	446650	7407300	53	-80#								Pyroxenite
5487741	446650	7407350	53	-80#								Pyroxenite

SAMPLE	EAST	NORTH	ZONE	FRACTION	COLOUR	DEPTH (cm)	OUTCROP LITHOLOGY	REGIONAL STRATIG.	REGOLITH REGIME	REGOLITH MATERIAL	FLOAT	COMMENTS
5487742	446650	7407400	53	-80#								Pyroxenite
5487743	446650	7407450	53	-80#								Pyroxenite; calcrete along E-W joint/ fracture
5487744	446650	7407500	53	-80#								Pyroxenite; calcrete float common
5487745	446650	7407550	53	-80#								Pyroxenite; just to S: calcrete along E-W joint
5487746	446650	7407600	53	-80#								Pyroxenite (top of hill)
5487747	446650	7407650	53	-80#								Pyroxenite; shonkinite short distance to N
5487748	446650	7407700	53	-80#								Shonkinite; NW-SE dyke 20m to SW
5487966	447478	7405238	53	-40#		10-	GNS					BTTGNS
5487967	447461	7405257	53	-40#		10-	GNS					AN
5487968	447445	7405276	53	-40#		10-	SNK					EQ
5487969	447429	7405295	53	-40#		10-	PEG					SNK near
5487970	447413	7405314	53	-40#		10-	AML					
5487971	447397	7405333	53	-40#		10-	N/O					
5487972	447381	7405353	53	-40#		10-	SNK					PR
5487973	447365	7405372	53	-40#		10-	SNK					PR
5487974	447349	7405391	53	-40#		10-	SNK					PR
5487975	447333	7405410	53	-40#		10-	SNK					PR
5487976	447317	7405429	53	-40#		10-	SNK					PR
5487977	447554	7405302	53	-40#		10-	GNS					AN
5487978	447538	7405321	53	-40#		10-	GNS					AN
5487979	447522	7405340	53	-40#		10-	SNK					PR&POIK
5487980	447506	7405359	53	-40#		10-	SNK					EQ
5487981	447490	7405379	53	-40#		10-	SNK					EQ
5487982	447474	7405398	53	-40#		10-	PEG in SNK					
5487983	447458	7405417	53	-40#		10-	SNK					EQ
5487984	447442	7405436	53	-40#		10-	N/O					
5487985	447426	7405455	53	-40#		10-	SNK					PR
5487986	447409	7405474	53	-40#		10-	SNK					PR
5487987	447393	7405493	53	-40#		10-	SNK					PR
5487988	447630	7405365	53	-40#		10-	GNS					AN
5487989	447615	7405385	53	-40#		10-	GNS					AN
5487990	447599	7405405	53	-40#		10-	N/O					
5487991	447583	7405424	53	-40#		10-	SYN					MGT-bearing
5487992	447566	7405443	53	-40#		10-	SNK					EQ

SAMPLE	EAST	NORTH	ZONE	FRACTION	COLOUR	DEPT' ¹ (cm)	OUTCROP LITHOLOGY	REGIONAL STRATIG.	REGOLITH REGIME	REGOLITH MATERIAL	FLOAT	COMMENTS
5487993	447550	7405462	53	-40#		10-	N/O					
5487994	447534	7405481	53	-40#		10-	N/O					
5487995	447518	7405500	53	-40#		10-	SNK					PR
5487996	447502	7405519	53	-40#		10-	SNK					PR
5487997	447486	7405539	53	-40#		10-	PEG					
5487998	447470	7405558	53	-40#		10-	SNK					PR
5487999	447707	7405430	53	-40#		10-	GNS					QTF
5488000	447691	7405450	53	-40#		10-	GNS					AN
5488028	447675	7405469	53	-40#		10-	GNS					AN
5488029	447659	7405488	53	-40#		10-	N/O					
5488030	447643	7405507	53	-40#		10-	SNK					EQ
5488031	447627	7405526	53	-40#		10-	SYN-SNK					(MELSYN-PRSNK)
5488032	447611	7405545	53	-40#		10-	SNK					PR
5488033	447595	7405565	53	-40#		10-	SNK					PR
5488034	447579	7405584	53	-40#		10-	N/O					
5488035	447563	7405603	53	-40#		10-	SNK					PR
5488036	447547	7405622	53	-40#		10-	SNK					PR
5488037	447784	7405495	53	-40#		10-	GNS					BTTGNS
5488038	447768	7405514	53	-40#		10-	GNS					BTTGNS
5488039	447752	7405533	53	-40#		10-	GNS					BTTGNS
5488040	447735	7405552	53	-40#		10-	GNS					PR
5488041	447720	7405571	53	-40#		10-	GNS					AN SNK ^{nearby}
5488042	447704	7405591	53	-40#		10-	N/O					
5488043	447688	7405610	53	-40#		10-	SNK					PR
5488044	447671	7405629	53	-40#		10-	N/O					
5488045	447655	7405648	53	-40#		10-	SNK					PR
5488046	447639	7405667	53	-40#		10-	N/O					
5488047	447623	7405686	53	-40#		10-	N/O					
5488048	447607	7405705	53	-40#		10-	N/O					
5488049	447591	7405724	53	-40#		10-	N/O					
5488050	447570	7405432	53	-40#		10-	IRSMGT					GOSSAN
5488387	447028	7404890	53	-40#SL		10-	GNS					AN(Augen)
5488388	447015	7404929	53	-40#SL		10-	GNS					QTF(Granitic)
5488389	447002	7404967	53	-40#SL		10-	GNS					QTF(Granitic)

SAMPLE	EAST	NORTH	ZONE	FRACTION	COLOUR	DEPTH (cm)	OUTCROP LITHOLOGY	REGIONAL STRATIG.	REGOLITH REGIME	REGOLITH MATERIAL	FLOAT	COMMENTS
5488390	446990	7405005	53	-40#SL		10-	SNK					PR
5488391	446977	7405043	53	-40#SL		10-	SNK					PR
5488392	446965	7405081	53	-40#SL		10-	PEG/GRT					DYKE
5488393	446952	7405119	53	-40#SL		10-	SNK					PR
5488394	446940	7405157	53	-40#SL		10-	PEG/GRT					DYKE
5488395	446927	7405195	53	-40#SL		10-	GRT/PEG					DYKE
5488396	446929	7404770	53	-40#SL		10-	GNS					AN(Augen)
5488397	446915	7404813	53	-40#SL		10-	GNS					QTF(Granitic)
5488398	446903	7404852	53	-40#SL		10-	GNS					AN(Augen)
5488399	446891	7404890	53	-40#SL		10-	GNS					QTF(Granitic)
5488400	446879	7404928	53	-40#SL		10-	GNS					QTF(Granitic)
5592219	446867	7404967	53	-40#SL		10-	SNK					PR
5592220	446855	7405005	53	-40#SL		10-	SNK					EQ
5592221	446843	7405043	53	-40#SL		10-	SNK					PR
5592222	446831	7405081	53	-40#SL		10-	SNK					PR
5592223	446648	7404729	53	-40#SL		10-	GNS/SCH					AN(Augen)
5592224	446640	7404752	53	-40#SL		10-	GNS					QTF(Granitic)
5592225	446632	7404776	53	-40#SL		10-	GNS/SCH					BTT
5592226	446624	7404800	53	-40#SL		10-	GNS					QTF(Granitic)
5592227	446616	7404823	53	-40#SL		10-	GNS					QTF(Granitic)
5592228	446608	7404847	53	-40#SL		10-	SNK					PR
5592229	446600	7404870	53	-40#SL		10-	SYN					AN/SYENITIC
5592230	446591	7404894	53	-40#SL		10-	GNS					DYKE
5592231	446583	7404917	53	-40#SL		10-	PEG					
5592232	446575	7404941	53	-40#SL		10-	SYN					
5592233	446219	7404633	53	-40#SL		10-	GNS					QTF
5592234	446211	7404657	53	-40#SL		10-	GNS					QTF
5592235	446203	7404680	53	-40#SL		10-	GRT					PR
5592236	446194	7404704	53	-40#SL		10-	SNK					PR
5592237	446186	7404728	53	-40#SL		10-	N/O					SAMPLED IN CREEK
5592238	446178	7404751	53	-40#SL		10-	N/O					SAMPLED NEAR CREEK BED
5592239	446170	7404775	53	-40#SL		10-	N/O					PR
5592240	446162	7404799	53	-40#SL		10-	SNK					PRSNK
5592241	446154	7404822	53	-40#SL		10-	3RT/PEG/SNI					

SAMPLE	EAST	NORTH	ZONE	FRACTION	COLOUR	DEPT.: (cm)	OUTCROP LITHOLOGY	REGIONAL STRATIG.	REGOLITH REGIME	REGOLITH MATERIAL	FLOAT	COMMENTS
5592242	446145	7404846	53	-40#SL		10-	3RT/PEG/SNK					PRSNK
5592243	446137	7404869	53	-40#SL		10-	GRT/PEG					DYKE
5592244	446129	7404893	53	-40#SL		10-	GRT/PEG					DYKE
5592245	445916	7404501	53	-40#SL		10-	GNS					QTF/BTT
5592246	445908	7404525	53	-40#SL		10-	GRT					PR/weaklyFO
5592247	445900	7404548	53	-40#SL		10-	SNK					PR
5592248	445892	7404572	53	-40#SL		10-	N/O					PR
5592249	445884	7404596	53	-40#SL		10-	SNK					PR
5592250	445876	7404620	53	-40#SL		10-	SNK					PR
5592251	445869	7404643	53	-40#SL		10-	SNK					PR
5592252	445861	7404667	53	-40#SL		10-	SNK					PR
5592253	445852	7404693	53	-40#SL		10-	SNK					PR
5592254	447875	7405895	53	-40#SL		10-	N/O					
5592255	447852	7405905	53	-40#SL		10-	PEG					DY
5592256	447830	7405916	53	-40#SL		10-	N/O					DY
5592257	447807	7405926	53	-40#SL		10-	PEG					DY
5592258	447784	7405937	53	-40#SL		10-	GRT/PEG					PRSNK
5592259	447761	7405947	53	-40#SL		10-	T/PEG/SNK/C					DY
5592260	447739	7405957	53	-40#SL		10-	GRT/CLC					DY
5592261	447716	7405968	53	-40#SL		10-	PEG/CLC					DY
5592262	447693	7405978	53	-40#SL		10-	N/O					SAMPLE FROM NEAR CREEK BED
5592263	447670	7405989	53	-40#SL		10-	SNK/GRT					PRSNK/PRGRTDY
5592264	447648	7405999	53	-40#SL		10-	N/O				SNK	
5592265	448224	7406260	53	-40#SL		10-	GNS					QTF/AN
5592266	448204	7406284	53	-40#SL		10-	N/O					
5592267	448188	7406304	53	-40#SL		10-	GRT/PEG					DY
5592268	448172	7406323	53	-40#SL		10-	SNK					EQ
5592269	448157	7406342	53	-40#SL		10-	SNK					PR
5592270	448141	7406362	53	-40#SL		10-	SNK					PR
5592271	448125	7406381	53	-40#SL		10-	N/O					
5592272	448109	7406401	53	-40#SL		10-	SYN/PEG					SYNDY/PEGDY
5592273	448093	7406420	53	-40#SL		10-	QTZ(PEG)					DY
5592274	448078	7406439	53	-40#SL		10-	N/O					
5592275	448062	7406459	53	-40#SL		10-	N/O					

SAMPLE	EAST	NORTH	ZONE	FRACTION	COLOUR	DEPTH (cm)	OUTCROP LITHOLOGY	REGIONAL STRATIG.	REGOLITH REGIME	REGOLITH MATERIAL	FLOAT	COMMENTS
5592276	448046	7406478	53	-40#SL		10-	N/O				SNK	
5592277	448457	7406701	53	-40#SL		10-	GNS				AN	
5592278	448437	7406716	53	-40#SL		10-	N/O					
5592279	448418	7406732	53	-40#SL		10-	N/O					
5592280	448398	7406747	53	-40#SL		10-	N/O					
5592281	448378	7406763	53	-40#SL		10-	N/O					
5592282	448359	7406778	53	-40#SL		10-	N/O					
5592283	448339	7406794	53	-40#SL		10-	GRT/PEG					DY
5592284	448320	7406809	53	-40#SL		10-	PEG					DY
5592285	448300	7406825	53	-40#SL		10-	PEG					DY
5592286	448574	7407411	53	-40#SL		10-	GRT					PR/weaklyFO
5592287	448550	7407413	53	-40#SL		10-	GRT					PR/weaklyFO
5592288	448525	7407415	53	-40#SL		10-	N/O					
5592289	448500	7407417	53	-40#SL		10-	N/O					
5592290	448475	7407419	53	-40#SL		10-	PEG					DY
5592291	448450	7407421	53	-40#SL		10-	PEG					DY
5592292	448425	7407423	53	-40#SL		10-	PEG					DY
5592293	448400	7407425	53	-40#SL		10-	PEG					DY
5592294	448616	7407765	53	-40#SL		10-	SNK/GNS					PRSNK/ANGNS
5592295	448594	7407778	53	-40#SL		10-	N/O					SAMPLE FROM CREEK
5592296	448573	7407790	53	-40#SL		10-	SNK/CLC					SNKPR
5592297	448551	7407802	53	-40#SL		10-	AML					BTT
5592298	448529	7407815	53	-40#SL		10-	CLC/GRT					
5592299	448508	7407828	53	-40#SL		10-	N/O				CLC/AML	
5592300	448486	7407840	53	-40#SL		10-	AML					BTT
5592612	448464	7407853	53	-40#SL		10-	N/O					
5592613	448443	7407865	53	-40#SL		10-	SNK/CLC					SNKPR
5592614	448421	7407878	53	-40#SL		10-	CLC				CLC	
5592615	448400	7407890	53	-40#SL		10-	SNK				SNK/CLC	PR
5592616	448378	7407903	53	-40#SL		10-	PEG/SNK				SNK	PEGDY
5592617	448356	7407915	53	-40#SL		10-	SNK				SNK/CLC	PR
5592618	448335	7407927	53	-40#SL		10-	SNK				SNK/CLC	PR

CRA EXPLORATION PTY. LIMITED : SOIL SAMPLE RESULTS

TENEMENT 9371
PROSPECT

ZONE 53
LAB

1:250,000 MAPSHEET SF5314
1:100,000 MAPSHEET 5751

DATE

SAMPLE	FRACTION	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Th	Ti	U	Zn
5487713	-40#	0.1	-1		5300	0.1	78900	0.1	51	70	91	123000	17500	175	37800	1000	-0.2	2500	41	17300	49.5	-0.2	8	14000	0.96	86
5487714	-40#	0.2	-1		6600	0.4	74000	0.1	56	115	97	136000	21700	140	43200	1000	-0.2	2700	56	14700	18	-0.2	7	15900	0.84	84
5487715	-40#	0.25	-1		5400	0.1	62100	0.1	73	460	115	107000	18300	150	62200	1100	-0.2	2300	210	12900	8	-0.2	11	14100	1	74
5487716	-40#	0.3	-1		980	-0.1	100000	0.2	62	760	29	50500	5400	21	67600	560	-0.2	900	370	1300	6	-0.2	3.9	4200	0.39	44
5487717	-40#	0.25	-1		1100	0.1	35900	0.1	56	740	39	61800	11000	32.5	48400	800	-0.2	2100	270	1600	8.5	-0.2	9	5700	0.78	63
5487718	-40#	0.3	-1		3300	0.1	50700	0.1	65	740	175	78100	14300	66	63900	860	-0.2	2000	300	7000	10.5	-0.2	7	8900	0.6	66
5487719	-40#	0.45	-1		1800	1.6	12500	0.3	18.5	125	30	45300	17600	39.5	12100	460	-0.2	13300	50	1900	71	-0.2	36.5	5400	6.5	150
5487720	-40#	0.4	1		3300	0.2	60600	0.3	53	430	105	65500	16100	79	55400	740	-0.2	2600	185	10100	38.5	-0.2	10.5	10100	0.93	77
5487721	-40#	0.25	-1		3500	0.2	71200	0.2	58	440	115	71000	16100	94	58100	820	-0.2	2500	180	13300	27.5	-0.2	10	10500	0.98	81
5487722	-40#	0.4	-1		2500	0.2	52000	0.3	63	580	79	65300	14600	62	61500	840	-0.2	2800	250	5900	20	-0.2	10.5	8200	0.89	73
5487723	-40#	0.45	-1		2000	0.2	150000	0.2	64	440	18	48200	3200	21.5	87500	600	-0.2	900	330	1000	9	-0.2	4.8	3800	0.39	48.5
5487724	-40#	0.4	-1		1200	0.2	42600	0.2	69	720	28	69000	11100	46.5	62200	880	-0.2	2300	320	1400	13.5	-0.2	11.5	6300	0.91	72
5487725	-40#	1.15	-1		1500	0.3	58000	0.2	67	660	83	70700	12500	87	55300	840	-0.2	2500	270	8700	17	-0.2	14.5	7000	1	66
5487726	-40#	0.55	-1		1600	0.5	56800	-0.1	75	880	330	68200	9900	48.5	75900	860	-0.2	2000	440	3000	23	-0.2	9	6700	0.77	68
5487727	-40#	0.45	2		1600	0.2	47400	-0.1	81	1000	150	74800	11700	53	70000	940	-0.2	2200	430	2200	16.5	-0.2	8	7600	0.79	73
5487728	-40#	0.3	3		1100	0.1	35300	0.2	61	720	27	58700	12500	42	58500	760	-0.2	2500	350	1300	11.5	-0.2	9.5	5500	0.8	60
5487729	-40#	0.45	-1		2100	0.2	64200	0.4	72	820	80	63100	11700	72	68300	800	-0.2	2400	290	3900	38.5	-0.2	12	7200	0.9	105
5487730	-40#	0.3	-1		3900	0.1	67200	-0.1	53	430	135	80500	14400	83	55500	860	-0.2	2000	250	8000	9	-0.2	8	10600	0.68	81
5487731	-80#	0.25	-1		3800	0.2	63800	0.2	39.5	62	62	80100	13800	145	26200	720	-0.2	2400	33	15000	10	-0.2	12	10200	0.99	87
5487732	-80#	0.2	-1		4700	0.4	64200	0.2	48	140	84	100000	17300	155	33200	800	-0.2	2700	57	13800	10	-0.2	10	12100	0.81	105
5487733	-80#	0.35	-1		3900	0.1	53500	0.3	68	540	105	90200	16400	140	47500	880	-0.2	2400	195	13700	11	-0.2	10.5	11100	0.97	100
5487734	-80#	0.25	-1		1200	-0.1	122000	0.1	62	700	22	48300	5300	21.5	63800	460	-0.2	850	380	1500	5	-0.2	3.9	4300	0.45	43.5
5487735	-80#	0.35	-1		980	0.1	22900	0.1	60	660	29.5	61100	13400	39	34800	780	0.3	2600	250	1800	10	0.2	12	6300	1.15	69
5487736	-80#	0.4	-1		2200	0.1	39300	-0.1	64	700	125	70800	15000	63	51000	820	-0.2	2500	300	6400	11	-0.2	8.5	7900	0.7	88
5487737	-80#	0.55	4		1600	1.8	10100	0.7	18.5	120	27	43700	20200	69	10200	410	-0.2	9500	49	1700	88	0.3	42	5500	6.5	150
5487738	-80#	0.4	-1		2200	0.2	42900	0.1	43	340	78	53600	13200	76	38900	620	-0.2	2500	150	7600	16.5	-0.2	12	7500	1.1	67
5487739	-80#	0.3	1		2500	0.2	71000	0.1	67	440	110	79000	17900	110	56600	940	-0.2	3400	200	14100	23	0.3	15.5	10300	1.1	85
5487740	-80#	0.5	-1		2000	0.3	41400	0.3	66	600	77	67300	15800	72	50700	860	-0.2	3200	240	5400	27	0.2	18.5	8400	1.55	82

SAMPLE	FRACTION	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Th	Ti	U	Zn
5487741	-80#	0.3	2		2100	-0.1	156000	-0.1	59	450	15.5	43700	3200	19.5	78300	520	-0.2	800	330	1000	6	-0.2	5	3700	0.37	51
5487742	-80#	0.3	2		1100	0.1	34400	0.2	72	640	29	72800	13600	48	52800	900	-0.2	2800	320	1600	13.5	-0.2	14.5	7100	1.25	68
5487743	-80#	0.35	-1		1200	0.3	37000	0.2	61	520	85	63300	12900	73	38200	740	-0.2	2600	240	6600	18	-0.2	18	6400	1.5	70
5487744	-80#	0.8	1		1500	0.5	43000	1	79	680	400	61400	10600	50	59200	740	0.3	2200	410	3000	25.5	-0.2	12.5	6700	1.15	79
5487745	-80#	0.35	-1		1300	0.3	33600	0.2	76	920	155	70500	12200	50	53000	840	-0.2	2400	400	2200	20	-0.2	13.5	7300	1.15	81
5487746	-80#	0.5	-1		980	0.2	27400	0.3	65	780	35	58600	14600	48	46900	720	0.2	3000	320	1400	17	0.2	14	6000	1.15	81
5487747	-80#	0.45	2		2100	0.2	58000	0.8	69	900	92	66700	13400	72	59400	760	-0.2	2600	300	4500	56	-0.2	17.5	7700	1.35	110
5487748	-80#	0.35	-1		3200	0.2	66200	0.1	58	400	145	73100	14100	88	49600	760	-0.2	2300	240	9000	18	0.2	15	8900	0.93	82
5487966	-40#	0.35	3	-1	640	0.3	6000	0.2	15.5	82	24.5	40300	12700	58	7100	350	0.5	5800	19	300	21.5	0.2	27	5000	2.3	69
5487967	-40#	0.4	2	-1	1300	0.2	26400	0.2	18	140	43	45400	13100	82	12000	540	0.6	7000	21	2400	21.5	0.2	24.5	6300	2.2	84
5487968	-40#	0.3	2	-1	2600	0.6	52500	0.3	35	125	58	57300	23500	140	27500	740	0.8	6600	41	10900	23	-0.2	25.5	9800	2.7	88
5487969	-40#	0.25	2	-1	1700	0.5	43000	0.3	27.5	150	43	46100	19500	74	25600	620	0.6	6600	41	4200	21.5	0.2	24.5	7000	2.5	110
5487970	-40#	0.3	2	-1	2200	0.4	47300	0.3	39.5	280	92	62400	21500	85	33100	860	0.6	4400	94	4400	21	0.3	17.5	7600	1.65	100
5487971	-40#	0.2	2	-1	2300	0.3	69000	0.3	35.5	135	87	54500	20400	95	34000	740	0.7	4000	50	8400	28	0.2	18	8300	2.2	105
5487972	-40#	0.25	2	-1	2600	0.3	77800	0.2	40.5	180	86	80900	20200	125	34000	820	0.7	4300	59	9400	20.5	-0.2	18	9600	2.6	105
5487973	-40#	0.25	2	-1	2500	0.2	75100	0.3	39.5	125	53	95500	20600	150	32700	1000	0.2	5400	42	7600	23.5	-0.2	13.5	8200	1.85	145
5487974	-40#	0.2	2	-1	2700	0.4	73400	0.3	45	130	67	85000	20300	210	31400	940	0.5	5500	51	10600	17	-0.2	17	10700	1.95	120
5487975	-40#	0.2	1	-1	3300	0.3	62500	0.2	54	155	82	110000	22300	240	33900	1200	0.2	4100	65	10800	18	-0.2	17.5	6600	2	125
5487976	-40#	0.2	2	-1	3400	0.3	56200	0.3	49	160	73	107000	22000	185	33800	1100	0.3	4500	63	9700	15.5	-0.2	15	9300	1.55	115
5487977	-40#	0.3	2	-1	720	0.3	7800	0.2	13	100	45.5	47300	22300	69	6400	440	0.5	6200	23	390	23.5	-0.2	31.5	5400	2.2	69
5487978	-40#	0.25	2	-1	1200	0.3	16700	0.2	21	150	115	54000	26700	78	11500	470	0.6	6800	42	2200	23	-0.2	26	6000	2.1	79
5487979	-40#	0.25	2	-1	2500	0.3	82600	0.2	34.5	125	89	55100	20300	135	34300	680	0.5	3900	48	9400	16.5	0.2	18.5	8500	2.2	79
5487980	-40#	0.3	3	-1	1500	0.7	67700	0.4	31.5	220	115	52200	19300	85	39500	880	0.8	4600	81	5300	15	0.2	26.5	8000	3	100
5487981	-40#	0.35	4	-1	760	13	20000	0.6	21.5	125	120	35700	16700	72	12300	720	0.5	15500	50	2400	37	0.9	64	5600	11.5	65
5487982	-40#	0.25	2	-1	4300	0.4	66900	0.3	77	240	540	80000	19200	140	38400	900	0.9	4500	195	10800	19	-0.2	20.5	10500	2.3	87
5487983	-40#	0.15	-1	-1	4500	0.3	82800	0.2	57	150	200	81600	22600	185	40700	940	0.4	4200	89	15500	15.5	-0.2	17	7400	1.9	80
5487984	-40#	0.15	-1	-1	3400	0.3	57600	0.2	45.5	135	100	89300	27000	200	32600	860	0.4	5100	54	8500	22	-0.2	20.5	5800	2.3	100
5487985	-40#	0.2	2	-1	2300	0.3	50700	0.3	42.5	125	59	99200	20000	195	28000	980	0.4	4600	44	8500	16.5	-0.2	18	9700	1.6	120
5487986	-40#	0.2	1	-1	2300	0.3	52200	0.2	41	110	46	97700	22700	200	26800	920	0.4	4800	37	7200	18.5	-0.2	17	6900	1.8	120
5487987	-40#	0.2	2	-1	2500	0.4	51400	0.3	45	125	56	121000	21100	190	29600	1100	0.3	5100	47	9800	21	-0.2	17	10700	2	130
5487988	-40#	0.3	2	-1	800	0.3	8700	0.2	10.5	97	18.5	52000	27400	73	5300	480	0.5	9900	14	480	25	-0.2	28.5	5300	3	65
5487989	-40#	0.3	2	-1	920	0.3	13800	0.3	15	84	32.5	60100	25900	92	6400	500	0.6	11400	19	1000	34	0.2	44.5	7000	4	65

SAMPLE	FRACTION	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Th	Ti	U	Zn
5487990	-40#	0.2	2	-1	2900	0.4	51800	0.2	39.5	110	100	72500	25500	185	24300	780	0.8	4700	49	11800	24.5	0.2	28	12300	3.1	86
5487991	-40#	0.5	3	-1	1600	2	30200	0.3	36.5	95	640	69300	21700	135	14200	700	0.7	4800	89	5100	93	0.3	23	8100	3.1	105
5487992	-40#	0.4	2	-1	2800	0.9	63600	0.3	38	105	380	67700	21200	150	33200	740	0.7	4500	130	11100	28	0.3	22	8400	2.3	69
5487993	-40#	0.2	1	-1	2500	0.3	100000	0.2	26	93	92	40900	16400	81	40700	490	0.4	3400	43	6300	16	-0.2	13	6200	1.85	52
5487994	-40#	0.2	1	-1	2700	0.3	73900	0.2	30	140	62	57900	19100	110	36800	620	0.4	4300	50	8900	15	-0.2	17.5	7700	2.1	72
5487995	-40#	0.25	2	-1	2300	0.7	61600	0.2	35	97	65	70900	22000	135	32400	760	0.8	4900	41	7500	22	0.2	22	10400	2.8	90
5487996	-40#	0.25	3	-1	1900	1.6	42900	0.3	35.5	97	36	78000	24200	145	23200	800	0.8	8300	39	7100	28.5	0.4	25	10700	6.5	89
5487997	-40#	0.3	4	-1	1600	2	46400	0.3	30.5	105	36.5	71100	20600	125	21000	820	0.6	7400	27	7200	29.5	0.8	23.5	11200	4	90
5487998	-40#	0.2	2	-1	2400	0.7	58100	0.3	39	115	48.5	89900	15500	200	28000	980	0.6	5600	41	9600	23.5	0.2	18.5	11400	2.2	115
5487999	-40#	0.15	2	-1	490	0.2	9400	0.2	16.5	150	19.5	36300	14700	44.5	10600	450	0.3	11200	33	330	24	-0.2	18.5	3700	2.5	50
5488000	-40#	0.25	1	-1	640	0.3	7700	0.3	11.5	130	27	45500	14300	75	7000	520	0.6	9800	13	600	28.5	-0.2	33.5	5500	3.5	77
5488028	-40#	0.25	2	-1	800	0.4	14800	0.3	14	110	20.5	63300	16100	100	6700	500	0.6	11900	15	1000	23	-0.2	40.5	7600	5	65
5488029	-40#	0.2	1	-1	2800	0.4	45600	0.3	30	185	47.5	69200	16600	135	29000	780	0.5	6300	57	7500	19	-0.2	17	8900	2.2	89
5488030	-40#	0.2	2	-1	3000	0.2	116000	0.2	31	115	85	52300	15700	165	50500	660	0.3	3700	46	11800	16.5	-0.2	19.5	7500	2.8	67
5488031	-40#	0.25	3	-1	1500	0.2	31700	0.2	22.5	130	41.5	64300	13400	105	21200	760	0.3	5500	35	3100	21.5	0.3	19.5	6900	1.7	84
5488032	-40#	0.2	2	-1	1600	0.3	30800	0.3	24.5	110	41.5	60700	16200	135	19400	720	0.6	6500	31	3600	23	0.2	22.5	8100	2.2	89
5488033	-40#	0.2	2	-1	2400	0.4	55700	0.3	32	125	71	74300	16300	130	30600	860	0.7	5000	46	8000	21	0.2	21	10200	2.3	105
5488034	-40#	0.2	2	-1	3400	0.4	59800	0.2	35	91	89	72500	14700	115	31600	720	0.7	4900	41	9400	17.5	0.2	17	9700	1.75	76
5488035	-40#	0.25	4	-1	1600	1.1	48300	0.2	24.5	95	53	50200	13900	90	18400	520	0.6	5300	30	3200	27.5	0.3	15.5	7000	2.4	57
5488036	-40#	0.4	3	-1	640	2.7	7800	0.3	10	100	22	31000	17200	50	5700	360	0.3	9600	19	860	34	0.5	31.5	4000	4.1	45
5488037	-40#	0.2	2	-1	500	0.3	36400	0.3	10.5	140	21.5	37200	19800	45	11600	470	0.4	6800	18	360	18.5	0.2	24	4400	1.8	57
5488038	-40#	0.2	2	-1	640	0.3	9900	0.2	14	155	20.5	62100	22200	59	8500	520	0.3	7600	20	600	25.5	0.2	23.5	4800	2.8	62
5488039	-40#	0.25	2	-1	800	0.2	8000	0.2	13.5	140	20	47400	19100	65	7300	440	0.5	6400	18	540	30.5	-0.2	31	5300	2.7	58
5488040	-40#	0.2	2	-1	840	0.2	7600	0.3	10	135	19.5	44300	20000	69	6100	370	0.4	8300	15	740	17.5	-0.2	24.5	4900	2	53
5488041	-40#	0.25	2	-1	1000	0.2	7700	0.2	14.5	120	23.5	44400	13800	92	7100	400	0.5	7500	15	1200	22	-0.2	34	5700	2.2	58
5488042	-40#	0.25	2	-1	1700	0.4	28800	0.3	23	115	39	52200	15800	115	18200	680	0.6	6900	29	2600	23.5	0.3	22	6800	2.2	91
5488043	-40#	0.2	2	-1	1800	0.3	29800	0.2	27.5	135	39.5	65800	15600	145	21000	760	0.8	7100	33	4300	20.5	-0.2	17	8500	2.3	97
5488044	-40#	0.2	2	-1	1700	0.3	27800	0.3	23.5	155	28.5	53600	18600	94	16900	620	0.6	8000	30	3700	20.5	-0.2	18.5	7300	2.6	76
5488045	-40#	0.2	3	-1	2300	0.4	60900	0.2	37.5	130	64	71700	19400	140	31300	860	0.7	5300	46	7200	23	-0.2	24	10000	3.2	87
5488046	-40#	0.25	2	-1	2700	0.4	48300	0.3	41	170	59	80500	16300	165	32500	840	0.6	5100	56	7600	26	0.2	26	9600	3.5	110
5488047	-40#	0.25	1	-1	2000	0.3	50600	0.2	32	140	47.5	69400	16500	120	29400	740	0.5	5300	40	5300	18	-0.2	14	8100	2.1	88
5488048	-40#	0.25	3	-1	1900	0.3	67800	0.3	35	130	53	69600	15500	125	27400	760	0.5	5400	38	6300	24	0.2	23	9000	3.8	83

SAMPLE	FRACTION	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Th	Ti	U	Zn
5488049	-40#	0.25	2	-1	1400	0.3	49900	0.3	24.5	140	46	57000	16500	91	23500	660	0.6	5000	33	4100	16.5	0.2	21	7700	2.7	73
5488050	-40#	0.95	6	-1	1300	9	21600	0.6	84	89	3000	114000	15300	99	13000	1000	1	2700	490	5200	46.5	0.4	25	6600	4	135
5488387	-40#SL	0.1	2	-0.001	0.4	32700	-0.1	0.1	22	110	32	81700	22100	81	19900	960	0.9	8550	29	3450	21	-0.2	19	9700	2.9	140
5488388	-40#SL	0.2	3	-0.001	0.6	25200	-0.1	0.1	18	135	28.5	43100	8800	45.5	19000	500	0.5	5900	33	700	16	-0.2	19	4050	1.8	91
5488389	-40#SL	0.2	2	-0.001	0.3	44800	-0.1	0.1	16.5	145	26	37500	8500	46.5	17800	490	0.5	8150	44	490	20	-0.2	22.5	3450	1.75	89
5488390	-40#SL	0.4	3	-0.001	0.5	64900	-0.1	0.1	24.5	110	63	65800	15100	130	25200	660	0.5	8250	27	4450	19	-0.2	26.5	7050	2.4	110
5488391	-40#SL	0.15	1	-0.001	0.4	86300	-0.1	0.1	40.5	135	68	90000	13000	165	38500	980	0.4	5450	62	10400	23.5	-0.2	21.5	10100	2.5	125
5488392	-40#SL	0.25	5	-0.001	0.4	46500	-0.1	0.1	22	94	27.5	56000	11200	97	18200	580	0.5	8400	32	3650	23	-0.2	21.5	6550	2	91
5488393	-40#SL	0.25	4	-0.001	0.2	46400	-0.1	0.1	40	110	60	118000	10600	175	28700	980	-0.2	4450	46	9600	25	-0.2	18	8650	1.9	165
5488394	-40#SL	0.25	4	-0.001	0.5	58600	-0.1	0.1	36.5	115	54	92400	13400	160	28900	940	0.7	5950	44	6200	24	0.2	23	11000	2.2	145
5488395	-40#SL	0.2	4	-0.001	0.5	31600	0.1	0.1	24.5	125	31	58200	24700	100	19500	660	0.8	6050	44	3100	20.5	0.2	25	7450	2.6	120
5488396	-40#SL	0.1	2	-0.001	0.3	24900	0.3	0.3	20	125	37	61400	28100	88	18100	640	0.6	7900	37	3400	22	-0.2	20	7000	2.4	110
5488397	-40#SL	0.15	2	-0.001	0.2	17900	-0.1	0.1	13	135	23.5	51300	29400	60	11900	490	0.5	9500	21	2200	17	-0.2	19	5750	2.1	79
5488398	-40#SL	0.05	2	-0.001	0.1	17700	-0.1	0.1	14.5	125	26	74000	26500	66	11600	700	0.5	10500	21	1300	18.5	-0.2	20.5	7300	2.7	140
5488399	-40#SL	0.15	4	-0.001	0.1	10200	-0.1	0.1	8.5	105	14.5	32400	26600	46.5	8050	360	0.3	16000	20	410	23.5	-0.2	24.5	2950	2.2	71
5488400	-40#SL	0.15	-1	-0.001	0.1	18700	-0.1	0.1	11.5	110	23	42700	26900	60	10300	490	-0.2	9100	22	600	18.5	-0.2	27.5	3850	2.6	76
5592219	-40#SL	0.35	3	-0.001	0.3	34400	-0.1	0.1	28.5	115	50	84900	16700	185	24400	860	0.9	5750	37	6650	28.5	-0.2	29	9250	2.8	130
5592220	-40#SL	0.3	3	-0.001	0.3	71500	-0.1	0.1	40	155	70	66300	18400	120	44100	740	0.6	5100	63	10400	18	-0.2	24.5	8950	3.1	105
5592221	-40#SL	0.25	3	-0.001	0.3	38100	-0.1	0.1	34	170	65	91200	15400	190	26600	800	0.3	5550	52	8050	25	-0.2	25	8250	4.8	130
5592222	-40#SL	0.25	2	-0.001	0.2	78800	-0.1	0.1	24	115	39.5	77700	14100	105	37400	720	-0.2	4500	34	5550	14.5	-0.2	13.5	6150	3.3	91
5592223	-40#SL	0.25	-1	-0.001	0.2	13400	-0.1	0.1	13	97	18.5	44000	27200	50	9350	520	0.4	12000	21	740	16.5	-0.2	24	5300	2.1	98
5592224	-40#SL	0.25	-1	-0.001	0.2	16500	-0.1	0.1	19.5	150	25	61200	22000	66	13600	620	0.5	10700	25	760	26	-0.2	51	7200	4.1	150
5592225	-40#SL	0.25	3	-0.001	0.1	9850	-0.1	0.1	12.5	125	29.5	42600	26300	62	9900	420	0.4	11200	26	420	25	-0.2	35.5	4450	3.5	86
5592226	-40#SL	0.25	4	-0.001	0.2	15000	-0.1	0.1	17.5	125	33.5	42400	24000	47.5	12500	560	0.4	12600	31	780	19	-0.2	22	3800	2.2	105
5592227	-40#SL	0.3	5	-0.001	0.2	16700	-0.1	0.1	21	115	30	59400	11900	63	13900	700	0.6	8700	24	1100	20	-0.2	27	6650	2.3	145
5592228	-40#SL	0.25	5	-0.001	0.2	26800	-0.1	0.1	21.5	88	35.5	57700	16500	200	17700	700	0.6	9150	26	4500	18	-0.2	27	8600	2.5	130
5592229	-40#SL	0.1	-1	-0.001	0.4	21000	-0.1	0.1	16	140	29	58200	9000	100	13500	580	0.3	9900	27	2650	41.5	-0.2	31.5	6700	5	105
5592230	-40#SL	0.15	-1	-0.001	0.2	14700	-0.1	0.1	16	110	22.5	45100	9550	105	9500	580	0.5	13000	16	1100	27.5	-0.2	39.5	4800	2.8	130
5592231	-40#SL	0.15	3	-0.001	0.5	74500	-0.1	0.1	28	105	42	65200	15400	135	24100	820	0.4	9000	30	6150	27.5	-0.2	26.5	7400	5	145
5592232	-40#SL	0.2	2	-0.001	0.2	12600	-0.1	0.1	15.5	120	31.5	41900	9150	125	8100	440	0.4	13300	15	1500	27.5	-0.2	36	4500	2.8	91
5592233	-40#SL	0.2	5	-0.001	0.1	15200	-0.1	0.1	12	135	22.5	45600	11400	60	11300	560	0.4	8850	19	960	22	-0.2	20.5	5500	1.5	98
5592234	-40#SL	0.3	4	-0.001	0.3	16500	-0.1	0.1	14.5	125	29.5	52800	11100	77	10300	540	0.7	8650	21	1250	47	-0.2	32.5	5950	2.5	115

SAMPLE	FRACTION	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Th	Ti	U	Zn
5592235	-40#SL	0.15	2	-0.001	0.2	15000	-0.1	15	125	26	45200	12500	85	10200	460	0.4	7700	22	1650	30.5	-0.2	28.5	5350	2.7	87	
5592236	-40#SL	0.3	-1	-0.001	0.3	37000	0.1	23	99	46.5	64100	19500	140	20000	660	1	6000	31	5900	21	0.2	33	8050	3.1	120	
5592237	-40#SL	0.4	5	0.002	0.1	84700	-0.1	25	155	46.5	59800	14300	105	28800	540	0.3	4950	47	7400	17	-0.2	16.5	6350	27	75	
5592238	-40#SL	0.25	3	-0.001	0.2	69500	-0.1	40	270	68	88700	16200	145	46400	840	-0.2	4200	105	13700	19.5	-0.2	14	9550	1.6	89	
5592239	-40#SL	1.05	1	-0.001	0.2	79500	-0.1	54	300	105	95200	14900	200	52700	900	0.2	3900	110	15500	16	-0.2	16	10100	1.45	140	
5592240	-40#SL	0.25	6	-0.001	0.3	46200	-0.1	27	200	48	80000	18800	170	25000	700	0.6	4900	58	10500	22	-0.2	19	8600	2.5	120	
5592241	-40#SL	0.25	4	-0.001	0.3	39900	-0.1	25	145	46	68300	11400	125	21300	640	0.4	6000	41	6150	25	-0.2	32.5	7200	2.9	93	
5592242	-40#SL	0.35	3	-0.001	0.2	65300	-0.1	44	280	89	81500	14200	145	47900	820	-0.2	4100	110	12700	17.5	-0.2	14	9700	1.35	105	
5592243	-40#SL	0.3	6	-0.001	0.2	55900	-0.1	32	160	45	82100	13500	170	29400	820	0.3	5400	46	10000	15.5	-0.2	19	8350	2	110	
5592244	-40#SL	0.4	3	-0.001	0.3	52100	-0.1	32.5	145	43	81200	12300	180	28500	880	0.7	5900	42	9500	19	-0.2	28.5	8450	3.1	150	
5592245	-40#SL	0.05	2	-0.001	0.2	22400	-0.1	12	140	24.5	44900	12200	67	11100	490	0.3	7150	20	660	29	-0.2	30	5050	2.2	87	
5592246	-40#SL	0.25	2	-0.001	0.2	15700	-0.1	13	110	22	65900	12500	125	9800	540	0.6	6300	20	1700	24	-0.2	28	6850	3.6	98	
5592247	-40#SL	0.35	3	0.002	0.2	116000	-0.1	28	88	45.5	70200	11900	150	33900	760	0.6	4900	29	6250	18.5	-0.2	20	6700	2.4	110	
5592248	-40#SL	0.45	4	-0.001	0.2	107000	-0.1	22.5	93	31	67900	15800	135	29600	720	0.5	5800	23	6100	17.5	-0.2	16.5	6250	2.2	84	
5592249	-40#SL	0.35	3	-0.001	0.3	55900	-0.1	41.5	120	71	94600	15000	250	30900	940	0.5	4900	48	11400	29	-0.2	36.5	8200	3.6	160	
5592250	-40#SL	0.25	2	-0.001	0.3	46400	-0.1	42	105	58	101000	12400	230	25100	880	0.4	4250	45	10800	22	-0.2	28	8100	2.8	130	
5592251	-40#SL	0.3	5	-0.001	0.1	40300	-0.1	35	100	56	107000	16300	180	21200	820	0.5	4650	38	8050	20	-0.2	21.5	7750	1.85	130	
5592252	-40#SL	0.3	5	-0.001	0.1	48600	-0.1	33	155	66	102000	11100	220	28500	860	0.2	4500	54	9700	15	-0.2	16	8000	1.45	125	
5592253	-40#SL	0.4	3	-0.001	0.2	81700	-0.1	40.5	210	82	98900	11800	260	39700	940	0.4	4650	66	16700	26.5	0.2	28	7900	2.5	125	
5592254	-40#SL	0.3	3	-0.001	0.4	44900	0.1	34.5	110	67	86900	18000	165	27500	800	0.8	5050	47	8550	19.5	-0.2	24	11300	3.4	155	
5592255	-40#SL	0.3	5	-0.001	0.5	44400	0.1	41	130	70	94900	13300	190	26100	840	0.4	5900	45	8650	31	-0.2	31.5	10400	3.8	170	
5592256	-40#SL	0.35	10	-0.001	0.4	55600	-0.1	45.5	140	87	110000	13300	210	30000	960	0.5	4050	55	11600	28.5	-0.2	35	10500	4.3	145	
5592257	-40#SL	0.15	3	-0.001	1.3	26200	-0.1	37.5	120	43	69700	20400	94	19700	720	0.8	6500	45	4200	42.5	0.3	31.5	8450	6.5	120	
5592258	-40#SL	0.45	5	-0.001	0.4	64600	-0.1	52	175	84	110000	12500	165	36300	880	1.3	4550	65	11100	15	-0.2	20.5	12000	2.1	135	
5592259	-40#SL	0.35	4	-0.001	0.3	64100	-0.1	56	210	85	130000	15200	145	35600	960	0.6	4000	68	12700	17.5	-0.2	20.5	10400	2.6	120	
5592260	-40#SL	0.45	5	-0.001	0.4	73000	0.2	48	165	97	106000	13400	185	33700	820	0.9	3950	59	11300	18.5	-0.2	28	9550	2.9	140	
5592261	-40#SL	0.5	5	0.003	0.4	76800	-0.1	42	150	68	97600	13200	125	37700	780	0.8	3850	45	8800	22	-0.2	23.5	8350	2.7	130	
5592262	-40#SL	0.5	3	-0.001	0.3	53800	-0.1	46	230	82	94400	13800	175	36000	860	0.5	4100	81	9200	22	0.2	25	8450	2.4	155	
5592263	-40#SL	0.3	-1	-0.001	0.2	62300	-0.1	39	110	60	117000	15200	230	27800	980	0.4	3450	40	12000	21.5	-0.2	26	8300	2.4	150	
5592264	-40#SL	0.4	2	-0.001	0.3	45000	0.2	40	120	76	90200	13500	165	29000	840	0.4	4150	51	8500	19	-0.2	18.5	9000	1.8	150	
5592265	-40#SL	0.15	1	-0.001	0.4	20100	-0.1	18	160	26.5	51600	13100	87	13100	500	0.6	7250	23	3500	23.5	-0.2	29	5850	2.6	80	
5592266	-40#SL	0.15	2	-0.001	0.3	23300	-0.1	23	145	45	52000	13500	105	16600	520	0.5	6600	33	4850	19.5	-0.2	28.5	6250	2.8	100	

SAMPLE	FRACTION	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Th	Ti	U	Zn
5592267	-40#SL	0.4	6 -0.001			0.6 43900	0.1	40	190	68	79300 13800	165 32200	820	0.8	4750	61 9650	24	-0.2	40.5	9200	3.9	140				
5592268	-40#SL	0.35	5 -0.001			0.4 45200	-0.1	45	180	68	89100 14100	160 32000	800	0.3	4750	64 10700	20	-0.2	26.5	9150	3.2	120				
5592269	-40#SL	0.25	3 -0.001			0.6 31900	-0.1	40	160	67	85800 26600	165 22700	660	0.9	6150	45 6600	19.5	-0.2	35	6400	3.1	120				
5592270	-40#SL	0.3	3 -0.001			0.6 27800	-0.1	31	105	61	77500 22900	140 22000	620	0.4	5850	39 6600	26	-0.2	29.5	7600	3.1	135				
5592271	-40#SL	0.35	2 -0.001			0.3 62700	-0.1	50	200	91	110000 20400	185 37900	1100	0.4	4400	74 10700	17	-0.2	17.5	8000	2.1	130				
5592272	-40#SL	0.4	4 -0.001			0.7 73200	-0.1	51	190	105	106000 19800	220 38300	1100	0.6	5700	75 11600	26	-0.2	27.5	11300	3.6	160				
5592273	-40#SL	0.25	3 -0.001			0.4 39800	-0.1	33.5	140	45.5	77200 20600	135 21300	720	0.6	7550	46 6350	17	-0.2	18.5	9200	2.1	110				
5592274	-40#SL	0.35	4 -0.001			0.4 75600	-0.1	57	170	105	121000 19100	185 35800	1100	0.7	4300	66 11100	23	-0.2	21	9400	2.1	185				
5592275	-40#SL	0.25	3 -0.001			0.3 71300	-0.1	48.5	155	81	113000 18400	185 36300	1100	0.2	4250	67 7100	21.5	-0.2	19	3900	2.3	140				
5592276	-40#SL	0.35	3 -0.001			0.3 61100	-0.1	46	170	69	117000 24400	140 37000	1050	-0.2	4600	64 10900	15.5	-0.2	20	9750	1.8	145				
5592277	-40#SL	0.3	3 -0.001			0.3 16100	-0.1	18	150	29.5	51000 30000	85 13100	490	0.5	6750	29 2500	21.5	-0.2	26.5	5250	2.1	78				
5592278	-40#SL	0.35	4 -0.001			0.4 47800	-0.1	41.5	165	77	92400 23200	145 32000	900	0.4	4800	54 8600	23.5	-0.2	40	6850	3.7	130				
5592279	-40#SL	0.4	1 -0.001			0.2 33300	-0.1	38.5	145	70	92300 17000	170 25300	840	0.7	5300	48 6900	16.5	-0.2	23	7350	1.9	135				
5592280	-40#SL	0.4	3 -0.001			0.2 47000	0.1	44	125	63	112000 16300	210 31600	980	0.3	5200	45 9250	24.5	-0.2	28.5	6850	2.6	175				
5592281	-40#SL	0.3	3 -0.001			0.2 47900	-0.1	38	220	57	96700 18800	150 32500	900	-0.2	4850	63 8350	20	-0.2	21	6700	2	135				
5592282	-40#SL	0.4	4 -0.001			0.3 48500	-0.1	41	210	75	88000 23000	240 35200	900	0.7	5000	74 8100	23.5	-0.2	20.5	7250	2	140				
5592283	-40#SL	0.3	2 -0.001			0.3 57600	-0.1	43	240	68	90400 18800	190 37700	940	0.6	4900	84 8800	21.5	-0.2	22.5	5600	2.6	140				
5592284	-40#SL	0.25	2 -0.001			0.3 62700	-0.1	53	280	64	98200 22600	145 42800	1000	-0.2	4450	100 8300	25	-0.2	20	5600	2.2	120				
5592285	-40#SL	0.35	2 -0.001			0.5 58400	-0.1	48	180	77	99400 21300	165 36000	940	0.4	4500	72 6900	20.5	-0.2	23	4750	2.1	125				
5592286	-40#SL	0.25	2 -0.001			0.5 3600	-0.1	5.5	120	19	22700 32300	67 2950	200	1	8750	12 340	34	-0.2	84	2300	7	45.5				
5592287	-40#SL	0.3	4 -0.001			0.6 5650	-0.1	8	195	28	26700 25900	68 4900	230	1.2	7950	16 1000	52	0.3	54	2750	6	67				
5592288	-40#SL	0.3	3 -0.001			0.7 21800	-0.1	20.5	180	44	53200 19000	115 16600	540	0.7	6950	40 4100	33.5	-0.2	36	5600	3.1	120				
5592289	-40#SL	0.3	2 -0.001			0.5 24000	-0.1	24.5	120	42	68800 26800	155 19700	680	0.6	6600	44 4150	28	0.2	20.5	6700	2.1	145				
5592290	-40#SL	0.4	3 -0.001			0.4 33700	-0.1	29	140	54	73200 19100	190 24800	840	0.5	7050	45 5350	30	-0.2	20.5	8050	2.3	180				
5592291	-40#SL	0.35	2 -0.001			0.4 32900	-0.1	26	145	41.5	71400 24400	130 24600	780	-0.2	6450	61 4450	24	-0.2	17.5	7550	2.2	160				
5592292	-40#SL	0.45	5 -0.001			0.4 45100	0.1	67	190	120	108000 18300	290 32700	980	0.3	4750	66 6600	29	-0.2	27	5800	2.5	180				
5592293	-40#SL	0.65	8 -0.001			0.1 33300	-0.1	27.5	155	52	90400 14400	115 21200	800	-0.2	5050	44 6350	14.5	-0.2	13	8500	1.2	145				
5592294	-40#SL	0.85	6 -0.001			0.9 26400	-0.1	25.5	190	74	76600 17100	98 25300	840	0.4	6650	81 4350	27	-0.2	18.5	6800	2.2	200				
5592295	-40#SL	0.8	13 -0.001			0.4 29600	0.2	31	130	66	64400 25400	145 24900	660	0.7	5050	55 5250	20	0.2	16	6200	1.45	170				
5592296	-40#SL	0.6	9 -0.001			0.2 38700	-0.1	33	140	51	80200 23800	94 30200	760	-0.2	4200	45 5950	14	0.2	14.5	6650	1.5	150				
5592297	-40#SL	0.5	3 -0.001			0.1 34000	-0.1	23	150	56	96700 16700	86 24400	940	-0.2	4700	47 6000	16.5	-0.2	8.5	7350	1	135				
5592298	-40#SL	0.85	10 -0.001			0.3 32200	-0.1	31	180	56	127000 21900	150 22700	920	0.3	5000	48 5700	20.5	0.2	16.5	7450	1.1	155				

SAMPLE	FRACTION	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Th	Ti	U	Zn
5592299	-40#SL	0.9	7	-0.001		0.2	34100	-0.1	22	120	46.5	65800	18000	72	22400	680	0.3	4750	40	2600	16.5	0.2	11.5	5800	0.95	120
5592300	-40#SL	0.8	13	-0.001		0.3	33900	0.2	41	115	70	76900	16500	87	24700	780	0.5	4800	50	2200	14	0.2	14	6550	0.92	165
5592612	-40#SL	0.9	16	-0.001		0.2	31900	0.2	41.5	145	73	96800	14200	170	23700	900	0.5	5150	45	5850	34.5	0.2	28.5	7100	2	200
5592613	-40#SL	0.85	10	-0.001		0.2	61300	0.2	28.5	170	70	86400	16000	97	38700	860	-0.2	3850	45	4950	18.5	0.2	14.5	5650	1.65	180
5592614	-40#SL	0.95	6	-0.001		0.1	37000	0.2	43	220	63	129000	18800	170	28000	1000	0.4	5050	56	6450	11	-0.2	15.5	8250	1.05	175
5592615	-40#SL	1.1	12	-0.001		0.3	50100	0.2	47.5	150	91	106000	15200	170	29900	980	0.3	4600	43	8200	21.5	0.2	21	8100	1.65	230
5592616	-40#SL	0.9	11	-0.001		0.3	56700	0.2	46	140	72	109000	23800	195	33800	1050	0.3	5350	43	9100	11	-0.2	15.5	9100	0.92	185
5592617	-40#SL	1	6	-0.001		0.2	53400	0.1	45	430	105	119000	16900	175	41400	1050	-0.2	4450	92	7900	16.5	-0.2	13	5600	1.25	210
5592618	-40#SL	1.2	11	-0.001		0.2	50300	-0.1	59	180	135	134000	17200	250	33000	1100	0.4	4700	55	11800	24.5	-0.2	21.5	9900	1.6	310

APPENDIX V

EL 9371 MORDOR POUND

Diamond Drill Hole Ledgers and Assay Results

CRA EXPLORATION PTY LIMITED: DIAMOND DRILL LEDGER

HOLE:	DD96MD001	EAST:	447564	TOTAL DEPTH:	122.6
TEST NUMBER:	9371	NORTH:	7405432	DPO NUMBER:	81937/39
PROSPECT:	BRAVEHEART	COMMENCED:	6/12/96	AZIMUTH:	145
GEOLOGIST:	DJL/DLW	COMPLETED:	6/18/96	INCLINATION:	-60

DEPTH FROM	DEPTH TO	LITHOLOGY CODE	GEOLOGY
0.00	47.00	SNKEQ	Medium-grained, equigranular, grey-green/black-brown(phlogopite+pyroxene) shonkinite. No obvious foliation except locally(shears); cut by thin pegmatite veins-dykes in places; disseminated sulphides common thin carbonate veinlets in places. 0.0-4.5: Clayey shonkinite; weathered, typical near-surface lithology; narrow bands of competent shonkinite but mostly clay alteration. 5.8-6.15: K-spar dominant granitic pegmatite. Lower contact: 30deg to CA. 11.41-11.51: Granitic pegmatite; K-psar-rich; pink-red to grey-white; 75deg to CA. 12.30-13.00: Fine-grained, schistose more mafic shonkinite, locally strong foliation. 14.00-15.20: Granitic pegmatite; K-psar-rich; pink to grey-white; flakes of phlogopite are common inclusions. 16.70-16.95: Zone of disseminated pyrrhotite in shonkinite. 22.10-22.30: Zone of disseminated and bleb-form pyrrhotite in shonkinite. 23.65-27.50: High sulphide content zone in shonkinite. Mostly pyrrhotite and lesser chalcopyrite. minor pyrite. 5-10% total sulphides. Epidote alteration is common. 24.10-24.40: Ksp/Qtz Pegmatite, disseminated magnetite and pyrrhotite at upper contact; minor magnetite at lower contact. Upper contact: 55deg to LCA. 27.92-28.02: Ksp/Qtz pegmatite. 65deg to LCA. 29.20-29.80: ~5% disseminated POH and CCP. 29.65-29.75: ~10% interstitial epidote. 29.90-33.40: Pale green to pink silicified zone (altered shonkinite?). 33.40-34.75: Ksp. dom. Pegmatite. Chalcopyrite grains are common, especially in shears. 34.75-41.75: Sulphide zone in shonkinite (1-5%POH and trace-1%CCP as interstitial blebs and disseminations). 38.75-39.30: Zone of equigranular shonkinite containing abundant fine-grained mafic xenoliths. 40.82-40.92: Qtz/Ksp pegmatite vein. 41.60-42.10: Zone of porphyritic shonkinite within equigranular shonkinite. 42.83-43.13: Zoned pegmatite: coarse-grained core, finer-grained margin bands. 60deg to LCA. 43.63-43.85: Sulphide zone (~10% interstitial blebs of POH and much lesser CCP). 44.55-47.20: Sulphide zone (~5% interstitial blebs of POH and lesser CCP). 46.20-46.53: Large, foliated, fine-grained mafic Xenolith in shonkinite.

DEPTH FROM	DEPTH TO	LITHOLOGY CODE	GEOLOGY
47.00	64.70	SNKPOP	Porphyritic Shonkinite. Contains 5-15mm subhedral, white K-spar phenocrysts in a dark (greenish-black), phlogopite-rich groundmass. Disseminated sulphides (POH and CCP) are common but generally less than in the equigranular shonkinite above. 47.75-47.98: Pink and white feldspar dominant pegmatite. 80-90deg to LCA. 48.12-48.41: Pink and white feldspar dominant. Green mineral (sericite?) common. Contains some POH and CCP in shears. 80-90deg to LCA. 48.41-50.75: Chalcopyrite-rich zone (~5% as interstitial blebs / disseminations) and slightly less pyrrhotite within porphyritic shonkinite. 50.75-52.08: Zone of equigranular shonkinite (does contain occasional white phenocrysts). 50.75-52.18: 1.4m of finely disseminated POH+CCP (3-5% total). 52.08-52.62: White K-feldspar dominant pegmatite. 15-20deg to LCA. 52.18-64.70: Zone of low grade mineralised porphyritic shonkinite (1-2% disseminated and bleb-form POH and CCP). 52.70-52.85: Pink K-feldspar dominant pegmatite. ~80deg to LCA. 54.01-54.87: White K-feldspar dominant pegmatite. contains occasional magnetite crystals. 58.03-58.35: Zone of poikilitic shonkinite. Trace POH common. 58.35-59.50: Zone of equigranular shonkinite. 58.80-58.92: K-spr dominant pegmatite. 45deg to LCA. Contains trace amounts of POH in matrix and trace CCP noted in K-spr crystals (remobilised from surrounding shonkinite?).
64.70	65.65	PEG	Kfs/Qtz pink/grey pegmatite. Trace POH and MGT.
65.65	73.30	SNKPOK	Poikilitic shonkinite. Dark green-brown/black groundmass. Grey-white feldspar with crystals with numerous phlogopite and pyroxene inclusions. Thin carbonate veins common. Trace pyrrhotite common. Moderately calcareous.
73.30	79.30	SNKPOP	Porphyritic shonkinite. Roughly equal amounts of pyroxene to phlogopite in groundmass surrounding large (up to 35mm long) subhedral to euhedral grey-white K-spar phenocrysts. K-spar commonly displays subtle pink-brown alteration (probably Fe alteration). Cross-cut by 5 narrow pegmatite veins (max width of 23cm).
79.30	99.00	SNKEQ	Equigranular shonkinite. Weakly poikilitic in places. Thin pegmatite veins are common. Thin carbonate veinlets are also common. Contains zones of trace POH.
99.00	102.50	SNK	Banded shonkinite (shear zone?). Bands of Dark green and speckled grey-white fine-grained shonkinite. Very broken/fractured core. Moderately calcareous. Limonite common along fractures. Epidote alteration in places.
102.50	115.92	SNK	Mixed shonkinite. Mainly coarse-grained equigranular variety but also some mottled/speckled (poikilitic) variety. 102.50-106.10: Mottled shonkinite where K-spar > pyroxene+phlogopite. Pegmatite veinlets are common. Trace POH(+/-PYT) common, trace CCP rare. 106.10-107.09: K-spr dominant pegmatite dyke. Common xenoliths/inclusions of SNK/PHG common. Pink-brown/grey-green coloured. 107.09-115.92: Dark, mafic shonkinite where pyroxene+phlogopite>K-spar. Coarse-grained and has a coarse mottled texture. Contains trace amounts of POH and CCP. 113.30-113.60: Broken core due to badly worn bit (bit changed). 113.46-114.45: Granitic augen gneiss "raft" within shonkinite. 114.45-115.92: Strongly foliated shonkinite near the basement gneiss contact (trace pyrrhotite common).
115.92	122.60	GNSAN	Basement granitic augen gneiss. Strongly foliated gneiss with a well-developed coarse-grained (~1-2x2-4cm) augen texture. Abundant interstitial biotite. Strongly magnetic (up to 6000 SI x 10 ⁻⁵ over 1m. Pegmatized in places (118.35-119.75 and 120.95-121.45m). Pegmatitic zones record lower mag. sus. readings. Foliation ranges from 65-80deg. to LCA.

END OF HOLE: 122.60m.

CRA EXPLORATION PTY LIMITED : DRILL HOLE LEDGER

<u>DRILL HOLE</u> DD96MD001		<u>GEOLOGIST</u> DJL/DLW	<u>RL COLLAR</u> 715	<u>COMMENCED</u> 12/06/96						
<u>TENEMENT</u> MORDOR POUND		<u>AMG E</u> 447564	<u>AZIMUTH</u> 145	<u>COMPLETED</u> 18/06/96						
<u>PROSPECT</u> BRAVEHEART		<u>AMG N</u> 7405432	<u>INCLINATION</u> -60	<u>CASING LEFT</u>						
<u>LAB</u>		<u>ZONE</u> 53	<u>DRILLING CO.</u> GOREY&COLE	<u>TOTAL DEPTH</u> 122.6 (Metres)						
<u>DPO</u>	81937/39	<u>250K MAP No.</u> SF5314	<u>DRILL TYPE</u> VK 600B	<u>TECTONIC DOMAIN</u> Arunta Orogen						
		<u>ALICE SPRINGS</u>								
DEPTH	SAMPLE	LOCAL LITHOLOGY	LITHOLOGICAL	COLOUR	TEXTURE	ALTERATN	MINERALN	CPS	MAG_SUS	COMMENTS
FROM	TO	STRAT	DESCRIPTOR						SI UNITS	
0.00	1.00	PM2	SNK	GW/VN	MG/EQ			120	100	Clayey in parts
1.00	2.00	PM2	SNK	GW/VN	MG/EQ			120	600	Clayey in parts
2.00	3.00	PM2	SNK	GW/VN	MG/EQ			120	700	Clayey in parts
3.00	4.00	PM2	SNK	GW/VN	MG/EQ			120	10	Clayey in parts
4.00	5.00	PM2	SNK	GW/VN	MG/EQ			120	100	
5.00	6.00	PM2	SNK	GW/VN	MG/EQ			120	800	
6.00	7.00	PM2	SNK	GW/VN	MG/EQ			120	600	
7.00	8.00	PM2	SNK	GW/VN	MG/EQ			120	300	
8.00	9.00	PM2	SNK	GW/VN	MG/EQ			120	400	
9.00	10.00	PM2	SNK	GW/VN	MG/EQ			120	150	
10.00	11.00	PM2	SNK	GW/VN	MG/EQ			120	150	
11.00	12.00	PM2	SNK	GW/VN	MG/EQ			120	150	
12.00	13.00	PM2	SNK	GW/VN	MG/EQ			120	100	
13.00	14.00	PM2	SNK	GW/VN	MG/EQ			120	80	
14.00	15.21	PM2	PEG	KR/GW	CG			160	40	
15.21	16.00	PM2	SNK	VN/GW	MG/EQ			130	200	
16.00	17.00	PM2	SNK	VN/GW	MG/EQ		POH	130	800	
17.00	18.00	PM2	SNK	VN/GW	MG/EQ			130	300	
18.00	19.00	PM2	SNK	VN/GW	MG/EQ			130	250	
19.00	20.00	PM2	SNK	VN/GW	MG/EQ			130	400	
20.00	21.00	PM2	SNK	VN/GW	MG/EQ			130	2000	
21.00	22.00	PM2	SNK	VN/GW	MG/EQ			120	500	
22.00	23.00	PM2	SNK	VN/GW	MG/EQ		POH	120	600	
23.00	23.62	PM2	SNK	VN/GW	MG/EQ		POH	120	2000	
23.62	24.00	PM2	SNK	VN/GW	MG/EQ			120	2000	
24.00	25.00	PM2	SNK	VN/GW	MG/EQ			120	4000	
25.00	26.00	PM2	SNK	VN/GW	MG/EQ			120	1500	
26.00	27.00	PM2	SNK	VN/GW	MG/EQ			120	6000	

DEPTH FROM TO	SAMPLE No	REG STRAT	LOCAL LITHOLOGY STRAT	LITHOLOGICAL DESCRIPTOR	COLOUR	TEXTURE	ALTERATN	MINERALN	CPS	MAG SUS SI UNITS	COMMENTS
27.00 28.00	5592705	PM2	SNK		VN/GW	MG/EQ			130	2000	
28.00 29.00	5592706	PM2	SNK		VN/GW	MG/EQ			130	100	
29.00 30.00	5592707	PM2	SNK		VN/GW	MG/EQ			130	300	
30.00 31.00	5592708	PM2	SNK		LV/K		SI		130	10	Possible strongly silicified SNK
31.00 32.00	5592709	PM2	SNK		LK		SI		130	10	Possible strongly silicified SNK
32.00 33.00	5592710	PM2	SNK		LK		SI		120	10	Possible strongly silicified SNK
33.00 34.00	5592711	PM2	PEG/SNK	KFS/QTZ	K/GW	CG		CCP	120	15	
34.00 34.85	5592712	PM2	PEG	KFS/QTZ	K/GW	CG			120	1000	
34.85 36.00	5592713	PM2	SNK		VN/GW	MG/EQ		POH/CCP	120	2500	
36.00 37.00	5592714	PM2	SNK		VN/GW	MG/EQ		POH/CCP	120	600	
37.00 38.00	5592715	PM2	SNK		VN/GW	MG/EQ		POH/CCP	120	1000	
38.00 39.00	5592716	PM2	SNK		VN/GW	MG/EQ		POH/CCP	120	4000	
39.00 40.00	5592717	PM2	SNK		VN/GW	MG/EQ		POH/CCP	110	10000	
40.00 41.00	5592718	PM2	SNK		VN/GW	MG/EQ		POH/CCP	110	17500	
41.00 42.00	5592719	PM2	SNK		VN/GW	MG/EQ		POH/CCP	110	5000	
42.00 43.00	5592720	PM2	SNK		VN/GW	MG/EQ			110	100	
43.00 44.00	5592721	PM2	SNK		VN/GW	MG/EQ		POH/CCP	110	2000	
44.00 45.00	5592722	PM2	SNK		VN/GW	MG/EQ		POH/CCP	110	3000	
45.00 46.00	5592723	PM2	SNK		VN/GW	MG/EQ		POH/CCP	120	6000	
46.00 47.00	5592724	PM2	SNK		VN/GW	MG/EQ		POH/CCP	120	2500	
47.00 47.75	5592325	PM2	SNK		VN/GW	POP		POH/CCP	140	6000	
47.75 48.40	5592326	PM2	PEG	KFS/QTZ	K/GW	CG			140	6000	
48.40 49.15	5592327	PM2	SNK		VN/GW	POP		CCP/POH	130	4000	
49.15 50.00	5592328	PM2	SNK		VN/GW	POP		CCP/POH	130	3000	
50.00 51.00	5592329	PM2	SNK		VN/GW	POP		POH/CCP	140	2500	
51.00 52.00	5592330	PM2	SNK		VN/GW	POP		POH/CCP	140	300	
52.00 53.00	5592331	PM2	PEG		W/K/GW	CG			175	200	
53.00 54.00	5592332	PM2	SNK		KVN	POP	SE	POH/CCP	175	6000	
54.00 55.00	5592333	PM2	PEG		W/P/GW	CG-MG	HM/PC		200	4000	
55.00 56.00	5592334	PM2	SNK		KVN	POP	HM/PC		160	3000	
56.00 57.00	5592335	PM2	SNK		KVN	POP	HM/PC		140	3000	
57.00 58.00	5592336	PM2	SNK		KVN	POP	HM/PC		140	5000	
58.00 59.00	5592337	PM2	SNK		VB-N	MG/EQ			140	1500	
59.00 60.00	5592338	PM2	SNK		KVN	POP	HM/PC		140	1000	
60.00 61.00	5592339	PM2	SNK		KVN	POP	HM/PC		120	3000	

DEPTH FROM TO	SAMPLE No	REG STRAT	LOCAL LITHOLOGY STRAT	LITHOLOGICAL DESCRIPTOR	COLOUR	TEXTURE	ALTERATN	MINERALN	CPS	MAG_SUS SI UNITS	COMMENTS
61.00	5592340	PM2		SNK	KVN	POP	HM/PC		120	3000	
62.00	5592341	PM2		SNK	KVN	POP	HM/PC		120	4000	
63.00	5592342	PM2		SNK	KVN	POP	HM/PC		120	4000	
64.00	5592343	PM2		SNK	KVN	POP	HM/PC		120	2000	
64.70	5592344	PM2		PEG	KO/GW	CG			120	100	
65.65	5592345	PM2		SNK	DVB/GW	PK			120	100	
66.30	5592346	PM2		SNK	DVB/GW	PK			110	1000	
67.00	5592347	PM2		SNK	DVB/GW	PK			130	1500	
68.00	5592348	PM2		SNK	DVB/GW	PK			140	1500	
69.00	5592349	PM2		SNK	DVB/GW	PK			140	1500	
70.00	5592350	PM2		SNK	DVB/GW	PK			140	1500	
71.00	5592351	PM2		SNK	DVB/GW	PK			140	6000	
72.00	5592352	PM2		SNK	DVB/GW	PK			140	4000	
73.00	5592353	PM2		SNK	VN/GW	POP			140	3000	
74.00	5592354	PM2		SNK	VN/GW	POP			140	2000	
75.00	5592355	PM2		SNK	VN/GW	POP			140	1500	
76.00	5592356	PM2		SNK	VN/GW	POP			140	5000	
77.00	5592357	PM2		SNK	VN/GW	POP			140	6000	
78.00	5592358	PM2		SNK	VN/GW	POP			140	7500	
79.00	5592359	PM2		SNK	GV/GW	MG/EQ			140	6000	
80.00	5592360	PM2		SNK	GV/GW	MG/EQ			140	5000	
81.00	5592361	PM2		SNK	GV/GW	MG/EQ			140	7500	
82.00	5592362	PM2		SNK	GV/GW	MG/EQ			140	4000	
83.00	5592363	PM2		SNK	GV/GW	MG/EQ			140	1000	
84.00	5592364	PM2		SNK	GV/GW	MG/EQ			140	500	
85.00	5592365	PM2		SNK	GV/GW	MG/EQ			140	250	
86.00	5592366	PM2		SNK	GV/GW	MG/EQ			140	300	
87.00	5592367	PM2		SNK	GV/GW	MG/EQ			140	400	
88.00	5592368	PM2		SNK	GV/GW	MG/EQ			140	400	
89.00	5592369	PM2		SNK	GV/GW	MG/EQ			140	300	
90.00	5592370	PM2		SNK	GV/GW	MG/EQ			140	200	
91.00	5592371	PM2		SNK	GV/GW	MG/EQ			140	300	
92.00	5592372	PM2		SNK	GV/GW	MG/EQ			130	500	
93.00	5592373	PM2		SNK	GV/GW	MG/EQ			130	1500	
94.00	5592374	PM2		SNK	GV/GW	MG/EQ			130	1500	
95.00	5592375	PM2		SNK	GV/GW	MG/EQ			130	2000	
96.00	5592376	PM2		SNK	GV/GW	MG/EQ			130	1000	

DEPTH FROM TO	SAMPLE No	REG STRAT	LOCAL LITHOLOGY STRAT	LITHOLOGICAL DESCRIPTOR	COLOUR	TEXTURE	ALTERATN	MINERALN	CPS	MAG_SUS SI UNITS	COMMENTS
97.00 98.00	5592377	PM2	SNK		GV/GW	MG/EQ			130	250	
98.00 99.00	5592378	PM2	SNK		GV/GW	MG/EQ			130	250	
99.00 100.00	5592379	PM2	SNK		DVB/GW	SH			120	300	Possible shonkinitite shear zone
100.00 101.00	5592380	PM2	SNK		DVB/GW	SH			120	300	Possible shonkinitite shear zone
101.00 102.00	5592381	PM2	SNK		DVB/GW	SH			120	500	Possible shonkinitite shear zone
102.00 103.00	5592382	PM2	SNK		DVB/GW	SH			120	100	Possible shonkinitite shear zone
103.00 104.00	5592383	PM2	SNK		VN/GW	EQ-PK			120	150	
104.00 105.00	5592384	PM2	SNK		VN/GW	EQ-PK			120	400	
105.00 106.00	5592385	PM2	SNK		VN/GW	EQ-PK			120	100	
106.00 107.07	5592386	PM2	PEG		KB/LGV	CG			120	300	
107.07 108.00	5592387	PM2	SNK		VN	EQ-PK			120	150	
108.00 109.00	5592388	PM2	SNK		VN	EQ-PK			120	500	
109.00 110.00	5592389	PM2	SNK		VN	EQ-PK			120	500	
110.00 111.00	5592390	PM2	SNK		VN	EQ-PK			120	400	
111.00 112.00	5592391	PM2	SNK		VN	EQ-PK			120	300	
112.00 113.00	5592392	PM2	SNK		VN	EQ-PK			120	500	
113.00 114.00	5592393	PM2	GNS	KFS/QTZ	K/GW	AN/FO			120	1000	
114.00 115.00	5592394	PM2	SNK		VN/GW	FO/EQ			120	1500	
115.00 115.86	5592395	PM2	SNK		VN/GW	FO/EQ			120	200	
115.86 117.00	5592396	PM2	GNS	KFS/QTZ	K/GW	AN/FO			140	4000	
117.00 118.00	5592397	PM2	GNS	KFS/QTZ	K/GW	AN/FO			140	6000	
118.00 119.00	5592398	PM2	GNS	KFS/QTZ	K/GW	AN/FO			150	2500	
119.00 120.00	5592399	PM2	GNS	KFS/QTZ	K/GW	AN/FO			160	3000	
120.00 121.00	5592400	PM2	GNS	KFS/QTZ	K/GW	AN/FO			140	4000	
121.00 122.00	5592401	PM2	GNS	KFS/QTZ	K/GW	AN/FO			150	2000	
122.00 122.60	5592402	PM2	GNS	KFS/QTZ	K/GW	AN/FO			150	5000	

CRA EXPLORATION PTY LIMITED:
DIAMOND LOG - STRUCTURE

HOLE : DD96MD001

Depth of core blocks (m)	Recovery	Size	Depth of structure (m) FromTo	Structure	CBA	Fractures / m	Orientation
0.00		HQ				2-3	
2.70	2.00	HQ				2-3	
3.90	1.35	HQ				2-3	
5.80	1.75	HQ	5	6	30	2-3	
8.80	3.00	HQ				2-3	
11.80	3.00	HQ	8	9	30	2-3	
14.75	2.77	HQ	12	13	60	2-3	
17.75	2.94	HQ	15	16	25	2-3	
20.75	3.00	HQ				2-3	
23.75	2.96	HQ	21	23	45/75	2-3	
26.75	3.02	HQ	23	24	65	2-3	
29.75	3.04	HQ	28	29	80	2-3	
32.75	2.92	HQ				2-3	
35.75	2.98	HQ	33.0	33.2	15	2-3	
38.75	3.02	HQ	34	35	S/S/S	2-3	
41.75	3.00	HQ	36.75	36.76	40	2-3	
44.75	2.92	HQ				2-3	
47.75	3.00	HQ				2-5	
50.75	2.94	HQ				4-5	
53.75	3.06	HQ				4-5	
56.75	3.00	HQ				2-5	
59.75	2.98	HQ	60	61	50	2-5	
62.75	3.05	HQ				5-6	
64.70	1.91	HQ	62.85	62.85	35	5-6	
67.70	3.08	HQ	63.25	63.25	32	3-7	
68.75	1.05	HQ	68.0	68.0	25	3-4	

Depth of core blocks (m)	Recovery	Size	Depth of structure (m)		Structure	CBA	Fractures / m	Orientation
			From	To				
71.75	3.02	HQ	68.2,68.3	68.2,68.3	J/J	27/35	3-4	
74.75	3.02	HQ					3-4	
77.75	3.00	HQ					3-4	
80.75	2.91	HQ					3-4	
83.75	3.00	HQ	82	83	J	90	8-9	
86.75	3.02	HQ	83	85	V/V	75/80	4-5	
89.75	3.00	HQ	88	89	V	45	2-3	
92.75	3.01	HQ					8-10	
95.75	3.06	HQ	93	94	V	10	4-10	
98.75	3.00	HQ					4-6	
101.75	2.94	HQ	98	99	V	55	10-12	
104.75	2.93	HQ	99	100	J/J	60/40	3-12	
107.75	3.00	HQ	105	106	V	10	3-8	
110.75	3.00	HQ	108	109	J	45	4-6	
113.60	2.90	HQ					4-5	
116.60	2.98	HQ	115	116	J	60	4-5	
119.60	2.96	HQ					4-5	
122.60	3.05	HQ					2-3	

CRA EXPLORATION PTY LIMITED : DRILLHOLE ASSAY RESULTS

DRILL HOLE	DD96MD001	GEOLOGIST	DJL/DLW	RL COLLAR	715	COMMENCED	12/06/96
TENEMENT	MORDOR POUND	AMGE	447564	AZIMUTH	145	COMPLETED	18/06/96
PROSPECT	BRAVEHEART	AMGN	7405432	INCLINATION	-60	CASING LEFT	
LAB		ZONE	53	DRILLING CO.	GOREY&COLE	TOTAL DEPTH	122. (metres)
DPO	81939	MAP REF.	SF5314	DRILL TYPE	VK 600B	TECTONIC DOMAIN	Arunta Orogen

FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
0.00	1.00	5592301	0.1	1	-0.01	1750	-0.2182000	-0.1	-0.1	11	15	39	13900	11400	102000	145	-0.2	1500	17	1700	5.5	0.006	-0.005	-2	3.9	50	35
1.00	2.00	5592302	0.3	1	-0.01	2500	-0.2174000	-0.1	-0.1	19	33	50	27000	14000	104000	240	-0.2	1500	28	3000	6	0.004	-0.005	-2	5.5	120	25
2.00	3.00	5592303	0.2	0.5	-0.01	4750	-0.2175000	-0.1	-0.1	25	92	87	49100	19900	81800	450	0.2	2250	49	5350	8.5	0.003	-0.005	3	5.5	220	45
3.00	4.00	5592304	0.2	1.5	-0.01	1600	-0.2187000	-0.1	-0.1	15	16	43	15500	12600	94100	185	-0.2	1400	17	3050	4.2	0.006	-0.005	-2	6.5	62	20
4.00	5.00	5592305	0.3	1	-0.01	9400	-0.2107000	-0.1	-0.1	39	310	100	75600	26500	75100	820	0.7	3700	60	10600	23	0.002	-0.005	7	2	270	65
5.00	6.00	5592306	0.2	1	-0.01	8950	-0.2106000	0.1	0.1	37	76	81	72900	48500	50200	820	0.6	7450	57	9900	23	-0.001	-0.005	8	1.35	250	70
6.00	7.00	5592307	0.2	0.5	-0.01	8950	-0.2189600	0.1	0.1	38	84	81	72700	43200	51300	840	0.5	8800	55	8900	27.5	0.002	-0.005	9	1.9	250	65
7.00	8.00	5592308	0.2	0.5	-0.01	11300	-0.2108000	0.1	0.1	45	79	115	85800	25200	63000	940	0.6	4850	69	12500	22.5	0.002	-0.005	8	0.94	310	70
8.00	9.00	5592309	0.2	0.5	-0.01	11400	-0.2195600	0.1	0.1	44	88	100	90200	57100	65100	1000	0.7	5100	69	12600	22.5	-0.001	-0.005	8	0.85	340	80
9.00	10.00	5592310	0.2	0.5	-0.01	11100	-0.2190100	0.1	0.1	45	87	81	90800	44700	62000	1000	0.8	4650	83	13400	20	0.001	-0.005	9	0.99	320	85
10.00	11.00	5592311	0.2	0.5	-0.01	11400	-0.2192900	0.2	0.2	46	105	130	93300	36100	67000	1000	0.7	4850	70	12800	16	-0.001	-0.005	8	0.8	350	85
11.00	12.00	5592312	0.2	1	-0.01	10100	-0.2185100	0.1	0.1	48	110	150	88800	35700	60100	980	0.7	5700	86	11600	18.5	0.002	-0.005	10	1.05	320	80
12.00	13.00	5592313	0.2	1	-0.01	4850	0.4171800	0.2	0.2	54	72	180	107000	51500	56500	1450	0.5	10600	115	3900	17.5	0.016	0.035	3	0.68	270	135
13.00	14.00	5592314	0.2	1	-0.01	8200	0.7193800	0.2	0.2	48	86	135	94300	30000	63000	1250	0.9	5900	67	11400	12	-0.001	-0.005	10	1.9	340	110
14.00	15.21	5592315	0.2	1	-0.01	1600	-0.2192000	-0.1	-0.1	6	21	48	10600	42800	4450	150	0.4	33200	12	1050	58	-0.001	-0.005	79	10	23	20
15.21	16.00	5592316	0.3	1	-0.01	8700	1188400	0.2	0.2	57	94	175	101000	38800	64700	1150	0.7	4250	78	12300	22.5	0.009	0.02	9	1.4	360	110
16.00	17.00	5592317	0.2	1	-0.01	10100	-0.2109000	0.2	0.2	78	120	230	127000	59300	76900	1250	0.9	4450	110	15500	14.5	0.002	-0.005	11	1.05	470	100
17.00	18.00	5592318	0.4	2	-0.01	9350	0.5103000	0.3	0.3	62	99	210	112000	50900	73400	1300	1.2	6250	105	13800	18	0.003	0.005	11	3.5	390	110
18.00	19.00	5592319	0.2	1	-0.01	10900	-0.2189300	0.2	0.2	53	98	115	96400	60800	65700	1050	0.8	4600	72	12400	17.5	0.001	-0.005	10	1.1	350	90
19.00	20.00	5592320	0.2	1	-0.01	11000	-0.2183200	0.1	0.1	49	86	74	92200	39500	60900	1000	0.8	4950	62	12300	23.5	0.001	-0.005	9	1.7	330	85
20.00	21.00	5592321	0.2	1	-0.01	11000	0.6188000	0.1	0.1	53	73	145	100000	56200	61200	1000	0.9	4750	67	10300	28.5	0.001	-0.005	10	0.97	370	90
21.00	22.00	5592322	0.3	0.5	-0.01	11000	0.6186600	0.2	0.2	49	98	130	97700	47200	63600	1100	0.9	4800	70	12500	43	0.002	-0.005	10	1.35	350	100
22.00	23.00	5592323	1.2	1	0.08	10300	4.1179900	0.3	0.3	45	77	740	93600	67000	56500	1050	1	7450	68	11100	140	0.001	-0.005	9	1.15	320	95
23.00	23.62	5592324	0.2	0.5	-0.01	11000	0.6194600	0.2	0.2	56	105	175	101000	55600	68700	1150	0.9	5100	97	11400	37	0.003	-0.005	9	1.45	350	100

FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
23.62	24.00	5592701	0.5	1.5	0.02	9750	1.2	83200	0.3	200	125	4400	115000	28600	59700	1050	1.4	3750	800	11600	31.5	0.06	0.1	10	0.98	320	90
24.00	25.00	5592702	2	1.5	0.1	6850	2.9	47900	0.7	270	120	13900	139000	26300	34700	960	1.1	7500	2750	6200	44	0.21	0.2	6	2.4	210	135
25.00	26.00	5592703	0.4	-0.5	0.02	10000	1.8	76000	0.4	170	210	2150	128000	28000	57000	1250	1.1	4050	1400	10800	39	0.06	0.1	11	1.5	320	120
26.00	27.00	5592704	0.2	1	0.02	10300	1.1	91500	0.3	130	160	2500	124000	24400	58800	1350	0.9	4100	680	10400	55	0.035	0.1	9	0.86	430	140
27.00	28.00	5592705	0.4	2.5	0.02	5500	1.4	83900	0.3	115	310	2950	112000	22800	55600	1300	0.9	6400	1250	7800	51	0.1	0.1	12	3.1	300	100
28.00	29.00	5592706	-0.1	1	-0.01	6150	0.7	92100	0.3	51	520	165	84900	23900	66700	1450	1	6000	140	6900	110	0.002	-0.005	36	2.4	280	120
29.00	30.00	5592707	0.3	2	0.05	6650	2.2	89100	0.5	66	360	1200	93500	22300	61100	1500	1	6050	250	6600	125	0.001	-0.005	24	3.1	270	155
30.00	31.00	5592708	-0.1	5	-0.01	740	0.6	105000	0.4	14	29	13	19000	11400	5950	960	0.5	20400	15	410	26.5	0.014	-0.005	6	0.78	25	70
31.00	32.00	5592709	-0.1	3	-0.01	120	0.6	122000	0.5	12	32	-2	19800	3350	5350	1150	0.4	19600	5	390	9.5	0.002	-0.005	7	0.91	30	70
32.00	33.00	5592710	-0.1	4	-0.01	420	0.7	124000	0.7	10	29	3	18900	9200	5050	920	-0.2	18200	7	400	52	-0.001	-0.005	19	3.4	36	95
33.00	34.00	5592711	0.2	1.5	0.02	1950	0.6	55600	0.4	17	63	12	23100	25200	7900	560	0.5	20300	40	660	100	0.003	-0.005	27	3.5	43	45
34.00	34.85	5592712	1.4	1	0.03	2900	1.4	8300	0.4	47	105	8500	24900	33400	3400	165	0.8	18400	140	380	190	0.044	-0.005	23	12.5	18	25
34.85	36.00	5592713	0.9	1	0.06	7100	2	82600	0.3	165	300	5400	118000	23600	60400	1250	1.1	3850	800	8850	63	0.06	0.1	12	1.65	300	105
36.00	37.00	5592714	0.2	1.5	0.01	8200	0.8	84400	0.3	80	410	1150	89200	28700	64000	1250	1	4900	320	7900	79	0.017	-0.005	16	1.8	280	95
37.00	38.00	5592715	0.3	0.5	-0.01	7600	0.4	71800	0.3	81	640	780	87700	28500	73500	1300	0.7	4900	390	5750	48	0.001	-0.005	15	1.1	260	100
38.00	39.00	5592716	0.3	1	0.02	6950	1.2	80000	0.4	92	270	1100	117000	30100	62800	1300	0.9	5300	330	9300	110	0.014	-0.005	18	2.4	370	120
39.00	40.00	5592717	1	0.5	0.11	6900	5.5	77400	1	115	185	3200	132000	28800	53600	1350	1.1	5200	540	10200	200	0.014	-0.005	19	2.8	390	150
40.00	41.00	5592718	0.6	-0.5	0.05	5900	2.2	71700	0.6	71	100	1350	118000	26200	44700	1350	1.1	7050	165	8200	145	0.08	0.2	20	2.5	440	140
41.00	42.00	5592719	0.5	1	0.03	7800	0.9	72400	0.5	97	140	2450	130000	31700	47800	1300	1	6300	260	8000	150	0.019	0.1	14	1.45	430	140
42.00	43.00	5592720	0.1	2	0.03	8800	1	73800	0.3	41	145	390	77700	33000	51500	1100	0.6	7750	67	10400	100	0.043	0.1	14	2.3	300	100
43.00	44.00	5592721	0.4	-0.5	0.03	9100	1	70800	0.4	60	160	1050	89000	31900	50600	1000	0.9	7900	150	8700	155	0.004	-0.005	18	1.6	320	100
44.00	45.00	5592722	0.3	-0.5	0.02	9200	1.9	72400	0.4	62	410	540	86800	33000	56700	1100	0.7	6600	160	7500	190	0.022	0.1	13	1.75	280	105
45.00	46.00	5592723	0.6	-0.5	0.03	9200	1.2	69200	0.5	105	260	2000	113000	26900	51400	1150	2	5800	290	7800	130	0.043	0.1	14	3.3	350	120
46.00	47.00	5592724	0.4	0.5	0.03	7500	1.4	67400	0.5	72	350	1350	105000	32300	58000	1500	0.9	6200	240	6050	130	0.03	0.1	12	1.3	330	140
47.00	47.75	5592325	2.7	1	0.2	9900	4.5	51800	0.9	79	85	5000	122000	56600	37100	1200	1.3	8200	420	6800	300	0.096	0.15	10	5	310	145
47.75	48.40	5592326	0.9	1	-0.01	5050	1.2	21200	0.5	24	79	1450	49100	63300	10400	450	0.9	19600	190	2000	300	0.11	0.045	9	18.5	105	65
48.40	49.15	5592327	2.5	1.5	0.18	12700	6	46600	0.7	45	62	3300	110000	87600	30700	1000	1.2	11100	150	5450	520	0.063	0.09	11	4.2	300	130
49.15	50.00	5592328	3.3	1	0.38	9400	7.5	31800	1.2	48	70	4450	95600	69000	26100	960	0.6	11000	230	3950	320	0.11	0.14	12	3.3	250	150
50.00	51.00	5592329	2.6	1	0.19	12400	5	50300	0.4	36	44	3000	83800	36800	31300	800	0.5	8950	125	5650	250	0.081	-0.005	11	2.5	250	90
51.00	52.00	5592330	4.8	1	0.28	10300	8.5	77400	0.6	47	81	3150	106000	56400	54600	1200	0.5	6550	125	10100	48	0.056	0.075	14	2.9	340	130
52.00	53.00	5592331	0.9	2	-0.01	3550	1	38800	0.6	45	67	840	90800	51500	35300	1300	0.5	14300	105	7450	64	0.035	0.035	56	9	220	190
53.00	54.00	5592332	1.4	1	-0.01	1100	0.8	18900	0.8	46	63	3200	112000	59900	25000	1400	0.4	16000	270	5150	31	0.17	0.17	65	5.5	185	210

FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
54.00	55.00	5592333	0.6	1	-0.01	920	0.2	23200	0.5	21	35	560	57600	41800	13500	820	0.3	28100	40	3000	59	0.031	-0.005	150	16.5	93	130
55.00	56.00	5592334	0.6	1.5	-0.01	12100	1.1	46300	0.3	42	52	640	97500	68100	32100	1150	0.8	12800	39	5850	130	0.011	-0.005	18	3	320	140
56.00	57.00	5592335	0.2	1.5	-0.01	13800	0.5	38200	0.2	35	31	190	72000	46600	23800	720	0.8	11300	30	4150	120	0.005	-0.005	11	2.3	230	80
57.00	58.00	5592336	0.2	1.5	-0.01	13100	0.5	35700	0.2	27	30	220	63200	43500	17700	700	0.5	14100	25	3050	120	0.008	0.015	6	2.1	185	80
58.00	59.00	5592337	0.3	0.5	-0.01	9400	0.2	74300	0.2	47	71	140	95100	53900	50400	1050	0.3	5950	53	10300	39.5	0.002	-0.005	8	1.15	340	105
59.00	60.00	5592338	0.2	1	-0.01	11200	0.3	52600	0.2	43	51	130	77900	32900	34900	840	0.4	10600	43	5450	66	0.001	0.04	10	4.8	250	85
60.00	61.00	5592339	0.3	1	-0.01	12400	0.4	45900	0.1	31	37	220	82200	47900	27200	780	0.6	11500	32	4600	72	0.009	0.04	8	1.75	260	85
61.00	62.00	5592340	0.3	1	-0.01	12700	0.8	46000	0.1	39	47	250	84900	65600	28500	800	0.6	9150	33	5150	105	0.005	0.15	10	1.9	280	90
62.00	63.00	5592341	0.5	1	-0.01	11900	1.5	50200	0.1	42	52	640	88500	56900	30700	860	0.6	9450	46	3550	105	0.021	0.24	11	2.1	290	90
63.00	64.00	5592342	0.4	1.5	0.02	10900	1	47600	0.2	37	47	390	83800	23100	31800	880	0.6	10500	30	5250	86	0.007	0.01	12	2.1	290	95
64.00	64.70	5592343	0.7	1	0.08	11800	1.9	47700	0.1	43	45	860	93100	40000	31500	960	0.6	9200	50	5750	76	0.029	0.065	12	1.9	300	100
64.70	65.65	5592344	-0.1	1	-0.01	1950	-0.2	6600	-0.1	-2	47	15	5500	42900	1450	80	0.7	12500	6	240	45	0.001	-0.005	12	2	6	10
65.65	66.30	5592345	0.4	1.5	-0.01	7150	0.4	80000	0.2	61	61	180	104000	20800	58100	1250	0.4	6400	54	11100	34.5	-0.001	-0.005	13	2.1	360	130
66.30	67.00	5592346	0.3	1	-0.01	9200	-0.2	78000	0.2	50	67	97	98400	45500	55100	1150	0.4	5900	51	10900	18.5	-0.001	-0.005	10	1.35	350	125
67.00	68.00	5592347	0.3	0.5	-0.01	8850	0.3	83500	0.1	57	66	98	96400	17600	57000	1100	0.4	6300	47	10600	21.5	-0.001	-0.005	11	1.5	350	120
68.00	69.00	5592348	0.3	1	-0.01	8650	-0.2	76700	0.2	53	59	95	94500	46600	52000	1050	0.4	8650	52	10200	27	-0.001	-0.005	12	2.9	320	110
69.00	70.00	5592349	0.3	1	0.06	9650	-0.2	84700	0.2	58	60	120	100000	55600	57300	1150	0.3	6900	54	10000	21.5	-0.001	-0.005	10	1.6	360	120
70.00	71.00	5592350	0.3	1	-0.01	8700	0.2	72800	0.1	55	62	135	94000	33700	51600	1050	0.4	7100	53	10000	17	-0.001	-0.005	12	1.95	340	110
71.00	72.00	5592351	0.3	1	0.03	13000	0.2	66800	0.2	53	52	180	102000	47500	42600	1050	0.5	8550	49	7450	10.5	0.001	-0.005	10	1.05	350	115
72.00	73.00	5592352	0.2	1.5	-0.01	12500	0.3	62300	0.1	53	55	130	98000	27500	42300	1050	0.6	8350	54	7850	28	-0.001	-0.005	13	2.1	340	110
73.00	74.00	5592353	0.3	1.5	-0.01	12700	0.6	52900	0.2	46	59	380	86100	48300	35100	900	0.8	9900	42	6200	43.5	0.009	0.01	10	2.4	300	95
74.00	75.00	5592354	0.3	1	0.03	11100	0.6	47300	0.2	37	50	300	77100	26000	30000	860	0.9	12500	30	4950	47.5	0.007	0.01	11	6.5	270	100
75.00	76.00	5592355	0.3	2	-0.01	8650	0.4	38000	0.2	28	68	155	56900	23700	23000	680	1	11100	24	3800	45	0.003	-0.005	9	4.8	185	75
76.00	77.00	5592356	0.3	1.5	-0.01	13100	0.7	52100	0.2	46	49	250	94400	45900	33000	940	1.1	9500	36	5950	47.5	0.004	-0.005	12	2.1	330	105
77.00	78.00	5592357	0.5	1.5	0.05	12800	1.4	49600	0.2	40	46	410	87700	37300	31500	880	0.9	10400	34	5600	89	0.01	0.02	10	2.4	300	95
78.00	79.00	5592358	0.3	1	-0.01	13400	0.4	50600	0.1	42	43	115	87700	42000	32300	880	0.8	10000	31	5850	39	0.002	-0.005	11	1.05	310	95
79.00	80.00	5592359																									
80.00	81.00	5592360	0.9	1	0.09	10200	0.7	68100	0.1	52	53	540	95400	47400	47300	1000	0.9	8950	43	8850	18.5	0.013	0.02	13	2	340	100
81.00	82.00	5592361	0.2	1.5	-0.01	12700	-0.2	47400	0.1	42	47	105	83900	40800	33500	860	0.7	12000	37	6350	26.5	-0.001	-0.005	11	3.4	300	95
82.00	83.00	5592362	0.3	1	-0.01	9100	-0.2	67800	0.2	53	65	100	101000	39500	49100	1150	0.6	6850	55	10700	8	-0.001	-0.005	11	1.45	350	115
83.00	84.00	5592363	0.3	1	-0.01	8000	-0.2	65000	0.2	48	62	105	79000	39900	43700	920	0.6	7850	44	8450	40	-0.001	-0.005	11	1.9	270	95
84.00	85.00	5592364	0.3	1	-0.01	8900	-0.2	75800	0.1	50	62	87	81900	30900	53600	1000	0.7	7700	50	10100	19.5	-0.001	-0.005	12	2.1	290	95

FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
85.00	86.00	5592365	0.3	1	-0.01	9250	-0.2	83200	-0.1	47	73	54	71100	30500	60500	960	0.6	7350	53	10800	24.5	-0.001	-0.005	13	1.35	240	80
86.00	87.00	5592366	0.3	1	-0.01	8200	-0.2	87400	0.1	45	81	69	70500	40200	61900	1000	0.5	7900	65	10800	19	-0.001	-0.005	15	1.6	230	85
87.00	88.00	5592367	0.3	1	-0.01	9050	-0.2	81900	-0.1	44	77	84	69900	23700	59600	940	0.3	8150	52	9550	27	-0.001	-0.005	13	1.25	240	80
88.00	89.00	5592368	0.2	1	-0.01	9050	-0.2	81300	0.1	44	70	86	67000	31100	57500	920	0.3	9100	50	9050	37.5	-0.001	-0.005	15	1.4	230	75
89.00	90.00	5592369	0.3	1	-0.01	8950	-0.2	83000	-0.1	48	73	100	69200	16100	59800	940	0.3	8150	57	9550	31	-0.001	-0.005	12	1.5	230	80
90.00	91.00	5592370	0.2	1	-0.01	7750	0.4	74800	-0.1	41	79	75	63800	23900	53800	860	0.5	10200	48	7050	30	-0.001	-0.005	12	3.3	210	75
91.00	92.00	5592371	0.4	1	0.01	8400	0.2	82000	0.1	46	80	110	74600	20100	60000	980	0.4	7400	55	10500	22	-0.001	-0.005	10	1.45	260	85
92.00	93.00	5592372	0.4	-0.5	-0.01	8800	-0.2	84200	-0.1	47	69	105	73100	21200	59500	980	0.3	7900	53	9800	20	-0.001	-0.005	11	1.4	250	85
93.00	94.00	5592373	0.3	0.5	0.08	8500	-0.2	78500	-0.1	48	70	81	72300	28500	56500	980	-0.2	8600	53	9350	21.5	-0.001	-0.005	12	1.6	240	85
94.00	95.00	5592374	0.4	0.5	-0.01	9050	-0.2	80300	0.1	46	81	110	74400	28700	58100	980	0.3	8150	53	10100	26	-0.001	-0.005	11	1.05	250	85
95.00	96.00	5592375	0.2	0.5	-0.01	9450	-0.2	78200	-0.1	47	66	90	73000	37700	55700	960	-0.2	7800	52	8150	22	-0.001	-0.005	10	1.15	240	85
96.00	97.00	5592376	0.4	0.5	-0.01	9200	-0.2	73700	0.1	47	77	96	76000	36900	54500	980	0.3	7300	54	10400	18	-0.001	-0.005	9	1	260	85
97.00	98.00	5592377	0.3	-0.5	-0.01	9150	-0.2	82200	-0.1	46	74	98	76700	18500	58600	1000	-0.2	7150	53	9300	18.5	-0.001	-0.005	10	1.15	270	90
98.00	99.00	5592378	0.4	0.5	-0.01	8900	-0.2	83100	0.1	51	92	105	75800	19700	59800	1000	0.3	6500	52	10400	16	-0.001	-0.005	10	1.2	270	95
99.00	100.00	5592379	0.4	2	-0.01	7000	-0.2	93800	-0.1	51	79	86	78800	21100	61100	1200	0.5	5400	54	10900	12	-0.001	-0.005	11	1.4	280	120
100.00	101.00	5592380	0.6	3	-0.01	6300	0.4	88500	0.2	58	67	115	95500	16800	62000	1600	0.7	5550	53	11100	11	-0.001	-0.005	14	2.6	340	170
101.00	102.00	5592381	1.1	2	-0.01	6750	0.5	80300	0.4	57	78	72	92300	19100	61500	1750	0.6	6050	60	11500	13	-0.001	-0.005	23	2.3	300	180
102.00	103.00	5592382	0.8	1.5	-0.01	6850	0.5	62800	0.3	45	55	135	92200	21900	47500	1500	0.4	10000	53	7800	16.5	-0.001	-0.005	42	2.8	260	185
103.00	104.00	5592383	0.3	2	-0.01	9900	0.3	64100	0.2	40	43	26	73800	17100	39200	980	0.6	8600	32	7300	21.5	-0.001	-0.005	11	2.9	240	110
104.00	105.00	5592384	0.3	1	-0.01	10500	0.3	62800	0.1	44	43	130	81800	18800	44700	960	0.4	6600	47	8200	20.5	-0.001	-0.005	9	1.25	270	105
105.00	106.00	5592385	0.3	1.5	-0.01	9050	0.6	61300	0.1	39	46	29	76100	18300	42200	980	0.6	8000	36	7700	25	-0.001	-0.005	9	3	250	105
106.00	107.07	5592386	0.3	1.5	-0.01	1650	0.2	10900	-0.1	4	31	19	11000	21100	3950	175	0.7	22900	7	680	43.5	-0.001	-0.005	9	13.5	21	40
107.07	108.00	5592387	0.2	3	-0.01	8050	0.6	63700	0.3	37	61	100	82400	20700	49900	1200	0.8	7400	56	8900	15	-0.001	-0.005	9	3.7	280	110
108.00	109.00	5592388	0.2	2.5	-0.01	9150	0.3	73000	0.2	35	62	175	87900	22400	55500	1100	0.4	6150	46	9750	14.5	-0.001	-0.005	8	1.4	310	110
109.00	110.00	5592389	0.2	2	-0.01	9200	-0.2	70000	0.1	36	66	105	88400	31000	53900	1100	0.5	5600	48	8850	21	-0.001	-0.005	8	1.1	300	100
110.00	111.00	5592390	0.2	1.5	-0.01	9450	-0.2	65400	0.2	38	57	120	84200	21700	50400	1000	0.4	5550	47	8400	16	-0.001	-0.005	8	1.4	290	95
111.00	112.00	5592391	0.2	2	0.1	8250	0.2	59200	0.2	34	68	81	79700	20000	45900	1000	0.7	6800	45	7800	26.5	-0.001	-0.005	9	2.6	270	105
112.00	113.00	5592392	0.2	1.5	-0.01	9150	-0.2	60100	0.2	34	47	150	80600	31600	45700	980	0.3	6050	51	8000	18.5	-0.001	-0.005	7	1.7	280	90
113.00	114.00	5592393	0.2	1.5	-0.01	6900	-0.2	49800	0.2	33	54	90	65100	22600	36200	860	0.4	10100	36	6000	21.5	-0.001	-0.005	10	1.75	195	80
114.00	115.00	5592394	0.2	1	-0.01	4900	-0.2	40800	0.1	24	61	74	52000	20600	27000	700	0.7	13900	30	4400	20	-0.001	-0.005	10	1.65	140	70
115.00	115.86	5592395	0.2	2.5	-0.01	7550	-0.2	54000	0.2	34	58	125	67200	39500	39600	980	0.4	7300	42	6100	20	-0.001	-0.005	11	1.7	220	95
115.86	117.00	5592396																									

FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
117.00	118.00	5592397	0.2	2	-0.01	1750	-0.2	14700	0.2	6	28	31	33800	36700	5450	430	0.7	24500	6	740	37	-0.001	-0.005	17	1.65	41	50
118.00	119.00	5592398	0.2	1.5	-0.01	2150	-0.2	12500	0.1	5	21	10	21400	34500	4400	370	0.6	23400	5	720	41.5	-0.001	-0.005	22	2.8	25	45
119.00	120.00	5592399	0.2	1	-0.01	1550	-0.2	11400	0.1	6	23	10	23800	21300	5700	390	0.5	25600	5	560	34.5	-0.001	-0.005	36	3.7	28	50
120.00	121.00	5592400	0.2	1.5	-0.01	1150	-0.2	13400	0.1	6	30	15	29500	22900	4700	400	0.6	21200	5	560	36.5	-0.001	-0.005	16	3.9	37	60
121.00	122.00	5592401	0.1	1.5	-0.01	1050	-0.2	13700	0.1	4	27	7	23800	26400	3550	310	0.5	25500	5	460	26	-0.001	-0.005	13	11.5	24	45
122.00	122.60	5592402	0.2	1	-0.01	1450	-0.2	18100	0.2	7	25	4	35100	28000	5700	480	0.4	29100	7	800	26	-0.001	-0.005	14	1.35	31	60

CRA EXPLORATION PTY LIMITED: DIAMOND DRILL LEDGER

HOLE: DD96MD002		EAST: 447557		TOTAL DEPTH: 216	
TENEMENT NUMBER: 9371		NORTH: 7405457		DPO NUMBER: 81938/39	
PROSPECT: BRAVEHEART		COMMENCED: 6/23/96		AZIMUTH: 150	
GEOLOGIST: DLW		COMPLETED: 6/28/96		INCLINATION: -75	
DEPTH FROM	DEPTH TO	LITHOLOGY CODE	GEOLOGY		
0.00	132.00	SNKEQ	Medium-grained equigranular shonkinite consisting of roughly equal amounts of pyroxene(dark green), phlogopite(black-bronze), and K-spar(grey-white). 0.0-12.0: Percussion pre-collar, containing mostly equigranular shonkinite. Contains 1-5% POH and common trace CCP. ...12.0-12.77: Mineralised zone containing 2-5% total POH and CCP occurring as disseminations and occasional coarse-grained interstitial blebs/clumps. 12.77-15.53: Pegmatite dyke (Pink and white feldspar dominant over quartz). 15.53-16.50: Mineralised zone (3-5% POH and lesser CCP occurring mainly as irregularly scattered interstitial clumps). 17.20-19.00: Zone of numerous pegmatite (k-spr/qtz) dykes/veins. 40-70deg. to LCA. Avg thickness:5-9cm. 18.05-55.82: Mineralised zone containing 2-5% POH+CCP (mostly as scattered clumps and lesser disseminations). 30.41-30.66: pink and green feldspar dominant pegmatite/granite dyke. 70deg. toLCA. 37.72-38.17: Pegmatite and shonkinite mixing zone. contacts: 65deg. to LCA. 38.17-39.07: Pegmatite dyke. Pink K-spar dominant. Fe(?) altered core (38.30-38.80). 80-90deg. to LCA. Moves into a shonkinite/peg mixing contact zone at both contacts. 39.01-39.07: Pegmatite and shonkinite mixing zone. 42.06-42.16: Pegmatite vein. Pink K-spr dominant. ~55deg. to LCA. 53.20-54.29: Pegmatite and shonkinite mixing zone. 45-50deg. to LCA. Contains two feldspar dominant pegmatite veins (53.55-53.85 (65deg to LCA) and 55.17-55.45: Zone of numerous small (1-3mm wide) calcite veins (irregular orientations). 55.82-56.35: Pegmatite dyke. Pink K-spar dominant. 75deg. to LCA. 56.35-85.00: Mineralised zone consisting of ~5% (up to 10% locally) of POH + CCP as regular interstitial clumps/blebs and disseminations within the shonkinite. 57.20-57.36: Pegmatite vein. Pink Kfs-dominant. 45deg. to LCA. 59.56-59.67:Pegmatite vein. Pink Kfs-dominant. 70deg. to LCA. 61.02-61.88: Dyke of mixed pegmatite and shonkinite. Siliceous dark, mafic groundmass surrounding subrounded, embayed pegmatite fragments. 65-70deg. to LCA. 64.84-64.96: Pegmatite vein. ~70deg. to LCA. 73.32-73.46: Two close pegmatite veins. Contains ~1% Fe sulphide. 70deg. to LCA. 76.95-77.11: Pegmatite vein/dyke. Grey-white quartz dominant (~90%). ~60deg. to LCA. Contains trace CCP. 82.03-82.06: Shonkinite-pegmatite contact shear zone. Contains sulphides. 82.06-82.88: Pegmatite dyke. White feldspar dominant. ~50deg. to LCA. Dyke also contains ~15% Magnetite. 84.19-84.39: Pegmatite vein. Pink KFS dom. ~50deg. to LCA. 87.55-87.64: Pegmatite vein. 55-60deg. to LCA. 91.81-92.25: Pegmatite/granite dyke. White KFS dom. ~5% f.g.magnetite. 25-30deg. to LCA. 92.80-92.98: Pegmatite and shonkinite mixing zone? 92.98-93.25: Zone of very fine grained xenoliths. Sericite and/or chlorite alteration. 93.38-94.32: Shonkinite and pegmatite(?) mixing zone or sericite and iron altered porphyritic shonkinite. 94.32-97.65: Pegmatite dyke. 50-60% KFS, 30-40% QTZ and 5-10% biotite. ~60deg. to LCA. 98.20-99.85: Pegmatite dyke. 50-60% KFS, ~40% QTZ and 5-10% biotite. ~70deg. to LCA. 104.89-105.31: Granite dyke. Pink KFS dom. 70-75deg. LCA.		

DEPTH FROM	DEPTH TO	LITHOLOGY CODE	GEOLOGY
			109.60-110.25: Mineralised zone. 1-3%POH and lesser (~0.5%) CCP. 114.10-126.10: Mineralised zone. 1-3%POH and lesser (~0.5%) CCP. Higher grade portion at 121.0-126.09 (~5% POH and CCP (~1% CCP)). 113.01-114.88: 2 pegmatite and one granite veins. 8-9cm wide. PEGs:70-80deg. to LCA; GRT: ~50deg. to LCA. 115.45-115.60: Pegmatite vein/dyke. Pink KSR-rich (~90%). ~75deg. to LCA. 115.97-116.30: Zone of three small granite veins (KSR-rich). ~80deg. to LCA. 119.25-119.34: Pegmatite/granite vein. ~55deg. to LCA. 123.86-123.98: Pegmatite vein/dyke. 50/50 QTZ/FSR. ~45deg. to LCA. 124.30-125.53: Pegmatite / microgranite dyke. KFR dominant (~75%). ~65deg. to LCA. 126.09-126.20: Pegmatite vein. Quartz dominant (~60%). ~60deg. to LCA. 126.53-128.40: Pegmatite/granite dyke. ~15% magnetite. 35-40deg. to LCA. 129.21-129.31: Pegmatite vein. 85-90deg. to LCA. Poikilitic shonkinite. Zones of white feldspar crystals embayed with pyroxene and phlogopite inclusions, surrounded by mafic-rich, feldspar-poor groundmass. 132.25-132.81: Granite dyke. ~30deg. to LCA. 126.09-202.31: Weakly mineralised zone. Trace to 1% total sulphide content consisting of occasional clumps of POH and CCP (+/- Magnetite) and common fine-grained disseminations. 135.5-138.4: Richer mineralised zone in above. 1-2% total POH and CCP (mainly scattered interstitial clumps of crystals). 144.11-144.33: Pegmatite dyke. Pink KFS dominant. ~40deg. to LCA. 146.90-147.08: Pegmatite dyke. Pink and white KFS dominant. ~55deg. to LCA. Medium-grained equigranular shonkinite. 150.44-151.54: Pegmatite dyke. Pink KFS dominant. 50-60deg. to LCA . 156.95-163.50: Slightly richer mineralised zone. 1-2% total sulphide as coarse-grained clumps of POH/CCP. 157.61-157.87: Shear zone in shonkinite. ~40deg. to LCA. Feldspar in this zone is strongly Fe altered (pink-red colour). Granite vein from 157.81-.87 has intruded parallel to shear.
132.00	150.00	SNKPK	
150.00	158.20	SNKEQ	

GEOLOGY

DEPTH FROM	DEPTH TO	LITHOLOGY CODE	GEOLOGY
158.20	193.00	SNKEQ/P	Zone of mixed poikilitic and equigranular shonkinite. However most showing at least a faint poikilitic texture. 162.27-162.68: Zone of abundant pink granite and pegmatite veins. Average of 75-80deg. to LCA. Small shear parallel to veins at 162.27-162.31m. 169-173.2: Higher grade mineralised zone. 1-2% total sulphide as scattered interstitial clumps of POH and CCP (+/- PYT). 172.05-172.26: Pegmatite dyke. Very coarse-grained. Roughly equal amounts of KFS and QTZ. ~60deg. to LCA. 173.24-173.33: Microgranite vein. ~25deg. to LCA. 174.50-178.60: Low grade mineralised zone ~1% Total sulphide - as clumps of anhedral POH and CCP sometimes surrounding single euhedral cubes of Pyrite. 178.60-184.56: Relatively high grade zone. ~2-5% (up to 10% locally) of sulphides occurring as above. 173.76-173.96: Granite vein-dyke. Sericite or chlorite altered. ~15% Magnetite content. ~45deg. to LCA. Cross-cut by a 1cm unaltered granite vein ~50deg. to LCA in other direction. 179.0-180.0: Slightly porphyritic shonkinite. 184.56-186.37: Zoned pegmatite/microgranite dyke. Pegmatite: 184.56-185.46; 185.83-92; 186.28-186.37. Fine grained granite: 185.46-.83; 185.92-186.28. Roughly equivalent QTZ to Pink KFS to White KFS. ~65deg. to LCA at top margin. ~50deg. to LCA at bottom margin. Medium-grained equigranular shonkinite. Feldspars are often clumped together. 194.77-196.80: 'Rat' of granitic basement gneiss. Foliation is not present to weakly developed (~60deg. to LCA). 196.80-197.03: Pegmatite dyke. Quartz dominant. ~25deg. to LCA. 197.03-197.63: Silicified zone of shonkinite containing numerous KFS-rich xenocrysts (from basement?). 201.26-201.51: Fine-grained granite dyke. Pink KFS dominant. ~70deg. to LCA. 202.01-202.31: Silicified shonkinite. Contains pink (KFS) xenocrysts. Foliation ~55deg. to LCA. Basement Augen gneiss. Contains abundant KFS (pink-whit-It-green) augen crystals with diffuse margins. Strongly deformed (gneissosity: 35-45deg. to LCA (although as low as 25deg. at 202.31-203.40m). 215.50: E.O.H.
193.00	202.31	SNKEQ	
202.31	215.50	GNSAN	

CRA EXPLORATION PTY LIMITED : DRILL HOLE LEDGER

<u>DRILL HOLE</u> DD96MD002		<u>GEOLOGIST</u> DLW	<u>RL COLLAR</u> 700	<u>COMMENCED</u> 23/06/96							
<u>TENEMENT</u> MORDOR POUND	<u>AMG E</u> 447557	<u>AZIMUTH</u> 150	<u>COMPLETED</u> 28/06/96								
<u>PROSPECT</u> BRAVEHEART	<u>AMG N</u> 7405457	<u>INCLINATION</u> -75	<u>CASING LEFT</u> 18.0M								
<u>LAB</u>	<u>ZONE</u> 53	<u>DRILLING CO.</u> GOREY&COLE	<u>TOTAL DEPTH</u> 216 (Metres)								
<u>DPO</u> 81938/39	<u>250K MAP No.</u> SF5314	<u>ALICE SPRINGS</u>	<u>TECTONIC DOMAIN</u> Arunta Orogen								
<u>DEPTH</u>	<u>SAMPLE No</u>	<u>REG STRAT</u>	<u>LOCAL LITHOLOGY</u>	<u>LITHOLOGICAL DESCRIPTOR</u>	<u>COLOUR</u>	<u>TEXTURE</u>	<u>ALTERATN</u>	<u>MINERALN</u>	<u>CPS</u>	<u>MAG. SUS SI UNITS</u>	<u>COMMENTS</u>
FROM	TO										
0.00	3.00	5592206	PM2	CLC/SNK	GW/T/N				140	200	
3.00	4.00	5592207	PM2	SNK	VN	MG/EQ			140	700	
4.00	5.00	5592208	PM2	PEG	K/W/N	DY			160	550	
5.00	6.00	5592209	PM2	SNK	N	MG/EQ			160	1700	
6.00	7.00	5592210	PM2	SNK	N	MG/EQ			160	2000	
7.00	8.00	5592211	PM2	PEG/SNK	K/W/N	DY			160	1000	
8.00	9.00	5592212	PM2	SNK	N/W/K	MG/EQ	SE		160	1000	
9.00	10.00	5592213	PM2	SNK	N/W/K	MG/EQ			150	1500	
10.00	11.00	5592214	PM2	SNK	N/W/K	MG/EQ			170	250	
11.00	12.00	5592215	PM2	SNK	N/W	MG/EQ			160	200	
12.00	12.77	5592403	PM2	SNK	VN/GW	MG/EQ		POH/CCP	130	40	
12.77	13.53	5592404	PM2	PEG	K/W/GW	DY			140	40	
13.53	14.53	5592405	PM2	PEG	K/W/GW	DY			150	85	
14.53	15.53	5592406	PM2	PEG	K/W/GW	DY			140	50	
15.53	16.50	5592407	PM2	SNK	VN/GW	MG/EQ		POH/CCP	130	200	
16.50	17.00	5592408	PM2	SNK	VN/GW	MG/EQ			130	200	
17.00	18.00	5592409	PM2	SNK	VN/GW	MG/EQ			130	2000	Numerous PEG veins
18.00	19.00	5592410	PM2	SNK	VN/GW	MG/EQ			120	4000	Numerous PEG veins
19.00	20.00	5592411	PM2	SNK	VN/GW	MG/EQ			120	3500	
20.00	21.00	5592412	PM2	SNK	VN/GW	MG/EQ			115	3000	
21.00	22.00	5592413	PM2	SNK	VN/GW	MG/EQ			110	2000	
22.00	23.00	5592414	PM2	SNK	VN/GW	MG/EQ			110	200	
23.00	24.00	5592415	PM2	SNK	VN/GW	MG/EQ			110	250	
24.00	25.00	5592416	PM2	SNK	VN/GW	MG/EQ			110	350	
25.00	26.00	5592417	PM2	SNK	VN/GW	MG/EQ			115	700	
26.00	27.00	5592418	PM2	SNK	VN/GW	MG/EQ			120	500	
27.00	28.00	5592419	PM2	SNK	VN/GW	MG/EQ			120	300	
28.00	29.00	5592420	PM2	SNK	VN/GW	MG/EQ			120	700	

DEPTH FROM TO	SAMPLE No	REG STRAT	LOCAL LITHOLOGY STRAT	LITHOLOGICAL DESCRIPTOR	COLOUR	TEXTURE	ALTERATN	MINERALN	CPS	MAG_SUS SI UNITS	COMMENTS
29.00	30.00	5592421	PM2	SNK	VN/GW	MG/EQ		POH	120	600	
30.00	31.00	5592422	PM2	SNK	VN/GW	MG/EQ		POH	120	350	
31.00	32.00	5592423	PM2	SNK	VN/GW	MG/EQ		POH	110	350	
32.00	33.00	5592424	PM2	SNK	VN/GW	MG/EQ		POH	120	400	
33.00	34.00	5592425	PM2	SNK	VN/GW	MG/EQ		POH	120	500	
34.00	35.00	5592426	PM2	SNK	VN/GW	MG/EQ		POH	130	500	
35.00	36.00	5592427	PM2	SNK	VN/GW	MG/EQ		POH	150	400	
36.00	37.00	5592428	PM2	SNK	VN/GW	MG/EQ		POH	160	350	
37.00	37.72	5592429	PM2	SNK	VN/GW	MG/EQ		POH	130	1000	
37.72	39.01	5592430	PM2	PEG	K/GW	DY		POH	130	30	
39.01	40.00	5592431	PM2	SNK	VN/GW	MG/EQ		POH	200	500	
40.00	41.00	5592432	PM2	SNK	VN/GW	MG/EQ		POH	150	400	
41.00	42.00	5592433	PM2	SNK	VN/GW	MG/EQ		POH	120	60	
42.00	43.00	5592434	PM2	SNK	VN/GW	MG/EQ		POH	120	200	
43.00	44.00	5592435	PM2	SNK	VN/GW	MG/EQ		POH	120	40	
44.00	45.00	5592436	PM2	SNK	VN/GW	MG/EQ		POH	110	200	
45.00	46.00	5592437	PM2	SNK	VN/GW	MG/EQ		POH	120	400	
46.00	47.00	5592438	PM2	SNK	VN/GW	MG/EQ		POH	110	50	
47.00	48.00	5592439	PM2	SNK	VN/GW	MG/EQ		POH	110	400	
48.00	49.00	5592440	PM2	SNK	VN/GW	MG/EQ		POH	110	3000	
49.00	50.00	5592441	PM2	SNK	VN/GW	MG/EQ		POH	110	1500	
50.00	51.00	5592442	PM2	SNK	VN/GW	MG/EQ		POH	110	1500	
51.00	52.00	5592443	PM2	SNK	VN/GW	MG/EQ		POH	110	1000	
52.00	53.00	5592444	PM2	SNK	VN/GW	MG/EQ		POH/CCP	110	1500	
53.00	54.00	5592445	PM2	SNK	VN/GW	MG/EQ		POH	120	4000	
54.00	55.00	5592446	PM2	SNK	VN/GW	MG/EQ		POH	120	500	
55.00	55.85	5592447	PM2	SNK	VN/GW	MG/EQ		POH	120	90	
55.85	56.35	5592448	PM2	PEG	K/GW	DY			120	80	
56.35	57.00	5592449	PM2	SNK	VN/GW	MG/EQ		POH/CCP	120	80	
57.00	58.00	5592450	PM2	SNK	VN/GW	MG/EQ		POH/CCP	120	250	
58.00	59.00	5592451	PM2	SNK	VN/GW	MG/EQ		POH/CCP	120	1000	
59.00	60.00	5592452	PM2	SNK	VN/GW	MG/EQ		POH/CCP	120	1200	
60.00	61.02	5592453	PM2	SNK	VN/GW	MG/EQ		POH/CCP	120	2500	
61.02	61.88	5592454	PM2	PEG/SNK	DG/KW	DY?	SI	POH/CCP	120	10000	SNK & PEG mixing zone?
61.88	63.00	5592455	PM2	SNK	VN/GW	MG/EQ		POH/CCP	120	4000	
63.00	64.00	5592456	PM2	SNK	VN/GW	MG/EQ		POH/CCP	110	2500	
64.00	65.00	5592457	PM2	SNK	VN/GW	MG/EQ		POH/CCP	120	600	

DEPTH FROM TO	SAMPLE No	REG STRAT	LOCAL LITHOLOGY STRAT	LITHOLOGICAL DESCRIPTOR	COLOUR	TEXTURE	ALTERATN	MINERALN	CPS	MAG_SUS SI UNITS	COMMENTS
65.00 66.00	5592458	PM2		SNK	VN/GW	MG/EQ		POH/CCP	120	1000	
66.00 67.00	5592459	PM2		SNK	VN/GW	MG/EQ		POH/CCP	120	2000	
67.00 68.00	5592460	PM2		SNK	VN/GW	MG/EQ		POH/CCP	120	3000	
68.00 69.00	5592461	PM2		SNK	VN/GW	MG/EQ		POH/CCP	120	1500	
69.00 70.00	5592462	PM2		SNK	VN/GW	MG/EQ		POH/CCP	110	900	
70.00 71.00	5592463	PM2		PEG/SNK	N/K/GW	MG/EQ		POH/CCP	110	2000	
71.00 72.00	5592464	PM2		SNK	VN/GW	MG/EQ		POH/CCP	110	2000	
72.00 73.00	5592465	PM2		SNK	VN/GW	MG/EQ		POH/CCP	120	1500	
73.00 74.00	5592466	PM2		SNK	VN/GW	MG/EQ		POH/CCP	110	2500	
74.00 75.00	5592467	PM2		SNK	VN/GW	MG/EQ		POH/CCP	110	2000	
75.00 76.00	5592468	PM2		SNK	VN/GW	MG/EQ		POH/CCP	110	2000	
76.00 77.00	5592469	PM2		SNK	VN/GW	MG/EQ		POH/CCP	110	2000	
77.00 78.00	5592470	PM2		SNK	VN/GW	MG/EQ		POH/CCP	110	500	
78.00 79.00	5592471	PM2		SNK	VN/GW	MG/EQ		POH/CCP	110	1500	
79.00 80.00	5592472	PM2		SNK	VN/GW	MG/EQ		POH/CCP	110	4000	
80.00 81.00	5592473	PM2		SNK	VN/GW	MG/EQ		POH/CCP	110	2000	
81.00 82.06	5592474	PM2		SNK	VN/GW	MG/EQ		POH/CCP	120	15000	
82.06 82.88	5592475	PM2		PEG	W/K/GW	DY		POH/CCP	120	15000	
82.88 84.00	5592476	PM2		SNK	VN/GW	MG/EQ		POH/CCP	120	4000	
84.00 85.00	5592477	PM2		SNK	VN/GW	MG/EQ		POH/CCP	110	8000	
85.00 86.00	5592478	PM2		SNK	VN/GW	MG/EQ		POH/CCP	110	10000	
86.00 87.00	5592479	PM2		SNK	VN/GW	MG/EQ		POH/CCP	110	4000	
87.00 88.00	5592480	PM2		SNK	VN/GW	MG/EQ		POH/CCP	120	2000	
88.00 89.00	5592481	PM2		SNK	VN/GW	MG/EQ		POH/CCP	120	2500	
89.00 90.00	5592482	PM2		SNK	VN/GW	MG/EQ		POH/CCP	110	2000	
90.00 91.00	5592483	PM2		SNK	VN/GW	MG/EQ		POH/CCP	110	5000	
91.00 92.00	5592484	PM2		SNK	VN/GW	MG/EQ		POH/CCP	120	5000	
92.00 93.00	5592485	PM2		PEG/SNK	BN/VG	MG/EQ		POH/CCP	110	400	
93.00 93.75	5592486	PM2		PEG/SNK	BN/VG						All further Mag sus and CPS is in down hole logging data
93.75 94.32	5592487	PM2		PEG/SNK	BN/VG						SNK&PEG mixing zone?
94.32 95.00	5592488	PM2		PEG	K/W/G/N	DY					SNK&PEG mixing zone?
95.00 96.00	5592489	PM2		PEG	K/W/G/N	DY					
96.00 97.00	5592490	PM2		PEG	K/W/G/N	DY					
97.00 97.65	5592491	PM2		PEG	K/W/G/N	DY					
97.65 98.20	5592492	PM2		SNK	VN/GW	MG/EQ					
98.20 99.00	5592493	PM2		PEG	K/W/GW	DY					

DEPTH FROM TO	SAMPLE No	REG STRAT	LOCAL LITHOLOGY STRAT	LITHOLOGICAL DESCRIPTOR	COLOUR	TEXTURE	ALTERATN	MINERALN	CPS	MAG SUS SI UNITS	COMMENTS
136.00 137.00	5592531	PM2		SNK	VN/GW	PK	POH/CCP				
137.00 138.00	5592532	PM2		SNK	VN/GW	PK	POH/CCP				
138.00 139.00	5592533	PM2		SNK	VN/GW	PK					
139.00 140.00	5592534	PM2		SNK	VN/GW	PK					
140.00 141.00	5592535	PM2		SNK	VN/GW	PK					
141.00 142.00	5592536	PM2		SNK	VN/GW	PK					
142.00 143.00	5592537	PM2		SNK	VN/GW	PK					
143.00 144.00	5592538	PM2		SNK	VN/GW	PK					
144.00 145.00	5592539	PM2		SNK	VN/GW	PK					
145.00 146.00	5592540	PM2		SNK	VN/GW	PK					
146.00 147.00	5592541	PM2		SNK	VN/GW	PK					
147.00 148.00	5592542	PM2		SNK	VN/GW	PK					
148.00 149.00	5592543	PM2		SNK	VN/GW	PK					
149.00 149.75	5592544	PM2		SNK	VN/GW	PK					
149.75 150.44	5592545	PM2		SNK	VN/GW	PK					
150.44 151.54	5592546	PM2		PEG	K/GW	DY					
151.54 152.25	5592547	PM2		SNK	VN/GW	MG/EQ					
152.25 153.00	5592548	PM2		SNK	VN/GW	MG/EQ					
153.00 154.00	5592549	PM2		SNK	VN/GW	MG/EQ					
154.00 155.00	5592550	PM2		SNK	VN/GW	MG/EQ					
155.00 156.00	5592551	PM2		SNK	VN/GW	MG/EQ					
156.00 157.00	5592552	PM2		SNK	VN/GW	MG/EQ					
157.00 158.00	5592553	PM2		SNK	VN/GW	MG/EQ					
158.00 159.00	5592554	PM2		SNK	VN/GW	PK-EQ		POH/CCP			
159.00 160.00	5592555	PM2		SNK	VN/GW	PK-EQ		POH/CCP			
160.00 161.00	5592556	PM2		SNK	VN/GW	PK-EQ		POH/CCP			
161.00 162.00	5592557	PM2		SNK	VN/GW	PK-EQ		POH/CCP			
162.00 163.00	5592558	PM2		SNK	VN/GW	PK-EQ		POH/CCP			
163.00 164.00	5592559	PM2		SNK	VN/GW	PK-EQ		POH/CCP			
164.00 165.00	5592560	PM2		SNK	VN/GW	PK-EQ		POH/CCP			
165.00 166.00	5592561	PM2		SNK	VN/GW	PK-EQ					
166.00 167.00	5592562	PM2		SNK	VN/GW	PK-EQ					
167.00 168.00	5592563	PM2		SNK	VN/GW	PK-EQ					
168.00 169.00	5592564	PM2		SNK	VN/GW	PK-EQ					
169.00 170.00	5592565	PM2		SNK	VN/GW	PK-EQ		POH/CCP			
170.00 171.00	5592566	PM2		SNK	VN/GW	PK-EQ		POH/CCP			
171.00 172.00	5592567	PM2		SNK	VN/GW	PK-EQ		POH/CCP			

DEPTH FROM TO	SAMPLE No	REG STRAT	LOCAL LITHOLOGY STRAT	LITHOLOGICAL DESCRIPTOR	COLOUR	TEXTURE	ALTERATN	MINERALN	CPS	MAG SUS SI UNITS	COMMENTS
172.00 173.20	5592568	PM2		SNK	VN/GW	PK-EQ		POH/CCP			
173.20 174.50	5592569	PM2		SNK	VN/GW	PK-EQ					
174.50 175.50	5592570	PM2		SNK	VN/GW	PK-EQ					
175.50 176.50	5592571	PM2		SNK	VN/GW	PK-EQ					
176.50 177.50	5592572	PM2		SNK	VN/GW	PK-EQ					
177.50 178.50	5592573	PM2		SNK	VN/GW	PK-EQ					
178.50 179.50	5592574	PM2		SNK	VN/GW	PK-EQ					
179.50 180.50	5592575	PM2		SNK	VN/GW	POP					
180.50 181.50	5592576	PM2		SNK	VN/GW	PK-EQ					
181.50 182.50	5592577	PM2		SNK	VN/GW	PK-EQ					
182.50 183.50	5592578	PM2		SNK	VN/GW	PK-EQ					
183.50 184.56	5592579	PM2		SNK	VN/GW	PK-EQ					
184.56 185.50	5592580	PM2		PEG/GRT	GW/KW	DY					
185.50 186.37	5592581	PM2		PEG/GRT	GW/KW	DY					
186.37 187.00	5592582	PM2		SNK	VN/GW	PK-EQ					
187.00 188.00	5592583	PM2		SNK	VN/GW	PK-EQ					
188.00 189.00	5592584	PM2		SNK	VN/GW	PK-EQ					
189.00 190.00	5592585	PM2		SNK	VN/GW	PK-EQ					
190.00 191.00	5592586	PM2		SNK	VN/GW	PK-EQ					
191.00 192.00	5592587	PM2		SNK	VN/GW	PK-EQ					
192.00 193.00	5592588	PM2		SNK	VN/GW	PK-EQ					
193.00 194.00	5592589	PM2		SNK	VN/GW	MG/EQ					
194.00 194.77	5592590	PM2		SNK	VN/GW	MG/EQ					
194.77 195.75	5592591	PM2		GNS	KW/GW	AN/FO					
195.75 197.03	5592592	PM2		GNS	KW/GW	AN/FO					
197.03 198.00	5592593	PM2		SNK	VN/GW	MG/EQ	SI				
198.00 199.00	5592594	PM2		SNK	VN/GW	MG/EQ					
199.00 200.00	5592595	PM2		SNK	VN/GW	MG/EQ					
200.00 201.00	5592596	PM2		SNK	VN/GW	MG/EQ					
201.00 202.30	5592597	PM2		SNK	VN/GW	MG/EQ					
202.30 203.00	5592598	PM2		GNS	KW/GW	AN/FO					
203.00 204.00	5592599	PM2		GNS	KW/GW	AN/FO					
204.00 205.00	5592600	PM2		GNS	KW/GW	AN/FO					
205.00 206.00	5592601	PM2		GNS	KW/GW	AN/FO					
206.00 207.00	5592602	PM2		GNS	KW/GW	AN/FO					
207.00 208.00	5592603	PM2		GNS	KW/GW	AN/FO					
208.00 209.00	5592604	PM2		GNS	KW/GW	AN/FO					

DEPTH FROM TO	SAMPLE No	REG STRAT	LOCAL LITHOLOGY STRAT	LITHOLOGICAL DESCRIPTOR	COLOUR	TEXTURE	ALTERATN	MINERALN	CPS	MAG_SUS SI UNITS	COMMENTS
209.00 210.00	5592605	PM2		GNS	K/W/GW	AN/FO					
210.00 211.00	5592606	PM2		GNS	K/W/GW	AN/FO					
211.00 212.00	5592607	PM2		GNS	K/W/GW	AN/FO					
212.00 213.00	5592608	PM2		GNS	K/W/GW	AN/FO					
213.00 214.00	5592609	PM2		GNS	K/W/GW	AN/FO					
214.00 215.00	5592610	PM2		GNS	K/W/GW	AN/FO					
215.00 215.50	5592611	PM2		GNS	K/W/GW	AN/FO					

CRA EXPLORATION PTY LIMITED:
DIAMOND LOG - STRUCTURE

HOLE : DD96MD002

Depth of core blocks (m)	Recovery	Size	Depth of structure (m) From To	Structure	CBA	Fractures / m	Orientation
17.35	2.45	NQ	15 17	J/V	30/45	3-4	
18.10	0.75	NQ	17 18	V	50	1	
20.95	2.70	NQ	20 21	J	65	2	
23.95	3.00	NQ				1-2	
26.95	3.00	NQ	24 27	J/J	35/15	1-2	
29.60	2.65	NQ	28 30	V/J+V	55/35	<4	
32.60	3.10	NQ	31 32	J	40	2-3	
35.75	3.05	NQ				1	
38.80	3.05	NQ	36 39	J/J	55/47	<4	
41.80	3.00	NQ				<2	
44.90	3.10	NQ	42 43	J	40	1-2	
47.90	3.00	NQ	47 48	V	15	1-2	
50.90	3.00	NQ	50 51	J	45	1	
53.90	2.95	NQ	53 54	J	75	3-4	
56.90	3.05	NQ	54 55	J	65	2-3	
59.90	3.00	NQ	59 60	V	60	2	
62.90	3.00	NQ	62 63	J	30	1-2	
0.00		RC					
12.0		RC					
14.90	2.90	NQ	12 13	V	0	2	
65.90	3.00	NQ	63 65	J+V/V	50/60	2	
68.90	3.00	NQ	67 68	V	30	1-2	
71.90	3.00	NQ	70 71	D	70	<2	
143.90	3.02	NQ	143 144	J	35	3-4	
146.90	2.98	NQ	145 147	V/J+V	70/50	2-3	
149.90	3.02	NQ	148 149	J+V	60	2-4	

Depth of core blocks (m)	Recovery	Size	Depth of structure (m) From To	Structure	CBA	Fractures / m	Orientation
152.90	3.04	NQ	150 153	J/JJ	50/40/75	2-5	
155.90	2.98	NQ				1	
158.90	3.02	NQ	157 158	J+V	30	2-3	
161.90	3.01	NQ	161 162	J	25	2	
164.90	3.03	NQ	162 165	V/JJ	50/60	1-3	
167.90	3.07	NQ	165 167	JJ	25/35	1-4	
170.90	3.03	NQ	170 171	J	30	2	
173.90	3.00	NQ	171 174	V/JJ	50/30	0-3	
176.90	3.03	NQ				1-4	
179.90	3.04	NQ	179 180	J	40	0-3	
181.70	1.79	NQ				2-3	
184.75	3.07	NQ	182 185	J/JJ	10/10/70	3-5	
187.85	3.07	NQ				0-5	
190.75	3.11	NQ	189 191	J+V/JJ+V	70/50	2-4	
193.00	2.10	NQ				3-4	
193.75	0.75	NQ				2	
194.00	0.25	NQ				1	
197.00	2.96	NQ				<2	
200.10	3.08	NQ				1-2	
74.90	3.00	NQ	73 74	J	60	2-3	
77.90	3.00	NQ				<2	
80.90	3.00	NQ	80 81	J	50	1-3	
83.90	2.90	NQ	82 84	JJ+V	50/40	1-3	
86.85	3.10	NQ				2-3	
89.90	2.95	NQ	88 89	J	60	1-2	
92.90	3.00	NQ	91 92	J+V	10	1-2	
95.90	3.00	NQ				<4	
98.90	3.00	NQ	97 98	J	60	1-2	
101.90	2.95	NQ	100 101	V	30	1	
104.90	3.05	NQ	104 105	V	55	1-3	
107.90	3.00	NQ	105 106	V	80	<2	
110.90	3.00	NQ				<2	

Depth of core blocks (m)	Recovery	Size	Depth of structure (m)		Structure	CBA	Fractures / m	Orientation
			From	To				
113.90	3.00	NQ	113	114	V/V	70	1-2	
116.90	3.00	NQ	116	117	V	25	<4	
119.90	3.00	NQ	118	119	J	60	<3	
122.90	3.00	NQ	122	123	J	65	0-1	
125.90	3.00	NQ	124	125	J	65	1-3	
128.90	3.00	NQ	128	129	J	35	1-2	
131.90	3.00	NQ	129	131	V/J	40/35	1-2	
134.90	3.00	NQ					<3	
137.90	3.05	NQ	136	137	J	50	1-3	
140.90	3.02	NQ	138	141	J+V/J/J	70/35/30	2-3	
203.20	3.10	NQ					<3	
206.20	3.10	NQ					2-3	
209.30	3.10	NQ					1-3	
212.40	3.10	NQ					1	
215.50	3.10	NQ					2-5	

CRA EXPLORATION PTY LIMITED : DRILLHOLE ASSAY RESULTS

<u>DRILL HOLE</u>	DD96MD002	<u>GEOLOGIST</u>	DLW	<u>RL COLLAR</u>	700	<u>COMMENCED</u>	23/06/96
<u>TENEMENT</u>	MORDOR POUND	<u>AMGE</u>	447557	<u>AZIMUTH</u>	150	<u>COMPLETED</u>	28/06/96
<u>PROSPECT</u>	BRAVEHEART	<u>AMGN</u>	7405457	<u>INCLINATION</u>	-75	<u>CASING LEFT</u>	18.0M
<u>LAB</u>		<u>ZONE</u>	53	<u>DRILLING CO.</u>	GOREY&COLE	<u>TOTAL DEPTH</u>	216 (metres)
<u>DPO</u>	81938	<u>MAP REF.</u>	SF5314 ALICE SPRINGS	<u>DRILL TYPE</u>	VK 600B	<u>TECTONIC DOMAIN</u>	Arunta Orogen

FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
0.00	3.00	5592206	0.1	0.5	-0.01	9000	-0.2	103000	0.1	50	90	99	71800	20900	86100	800	0.6	3800	78	8300	13	0.002	-0.005	5	2.1	290	155
3.00	4.00	5592207	0.2	1	-0.01	11100	-0.2	96200	-0.1	64	115	115	80200	35600	73100	1000	0.9	4500	92	12800	18	-0.001	-0.005	8	0.98	360	85
4.00	5.00	5592208	0.2	1	-0.01	10100	-0.2	85200	0.1	58	100	89	76900	21400	62600	880	1.2	6950	79	11600	19	-0.001	-0.005	10	2.2	300	75
5.00	6.00	5592209	0.2	-0.5	-0.01	11300	-0.2	96500	0.1	64	110	120	77800	27000	70500	980	1.3	4800	91	13600	19	-0.001	-0.005	8	1.15	340	75
6.00	7.00	5592210	0.2	-0.5	-0.01	11100	-0.2	93900	-0.1	61	105	120	76400	29900	65400	920	1	4300	87	12300	17.5	-0.001	-0.005	7	1.05	320	70
7.00	8.00	5592211	0.2	1	-0.01	9900	-0.2	77400	0.1	54	83	87	67900	21800	57400	800	1	6750	73	10100	23	-0.001	-0.005	8	1.85	280	70
8.00	9.00	5592212	0.2	0.5	-0.01	11000	-0.2	93100	-0.1	64	91	130	75000	31700	67100	960	1.2	4500	98	12300	17.5	0.001	-0.005	8	1.6	320	75
9.00	10.00	5592213	0.1	1.5	-0.01	8700	-0.2	56800	-0.1	39	54	68	64400	27900	37600	760	1.1	10500	49	6700	30.5	-0.001	-0.005	5	0.99	210	75
10.00	11.00	5592214	0.3	1.5	-0.01	10100	-0.2	87700	0.1	57	93	115	73300	20400	62700	880	1.4	5850	88	11700	13	-0.001	-0.005	8	3	300	70
11.00	12.00	5592215	0.4	1	-0.01	10900	-0.2	88300	-0.1	63	115	82	74300	20100	69200	940	1.2	4100	84	11200	9.5	-0.001	-0.005	8	1.6	320	85
12.00	12.77	5592403	-0.1	0.5	-0.01	11000	-0.2	81600	0.1	52	89	89	72200	16400	60800	880	0.9	5300	63	8100	15.5	-0.001	-0.005	8	7.5	270	60
12.77	13.53	5592404	-0.1	2.5	-0.01	1400	-0.2	9200	0.1	-2	53	8	6100	64100	1750	75	2	23900	4	280	67	-0.001	-0.005	4	3.7	9	15
13.53	14.53	5592405	0.2	1.5	-0.01	520	-0.2	15100	-0.1	-2	49	3	5100	34100	1100	115	1.3	36200	2	55	53	-0.001	-0.005	5	19	5	15
14.53	15.53	5592406	0.2	2	-0.01	600	-0.2	21200	0.1	-2	56	3	6500	20800	1800	145	1.8	43500	2	220	33.5	-0.001	-0.005	16	25.5	7	20
15.53	16.50	5592407	0.2	1.5	-0.01	10400	-0.2	87000	0.1	52	92	150	89400	32500	66900	1000	0.9	4300	83	12400	7.5	-0.001	-0.005	6	1.4	350	70
16.50	17.00	5592408	0.1	1.5	-0.01	10800	-0.2	85900	0.1	48	75	71	81500	18200	64300	960	0.8	4450	72	9550	9	-0.001	-0.005	6	1.45	320	70
17.00	18.00	5592409	0.1	1	-0.01	10000	0.2	83200	0.1	45	87	74	79700	18200	60900	920	1.1	6100	64	11400	15	-0.001	-0.005	7	2.4	310	65
18.00	19.00	5592410	0.1	-0.5	0.1	9550	-0.2	71900	0.1	45	69	69	75700	32000	52400	880	0.9	8200	52	10300	24	-0.001	-0.005	6	1.3	280	70
19.00	20.00	5592411	0.1	1	-0.01	11100	-0.2	88200	0.1	55	89	170	89200	29700	68700	980	0.7	4800	99	10800	16	-0.001	-0.005	6	1.25	340	70
20.00	21.00	5592412	0.2	1	-0.01	10900	-0.2	88300	0.1	59	90	195	89700	30300	68800	960	0.9	5250	100	12700	19.5	-0.001	-0.005	7	1.4	340	75
21.00	22.00	5592413	-0.1	1	-0.01	11200	-0.2	86900	0.1	54	84	150	85100	16900	68400	940	0.6	4900	91	9600	15	-0.001	-0.005	6	0.98	320	65
22.00	23.00	5592414	-0.1	1	-0.01	10400	-0.2	83000	0.1	67	96	135	85200	24900	66300	960	0.7	5000	105	9550	10.5	-0.001	-0.005	6	1.15	310	65
23.00	24.00	5592415	-0.1	0.5	-0.01	10900	-0.2	86900	-0.1	51	60	130	82400	27400	67900	940	0.5	4600	88	7300	10	-0.001	-0.005	6	0.99	300	65
24.00	25.00	5592416	-0.1	1	-0.01	11100	-0.2	86700	-0.1	55	74	110	83900	24800	68400	960	0.8	5250	93	8200	17.5	-0.001	-0.005	6	1.55	300	70

FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
25.00	26.00	5592417	-0.1	1	-0.01	11200	-0.2	87900	0.1	53	98	125	83800	22700	67700	980	0.8	4900	89	10000	16	-0.001	-0.005	6	1.35	310	65
26.00	27.00	5592418	0.1	1	-0.01	9250	0.3	78600	0.2	61	110	78	82800	18100	62900	980	1.1	6950	88	11800	15	-0.001	-0.005	7	2.8	310	75
27.00	28.00	5592419	0.2	1	-0.01	11000	-0.2	85400	0.2	50	99	90	84200	23600	66000	980	1	5800	86	12700	18.5	-0.001	-0.005	7	2.1	320	90
28.00	29.00	5592420	0.1	1.5	-0.01	11100	-0.2	88200	0.1	68	93	145	85600	28000	69700	940	1	5000	95	13000	16	-0.001	-0.005	6	1.15	330	65
29.00	30.00	5592421	-0.1	1	0.32	11000	-0.2	90200	0.1	53	95	125	85200	26300	70200	980	0.6	5300	88	8100	12	-0.001	-0.005	6	1.85	310	75
30.00	31.00	5592422	-0.1	1	-0.01	9700	-0.2	74900	-0.1	54	105	96	78500	23000	55300	900	0.6	8450	66	7750	24	-0.001	-0.005	7	2	270	65
31.00	32.00	5592423	0.1	1	-0.01	10900	-0.2	90300	0.1	53	99	110	88300	21400	69700	1000	0.7	4450	82	12600	9.5	-0.001	-0.005	6	1.7	350	70
32.00	33.00	5592424	-0.1	1	-0.01	11200	-0.2	88500	-0.1	68	100	105	85800	21900	71200	1000	1	4750	88	7900	9.5	-0.001	-0.005	6	1.5	310	70
33.00	34.00	5592425	0.1	1	-0.01	11000	-0.2	89400	0.1	54	100	155	86800	29500	70800	980	1	4500	86	12200	7.5	-0.001	-0.005	6	1.45	330	70
34.00	35.00	5592426	0.1	2	-0.01	11500	-0.2	88700	0.1	64	100	145	83900	25700	69300	960	1	4500	80	10900	9	-0.001	-0.005	6	1.7	320	65
35.00	36.00	5592427	0.1	1.5	-0.01	11000	-0.2	90700	0.2	64	105	130	86800	24100	71600	1000	1	4400	80	12900	8	-0.001	-0.005	6	1.3	340	75
36.00	37.00	5592428	0.2	1.5	-0.01	11300	-0.2	91800	0.2	64	105	185	84900	25400	71200	980	1.1	4400	92	12600	9	-0.001	-0.005	6	1.05	330	75
37.00	37.72	5592429	0.2	1.5	-0.01	10300	0.3	89600	0.2	51	105	66	81600	21200	69800	1100	1.1	5100	79	12400	6.5	-0.001	-0.005	7	1.6	310	90
37.72	39.01	5592430	2.7	0.5	-0.01	1050	0.4	21900	1.6	13	53	10	27600	37000	9850	680	1.4	26100	16	2850	80	-0.001	-0.005	250	110	44	85
39.01	40.00	5592431	0.6	1.5	-0.01	9600	0.4	97300	0.5	73	125	230	84800	73000	64600	1200	1.4	4750	135	12300	13.5	0.004	-0.005	18	2.9	270	110
40.00	41.00	5592432	0.4	2	-0.01	10800	-0.2	104000	0.2	69	135	155	81600	70600	65600	1050	1.6	4050	105	12800	7.5	0.002	-0.005	12	1.8	270	70
41.00	42.00	5592433	0.5	1	-0.01	10600	0.2	105000	0.2	76	120	220	80800	64800	66100	1050	1.4	4150	125	12800	8	0.004	-0.005	11	1.85	270	80
42.00	43.00	5592434	0.4	1.5	-0.01	10800	0.4	101000	0.3	71	120	165	79900	57000	63700	1100	1.6	4550	105	12300	11	0.002	-0.005	11	2.6	260	85
43.00	44.00	5592435	0.6	2	-0.01	10900	0.5	99200	0.4	73	110	210	82900	69900	66400	1200	1.6	5050	110	12800	12.5	0.002	-0.005	12	2.9	260	90
44.00	45.00	5592436	0.4	2.5	-0.01	11000	-0.2	102000	0.3	86	140	350	80800	63800	64600	1000	1.5	4300	145	12500	17	0.005	-0.005	11	1.65	260	75
45.00	46.00	5592437	0.6	2.5	-0.01	9800	0.3	103000	0.4	71	120	115	82900	39300	65200	1200	1.7	5400	110	12700	16	0.003	-0.005	14	3.1	260	95
46.00	47.00	5592438	0.4	3	-0.01	10800	-0.2	103000	0.3	76	130	210	83000	72000	66400	1050	1.6	5050	135	12800	23	0.004	-0.005	12	2.8	270	90
47.00	48.00	5592439	0.4	-0.5	-0.01	11300	-0.2	103000	0.3	86	125	190	80300	73600	66600	1000	1.3	5050	120	12700	25.5	0.003	-0.005	11	1.7	260	75
48.00	49.00	5592440	0.4	2.5	-0.01	11600	-0.2	106000	0.3	78	125	320	81800	66800	67500	1000	1.2	5150	135	12900	25	0.005	-0.005	11	2.3	270	70
49.00	50.00	5592441	0.5	2	0.03	11300	-0.2	119000	0.3	99	140	540	95800	81200	76900	1150	1.4	5900	170	14500	34	0.006	-0.005	13	2.1	300	95
50.00	51.00	5592442	0.5	1.5	0.02	11200	-0.2	98700	0.3	83	120	450	84200	67600	64900	980	1.3	5250	200	12300	24.5	0.008	-0.005	12	2.5	260	75
51.00	52.00	5592443	0.4	-0.5	0.05	11500	-0.2	103000	0.2	93	135	390	83700	64400	67700	1000	1.2	5200	155	12300	24.5	0.005	-0.005	12	1.75	270	80
52.00	53.00	5592444	0.5	-0.5	0.06	11000	-0.2	104000	0.3	125	120	1200	90700	68600	66500	980	1.4	4650	280	12500	24.5	0.012	-0.005	10	2.3	260	70
53.00	54.00	5592445	0.4	1	-0.01	5600	0.2	45500	0.3	38	67	86	59200	54900	24900	680	1.7	16900	36	4550	54	0.002	-0.005	12	8	140	85
54.00	55.00	5592446	0.5	1	-0.01	9850	-0.2	84200	0.3	81	98	500	79200	63600	52200	900	1.7	7700	200	9700	53	0.01	-0.005	10	2.3	220	75
55.00	55.85	5592447	0.4	2.5	0.02	10900	0.3	102000	0.3	82	110	300	78700	65800	63100	1000	1.6	3400	120	11800	28.5	0.006	-0.005	11	2.2	250	90
55.85	56.35	5592448	0.3	1.5	0.02	1850	-0.2	18200	0.1	9	110	25	10400	44800	3500	140	2.6	21500	17	600	62	0.001	-0.005	11	7.5	15	15

FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
56.35	57.00	5592449	0.4	4	-0.01	10500	0.3103000	0.3	80	120	120	270	79400	55000	61900	1000	1.5	3900	135	11700	25.5	0.006	-0.005	11	2.6	250	75
57.00	58.00	5592450	0.4	1	0.02	9650	0.3	86900	0.3	72	105	260	69500	50900	53500	840	1.5	7750	110	10300	41.5	0.007	-0.005	14	3	220	65
58.00	59.00	5592451	0.8	1.5	0.07	11200	0.4102000	0.3	115	135	135	1150	95000	74300	66200	1050	1.4	4750	240	12400	43	0.014	-0.005	10	1.95	270	75
59.00	60.00	5592452	0.7	-0.5	0.04	10400	0.7	93100	0.3	88	120	700	82200	65500	59900	940	1.3	6600	190	11300	51	0.009	-0.005	13	3.5	250	70
60.00	61.02	5592453	1.2	0.5	0.1	10700	0.9106000	0.4	120	130	130	1150	96100	70800	65600	1100	1.3	4150	290	12000	45	0.022	0.01	10	1.9	270	75
61.02	61.88	5592454	0.4	2	-0.01	6150	-0.2	43900	0.3	38	48	115	74400	29100	22200	900	1.4	16300	31	3550	55	0.002	-0.005	16	1.85	150	110
61.88	63.00	5592455	1.9	1	0.1	10600	0.5127000	0.4	140	190	190	1400	121000	81500	79800	1300	1.4	6150	370	14100	64	0.022	0.01	14	2.8	340	105
63.00	64.00	5592456	1.4	-0.5	0.04	10700	0.4	96500	0.4	120	120	1300	95800	65400	64000	1000	1.1	4850	370	12000	55	0.019	0.005	13	3	270	75
64.00	65.00	5592457	1.7	0.5	0.06	10000	0.3	99200	0.3	125	145	1450	99200	79900	64500	1000	1.4	6750	420	12100	52	0.023	0.005	13	5.5	270	85
65.00	66.00	5592458	1	2.5	0.01	10700	0.3	93200	0.4	115	140	1000	93600	53900	60700	980	1.8	4300	280	11300	40	0.015	0.005	11	3.8	260	85
66.00	67.00	5592459	1	-0.5	0.07	11000	0.3	97000	0.4	130	115	1300	97600	70100	62400	980	1.3	4400	290	11800	61	0.021	0.01	11	1.55	270	75
67.00	68.00	5592460	0.5	0.5	-0.01	8450	0.4117000	0.5	88	120	120	310	91800	52100	67300	1200	1.5	7200	135	12300	63	0.006	-0.005	13	2	260	95
68.00	69.00	5592461	0.4	1.5	-0.01	10400	0.5108000	0.3	86	140	140	210	80900	59200	65500	1050	1.2	4950	115	12400	53	0.004	-0.005	14	2.2	260	80
69.00	70.00	5592462	0.7	1	-0.01	10900	0.4123000	0.5	120	160	160	360	100000	79100	79700	1250	2.1	5600	170	14800	68	0.005	-0.005	15	2.4	310	90
70.00	71.00	5592463	0.6	1.5	0.03	6950	0.4	70600	0.9	99	125	940	63100	63500	43200	720	1.8	10600	260	7750	97	0.018	0.005	10	4.8	170	80
71.00	72.00	5592464	0.6	1.5	-0.01	11100	0.4	95800	0.4	100	130	600	82400	48000	67200	1000	1.5	4500	185	12000	61	0.01	0.015	12	1.3	250	75
72.00	73.00	5592465	0.7	0.5	0.02	10600	0.6100000	0.5	97	150	150	580	89500	60300	69100	1050	1.3	4550	220	12300	56	0.01	-0.005	13	1.3	270	90
73.00	74.00	5592466	1.7	2.5	0.11	9200	3.7	87000	0.7	160	175	3100	107000	61500	56400	960	1.9	5800	740	10000	68	0.044	-0.005	8	1.5	230	90
74.00	75.00	5592467	0.8	1	0.04	7800	1.3	92100	0.5	125	270	1350	94400	56700	60100	1100	1.6	6200	350	7900	33	0.024	-0.005	11	3.2	250	95
75.00	76.00	5592468	0.6	2.5	-0.01	8350	1.1	95700	0.5	105	280	580	91400	50300	66000	1100	2.2	4600	185	7950	42.5	0.01	-0.005	13	1.4	270	95
76.00	77.00	5592469	0.7	-0.5	-0.01	7600	1.5110000	0.5	110	360	360	470	107000	47500	75400	1400	2.6	5250	145	9350	33.5	0.003	0.1	15	2.2	330	120
77.00	78.00	5592470	0.5	-0.5	-0.01	6500	1	87200	0.3	79	310	330	86700	34400	55600	1150	2.4	3900	85	6750	16	0.004	0.02	11	1.45	260	95
78.00	79.00	5592471	0.4	2.5	-0.01	7450	0.4	98000	0.3	78	310	200	98000	49000	65700	1250	1.7	4650	88	7950	32	0.004	0.01	12	1.35	320	95
79.00	80.00	5592472	0.8	0.5	0.01	7600	1.1	95800	0.4	130	280	820	105000	42500	61200	1200	2.3	5000	240	7450	58	0.036	0.04	12	1.65	280	110
80.00	81.00	5592473	3.2	-0.5	0.12	6500	3.8	83900	0.9	490	98	8100	161000	30800	50600	1150	2.9	3750	920	9000	75	0.054	0.09	8	1.4	360	120
81.00	82.06	5592474	1	1	0.12	6750	3	87200	0.6	125	70	1950	178000	25100	53900	1550	1.1	3700	760	9900	105	0.058	0.075	5	2.5	410	160
82.06	82.88	5592475	0.2	1	-0.01	1950	0.2	25700	0.1	14	56	18	46100	27600	5650	300	1.6	32200	33	760	41.5	0.001	-0.005	14	5	56	55
82.88	84.00	5592476	0.4	1.5	0.04	8000	1.1	101000	0.3	83	98	840	143000	39500	61700	1450	1.9	5000	190	10900	35	0.01	0.01	9	2.6	440	130
84.00	85.00	5592477	0.8	1	0.15	5300	2.4	80100	0.3	82	200	2000	114000	33800	48400	1100	1.5	8850	370	6900	43.5	0.038	0.05	7	4.1	280	80
85.00	86.00	5592478	0.2	0.5	0.06	4250	0.3101000	0.2	60	380	380	340	90700	27200	59600	1250	0.6	6100	105	5850	35.5	0.005	-0.005	10	1.25	240	85
86.00	87.00	5592479	0.2	1	-0.01	5400	0.3108000	0.2	61	440	440	220	88100	38100	67200	1400	1.3	7250	120	6350	40	0.005	-0.005	11	1.45	230	85
87.00	88.00	5592480	0.2	1	0.18	5050	0.2	93200	0.2	51	360	150	76800	25200	56700	1200	0.8	7250	105	5500	32.5	0.006	-0.005	8	2.6	210	75

FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
88.00	89.00	5592481	0.2	1	0.03	5950	-0.2	103000	0.2	59	390	170	82800	30300	67200	1350	1.1	5950	125	6700	27	0.005	-0.005	9	1.4	220	80
89.00	90.00	5592482	0.2	-0.5	0.01	7700	-0.2	91500	0.2	62	390	150	90100	31900	64000	1250	0.6	4750	120	7250	20.5	0.004	-0.005	7	1.1	270	95
90.00	91.00	5592483	0.2	0.5	-0.01	8100	-0.2	94400	0.2	68	320	160	98000	26600	65600	1300	0.9	5500	125	7950	30	0.003	-0.005	9	1.15	290	90
91.00	92.00	5592484	0.1	0.5	-0.01	5850	-0.2	83000	0.2	45	290	86	71400	28400	51900	1050	0.8	9650	76	5250	25	0.004	-0.005	7	2	180	75
92.00	93.00	5592485	0.2	0.5	-0.01	5450	-0.2	73200	0.2	41	270	120	69000	27600	43900	980	1.1	10800	92	4000	26	0.002	-0.005	6	3	185	70
93.00	93.75	5592486	0.2	-0.5	-0.01	4850	-0.2	71400	0.2	49	175	100	98800	24700	42700	1350	0.6	12400	74	4650	37	0.001	-0.005	10	3	210	130
93.75	94.32	5592487	0.2	1.5	0.03	5450	0.4	69200	0.3	48	165	66	88100	23700	44500	1250	0.7	12900	69	5300	31	-0.001	-0.005	10	2	230	115
94.32	95.00	5592488	0.3	1	-0.01	1150	-0.2	3950	-0.1	5	135	9	11100	47300	3350	125	2.5	8800	8	320	34	-0.001	-0.005	3	0.88	16	20
95.00	96.00	5592489	-0.1	0.5	-0.01	500	-0.2	12800	-0.1	2	74	4	9850	28800	2100	125	1.6	31100	3	65	28	-0.001	-0.005	9	27	15	20
96.00	97.00	5592490	0.2	1	-0.01	740	-0.2	14200	0.2	-2	32	3	5050	32600	1050	120	1.2	43600	3	25	23.5	-0.001	-0.005	14	29.5	10	15
97.00	97.65	5592491	-0.1	1.5	0.1	420	-0.2	15500	0.1	-2	49	7	7300	25200	3350	260	2.1	46100	4	85	14.5	-0.001	-0.005	13	20.5	7	25
97.65	98.20	5592492	0.3	2.5	0.11	2150	0.8	74900	0.6	55	250	19	89000	30100	56400	1800	0.6	6300	93	5800	19.5	0.001	-0.005	25	4.6	210	180
98.20	99.00	5592493	0.1	1.5	-0.01	200	-0.2	21500	0.1	-2	65	14	6350	19800	1700	120	1.6	35800	4	140	25	-0.001	-0.005	9	28	6	15
99.00	99.85	5592494	-0.1	0.5	0.1	2450	-0.2	6800	0.1	-2	71	5	4100	26500	820	55	1.4	21500	2	75	44.5	-0.001	-0.005	24	24.5	5	10
99.85	101.00	5592495	0.2	1	-0.01	7750	-0.2	86300	0.1	52	110	82	73800	18900	59300	1100	1.1	5950	68	10500	15	-0.001	-0.005	10	2.3	220	95
101.00	102.00	5592496	0.2	1.5	-0.01	9300	-0.2	81600	0.2	51	105	100	68900	25800	56100	960	1	5800	67	10100	23.5	-0.001	-0.005	11	1.95	200	75
102.00	103.00	5592497	0.2	1.5	0.17	8800	-0.2	85600	0.2	53	100	105	72700	26000	56800	1000	1	5750	67	10400	22.5	-0.001	-0.005	11	1.8	220	80
103.00	104.00	5592498	0.2	1	0.01	9100	-0.2	81700	0.2	51	110	105	70700	27900	55300	960	0.8	6050	65	9900	25	-0.001	-0.005	11	2	210	80
104.00	105.00	5592499	0.2	1	0.01	8500	0.4	69800	0.2	47	105	120	68100	24900	45500	880	1.2	7850	61	8600	25.5	-0.001	-0.005	10	4.7	200	75
105.00	106.00	5592500	0.2	1.5	-0.01	6450	0.2	56300	0.2	46	95	96	68200	18400	37200	800	1.2	11500	45	6950	29	-0.001	-0.005	10	6	210	70
106.00	107.00	5592501	0.2	1	0.03	9050	-0.2	81700	0.2	61	84	110	87800	25800	53200	1100	1.8	5600	67	10100	23	-0.001	-0.005	10	1.55	270	85
107.00	108.00	5592502	0.2	1	-0.01	9000	-0.2	81700	0.2	63	80	100	90500	34200	53000	1050	1.7	5500	61	10400	22	-0.001	-0.005	10	1.6	280	90
108.00	109.00	5592503	0.2	-0.5	0.01	9100	-0.2	82400	0.2	61	91	100	91500	29700	54400	1050	1.2	5500	63	10500	20.5	-0.001	-0.005	11	1.45	280	90
109.00	110.00	5592504	0.2	-0.5	-0.01	9250	-0.2	84500	0.2	60	100	110	85800	22300	55300	1050	1	5350	66	10500	19	-0.001	-0.005	10	1.35	260	85
110.00	111.00	5592505	0.3	1.5	-0.01	9300	-0.2	83300	0.2	69	94	185	86700	41900	54000	1050	1.6	5850	84	10000	24.5	-0.001	-0.005	11	1.5	260	80
111.00	112.00	5592506	0.2	-0.5	0.05	9250	-0.2	82400	0.2	53	105	140	82300	35400	53900	1000	1.4	5300	81	9900	19	-0.001	-0.005	10	1.4	240	80
112.00	113.00	5592507	0.2	1	-0.01	8500	0.2	87800	0.2	50	110	115	81200	18400	59100	1050	1.1	5350	80	10800	14	-0.001	-0.005	10	2	240	80
113.00	114.00	5592508	0.3	1.5	-0.01	8150	0.3	71100	0.2	49	100	120	66000	24500	46400	880	1	7200	66	8550	17.5	-0.001	-0.005	9	2.2	190	70
114.00	115.00	5592509	0.2	1.5	0.05	7950	-0.2	81100	0.2	60	94	130	76100	23100	51600	920	0.9	6100	79	9650	16	-0.001	-0.005	10	2.4	230	80
115.00	116.00	5592510	0.2	2.5	-0.01	6950	0.6	69200	0.3	51	87	46	77000	16300	45800	1050	1.2	8200	63	8750	16.5	-0.001	-0.005	10	3.5	210	105
116.00	117.00	5592511	0.2	1.5	-0.01	7850	0.6	77400	0.3	56	88	80	78700	25500	47700	1050	1.5	7550	61	9200	20.5	-0.001	-0.005	11	3.1	220	95
117.00	118.00	5592512	0.2	1	-0.01	9050	-0.2	80200	0.2	55	92	100	76800	22800	50600	940	0.7	6100	59	9500	25.5	-0.001	-0.005	11	1.8	230	75

FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
118.00	119.00	5592513	0.2	0.5	-0.01	9000	-0.2	80400	0.2	60	89	125	80100	33000	51700	940	0.6	6000	71	9600	24.5	-0.001	-0.005	12	1.55	240	75
119.00	120.00	5592514	0.2	1	-0.01	8650	-0.2	70700	0.2	60	93	165	75800	26100	46000	880	0.8	7600	83	8500	27.5	-0.001	-0.005	11	2.8	220	70
120.00	121.00	5592515	0.2	1	-0.01	8850	-0.2	81000	0.2	63	115	170	80500	30300	52600	960	0.6	5950	85	9450	25.5	-0.001	-0.005	12	1.65	240	75
121.00	122.00	5592516	0.2	0.5	0.03	8550	0.2	76100	0.2	64	89	210	77800	29500	49800	920	0.6	6400	125	9100	28.5	0.002	-0.005	12	2.2	220	75
122.00	123.00	5592517	0.3	1	-0.01	8300	-0.2	72000	0.2	68	97	270	74900	26400	47400	900	1.7	6950	115	8700	30.5	0.002	-0.005	12	3.2	210	80
123.00	124.30	5592518	0.3	1	-0.01	8200	0.3	71000	0.2	66	110	260	72400	51200	45500	920	0.9	6650	125	8850	30.5	-0.001	-0.005	11	2.3	200	90
124.30	125.53	5592519	0.2	1	-0.01	900	-0.2	8300	0.1	3	115	19	7100	35600	1800	75	1.3	25300	4	180	48	-0.001	-0.005	25	5.5	10	20
125.30	126.55	5592520	0.3	1.5	-0.01	7050	0.4	82100	0.2	81	105	300	84300	44300	51900	1100	1.2	6450	130	8600	21.5	-0.001	-0.005	13	2.7	230	100
126.55	127.50	5592521	0.1	1	-0.01	2450	-0.2	12600	0.2	15	67	31	18400	20800	2900	180	1.1	22900	3	270	44	-0.001	-0.005	4	2	27	25
127.50	128.40	5592522	-0.1	1.5	-0.01	2550	-0.2	19700	0.1	7	34	11	28000	23200	4100	250	0.9	31900	4	580	43	-0.001	-0.005	14	2.8	41	40
128.40	129.20	5592523	0.2	1	-0.01	8050	-0.2	80200	0.2	60	83	115	81800	26700	59800	1150	0.5	6100	60	11400	19	-0.001	-0.005	11	1.6	280	110
129.20	130.00	5592524	-0.1	2.5	-0.01	7950	-0.2	72400	0.2	53	89	135	71600	20100	53500	1000	0.4	9050	58	8500	23.5	-0.001	-0.005	9	2.8	250	85
130.00	131.00	5592525	-0.1	1.5	-0.01	9300	-0.2	78400	0.2	60	91	185	77800	27700	59600	1000	0.5	6400	78	10500	24	-0.001	-0.005	10	1	280	85
131.00	132.00	5592526	0.2	0.5	-0.01	9300	-0.2	77800	0.2	61	91	155	77200	24900	59700	1050	0.6	6350	63	10900	20.5	-0.001	-0.005	10	0.99	280	85
132.00	133.00	5592527	-0.1	1	-0.01	5750	-0.2	48300	0.2	43	74	125	53400	14400	38100	700	0.6	12300	51	6900	24	-0.001	-0.005	13	3.5	175	65
133.00	134.00	5592528	0.1	0.5	-0.01	9400	-0.2	80700	0.2	60	105	125	79700	28900	61700	1050	0.5	6250	64	11400	18.5	-0.001	-0.005	12	0.94	290	85
134.00	135.00	5592529	0.2	-0.5	-0.01	9250	-0.2	80200	0.2	64	80	165	79300	37200	60100	1050	0.4	6750	66	10900	20.5	-0.001	-0.005	10	0.93	280	85
135.00	136.00	5592530	0.2	1.5	-0.01	8650	-0.2	75600	0.2	85	83	480	86700	31200	57900	1000	0.5	5800	165	10400	26.5	0.001	-0.005	8	0.87	280	95
136.00	137.00	5592531	-0.1	1	-0.01	9000	-0.2	74000	0.2	58	84	105	76100	22500	59800	1050	0.3	6050	57	10400	21.5	-0.001	-0.005	10	1.35	270	90
137.00	138.00	5592532	0.2	1	-0.01	9400	-0.2	75800	0.1	57	76	115	76100	32100	57000	1050	0.4	6550	56	10600	20.5	-0.001	-0.005	9	1.25	270	85
138.00	139.00	5592533	0.1	1	-0.01	8950	-0.2	72100	0.2	63	77	300	76300	31000	54300	980	0.5	6700	79	9750	18.5	-0.001	-0.005	9	2.3	260	85
139.00	140.00	5592534	-0.1	2.5	-0.01	9350	-0.2	76200	0.1	55	78	125	76600	20500	56700	1050	0.3	6550	55	10500	22	-0.001	-0.005	9	1.45	280	80
140.00	141.00	5592535	0.1	-0.5	-0.01	9100	-0.2	75100	0.2	62	70	100	75800	30400	55300	1000	0.3	6050	49	10300	18.5	-0.001	-0.005	9	1.5	280	85
141.00	142.00	5592536	-0.1	-0.5	-0.01	9250	-0.2	74300	0.1	52	77	130	73900	13800	54500	1000	0.3	6050	53	10000	19.5	-0.001	-0.005	8	1.05	270	80
142.00	143.00	5592537	-0.1	1	-0.01	8850	-0.2	77100	0.2	58	79	135	79400	27300	57900	1050	0.4	6100	58	10600	16.5	-0.001	-0.005	10	1.15	290	85
143.00	144.00	5592538	0.2	1.5	-0.01	8500	0.5	70500	0.2	53	65	77	72900	20500	51500	1050	0.6	7000	55	7950	21.5	-0.001	-0.005	10	3.8	250	85
144.00	145.00	5592539	-0.1	-0.5	-0.01	8150	0.4	58900	0.2	46	68	70	63800	18700	44600	900	0.6	9600	44	8200	21.5	-0.001	-0.005	7	2.6	230	75
145.00	146.00	5592540	-0.1	1.5	-0.01	8900	-0.2	69900	0.2	54	76	105	73900	19200	53400	960	0.3	5650	48	9700	18.5	-0.001	-0.005	7	1.6	270	80
146.00	147.00	5592541	0.1	1.5	-0.01	7900	0.6	70000	0.2	56	73	140	73400	32000	52500	1000	0.5	6600	56	9350	20	-0.001	-0.005	8	1.5	260	90
147.00	148.00	5592542	-0.1	1.5	-0.01	8050	0.2	68600	0.1	51	75	98	71400	14300	51400	920	0.4	7450	47	9750	16.5	-0.001	-0.005	9	2.8	260	80
148.00	149.00	5592543	0.1	1	-0.01	8900	0.6	69300	0.3	53	87	58	77400	12500	53200	1050	0.7	5700	52	10000	16.5	-0.001	-0.005	9	1.4	270	95
149.00	149.75	5592544	-0.1	2	-0.01	9050	0.5	76900	0.2	56	78	140	80900	13800	57100	1050	0.5	5050	51	10900	13	-0.001	-0.005	8	1.35	300	90

FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
149.75	150.44	5592545	-0.1	2	-0.01	7650	0.6	72200	0.3	57	72	53	82900	12800	55800	1150	0.8	5600	51	10300	11	-0.001	-0.005	10	1.6	300	110
150.44	151.54	5592546	-0.1	1	-0.01	2850	-0.2	10500	0.1	10	61	5	17800	20200	8000	260	0.8	15900	12	1350	34.5	-0.001	-0.005	17	2.3	35	35
151.54	152.25	5592547	-0.1	1	-0.01	7700	0.4	73500	0.3	55	90	42	81900	19000	54200	1100	0.7	6100	53	10300	12	-0.001	-0.005	8	1.5	280	110
152.25	163.00	5592548	-0.1	-0.5	-0.01	7700	0.3	67800	0.4	52	74	63	78200	28200	51400	1100	0.6	6600	52	9750	16	-0.001	-0.005	11	2.7	260	105
153.00	154.00	5592549	-0.1	-0.5	-0.01	9050	-0.2	73600	0.2	52	70	98	74300	13400	55200	960	0.4	5400	54	10100	15	-0.001	-0.005	9	1.1	270	80
154.00	155.00	5592550	0.1	-0.5	-0.01	8550	-0.2	70200	0.2	51	72	135	73100	29100	51200	1000	0.3	6150	58	8200	16.5	-0.001	-0.005	8	1.45	260	85
155.00	156.00	5592551	0.1	1	-0.01	8850	-0.2	67600	0.2	51	63	120	71000	13400	49700	940	0.2	5600	58	9050	16.5	-0.001	-0.005	8	1.1	250	75
156.00	157.00	5592552	0.1	1	-0.01	9250	-0.2	66100	0.2	49	72	105	66600	16400	48000	940	0.3	5950	53	8800	18	-0.001	-0.005	9	1.1	230	75
157.00	158.00	5592553	0.1	2	-0.01	7300	-0.2	62900	0.2	75	61	350	69300	29100	42700	900	0.3	6600	92	8050	41.5	-0.001	-0.005	7	1.2	210	90
158.00	159.00	5592554	-0.1	0.5	-0.01	8700	-0.2	62400	0.2	53	83	165	66100	31300	46300	940	0.4	5250	74	7900	16	-0.001	-0.005	7	0.85	220	70
159.00	160.00	5592555	-0.1	0.5	-0.01	8500	-0.2	45000	0.1	37	43	130	49800	16900	33700	660	-0.2	3900	48	6050	13.5	-0.001	-0.005	5	0.74	170	55
160.00	161.00	5592556	-0.1	1.5	-0.01	8900	-0.2	47000	0.1	39	43	105	50700	23800	34700	660	-0.2	4400	59	6300	12.5	-0.001	-0.005	5	0.69	170	55
161.00	162.00	5592557	-0.1	0.5	-0.01	8800	-0.2	43200	-0.1	38	43	140	47000	13000	32300	600	0.3	3650	52	5950	10	-0.001	-0.005	4	0.71	155	55
162.00	163.00	5592558	-0.1	1.5	-0.01	8300	0.2	36200	-0.1	37	39	165	42300	11500	26700	560	0.4	4700	59	4800	11.5	-0.001	-0.005	4	1.25	130	55
163.00	164.00	5592559	-0.1	-0.5	-0.01	8900	-0.2	43900	0.1	33	42	83	45700	11500	32200	600	0.2	4600	36	5900	13	-0.001	-0.005	5	1.45	155	50
164.00	165.00	5592560	-0.1	1	-0.01	8900	-0.2	42300	0.1	33	39	100	43900	12900	30600	580	0.2	3450	40	5600	9.5	-0.001	-0.005	3	0.63	150	45
165.00	166.00	5592561	-0.1	-0.5	-0.01	9450	-0.2	60700	0.2	45	58	115	63200	20200	44400	820	0.4	5300	46	8150	16	-0.001	-0.005	5	0.79	220	75
166.00	167.00	5592562	-0.1	1	-0.01	8800	-0.2	43600	0.2	32	45	52	45700	15200	32200	600	0.2	4650	28	5800	14.5	-0.001	-0.005	5	1.8	155	55
167.00	168.00	5592563	0.1	5	-0.01	8850	0.3	82500	0.3	66	98	220	89500	20700	62800	1200	0.9	10600	68	11400	29	-0.001	-0.005	10	4.4	310	100
168.00	169.00	5592564	0.1	2	-0.01	9250	-0.2	83100	0.3	71	83	330	89500	34500	60300	1150	0.6	6600	105	11200	18.5	-0.001	-0.005	8	1.25	310	100
169.00	170.00	5592565	0.1	-0.5	-0.01	8750	-0.2	73400	0.1	56	66	165	75100	12700	52800	1000	0.4	7100	72	7500	20.5	-0.001	-0.005	8	1.55	250	90
170.00	171.00	5592566	0.1	2	-0.01	8850	-0.2	80400	0.2	57	73	170	83600	14500	56700	1100	0.3	6300	69	9350	17.5	-0.001	-0.005	8	2	300	95
171.00	172.00	5592567	-0.1	-0.5	-0.01	9100	-0.2	74200	0.2	64	71	250	79900	23700	54200	1050	0.3	6450	92	9650	19.5	-0.001	-0.005	9	1.3	280	90
172.00	173.20	5592568	0.2	-0.5	-0.01	7000	-0.2	67700	0.2	50	73	155	70200	12200	47900	960	0.5	10700	61	8550	20	0.002	-0.005	8	1.75	240	90
173.20	174.50	5592569	-0.1	1.5	-0.01	6500	0.3	71400	0.2	49	70	145	84500	12200	48400	1050	0.6	11500	55	8500	48.5	-0.001	-0.005	9	2.3	250	125
174.50	175.50	5592570	0.1	-0.5	-0.01	8050	-0.2	77900	0.2	57	81	175	82000	11500	55400	1150	0.5	7900	63	9450	17.5	0.002	-0.005	9	2.1	280	100
175.50	176.50	5592571	-0.1	3.5	-0.01	9000	-0.2	78400	0.2	55	86	130	81100	9150	54600	1100	0.6	6500	56	9650	18.5	0.001	-0.005	9	1.4	290	95
176.50	177.50	5592572	0.2	1.5	-0.01	9050	-0.2	78400	0.2	55	79	150	79800	12200	56100	1050	0.5	6950	64	9550	21	0.002	-0.005	9	1.45	280	95
177.50	178.50	5592573	0.1	2.5	-0.01	9000	-0.2	83900	0.2	58	87	135	82600	29000	60000	1150	0.4	6350	59	10300	21	0.001	-0.005	11	1.85	290	95
178.50	179.50	5592574	0.2	-0.5	-0.01	7700	-0.2	75100	0.2	61	380	195	75900	22000	63700	1150	0.3	6450	195	6700	21.5	0.004	-0.005	8	1.6	230	95
179.50	180.50	5592575	0.5	-0.5	-0.01	6150	-0.2	90100	0.2	115	100	940	105000	27200	52900	1250	1	6600	300	9400	22	0.005	-0.005	8	1.25	310	100
180.50	181.50	5592576	0.4	1	0.01	5800	-0.2	66400	0.2	160	105	1750	122000	27500	42400	1100	1.3	9500	490	7200	28.5	0.007	-0.005	6	1.75	300	110

FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
181.50	182.50	5592577	0.2	1.5	-0.01	7700	-0.2	80700	0.2	69	110	390	86400	26100	55500	1200	0.6	6450	145	9400	22	0.002	-0.005	9	1.45	270	95
182.50	183.50	5592578	0.2	3.5	-0.01	8800	0.7	74800	0.2	65	93	360	84200	27000	55900	1200	1.1	6500	125	9500	16.5	0.002	-0.005	10	2.1	280	105
183.50	184.56	5592579	0.8	-0.5	-0.01	6800	1	74400	0.5	115	135	1850	95800	20200	58500	1300	1.9	5450	350	9350	17.5	0.005	-0.005	14	1.85	270	140
184.56	185.50	5592580	0.1	0.5	-0.01	780	-0.2	8800	-0.1	-2	125	16	5500	13600	1300	85	1.9	21900	5	145	32	-0.001	-0.005	12	12.5	5	10
185.50	186.37	5592581	-0.1	0.5	-0.01	1100	-0.2	10000	0.1	3	81	17	9050	13700	2550	140	2	23900	5	300	42	-0.001	-0.005	55	17	10	20
186.37	187.00	5592582	0.2	2	-0.01	9000	-0.2	69800	0.1	45	77	105	66500	14400	49900	920	0.7	7550	44	8900	22.5	-0.001	-0.005	10	1.7	240	80
187.00	188.00	5592583	0.1	5	-0.01	9300	-0.2	78000	0.1	52	82	100	73600	14000	55700	1000	0.8	6250	49	10000	22.5	-0.001	-0.005	10	1.3	270	90
188.00	189.00	5592584	0.3	-0.5	-0.01	9500	-0.2	77100	0.2	50	73	105	74400	24300	54800	1000	0.6	6700	47	9600	22	-0.001	-0.005	10	0.97	270	90
189.00	190.00	5592585	0.3	-0.5	-0.01	9100	-0.2	73400	0.2	56	82	165	75600	14400	51900	1000	0.7	7600	65	8950	24.5	0.002	-0.005	9	1.55	260	90
190.00	191.00	5592586	0.2	1	-0.01	8800	-0.2	71600	0.2	48	70	84	72700	10400	50600	980	0.5	8050	43	9000	25	-0.001	-0.005	10	2.4	250	90
191.00	192.00	5592587	0.2	3	-0.01	9050	-0.2	75100	0.2	49	75	110	76200	15900	53700	1000	0.6	7450	44	9200	19.5	0.001	-0.005	8	1.1	270	90
192.00	193.00	5592588	0.5	-0.5	-0.01	9050	-0.2	74500	0.2	49	68	94	76200	21300	52000	1000	1.2	7750	43	9100	19	-0.001	-0.005	11	1.25	270	90
193.00	194.00	5592589	0.1	2	-0.01	8550	-0.2	72100	0.2	47	69	90	74500	22100	51000	960	0.8	7500	42	8900	20	-0.001	-0.005	12	1.85	260	90
194.00	194.77	5592590	-0.1	2	-0.01	8200	-0.2	71000	0.2	47	84	93	74100	20300	50000	1050	0.8	7650	42	9050	20	-0.001	-0.005	12	1.65	260	95
194.77	195.75	5592591	-0.1	0.5	-0.01	1600	-0.2	19800	-0.1	9	64	30	33400	10900	6450	490	1.5	21200	6	860	26.5	-0.001	-0.005	13	2.2	46	65
195.75	197.03	5592592	-0.1	-0.5	-0.01	1500	-0.2	14700	-0.1	6	105	24	23800	11900	4150	330	2.1	19600	5	490	24.5	-0.001	-0.005	10	2.2	29	50
197.03	198.00	5592593	0.1	1	-0.01	4350	-0.2	31800	0.2	20	62	42	43200	11100	18900	580	1.4	19200	15	3150	29	-0.001	-0.005	21	5	110	75
198.00	199.00	5592594	0.3	2	-0.01	8550	-0.2	63200	0.3	42	76	87	76000	18900	42700	1000	1	8300	36	7150	22	-0.001	-0.005	11	1.8	250	100
199.00	200.00	5592595	0.2	-0.5	-0.01	8950	-0.2	68600	0.2	45	68	91	77300	13000	45300	1050	0.7	8450	39	7300	22.5	-0.001	-0.005	11	1.45	250	110
200.00	201.00	5592596	0.1	7.5	-0.01	6550	0.4	68700	0.3	38	72	140	75200	13300	43000	1100	1.4	9350	42	7100	26	-0.001	-0.005	12	2.6	220	115
201.00	202.30	5592597	0.2	1	-0.01	5700	0.3	60200	0.1	35	67	94	61300	16700	36300	920	1.2	11900	34	6050	29.5	-0.001	-0.005	15	3.8	190	95
202.30	203.00	5592598	-0.1	5.5	-0.01	2150	-0.2	37100	0.2	16	50	36	52900	13300	13800	700	1.5	35700	12	1750	34.5	-0.001	-0.005	12	2.6	89	100
203.00	204.00	5592599	0.1	1	-0.01	2200	0.4	23900	0.3	10	22	4	40000	15700	6600	500	1	28300	9	520	52	-0.001	-0.005	10	1.2	41	80
204.00	205.00	5592600	0.2	-0.5	-0.01	1700	-0.2	22700	0.2	8	32	2	32900	11900	6150	460	1	29400	4	1550	46.5	-0.001	-0.005	15	1.15	33	65
205.00	206.00	5592601	-0.1	-0.5	-0.01	1500	-0.2	22400	0.2	8	28	3	32200	12000	5550	460	1.2	33400	4	460	46.5	-0.001	-0.005	13	1.75	32	60
206.00	207.00	5592602	0.1	-0.5	-0.01	1800	-0.2	21800	0.2	8	34	12	33500	10300	5600	450	0.9	31700	4	760	40	-0.001	-0.005	13	2.9	44	60
207.00	208.00	5592603	-0.1	-0.5	-0.01	1450	-0.2	18100	0.2	5	27	2	23400	10800	4150	320	0.7	29500	2	740	32.5	-0.001	-0.005	13	0.9	21	40
208.00	209.00	5592604	-0.1	1	-0.01	1450	-0.2	22200	0.2	8	27	-2	32300	11100	5850	470	0.7	35800	4	370	35	-0.001	-0.005	13	0.89	30	60
209.00	210.00	5592605	-0.1	1	-0.01	1200	-0.2	17300	0.2	7	30	3	27900	11900	5000	420	0.8	38600	4	320	29.5	-0.001	-0.005	21	2.2	25	60
210.00	211.00	5592606	-0.1	1	-0.01	1250	-0.2	19900	0.2	8	33	3	29700	14300	5400	500	1	38700	4	620	28	-0.001	-0.005	26	2.4	26	65
211.00	212.00	5592607	-0.1	0.5	-0.01	1200	-0.2	18000	0.2	8	33	2	28200	11400	5150	410	0.9	39700	-2	720	28	-0.001	-0.005	27	3	25	50
212.00	213.00	5592608	-0.1	0.5	-0.01	1250	-0.2	20300	0.3	8	48	3	31900	14700	5800	540	1.1	37700	4	880	26	-0.001	-0.005	24	2.5	29	65

FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
213.00	214.00	5592609	0.3	-0.5	-0.01	1250	0.2	14600	0.5	7	34	-2	27600	25800	5400	460	1.1	36800	3	580	22	-0.001	-0.005	14	2.2	26	50
214.00	215.00	5592610	-0.1	0.5	-0.01	1250	-0.2	17600	0.3	7	54	-2	26900	14300	5050	440	1	36900	2	720	24.5	-0.001	-0.005	10	1.65	26	50
215.00	215.50	5592611	-0.1	2.5	-0.01	1300	-0.2	19000	0.3	9	55	-2	30700	19800	5450	440	1	39100	3	640	27.5	-0.001	-0.005	14	1.5	27	60

APPENDIX VI

EL 9371 MORDOR POUND

RC-Percussion Drill Hole Ledgers and Assay Results

CRA EXPLORATION PTY LIMITED : DRILL HOLE LEDGER

DRILL HOLE RC96MD002
TENEMENT MORDOR POUND
PROSPECI BRAVEHEART WE
LAB
DPO 81936

GEOLOGIST DJL
AMGE 447458
AMGN 7405400
ZONE 53
250K MAP No. SF5314 ALICE SPRINGS

RL COLLAR 695
AZIMUTH 145
INCLINATION -60
DRILLING CO. GOREY&COLE
DRILL TYPE VK 600B

COMMENCED 18/06/96
COMPLETED 19/06/96
CASING LEFT 6M
TOTAL DEPTH 114 (Metres)
TECTONIC DOMAIN Arunta Orogen

DEPTH FROM TO	SAMPLE No	REG STRAT	LOCAL STRAT	LITHOLOGY	LITHOLOGICAL DESCRIPTOR	COLOUR	TEXTURE	ALTERATN	MINERALN	CPS	MAG SUS SI UNITS	COMMENTS
0.00 5.00	5592101	PM2		SNK		DB/V	FN/MN		MAL	160	4500	10-20% CALCRETE; HIGH PHLOGOPITE CONTENT
5.00 10.00	5592102	PM2		SNK		DB/V	FN/MN		POH	170	2500	HIGH PHLOGOPITE CONTENT
10.00 15.00	5592103	PM2		SNK		DB/V	FN/MN		POH	190	1500	UP TO 20% PEGM (1M)
15.00 20.00	5592104	PM2		SNK		DB/V	FN/MN		POH	180	750	V.HIGH PHLOGOPITE CONTENT
20.00 23.00	5592105	PM2		PEG/SNK		KW;B/V	DY/FN/MG		POH	190	350	70% PEGMATITE
23.00 28.00	5592106	PM2		SNK		KW;B/V	FN/MN		POH	180	800	UP TO 1% POH
28.00 33.00	5592107	PM2		SNK		DB/V	FN/MN		POH	170	1500	HIGH PHLOG.; UP TO 25% PEGM (1M)
33.00 38.00	5592108	PM2		SNK		DB/V	FN/MN		POH/CPY	170	1700	UP TO 20% PEGM. OVER 1M
38.00 41.00	5592109	PM2		SNK		DB/V	FN/MN		POH	170	1500	
41.00 44.00	5592110	PM2		SNK		DB/V	FN/MN		POH	170	1200	
44.00 47.00	5592111	PM2		PEG		KW;B/V	DY			180	3500	
47.00 52.00	5592112	PM2		SNK		DB/V	FN/MN		POH	180	1500	UP TO 30% PEGMATITE OVER 1M
52.00 56.00	5592113	PM2		SNK		DB/V	FN/MN		POH	180	2500	
56.00 59.00	5592114	PM2		PEG/SNK		KW;B/V	DY/FN			180	3000	TOTAL 60% PEGMATITE
59.00 64.00	5592115	PM2		SNK		DB/V	FN/MN		POH	170	2000	10% PEGMATITE OVER 1M
64.00 69.00	5592116	PM2		SNK		DB/V	FN/MN		POH	170	2000	35% PEGMATITE OVER 1M
69.00 74.00	5592117	PM2		SNK		DB/V	FN/MN		POH	200	650	UP TO 60% PEGMATITE OVER 1M
74 00 79 00	5592118	PM2		SNK		DB/V	FN/MN		POH/CPY	180	450	40% VEIN QTZ OVER 1M
79 00 84.00	5592119	PM2		SNK		DB/V	FN/MN		POH	170	400	UP TO 45% PEGMATITE OVER 1M
84.00 89.00	5592120	PM2		SNK		DB/V	FN/MN		POH	190	250	UP TO 40% PEGMATITE OVER 1M
89.00 94 00	5592121	PM2		SNK		DB/V	FN/MN		POH	190	350	UP TO 25% PEGMATITE

DEPTH FROM TO	SAMPLE No	REG STRAT	LOCAL LITHOLOGY STRAT	LITHOLOGICAL DESCRIPTOR	COLOUR	TEXTURE	ALTERATN	MINERALN	CPS	MAG SUS SI UNITS	COMMENTS
94.00 98.00	5592122	PM2	SNK		DB/V	FN/MN		POH	180	300	
98.00 101.00	5592123	PM2	SNK		DB/V	FN/MN			180	250	
101.00 104.00	5592124	PM2	PEG		K-G/W	DY			250	600	TOTAL 25% SNK
104.00 108.00	5592125	PM2	SNK		DB/V	FN/MN		POH	190	250	25% PEGMATITE OVER 1M
108.00 111.00	5592126	PM2	PEG		LB-G	DY			200	650	UP TO 35% SNK OVER 1M
111.00 114.00	5592127	PM2	PEG		G-W-K	DY			250	650	

CRA EXPLORATION PTY LIMITED : DRILLHOLE ASSAY RESULTS

DRILL HOLE		RC96MD002		GEOLOGIST		D.J.L		RL COLLAR		695		COMMENCED		18/06/96													
TENEMENT		MORDOR POUND		AMGE		447458		AZIMUTH		145		COMPLETED		19/06/96													
PROSPECT		BRAVEHEART WE		AMGN		7405400		INCLINATION		-60		CASING LEFT		6M													
LAB				ZONE		53		DRILLING CO.		GOREY&COLE		TOTAL DEPTH		114 (metres)													
DPQ		81936		MAP REF.		SF5314 ALICE SPRINGS		DRILL TYPE		VK 600B		TECTONIC DOMAIN		Arunta Orogen													
FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
0.00	5.00	5592101	0.2	1	0.01	9300	-0.2	93800	0.2	78	81	310	105000	30200	60300	960	0.5	3600	105	9350	15	-0.001	-0.005	8	1.45	440	100
5.00	10.00	5592102	-0.1	-0.5	-0.01	10000	-0.2	85800	0.2	70	150	220	93100	35700	68700	1100	1	4250	115	11400	19.5	-0.001	-0.005	10	0.88	370	100
10.00	15.00	5592103	0.1	-0.5	-0.01	9300	-0.2	90800	0.2	58	145	170	84300	38000	68900	1100	1	5100	95	12400	22.5	-0.001	-0.005	9	1.7	330	100
15.00	20.00	5592104	-0.1	0.5	0.03	9400	-0.2	87000	0.2	59	140	140	80800	30100	65700	1100	0.9	4400	88	11500	21.5	-0.001	-0.005	11	1.4	320	95
20.00	23.00	5592105	-0.1	0.5	-0.01	5500	-0.2	46000	0.1	32	100	47	46800	29500	34300	620	1.7	12400	46	5800	35	-0.001	-0.005	10	7.5	170	55
23.00	28.00	5592106	0.1	-0.5	-0.01	9650	-0.2	87500	0.2	62	135	135	82000	34200	65100	1100	1.3	5500	83	12100	20	-0.001	-0.005	12	1.85	320	90
28.00	33.00	5592107	0.2	-0.5	-0.01	10000	-0.2	83400	0.2	59	115	115	78400	23300	63700	1000	0.9	4800	79	10800	21	-0.001	-0.005	11	1.35	310	85
33.00	38.00	5592108	0.1	-0.5	-0.01	9450	-0.2	82600	0.3	65	115	120	82000	33500	63100	1050	0.9	5550	82	10800	18.5	-0.001	-0.005	11	1.95	320	90
38.00	41.00	5592109	0.1	-0.5	-0.01	9300	-0.2	84200	0.2	61	120	105	83800	31100	66400	1150	1	5350	73	11400	36.5	-0.001	-0.005	11	2.4	330	100
41.00	44.00	5592110	0.2	-0.5	-0.01	9100	-0.2	85800	0.2	63	115	135	85400	27900	65800	1150	1.2	5200	76	12500	44	-0.001	-0.005	12	1.5	340	110
44.00	47.00	5592111	0.1	0.5	-0.01	5900	-0.2	62600	0.2	48	115	54	77500	24900	47500	960	1	9900	61	9350	75	-0.001	-0.005	11	2.6	250	115
47.00	52.00	5592112	0.2	1	0.03	9100	-0.2	83100	0.3	69	115	115	82800	26700	63700	1050	1	5200	75	11800	22	-0.001	-0.005	15	1.95	330	100
52.00	56.00	5592113	-0.1	1	0.01	9300	0.6	82500	0.5	61	110	115	81400	23000	62300	1000	1.3	5150	70	11900	22.5	-0.001	-0.005	14	1.35	330	95
56.00	59.00	5592114	0.1	1	-0.01	5500	-0.2	47900	0.3	37	78	64	56400	34800	31200	620	1.3	16100	40	5950	35.5	-0.001	-0.005	10	2.7	180	65
59.00	64.00	5592115	0.1	-0.5	-0.01	9450	-0.2	88100	0.3	69	115	115	86100	24900	66300	1050	1	5650	77	12400	19	-0.001	-0.005	15	1.55	340	95
64.00	69.00	5592116	0.1	1	-0.01	9300	-0.2	85000	0.2	63	115	115	83000	19200	64500	1000	0.6	5800	73	11800	17	-0.001	-0.005	16	1.65	330	90
69.00	74.00	5592117	0.2	0.5	-0.01	8350	-0.2	81400	0.3	61	110	140	75000	23300	59500	940	0.9	6350	76	11500	21	-0.001	-0.005	21	3.2	300	85
74.00	79.00	5592118	0.1	-0.5	-0.01	8400	0.2	86300	0.3	70	115	135	83100	30800	64700	1000	0.9	5700	79	12300	19	-0.001	-0.005	19	2.3	330	90
79.00	84.00	5592119	0.2	0.5	-0.01	8850	0.2	88500	0.2	59	130	110	76300	24000	65600	1050	0.9	5500	76	12300	20	-0.001	-0.005	17	1.65	300	85
84.00	89.00	5592120	0.5	1.5	-0.01	8700	0.2	86400	0.3	59	125	96	61700	13900	63600	920	0.9	5000	70	7250	22	-0.001	-0.005	18	1.7	230	70
89.00	94.00	5592121	0.2	0.5	-0.01	8800	-0.2	90700	0.3	62	125	110	69200	27200	66700	980	0.8	5000	75	12000	23.5	-0.001	-0.005	22	1.6	270	75
94.00	98.00	5592122	0.1	-0.5	-0.01	8600	-0.2	90600	0.2	58	125	99	70200	25200	66800	1000	0.8	4550	77	11300	24.5	-0.001	-0.005	18	1.3	280	80
98.00	101.00	5592123	0.2	0.5	-0.01	8950	-0.2	91800	0.3	62	115	125	68100	26300	66200	980	1	4750	77	13000	23	-0.001	-0.005	23	1.9	270	75
101.00	104.00	5592124	0.2	1	-0.01	4650	-0.2	54500	0.3	40	125	60	46100	20600	38600	660	1.2	16400	45	6900	36	-0.001	-0.005	31	9.5	160	55

FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
104.00	108.00	5592125	0.1	-0.5	-0.01	8550	-0.2	87500	0.2	55	115	115	69100	35800	67700	1000	0.7	4750	77	12100	12.5	-0.001	-0.005	18	1.55	270	80
108.00	111.00	5592126	-0.1	-0.5	-0.01	1900	-0.2	18600	0.3	14	130	20	22100	34500	14600	290	1.3	15200	19	2300	30	-0.001	-0.005	9	5	56	30
111.00	114.00	5592127	-0.1	-0.5	-0.01	1000	-0.2	5450	0.2	3	125	4	10000	16500	3500	125	1.2	18500	6	250	39	-0.001	-0.005	10	12	12	15

CRA EXPLORATION PTY LIMITED : DRILL HOLE LEDGER

DRILL HOLE RC96MD003
TENEMENT MORDOR POUND
PROSPECT BRAVEHEART SW
LAB
DPO 81936

GEOLOGIST DLW
AMGE 447284
AMGN 7405245
ZONE 53
250K MAP No. SF5314 ALICE SPRINGS

RL COLLAR 703
AZIMUTH 145
INCLINATION -60
DRILLING CO. GOREY&COLE
DRILL TYPE VK 600B

COMMENCED 19/06/96
COMPLETED 20/06/96
CASING LEFT 5.5M
TOTAL DEPTH 74 (Metres)
TECTONIC DOMAIN Arunta Orogen

DEPTH		SAMPLE No	REG STRAT	LOCAL LITHOLOGY	LITHOLOGICAL DESCRIPTOR	COLOUR	TEXTURE	ALTERATN	MINERALN	CPS	MAG. SUS SI UNITS	COMMENTS
FROM	TO											
0.00	4.00	5592128	PM2	SNK		GW/N	MN/EQG	CL		150	500	~40% CLC
4.00	7.00	5592129	PM2	SNK		GW/N	POP	CL	POH	150	2500	~40%-50% CLC+SIL
7.00	12.00	5592130	PM2	SNK		GW/N	POP	CL	POH	150	6000	
12.00	17.00	5592131	PM2	SNK	KFS	GW/N	POP		POH	160	7000	~60% WKFS
17.00	20.00	5592132	PM2	SNK		KW/N	POP		POH	160	6500	WATER TABLE AT 18M
20.00	24.00	5592133	PM2	SNK		KW/N	POP			160	6500	
24.00	29.00	5592134	PM2	SNK		KW/N	POP		POH	160	6500	
29.00	34.00	5592135	PM2	SNK		KW/N	POP	HM	POH	160	5000	
34.00	39.00	5592136	PM2	SNK		CR/BK	POP	HM/SE		150	5000	
39.00	44.00	5592137	PM2	SNK		GW/N	POP			160	4500	
44.00	49.00	5592138	PM2	SNK		GW/N	POP	SE		150	1500	
49.00	54.00	5592139	PM2	SNK		VW/N	POP	SE/HM	POH	140	2500	
54.00	59.00	5592140	PM2	SNK		VW/N	POP	SE/HM	POH	150	2500	
59.00	64.00	5592141	PM2	SNK		GW/N	POP	SE	POH	150	5000	
64.00	69.00	5592142	PM2	SNK		GW/N	POP	SE	POH	155	7000	
69.00	74.00	5592143	PM2	SNK/SYN		LV/N	POP/MEL	EP/SE	POH	155	4000	SYN IS MEL

CRA EXPLORATION PTY LIMITED : DRILLHOLE ASSAY RESULTS

DRILL HOLE		RC96MD003		GEOLOGIST		DLW		BL COLLAR		703		COMMENCED		19/06/96													
TENEMENT	MORDOR POUND	AMGE		447284		AZIMUTH		145		COMPLETED		20/06/96															
PROSPECT	BRAVEHEART SW	AMGN		7405245		INCLINATION		-60		CASING LEFT		5.5M															
LAB		ZONE		53		DRILLING CO.		GOREY&COLE		TOTAL DEPTH		74 (metres)															
DPO	81936	MAP REF.		SF5314 ALICE SPRINGS		DRILL TYPE		VK 600B		TECTONIC DOMAIN		Arunta Orogen															
FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
0.00	4.00	5592128	0.3	1	-0.01	4200	-0.2	122000	0.2	30	290	50	37800	20300	92300	560	-0.2	4000	145	2650	16	0.003	-0.005	7	3.6	130	75
4.00	7.00	5592129	0.4	0.5	0.01	6950	-0.2	78800	0.1	38	220	47	51400	20600	59800	660	0.3	6650	87	3900	29	0.002	-0.005	8	2.2	175	85
7.00	12.00	5592130	0.3	1	-0.01	10300	-0.2	44500	0.2	38	52	53	68500	19900	32400	780	0.8	9850	36	5500	43.5	-0.001	-0.005	7	0.81	230	95
12.00	17.00	5592131	0.3	1	-0.01	10600	-0.2	42000	0.2	34	51	49	74000	25800	30100	800	0.9	10300	34	5450	47.5	-0.001	-0.005	10	1.15	240	95
17.00	20.00	5592132	0.2	0.5	-0.01	9900	-0.2	51300	0.3	44	64	57	80200	24800	37100	920	0.8	10700	42	6400	55	-0.001	-0.005	11	1.05	270	105
20.00	24.00	5592133	0.1	-0.5	-0.01	10100	-0.2	46700	0.3	40	57	50	76100	22600	35700	840	0.6	9550	43	6000	47.5	-0.001	-0.005	10	1.1	260	95
24.00	29.00	5592134	0.1	-0.5	-0.01	10300	-0.2	49300	0.2	40	52	52	80000	26400	35900	860	0.3	10300	42	6350	35	-0.001	-0.005	11	0.76	280	100
29.00	34.00	5592135	0.3	-0.5	-0.01	10800	-0.2	49600	0.4	49	52	57	73700	19400	34500	840	0.6	9300	32	6500	52	-0.001	-0.005	12	1.25	270	100
34.00	39.00	5592136	0.2	0.5	-0.01	10000	-0.2	46500	0.3	40	59	51	74900	26300	33900	860	0.7	10400	34	6050	53	-0.001	-0.005	12	1.3	250	100
39.00	44.00	5592137	0.1	1	-0.01	10200	0.3	40600	0.2	35	55	54	71000	21900	28300	780	1	10900	28	5200	57	-0.001	-0.005	14	1.95	230	90
44.00	49.00	5592138	0.2	2	-0.01	9050	1.5	87300	0.4	69	400	100	121000	21800	69500	1600	2.4	14400	145	8950	59	0.001	-0.005	18	2.1	410	170
49.00	54.00	5592139	0.2	1.5	-0.01	8750	0.4	64200	0.3	53	125	71	85600	25600	44600	1050	0.9	9000	63	7100	28.5	-0.001	-0.005	13	1.15	310	115
54.00	59.00	5592140	0.2	0.5	-0.01	8400	0.3	55000	0.3	48	105	45	85700	21000	37600	980	0.7	9650	42	6450	32.5	-0.001	-0.005	11	2.1	300	120
59.00	64.00	5592141	0.1	-0.5	-0.01	9000	-0.2	60300	0.1	50	77	58	90400	34200	39800	1000	0.4	9900	45	7200	33	-0.001	-0.005	10	1.1	320	120
64.00	69.00	5592142	0.2	-0.5	-0.01	8850	-0.2	52300	0.5	48	97	47	82700	30600	35400	940	0.8	10100	42	6200	34.5	-0.001	-0.005	14	1.4	290	115
69.00	74.00	5592143	-0.1	1	-0.01	4650	-0.2	37300	0.2	22	230	35	52700	33100	23300	740	0.8	14800	48	2900	25.5	-0.001	-0.005	9	1.2	145	85

CRA EXPLORATION PTY LIMITED : DRILL HOLE LEDGER

DRILL HOLE RC96MD004		GEOLOGIST DLW		RL COLLAR 710		COMMENCED 20/06/96					
TENEMENT MORDOR POUND		AMQ.E 447630		AZIMUTH 145		COMPLETED 21/06/96					
PROSPECT BRAVEHEART SW		AMQ.N 7405486		INCLINATION -60		CASING LEFT 4.5M					
LAB		ZONE 53		DRILLING CO. GOREY&COLE		TOTAL DEPTH 102 (Metres)					
DPO 81938		250K MAP No. SF5314 ALICE SPRINGS		DRILL TYPE VK 600B		TECTONIC DOMAIN Arunta Orogen					
DEPTH FROM TO	SAMPLE No	REG STRAT	LOCAL LITHOLOGY STRAT	LITHOLOGICAL DESCRIPTOR	COLOUR	TEXTURE	ALTERATN	MINERALN	CPS	MAG SUS SI UNITS	COMMENTS
0.00 4.00	5592144	PM2		CLC/SNK	RB/OB/G/ B	FN-MN/EQG			175	200	
4.00 8.00	5592145	PM2		SNK	N/GW	FN-MN/EQG		POH	170	6500	~1-2%POH
8.00 13.00	5592146	PM2		SNK	N/GW	MN/EQG		POH	180	2000	
13.00 17.00	5592147	PM2		SNK	N/W	MN/EQG		POH	180	3500	
17.00 20.00	5592148	PM2		SNK	N/W	EQG/POP			170	1500	Contains ~25% PEG
20.00 25.00	5592149	PM2		SNK	N/W	EQG/POP			155	1000	~1%POH 20-21m/ abundant PHG
25.00 29.00	5592150	PM2		SNK	N	EQG/POP		POH/CCP	190	1000	1-5%POH/ trace CCP/ abundant PHG
29.00 32.00	5592151	PM2		SNK	N/W	POP			200	100	25%PEG/2-3%SEP
32.00 35.00	5592152	PM2		SNK	N/W	EQG	HM/CH?	POH	200	200	
35.00 36.00	5592153	PM2		PEG	W/K/N	DY			200	2500	~40%EQGSK
36.00 39.00	5592154	PM2		SNK	N/W/K	EQG		POH	195	750	~25%PEG
39.00 41.00	5592155	PM2		PEG	K/W/N	DY			185	1500	~25%EQGSNK
41.00 46.00	5592156	PM2		SNK	N/GW	EQG			180	1000	
46.00 49.00	5592157	PM2		SNK	VN/GW	EQG			190	300	
49.00 54.00	5592158	PM2		SNK	VN/GW	EQG	HM	POH	180	250	~15%PEG
54.00 58.00	5592159	PM2		PEG	W/K/LV	DY			225	600	
58.00 63.00	5592160	PM2		SNK	N/W/K	EQG			190	250	~10%PEG
63.00 65.00	5592161	PM2		SNK	N/GW	EQG/POP			195	275	
65.00 66.00	5592162	PM2		PEG	K/W/N	DY			190	300	~40%EQGSNK
66.00 71.00	5592163	PM2		SNK	N/W/K	EQG			185	300	~10%PEG
71.00 75.00	5592164	PM2		SNK	N/GW	EQG		POH	170	1750	~20%PEG
75.00 78.00	5592165	PM2		SNK	N/GW	EQG		POH	175	650	10-20%PEG
78.00 81.00	5592166	PM2		PEG	OK/W	DY			200	2000	~10%EQGSNK
81.00 82.00	5592167	PM2		SNK	N/OK/W	EQG		POH	200	1000	~2%POH
82.00 84.00	5592168	PM2		PEG	OK/W	DY			270	550	~20%EQGSNK
84.00 86.00	5592169	PM2		SNK	GW/N	POP			210	700	

DEPTH FROM TO	SAMPLE No	REG STRAT	LOCAL LITHOLOGY STRAT	LITHOLOGICAL DESCRIPTOR	COLOUR	TEXTURE	ALTERATN	MINERALN	CPS	MAG_SUS SI UNITS	COMMENTS
86.00 91.00	5592170	PM2	SNK		N/W	POP		POH/CCP	165	1200	~5-10%POH/ traceCCP
91.00 96.00	5592171	PM2	SNK		N/GW	POP	HM	POH/CCP	170	450	~1-2%POH/ traceCCP
96.00 99.00	5592172	PM2	SNK		N/GW	POP		POH/CCP	170	2000	~5-10%POH/ traceCCP
99.00 102.00	5592173	PM2	SNK		N/GW	POP		POH/CCP	160	2800	~5-10%POH/ traceCCP/ hole abandoned due to groundwater flooding

CRA EXPLORATION PTY LIMITED : DRILLHOLE ASSAY RESULTS

DRILL HOLE			RC96MD004		GEOLOGIST		DLW		RL COLLAR		710		COMMENCED		20/06/96											
TENEMENT		MORDOR POUND		AMGE		447630		AZIMUTH		145		COMPLETED		21/06/96												
PROSPECT		BRAVEHEART SW		AMGN		7405486		INCLINATION		-60		CASING LEFT		4.5M												
LAB				ZONE		53		DRILLING CO.		GOREY&COLE		TOTAL DEPTH		102 (metres)												
DPO		81938		MAP REF.		SF5314		ALICE SPRINGS		DRILL TYPE		VK 600B		TECTONIC DOMAIN		Arunta Orogen										
FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V
0.00	4.00	5592144	0.3	2	0.03	4250	0.2	138000	0.2	32	185	66	52200	17500	63400	700	0.4	5150	50	3350	17.5	0.003	-0.005	9	2.8	210
4.00	8.00	5592145	0.4	1.5	-0.01	6800	-0.2	79000	0.2	78	200	620	117000	32500	57300	1200	1.1	6550	180	7250	23.5	0.003	-0.005	15	1.65	390
8.00	13.00	5592146	0.3	2	-0.01	6150	0.2	76600	0.2	47	280	85	70300	21800	56000	1050	1.2	8600	92	5800	27.5	0.003	-0.005	16	3.9	270
13.00	17.00	5592147	0.3	1.5	0.01	6700	-0.2	80200	0.2	50	270	105	79900	22300	61700	1100	0.9	6900	95	6650	20.5	0.003	-0.005	12	1.55	300
17.00	20.00	5592148	0.2	2	-0.01	7300	-0.2	71300	0.2	47	145	105	69200	20000	51600	940	0.9	8250	71	8150	28.5	0.001	-0.005	10	1.75	250
20.00	25.00	5592149	0.3	2	-0.01	9150	-0.2	82400	0.2	51	95	140	75200	21700	62300	960	1	6700	86	12300	17	-0.001	-0.005	11	1.8	290
25.00	29.00	5592150	0.2	2	-0.01	9600	-0.2	75800	0.2	50	97	115	72700	18900	55800	940	1.6	6700	77	9750	28	-0.001	-0.005	15	1.65	270
29.00	32.00	5592151	0.3	2	0.01	8600	0.5	83400	0.2	51	90	105	70800	21700	61300	1050	1.2	5900	76	11300	21	-0.001	-0.005	17	2.4	260
32.00	35.00	5592152	0.3	2	-0.01	9300	-0.2	90300	0.2	54	92	105	82000	26300	66800	1050	1.3	5250	81	12100	14	-0.001	-0.005	17	1.8	290
35.00	36.00	5592153	0.2	2	0.01	6050	-0.2	62900	0.2	34	120	97	66000	22300	42400	800	1.3	11700	52	7950	26.5	-0.001	-0.005	12	5	190
36.00	39.00	5592154	0.3	1.5	-0.01	8800	-0.2	83900	0.2	49	100	110	65800	25100	63100	1000	1.1	5900	78	11100	22.5	-0.001	-0.005	16	2.2	260
39.00	41.00	5592155	0.2	2	-0.01	3800	-0.2	42400	0.1	22	84	35	44100	31800	28200	580	1.1	20200	35	5000	27.5	-0.001	-0.005	11	3.7	130
41.00	46.00	5592156	0.3	2	-0.01	9200	-0.2	85800	0.2	52	86	110	72500	23600	62200	1050	0.9	5600	70	11200	28.5	-0.001	-0.005	15	1.8	290
46.00	49.00	5592157	0.3	1.5	-0.01	8800	0.3	83200	0.2	45	100	100	68500	25600	61900	1000	1.1	6150	74	11100	28	-0.001	-0.005	16	2.1	260
49.00	54.00	5592158	0.3	2	-0.01	7800	0.3	87700	0.2	50	90	98	72500	22000	65600	1050	1	5550	77	11900	19.5	-0.001	-0.005	17	1.95	270
54.00	58.00	5592159	0.2	2	-0.01	1450	-0.2	20100	0.1	7	81	28	16700	23600	8900	310	1.2	24200	14	1400	33	-0.001	-0.005	16	11.5	35
58.00	63.00	5592160	0.2	1	-0.01	8600	-0.2	62800	0.1	37	67	84	52300	20300	48700	800	0.9	5450	59	8450	16	-0.001	-0.005	11	1.5	210
63.00	65.00	5592161	0.3	1	-0.01	8950	-0.2	76200	0.2	46	75	98	72100	21200	61700	980	1.1	5400	71	10800	21	-0.001	-0.005	13	1.4	260
65.00	66.00	5592162	0.4	1.5	0.01	5050	-0.2	45300	-0.1	40	84	71	56500	22000	57000	740	0.9	6500	54	7800	21.5	-0.001	-0.005	12	4.8	190
66.00	71.00	5592163	0.3	1.5	-0.01	6300	-0.2	67400	0.1	46	79	105	77300	23100	64400	1000	0.9	4950	70	10300	18	-0.001	-0.005	15	2.4	270
71.00	75.00	5592164	0.7	-0.5	-0.01	9550	-0.2	82100	0.2	63	83	150	80800	18900	62800	1050	1.1	4700	85	9900	17.5	-0.001	-0.005	13	1.35	310
75.00	78.00	5592165	0.1	1	-0.01	8650	-0.2	78200	0.1	52	83	135	72400	18900	57600	960	0.9	5850	74	9650	27.5	-0.001	-0.005	13	1.9	270
78.00	81.00	5592166	0.1	1	-0.01	4250	-0.2	32200	0.1	19	41	44	41700	19900	17600	410	0.9	18900	22	3500	39	-0.001	-0.005	8	3.7	115
81.00	82.00	5592167	0.3	1	-0.01	7500	0.2	75200	0.2	50	74	175	66500	19200	53100	940	0.9	7850	75	9650	21.5	-0.001	-0.005	13	2.3	240

FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
82.00	84.00	5592168	0.3	2	-0.01	3400	0.3	26900	0.2	19	89	36	35200	23000	18200	520	1.3	13000	33	3450	46	-0.001	-0.005	13	21	96	150
84.00	86.00	5592169	0.3	1.5	-0.01	5350	-0.2	44100	0.1	29	65	78	62500	21500	27500	760	1.1	12400	37	4850	20.5	-0.001	-0.005	15	2.2	160	85
86.00	91.00	5592170	0.3	1.5	-0.01	8850	0.2	59800	0.2	46	60	125	83400	21100	45300	920	1	6900	65	8200	28.5	-0.001	-0.005	12	1.8	270	90
91.00	96.00	5592171	0.2	1	0.01	10200	-0.2	59700	0.2	42	65	125	75800	22800	42900	920	1	7300	61	7650	28	-0.001	-0.005	11	1.75	260	90
96.00	99.00	5592172	0.2	1.5	-0.01	8500	-0.2	62300	0.2	44	64	100	80100	26400	47300	1000	0.8	6700	57	7950	30.5	-0.001	-0.005	11	1.5	290	115
99.00	102.00	5592173	0.3	0.5	-0.01	8650	-0.2	66700	0.2	56	86	240	85500	33500	46600	1000	0.9	6850	100	8100	32.5	-0.001	-0.005	9	1.1	290	130

CRA EXPLORATION PTY LIMITED : DRILL HOLE LEDGER

DRILL HOLE RC96MD005		GEOLOGIST DLW	RL COLLAR 720	COMMENCED 22/06/96						
TENEMENT MORDOR POUND		AMGE 448184	AZIMUTH 165	COMPLETED 23/06/96						
PROSPECT GANDALF		AMGN 7406407	INCLINATION -60	CASING LEFT 5.0M						
LAB		ZONE 53	DRILLING CO. GOREY&COLE	TOTAL DEPTH 114 (Metres)						
DPQ 81938		250K MAP No. SF5314	DRILL TYPE VK 600B	TECTONIC DOMAIN Arunta Orogen						
ALICE SPRINGS										
DEPTH	SAMPLE	LOCAL LITHOLOGY	LITHOLOGICAL	COLOUR	TEXTURE	ALTERATN	MINERALN	CPS	MAG SUS	COMMENTS
FROM TO	No	STRAT	DESCRIPTOR					SI UNITS		
0.00 4.00	5592174	PM2	SNK	MGT	GW/VN	POP		190	750	
4.00 8.00	5592175	PM2	SNK		GW/N	POP	HM/SE	185	1750	~15%CLC
8.00 12.00	5592176	PM2	SNK		GW/N	POP	HM	180	2000	
12.00 17.00	5592177	PM2	SNK	MGT	GW/N	POP	HM	180	4000	
17.00 21.00	5592178	PM2	SNK		KW/N	POP	HM	180	3000	
21.00 25.00	5592179	PM2	SNK		KW/N	POP	HM	190	2500	
25.00 28.00	5592180	PM2	SNK		KW/N	POP	POH	180	3500	~2-3%POH
28.00 31.00	5592181	PM2	SNK		KW/N	POP	POH	190	500	~1-5%POH
31.00 35.00	5592182	PM2	SNK		GW/K/N	POP	POH	180	500	
35.00 36.00	5592183	PM2	SNK	QTZ	NW	EQG/BXD	POH/CCP	190	6000	~2-3%POH/ traceCCP
36.00 40.00	5592184	PM2	SNK		N/VW	POP	POH	195	6000	
40.00 43.00	5592185	PM2	SNK/PEG		N/GW	POP	POH	210	600	~1-2%POH
43.00 44.00	5592186	PM2	SNK/BXA	QTZ	NW/RB	POP/BXD	POH/CCP	180	1000	~3%POH/ ~2%CCP
44.00 45.00	5592187	PM2	SNK/BXA	QTZ	NW/RB	POP/BXD	POH/CCP	190	1500	~2%POH/ ~1%CCP
45.00 46.00	5592188	PM2	SNK/BXA	QTZ	NW/RB	POP/BXD	POH/CCP	190	1000	~2%POH/ ~1%CCP
46.00 47.00	5592189	PM2	SNK/BXA	QTZ	NW/RB	POP/BXD	POH/CCP	190	500	~1%POH/ ~1%CCP
47.00 48.00	5592190	PM2	SNK/BXA	QTZ	NW/RB	POP/BXD	POH/CCP	190	5500	~1%POH/ trace CCP
48.00 50.00	5592191	PM2	SNK	QTZ	NW/OB	POP/BXD	POH/CCP	190	1750	~1%POH/ trace CCP
50.00 52.00	5592192	PM2	PEG		OK/W	DY		185	1000	
52.00 57.00	5592193	PM2	SNK		N/KW/VW	POP	POH/CCP	190	6000	~1-2%POH
57.00 62.00	5592194	PM2	SNK		N/VW	POP	POH	200	3000	~1-2%POH
62.00 67.00	5592195	PM2	SNK		N/VW	POP	POH/CCP?	180	5500	~1-2%POH
67.00 72.00	5592196	PM2	SNK		N/VW	POP	POH/CCP	190	5000	~1-2%POH
72.00 77.00	5592197	PM2	SNK		N/VW	POP	POH	190	6000	~1%POH
77.00 82.00	5592198	PM2	SNK		NW/VW	POP	POH	195	3500	
82.00 87.00	5592199	PM2	SNK		NW/VW	POP	POH	190	6000	
87.00 92.00	5592200	PM2	SNK		GW/N	POP	POH	180	5000	
92.00 97.00	5592201	PM2	SNK		GW/N	POP	POH	190	6000	

DEPTH FROM TO	SAMPLE No	REG STRAT	LOCAL LITHOLOGY STRAT	LITHOLOGICAL DESCRIPTOR	COLOUR	TEXTURE	ALTERATN	MINERALN	CPS	MAG_SUS SI UNITS	COMMENTS
97 00 102.00	5592202	PM2	SNK		GW/N	POP		POH	185	5500	
102.00 107 00	5592203	PM2	SNK/PEG		GW/K/N	POP/DY		POH	180	1500	
107 00 111 00	5592204	PM2	SNK		GW/VW/N	POP		POH	180	5000	
111 00 114.00	5592205	PM2	SNK		GW/K/N	POP		POH	175	5500	

CRA EXPLORATION PTY LIMITED : DRILLHOLE ASSAY RESULTS

DRILL HOLE		RC96MD005	GEOLOGIST		DLW	RL COLLAR		720	COMPLETED		22/06/96																
TENEMENT	MORDOR POUND		AMGE	448184		AZIMUTH	165		COMPLETED	23/06/96																	
PROSPECT	GANDALF		AMGN	7406407		INCLINATION	-60		CASING LEFT	5.0M																	
LAB			ZONE	53		DRILLING CO.	GOREY&COLE		TOTAL DEPTH	114 (metres)																	
DPO	81938		MAP REF.	SF5314	ALICE SPRINGS	DRILL TYPE	VK 600B		TECTONIC DOMAIN	Arunta Orogen																	
FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
0.00	4.00	5592174	0.2	1.5	-0.01	7250	-0.2	32900	0.1	32	57	31	61400	15300	31400	620	0.3	8700	41	4800	36	-0.001	-0.005	13	2.2	220	85
4.00	8.00	5592175	0.2	1.5	-0.01	7700	-0.2	49700	0.1	35	69	52	74000	18000	30000	820	0.7	9650	42	5350	39.5	-0.001	-0.005	13	2	240	105
8.00	12.00	5592176	0.2	1	-0.01	7850	-0.2	50200	0.1	32	63	42	73200	25900	30900	920	1	11700	41	5900	41.5	-0.001	-0.005	13	2.2	250	105
12.00	17.00	5592177	0.2	1	0.01	8300	-0.2	51400	0.2	31	65	45	74100	20400	29500	880	1.3	13200	37	5400	45.5	-0.001	-0.005	14	2	230	100
17.00	21.00	5592178	0.2	1	-0.01	8100	-0.2	49300	0.2	32	55	42	73700	20800	30600	920	1	12400	38	5650	44.5	-0.001	-0.005	14	2.1	250	110
21.00	25.00	5592179	0.2	1.5	-0.01	8250	-0.2	47800	0.1	30	60	41	70400	35600	30200	980	0.9	13500	36	5100	44.5	-0.001	-0.005	13	2.2	230	105
25.00	28.00	5592180	0.1	1	-0.01	8450	-0.2	43500	0.1	29	62	34	67900	23900	27800	880	0.8	13600	33	4750	49.5	-0.001	-0.005	13	2.1	210	90
28.00	31.00	5592181	0.2	1.5	-0.01	8250	-0.2	43900	0.1	31	67	47	64600	15300	28800	880	1.1	11900	38	4900	40.5	-0.001	-0.005	14	2.3	210	90
31.00	35.00	5592182	0.2	1.5	-0.01	5250	0.3	43200	0.2	34	115	30	72600	23900	34900	880	0.9	10300	49	6000	28	-0.001	-0.005	13	2.8	250	100
35.00	36.00	5592183	0.2	1	-0.01	5100	0.3	66100	0.1	48	115	70	83400	16100	33200	1050	0.6	6600	74	6350	21.5	-0.001	-0.005	14	2	280	100
36.00	40.00	5592184	0.2	1	-0.01	7300	-0.2	61500	0.1	49	125	67	94200	27900	51000	1150	0.6	6900	89	7350	37	-0.001	-0.005	15	2.3	320	125
40.00	43.00	5592185	0.4	2.5	-0.01	3700	0.9	55700	0.2	39	120	47	79000	20900	40900	1050	0.7	8650	77	6550	23.5	-0.001	-0.005	20	5	260	110
43.00	44.00	5592186	0.7	2	-0.01	1250	-0.2	33500	0.1	32	180	2900	63500	12200	23400	680	1.1	2900	56	5150	9.5	-0.001	-0.005	10	2.3	195	80
44.00	45.00	5592187	0.3	2	-0.01	2250	0.3	47600	0.1	49	140	410	100000	17100	35300	920	0.8	6000	87	8200	14	-0.001	-0.005	21	3	320	115
45.00	46.00	5592188	0.4	1	-0.01	450	0.3	40800	0.1	63	155	720	95700	13000	40800	820	0.7	4350	88	8100	5	-0.001	-0.005	18	8.5	320	105
46.00	47.00	5592189	0.2	1.5	-0.01	720	-0.2	43700	0.1	37	155	240	86300	15800	37200	860	0.6	3700	83	7550	4	-0.001	-0.005	15	2.4	280	100
47.00	48.00	5592190	0.2	1.5	-0.01	2000	0.3	73900	0.1	51	145	88	96500	14400	35300	1150	0.6	4550	88	7650	11.5	-0.001	-0.005	16	2.4	290	105
48.00	50.00	5592191	0.2	1.5	-0.01	4650	0.2	58900	0.1	50	155	78	85400	20500	52300	1050	0.8	6350	98	7600	17.5	-0.001	-0.005	19	3	310	120
50.00	52.00	5592192	0.1	0.5	-0.01	1450	-0.2	11500	-0.1	9	96	18	23100	20300	9800	230	1.1	11500	17	1100	31.5	-0.001	-0.005	9	1.55	51	25
52.00	57.00	5592193	0.2	1.5	-0.01	6600	-0.2	62300	0.1	51	130	81	94600	17400	51600	1050	0.9	7250	95	7400	23	-0.001	-0.005	15	2.9	330	105
57.00	62.00	5592194	0.3	1.5	-0.01	5650	-0.2	52000	-0.1	44	130	67	77300	19100	42600	920	0.9	9000	75	6500	27.5	-0.001	-0.005	20	2.5	270	90
62.00	67.00	5592195	0.3	1	-0.01	6150	-0.2	63300	0.2	56	140	80	93300	22700	56600	1150	0.7	6500	94	8500	23.5	-0.001	-0.005	14	2.1	340	110
67.00	72.00	5592196	0.3	3	-0.01	6650	-0.2	69300	0.2	55	150	82	90000	22900	56500	1250	0.8	8100	95	8200	32	-0.001	-0.005	15	1.95	330	115
72.00	77.00	5592197	0.4	1.5	-0.01	7100	-0.2	65900	0.1	57	145	69	85100	22000	51400	1100	0.8	8300	90	7750	27.5	-0.001	-0.005	15	1.8	320	105

FROM	TO	SAMPLE	Ag	As	Au	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Th	U	V	Zn
77.00	82.00	5592198	0.2	1.5	-0.01	7550	-0.2	65300	0.2	48	115	67	85600	22300	46300	1050	0.8	9150	83	7300	32.5	-0.001	-0.005	15	2.1	310	110
82.00	87.00	5592199	0.2	1.5	-0.01	8000	-0.2	56700	0.2	42	96	56	79700	23100	39800	980	0.8	11000	65	6500	35	-0.001	-0.005	12	1.8	290	105
87.00	92.00	5592200	0.2	1	-0.01	8850	-0.2	52400	0.1	36	88	49	76400	21100	37500	940	0.7	10900	56	6100	38	-0.001	-0.005	12	1.75	270	125
92.00	97.00	5592201	0.2	1	-0.01	8600	-0.2	53400	0.2	39	99	50	87900	23700	40400	1000	0.7	9900	55	6150	36.5	-0.001	-0.005	12	1.6	280	120
97.00	102.00	5592202	0.2	1	-0.01	8800	-0.2	57000	0.2	40	99	57	80200	28700	41200	980	0.7	9650	60	6300	33	-0.001	-0.005	10	1.3	280	105
102.00	107.00	5592203	0.2	1.5	-0.01	6300	0.8	46000	0.2	33	100	46	68100	23800	31900	860	0.8	14000	46	5150	34.5	-0.001	-0.005	12	2.2	220	95
107.00	111.00	5592204	0.2	1.5	-0.01	7950	0.4	54400	0.2	38	86	51	88400	35600	41000	1200	0.7	14400	49	6500	48	-0.001	-0.005	13	1.55	290	130
111.00	114.00	5592205	0.2	1.5	-0.01	7800	-0.2	43500	0.1	36	92	41	81600	23400	34100	900	0.7	12500	43	5400	36.5	-0.001	-0.005	9	1.75	240	100

APPENDIX VII

EL 9371 MORDOR POUND

Martin Gole and Associates Petrological Report

Martin Gole and Associates

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REPORT TO : CRA EXPLORATION PTY LTD

**MORDOR COMPLEX, ARUNTA BLOCK, NORTHERN TERRITORY,
GEOLOGY AND IMPLICATIONS FOR NICKEL SULPHIDE POTENTIAL**

**Martin Gole
June 1996**

Introduction

The Mordor Complex, located 65 km ENE of Alice Springs, is a 1.2 Ga old ultrapotassic igneous complex that has intruded into granitic gneisses of the Arunta Block. The complex is composed of syenite, shonkinite and minor ultramafic rocks and it is the aim of this report to assess the potential of these rocks to host magmatic Ni sulphides.

Data for the report were obtained from a 2 day field trip to the Mordor Complex guided by Steve Hulton and Dave Louwrens (CRAE, Darwin), inspection of diamond drill core held at the NTGS core library in Alice Springs and several publications including CRAE internal reports. This report covers observations on the general geology of the complex, presentation of relevant data and discussion on the Ni potential of the complex as well as detailed petrographic descriptions of rock chips and drill core (Appendix I).

Geological Observations

The complex is a generally oval-shaped body that consists mostly of three gradational lithologies; syenite, shonkinite and minor ultramafic rock. All lithologies have well preserved igneous textures and mineralogy and metamorphic alteration of the rocks is minor and appears to be mostly restricted to relatively discrete zones or patches. Field relationships, igneous textures, mineralogy and particularly the gradational relationships between these lithologies clearly indicate that they are related by fractional crystallisation from a K-rich mafic magma (see Langworthy and Black, 1978, *Contribs. Mineral. Petrol.*, 67:51-62).

In outcrop and in diamond drill core shonkinite can be seen to be highly variable both in mineral proportions, grain size and texture. Equant-grained shonkinite is, in general, massive but porphyritic shonkinite has a very strong igneous foliation defined by alignment of coarse-grained tabular orthoclase phenocrysts. When weathered this foliation imparts a flaggy cleavage that is a dominant feature in outcrop and provides a marked contrast with the massive appearance of the ultramafic rocks. These latter rocks have no igneous lamination despite containing abundant very coarse-grained phlogopite.

Field relationships show that shonkinite and the ultramafic rocks are cut by numerous syenitic dykes, most commonly with pegmatitic textures but also very fine-grained syenite. Ultramafic rocks are cut by uncommon micro-shonkinite dykes. In places shonkinite appears to occur as rafts or blocks within syenite. However lithological contacts are generally not sufficiently well exposed to be totally confident about this interpretation.

Outcrop relationships on Mt Doom South appear to indicate that the ultramafic rocks dip westerly at 20-30° and are underlain by shonkinite. This dip is similar to that shown on a diamond drill cross section located just to the north (Baraclough, 1981, NTGS Rpt GS 81/48). The ultramafic rocks on Mt Doom South thus occur either as a raft or a layer within the shonkinite. The former interpretation is, I think, most likely. Numerous ultramafic bodies, some as small as ~2 x ~6 m, occur scattered throughout the complex, mostly in the shonkinite. These bodies are generally homogeneous, may be pyroxenitic or peridotitic and most are medium to very coarse-grained (including 3 cm sized phlogopite). None show any sign of zoning in grain size or composition as might be expected if they were intrusive plugs. The drill cross section of Baraclough (1981) shows the layering in the ultramafic rocks to be at an angle to the ultramafic/shonkinite contact. Baraclough marks the contact as a fault but according to his log of MCDDH2 interlayered ultramafic and shonkinite occur for a further ~10 m beyond the fault suggesting that the contact is complex. The question that arises is whether this complexity be due to partial assimilation by shonkinite of an ultramafic cognate xenolith?

The above field relations suggest that syenite has intruded shonkinite and that shonkinite (and syenite) has intruded the ultramafic rocks. In general Baraclough (1981) supports this proposed sequence but it is the reverse of that proposed by Langworthy and Black (1978).

Speculative Intrusion Model: If the rock relationships outlined above are correct then it appears that the fractionation processes that led to the formation of the 3 broad rock types that make up the Mordor Complex occurred within a magma chamber at depth below (probably well below) the current land surface. Such a model would allow the early formation of ultramafic cumulates that may then be disrupted by injection of new magma into the chamber. Such blocks could be carried by crystal-rich shonkinitic magma that is forcefully injected into overlying rocks. Such forceful injection is indicated by strongly foliated contact rocks seen along the eastern boundary of the complex. Late stage fractionated magma could then be intruded to form syenite and associated highly fractionated pegmatitic dykes. The interplay of fractionation within a magma chamber and timing of intrusion into and from this chamber is likely to be highly complex.

Mordor Complex: In the Mordor Complex both magnetite and sulphides are present in almost all mafic and ultramafic rocks (Baraclough, 1981) including olivine-rich rocks which are the earliest cumulates present within the outcropping section of the complex. Eight diamond drill core samples and five rock chips samples were petrographically examined with the aim of determining and documenting the textural and hence the petrogenic relationships of sulphides to the other rock forming minerals and to obtain any other petrographic data that may have relevance to the Ni potential of the Mordor

Complex. These samples include porphyritic shonkinite, mafic shonkinite, pyroxenite and various olivine-rich lithologies. Igneous textures seen both in hand specimen and particularly during petrographic examination of the polished thin sections (see Appendix I) clearly demonstrate that most of the sulphides are magmatic. Sulphide aggregates have classic magmatic textures of smooth curved contacts with adjacent igneous silicate minerals and with magnetite and ilmenite with the sulphide aggregates filling interstitial spaces between generally coarser-grained silicates. Textures also clearly show that ilmenite and most magnetite are magmatic phases.

The sulphides in these lobate aggregates are pyrite, pyrrhotite and trace amounts of chalcopyrite. A minor to minute trace of the sulphide present in the Mordor rocks are very fine, ragged grains associated with secondary alteration or within veinlets. In one strongly serpentinised sample fine-grained ragged pentlandite is present. These ragged grains are all secondary, forming by remobilisation of pre-existing igneous sulphides or forming during secondary alteration (or a combination of both processes).

Martin Gole

APPENDIX I.

PETROGRAPHIC DESCRIPTIONS OF DIAMOND DRILL CORE AND ROCK

CHIPS, MORDOR COMPLEX

<u>Mineralogy</u>	<u>mode %</u>
Clinopyroxene	30
K-feldspar - phenocrysts	25
- matrix	8
Biotite	25
Magnetite	6
Ilmenite	3
Apatite	2
Tremolite	1
Pyrite	tr
White mica	tr
Carbonate	tr
Chalcopyrite	mtr

Excellent preserved igneous texture and mineralogy. The mineralogy is very fresh with only minor to moderate secondary alteration of clinopyroxene to very fine-grained tremolite and very minor alteration of K-feldspar to white mica and carbonate.

The texture is dominated by tabular K-feldspar phenocrysts up to 1 cm long that occur as single grains and aggregates. These define a strong igneous foliation to the rock and are set in a massive (ie. unfoliated) matrix of oval to weakly tabular, colourless to pale green clinopyroxene up to 2.6 mm across and deep brown biotite grains up to 2 mm long. Intergranular to these minerals are small rounded to anhedral K-feldspar and lobate magnetite and ilmenite. Ilmenite has lamellar exsolution of hematite. These oxides also occur as inclusions within clinopyroxene. Textural relationships clearly indicate that magnetite is part of the igneous assemblage.

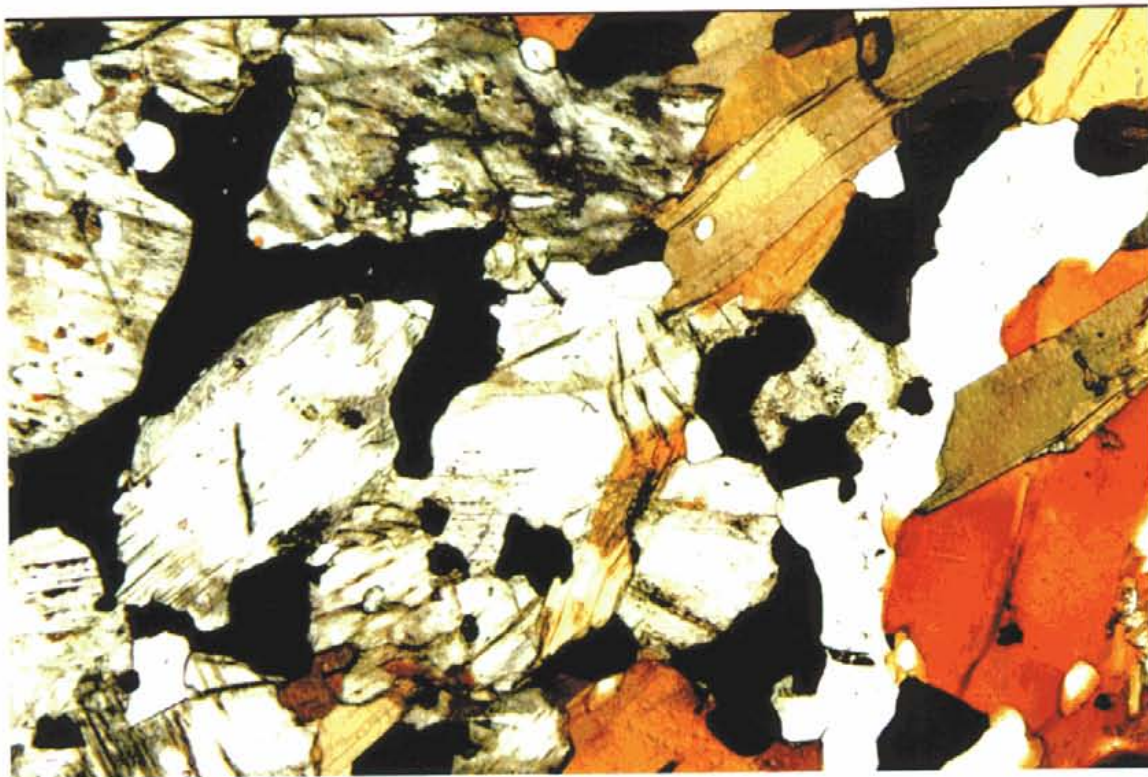
Pyrite and minute amounts of chalcopyrite, intergrown in places with oxides, form aggregates with smooth, curved margins with adjacent minerals and are clearly part of the igneous mineral assemblage. A minute amount of sulphide occurs in fine-grained ragged intergrowths with secondary minerals and in one diffuse veinlet composed of biotite, magnetite, sulphide and carbonate. Such sulphide is either remobilised from the primary sulphides or some of the components have been introduced during secondary alteration.

MCDDH2 - 38.0 m. SERPENTINISED BIOTITE WEHERLITE

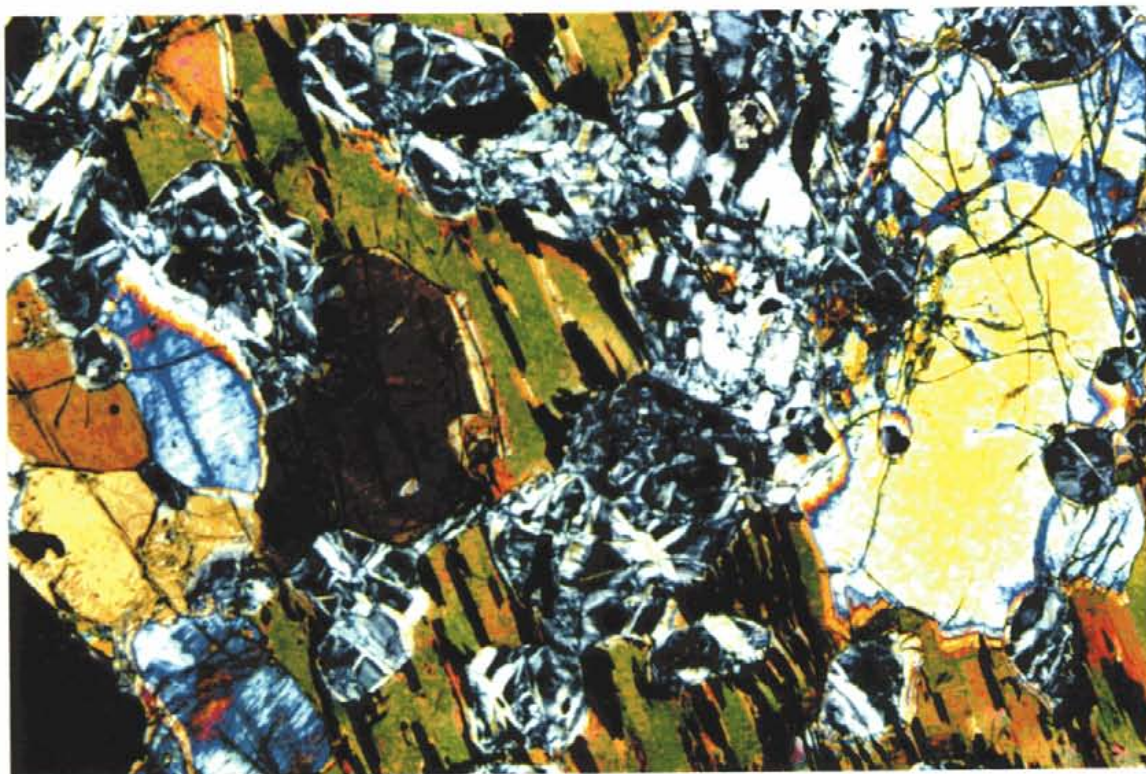
Polished Thin Section

<u>Mineralogy</u>	<u>mode %</u>
Serpentine	57
Biotite	20
Clinopyroxene	15
Magnetite	6
Chromite	3
Pyrite	mtr

Olivine is totally altered to a mesh of fine-grained serpentine and scattered, ragged magnetite. However the igneous texture of the rock is well preserved and consisted of an aggregate of 1.5 mm sized grains of anhedral olivine and clinopyroxene with smooth, curved, well adjusted grain boundaries. Deep red-brown biotite forms tabular strongly poikilitic grains up to 15 mm long enclosing olivine and less commonly clinopyroxene. Secondary magnetite occurs as stringers along the biotite cleavages. Chromite forms 0.1 mm equant to anhedral grains with common secondary magnetite overgrowths, scattered throughout the rock. All magnetite in the rock appears to be related to secondary alteration and none was recognised as being part of the igneous assemblage. One grain of chromite contains an inclusion of pyrite suggest that pyrite was an early igneous phase but most pyrite occurs as ragged grains, in places intergrown with magnetite, and is clearly secondary in origin.



MCDDH1- 24.5 Matrix of porphyritic shonkinite with clinopyroxene moderately altered to very fine-grained tremolite along cleavages and in patches, biotite, K-feldspar (clear) and opaque (magnetite, ilmenite, trace sulphide). The small, clear, hexagonal grains are apatite. Plane light. FOV = 2.6 mm.



MCDDH2 - 38.0 m. Serpentinised biotite weherlite composed of coarse-grained poikilitic biotite (green) with inclusions of anhedra of clinopyroxene (blue, yellow, brown-red) and oval to anhedra of olivine pseudomorphed by serpentine and magnetite. Stringers of secondary magnetite also occur along biotite cleavages. Crossed polars. FOV = 2.6 mm.

MCDDH2 - 40.5 m.

OLIVINE BIOTITE CLINOPYROXENE

Polished Thin Section

<u>Mineralogy</u>	<u>mode %</u>
Clinopyroxene	60
Biotite	15
Serpentine	7
Orthopyroxene	5
Magnetite	4
Chlorite	3
Tremolite	3
Carbonate	2
Ilmenite	1
Apatite	tr
Pyrrhotite	tr
Pyrite	tr
Chalcopyrite	mtr

Moderate to poorly preserved igneous texture due to secondary (perhaps metamorphic) alteration. Anhedral to tabular clinopyroxene grains up to 4 mm across, in places forming aggregates of equal sized grains with smooth, curved, well adjusted grains boundaries. Red-brown biotite is poikilitic with grains up to 4 mm but commonly occurring as smaller grains in somewhat patchily distributed aggregates up to 8 mm across. Serpentine and fine-grained ragged magnetite pseudomorph rounded to anhedral olivine grains which had a patchy distribution throughout the rock. Orthopyroxene occurs as small scattered grains intergranular to clinopyroxene.

Part of the rock is strongly altered to such an extent to destroy the igneous texture and mineralogy. The alteration consists of fine-grained tremolite, serpentine, chlorite, magnetite and carbonate. Elsewhere clinopyroxene has minor to moderate alteration to tremolite along grain boundaries and cleavages.

Opaques consist of magnetite, ilmenite and minute traces of pyrrhotite, pyrite and chalcopyrite. Ilmenite and some magnetite forms anhedral grains with smooth curved grain boundaries against igneous silicates and are clearly part of the igneous mineral assemblage. Other magnetite is fine-grained and ragged and is associated with secondary alteration. The distinction between these two magnetite textural types is, however, not always clear cut. Most sulphides occur in ragged intergrowths with secondary magnetite, tremolite, serpentine and carbonate and thus clearly appear to be secondary. These sulphides are thus either remobilised igneous sulphides or have been formed from components, most likely S, introduced with the alteration fluids.



MCDDH2 - 40.5m. Olivine biotite clinopyroxene with coarse-grained, pale green clinopyroxene moderately to strongly altered and containing very fine-grained opaque and tremolite. Red-brown biotite is partly intergranular and is relatively fresh given the extent of alteration of clinopyroxene. Plane light. FOV = 2.6 mm.

MCDDH2 - 46.5 m.

MAFIC SHONKINITE

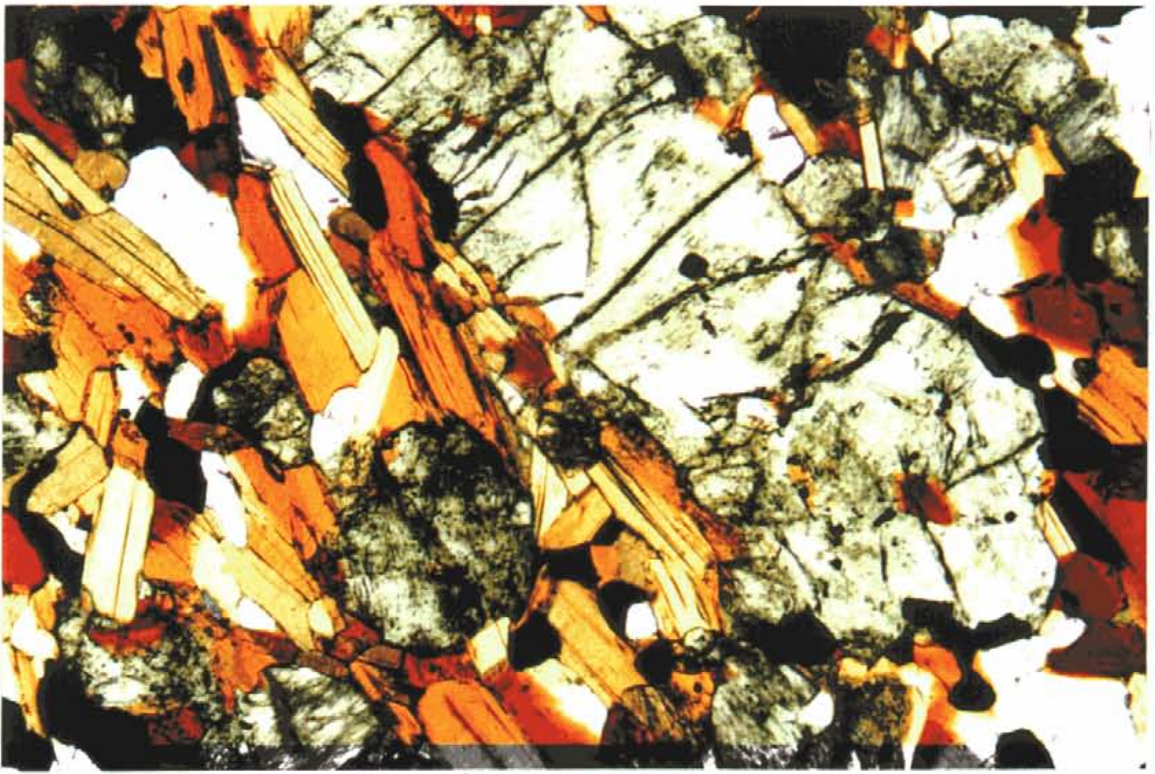
Polished Thin Section

<u>Mineralogy</u>	<u>mode %</u>
Clinopyroxene	35
Biotite	30
K-feldspar	15
Tremolite	10
Magnetite	6
Ilmenite	2
Pyrrhotite	2
Apatite	2
White mica	tr
Carbonate	tr
Chalcopyrite	mtr

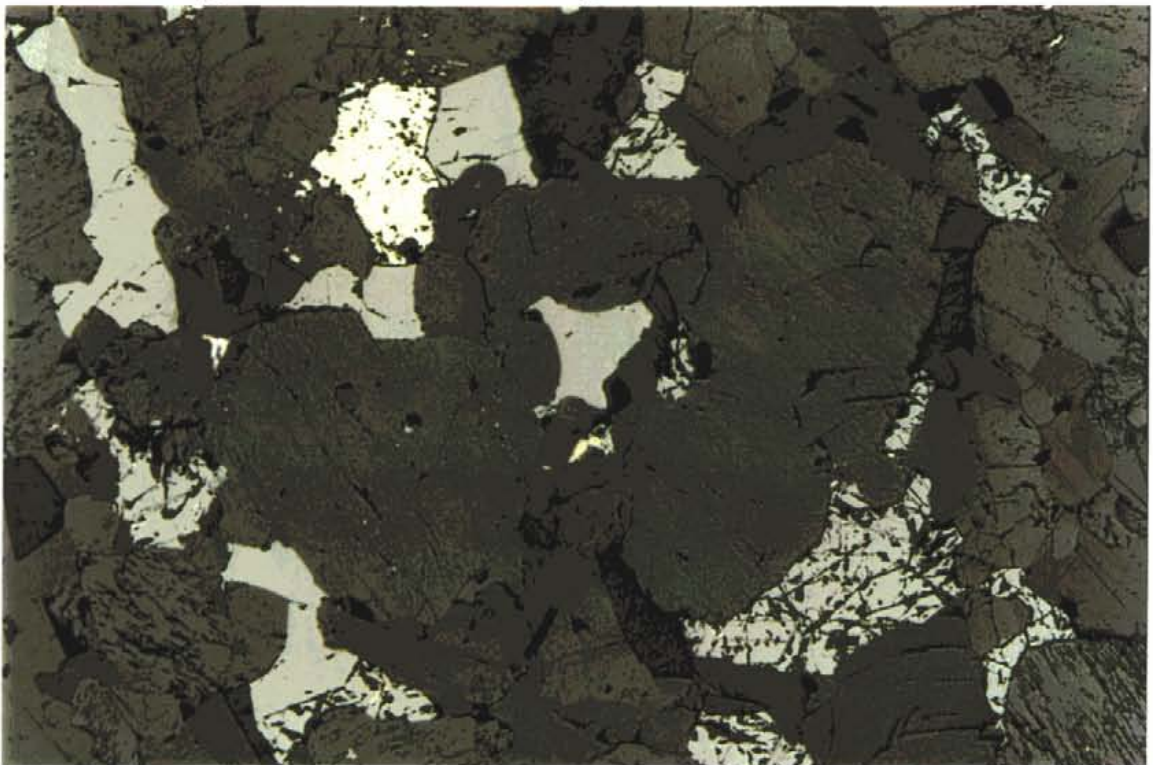
Very well preserved igneous texture and mineralogy. The mineralogy is very fresh with only minor to moderate secondary alteration of clinopyroxene to very fine-grained tremolite and very minor alteration of K-feldspar to white mica and carbonate.

Colourless to pale green clinopyroxene, up to 3.5 mm across, forms oval to weakly tabular grains in a matrix of decussate, fine-grained (0.8 mm) red-brown biotite, small anhedral, intergranular K-feldspar and anhedral to lobate magnetite and ilmenite. There is a moderate igneous foliation defined by alignment of tabular clinopyroxene and particularly the distribution of biotite.

Pyrrhotite forms lobate grains and aggregates with smooth curved boundaries with igneous silicates and oxides. Some fine, ragged sulphide grains are associated with secondary alteration, particularly of clinopyroxene, with some sulphide in very fine veinlets. The textures strongly suggest that the bulk of the sulphides are part of the igneous mineral assemblage.



MCDDH2 - 46.5 m. Foliated mafic shonkinite with pale green, large tabular and much smaller rounded clinopyroxene with biotite, small grains of K-feldspar (clear) and opaque (magnetite, ilmenite, trace sulphide). Foliation is defined by alignment of tabular clinopyroxene and biotite. Plane light. FOV - 2.6 mm.



MCDDH2 - 46.5 m. Ilmenite (clear grey), magnetite (grey, pitted) and pyrrhotite (pale yellow) with smooth, curved grain boundaries against igneous silicates (clinopyroxene, biotite, K-feldspar) and form intergranular, somewhat lobate grains and are clearly part of the igneous assemblage. A trace amount of very fine-grained, ragged sulphide is intergrown with secondary alteration minerals. Reflected light. FOV = 2.6 mm.

MCDDH2 - 82.5 m.

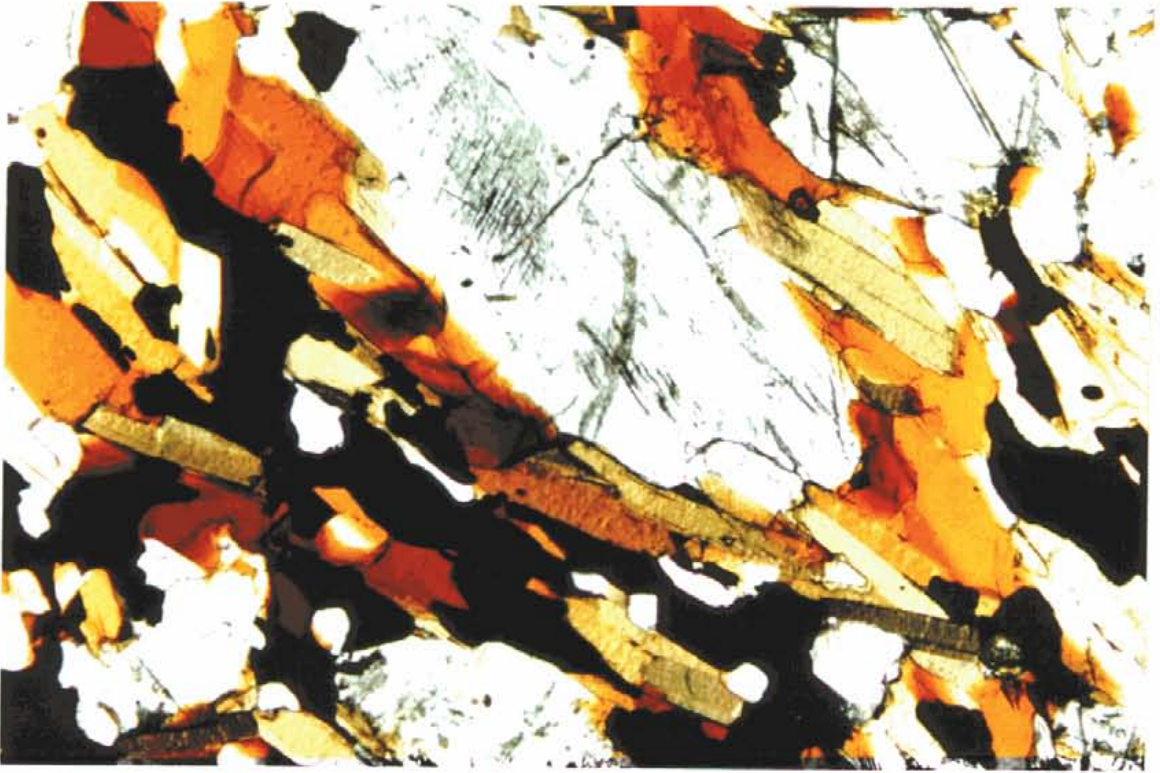
MAFIC SHONKINITE

Polished Thin Section

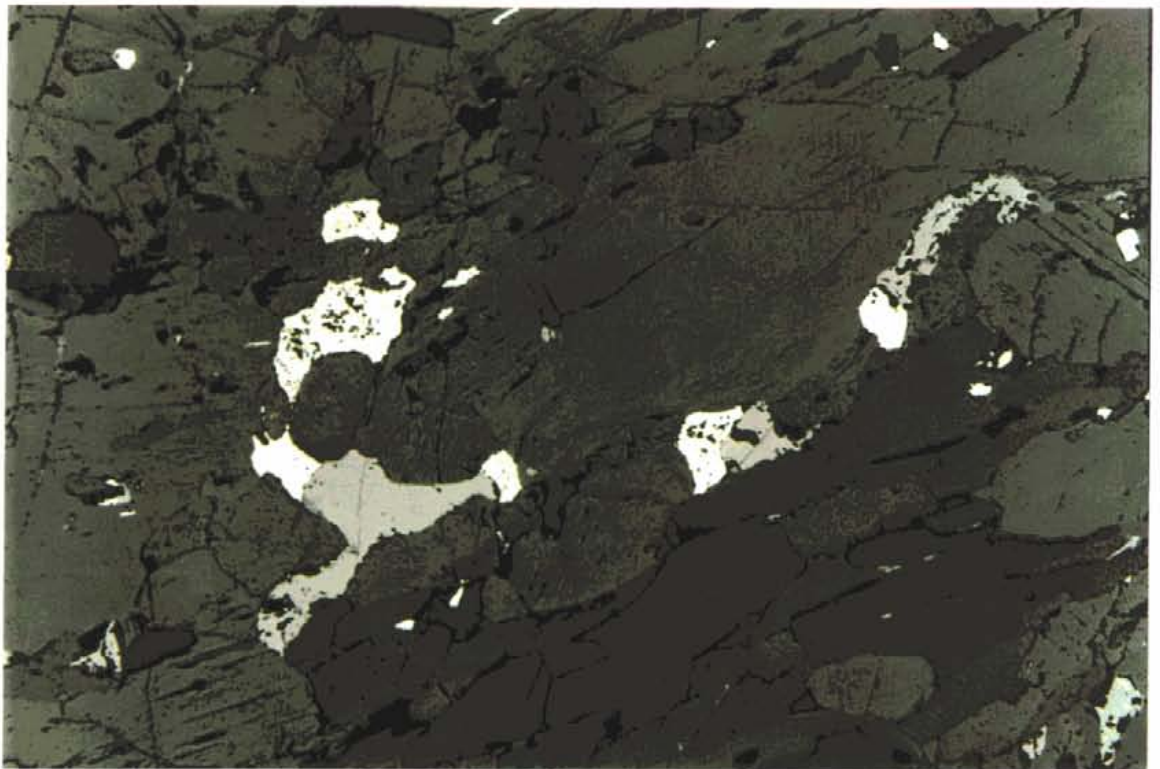
<u>Mineralogy</u>	<u>mode %</u>
Clinopyroxene	45
Biotite	30
K-feldspar	20
Magnetite	6
Ilmenite	2
Pyrrhotite	2
Apatite	2
Hornblende	tr
Tremolite	tr
Chalcopyrite	mtr

The mineralogy is very fresh with only minor secondary alteration of clinopyroxene to very fine-grained tremolite. The rock is very similar to MCDDH2 - 46.5 m and consists of colourless to pale green clinopyroxene, up to 3.5 mm across, as oval to weakly tabular grains in a matrix of decussate, fine-grained (0.8 mm) red-brown biotite, anhedral K-feldspar and anhedral to lobate magnetite and ilmenite. Pale green hornblende occurs in intergranular spaces mostly between clinopyroxene grains. There is a moderate igneous foliation defined by alignment of tabular clinopyroxene and particularly the distribution of biotite and opaques.

Pyrrhotite forms lobate grains and aggregates with smooth curved boundaries with igneous silicates and oxides. Minute traces of fine, ragged sulphide is associated with secondary alteration, particularly of clinopyroxene. The textures strongly suggest that the bulk of the sulphides are part of the igneous mineral assemblage.



MCDDH2 - 82.5 m. Mafic shonkinite with moderate igneous foliation defined by alignment of pale green tabular clinopyroxene, biotite and opaque aggregates (magnetite, ilmenite, trace sulphide). Small clear grains are K-feldspar (area of photograph has relatively low feldspar content). Plane light. FOV = 2.6 mm.

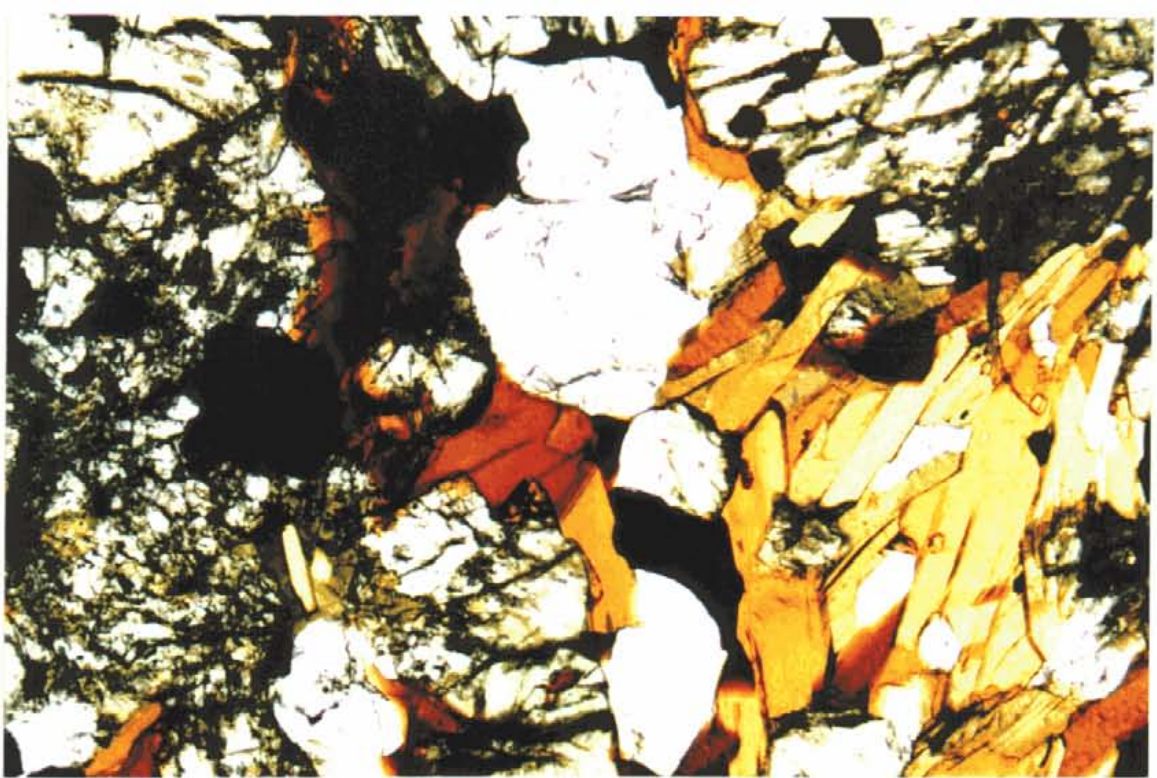


MCDDH2 - 82.5 m. Ilmenite (clean grey), magnetite (grey, pitted) and pyrrhotite (pale yellow) forming lobate aggregates intergranular to silicates that define igneous foliation. Some of the very fine-grained sulphides are secondary. Reflected light. FOV = 2.6 mm.

<u>Mineralogy</u>	<u>mode %</u>
Clinopyroxene	40
Biotite	28
K-feldspar	15
Magnetite	5
Tremolite	5
Ilmenite	3
Pyrite	2
Apatite	2
Pyrrhotite	tr
Carbonate	tr
Chalcopyrite	mtr

Anhedral to weakly tabular, colourless to pale green clinopyroxene up to 4 mm long, intergrown with similar sized, stubby dark-brown biotite with K-feldspar, magnetite and ilmenite forming smaller anhedral grains and lobate aggregates between the main minerals. Clinopyroxene contains numerous inclusions of biotite, minor K-feldspar and oxides. Clinopyroxene is variably altered to very fine-grained tremolite and carbonate but biotite and K-feldspar are very fresh even when adjacent to strongly altered pyroxene. Ilmenite has lamellar exsolution of hematite that is probably related to the secondary alteration present in the rock.

Sulphides consist of pyrite and trace pyrrhotite and chalcopyrite and occur as small grains and aggregates with smooth, curved boundaries with adjacent igneous minerals. Only a very small proportion of the sulphides occur in ragged intergrowth associated with secondary alteration. Very clearly sulphides are part of the igneous assemblage.



MCDDH4 - 35.4 m. Mafic shonkinite with massive texture defined by K-feldspar (clear), biotite and altered clinopyroxene with minor intergranular karkarite green hornblende and opaque. Plane light. FOV = 2.6 mm.



MCDDH4 - 35.4 m. Lobate aggregate of pyrite (pale yellow) and a trace of chalcopyrite (yellow). Oxide (grey) is magnetite. Reflected light. FOV = 2.6 mm.

MCDDH4 - 59.8 m.

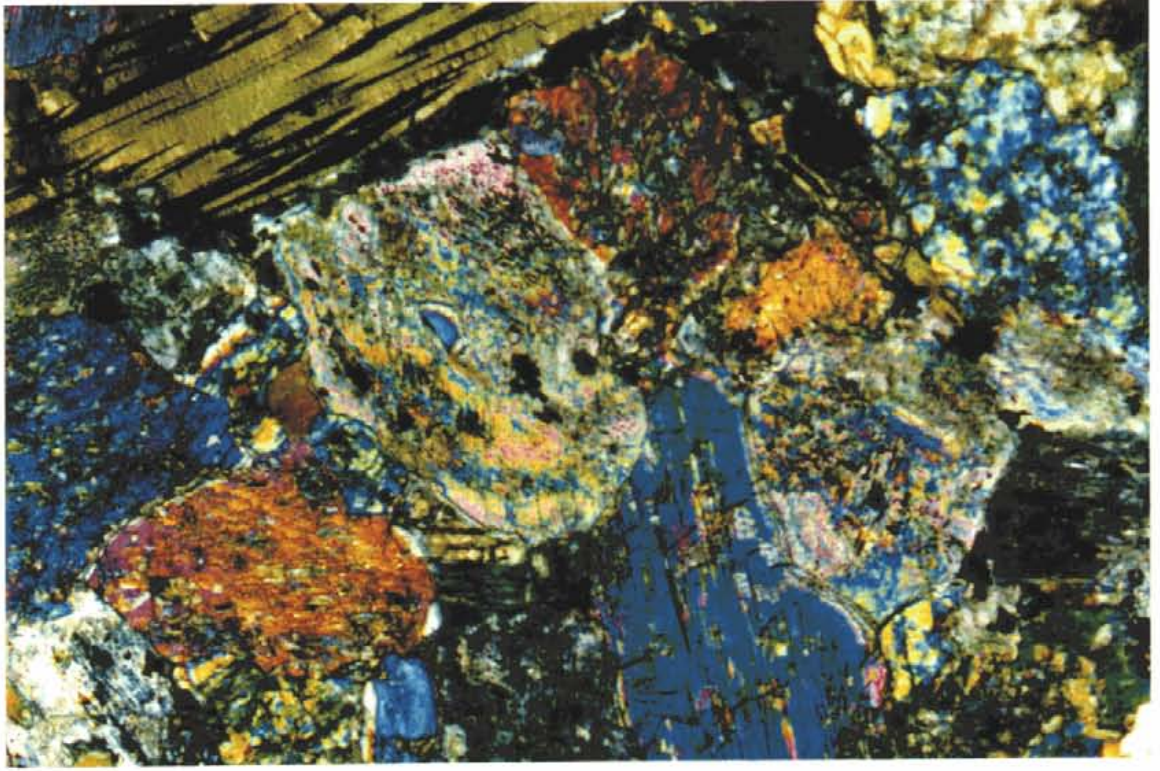
PYROXENITE

Polished Thin Section

<u>Mineralogy</u>	<u>mode %</u>
Clinopyroxene	55
Colourless amphibole	23
Biotite	10
Talc	5
K-feldspar	3
Hornblende	2
Magnetite	tr
Ilmenite	tr
Hematite	mtr
Pyrite	mtr

Aggregate of colourless to pale green, oval to weakly tabular clinopyroxene up to 4 mm long and generally smaller oval to anhedral orthopyroxene that is entirely pseudomorphed by very fine-grained, fibrous amphibole (cummingtonite?) and talc. Dark red-brown biotite infills intergranular space with larger grains (up to 4 mm) being strongly poikilitic. Pale green hornblende is scattered throughout the rock in intergranular spaces and is clearly igneous although some appears to have been recrystallised during secondary alteration. Small grains and aggregates of K-feldspar are scattered throughout the rock. Clinopyroxene shows some alteration to very fine-grained tremolite.

Opaques are magnetite, ilmenite, hematite and pyrite. Hematite is secondary, occurring as inclusions and stringers along biotite cleavage traces. Magnetite, ilmenite and pyrite form oval to lobate grains and aggregates along igneous grain boundaries and are clearly part of the igneous mineralogy. Some remobilised or secondary sulphide is present in places as ragged grains associated with secondary silicates and oxides as well as in very minor veinlets.



MCDDH4 - 59.8 m. Moderately altered biotite pyroxenite with anhedral clinopyroxene (blue, red), orthopyroxene pseudomorphed by very fine-grained talc and colourless amphibole (mottled high birefringence colours) and biotite. All opaques are secondary. Crossed polars. FOV = 2.6 mm.

MCDDH4 - 95.8 m.

SULPHIDE - BEARING MAFIC SHONKINITE

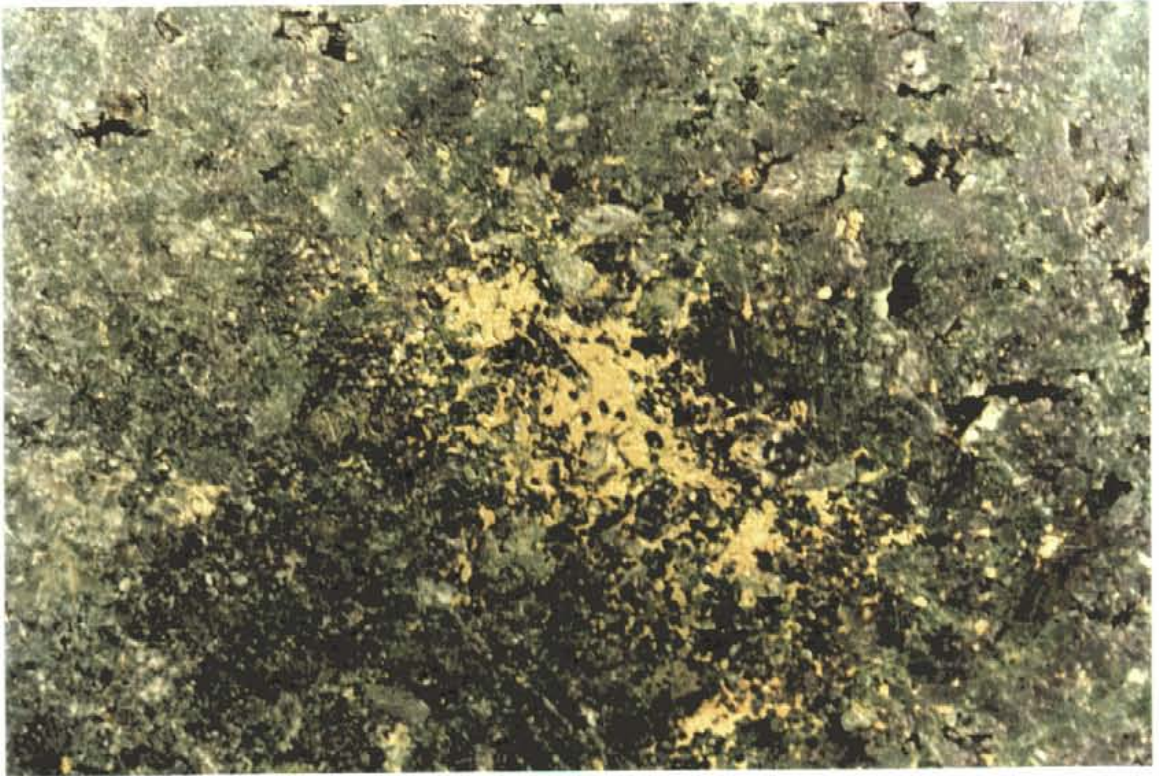
Polished Thin Section

<u>Mineralogy</u>	<u>mode %</u>
Clinopyroxene	50
K-feldspar	20
Biotite	15
Pyrite	7
Tremolite	5
Magnetite	3
Hornblende	2
Ilmenite	tr
Chalcopyrite	mtr

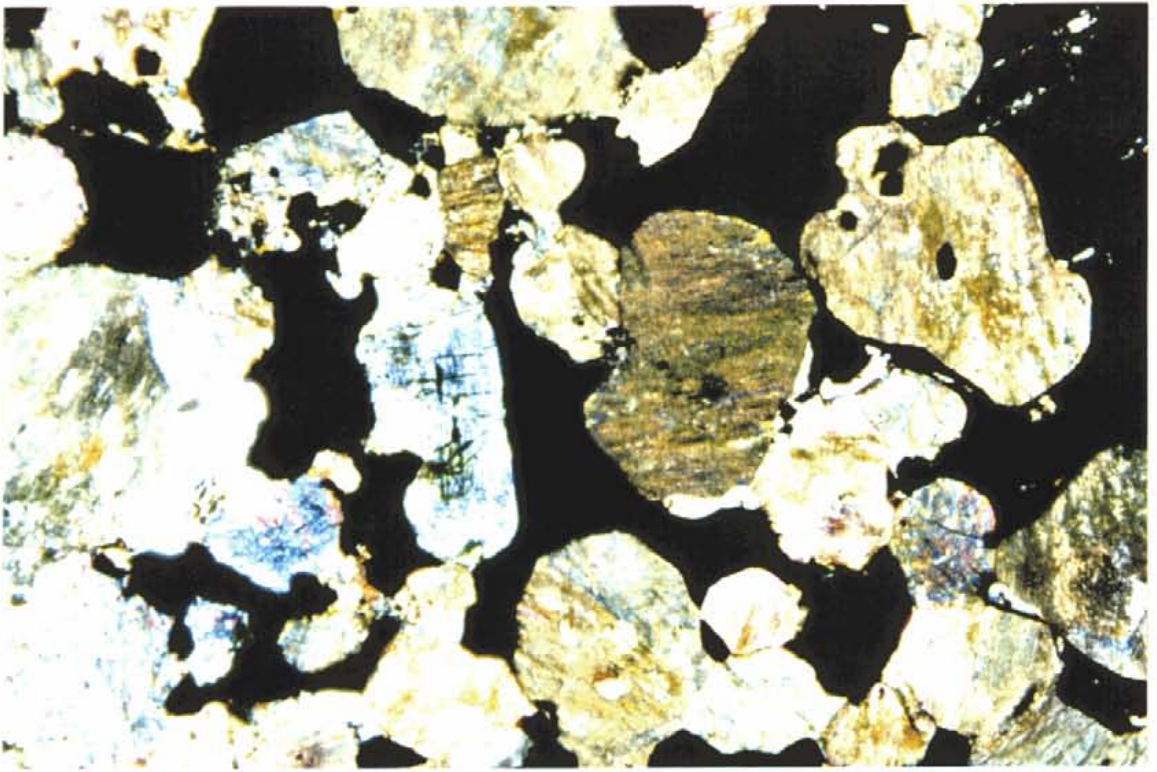
This rock consists of diffuse patches of clinopyroxene-rich assemblages and mafic shonkinite where K-feldspar may form up to 20% of the assemblage. The sample contains a coarse patch of sulphide, 1 cm across, intergrown with silicates and determining the sulphide species and the paragenesis of this sulphide has critical implications for the Ni potential of the Mordor Complex.

The clinopyroxenite patches consist of anhedral grains up to 2.5 mm and some larger tabular grains up to 7 mm long. Clinopyroxene grains have a high proportion of mutual grain boundary contact. Dark red-brown biotite is mostly intergranular with larger grains being weakly poikilitic. Sulphides, hornblende, trace amounts of K-feldspar, magnetite and ilmenite are all intergranular. The mafic shonkinite part of the rock contains abundant K-feldspar with irregular shaped aggregates up to 6 mm across and the biotite content is lower than in the clinopyroxenite. Clinopyroxene is moderately altered along grain boundaries and cleavages to murky fine-grained tremolite but biotite and K-feldspar are mostly very fresh.

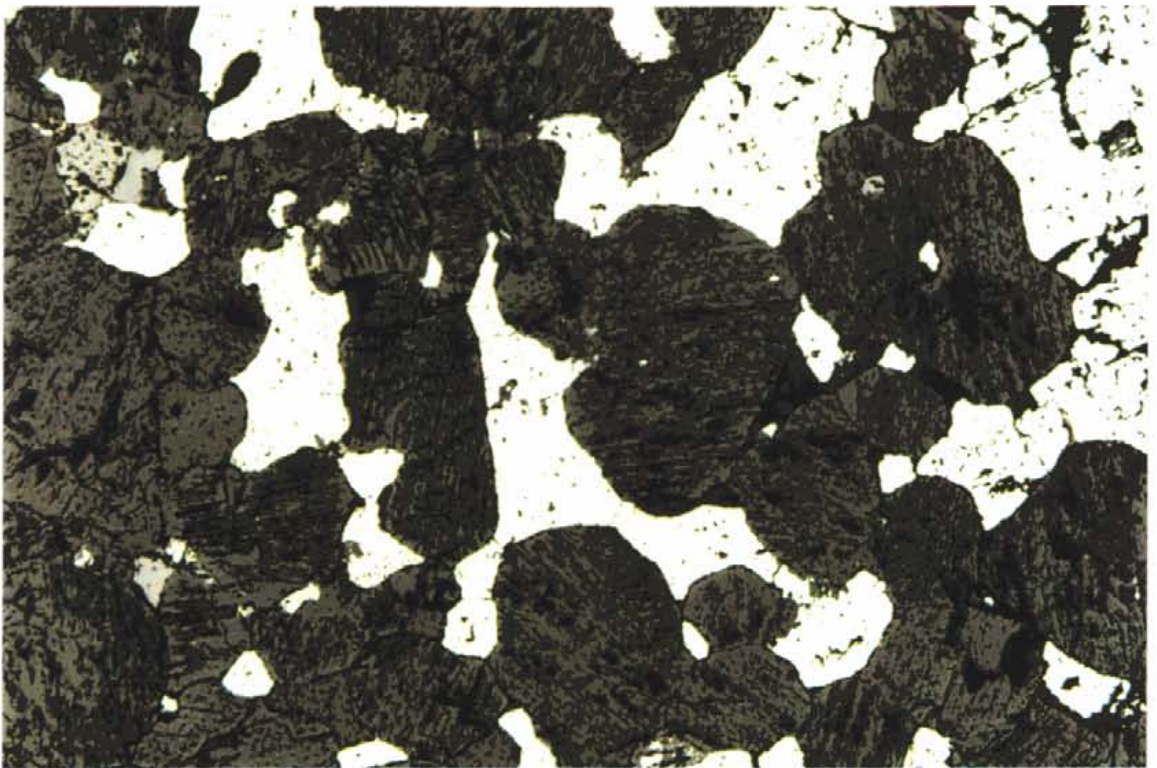
Of critical importance in this rock is the textural relationships of the abundant pyrite to the other minerals. Pyrite forms very well preserved and defined lobate aggregates that are intergranular clinopyroxene, biotite and minor K-feldspar. Magnetite and ilmenite also have smooth, curved, well adjusted grain boundaries with sulphide. The textures very clearly indicate that the sulphides are magmatic. Minute amounts of chalcopyrite occur as fine, ragged grains and appear to be secondary. These grains could be either be a result of remobilisation of original igneous sulphides or be introduced.



MCDDH4 - 95.8 m. Photograph of polished rock slab showing patch of sulphide within assemblage of clinopyroxene, biotite and minor K-feldspar and oxide (magnetite, ilmenite). Sulphide is pyrite and forms lobate aggregates with smooth curved margins against silicates. These textures indicate that the sulphides are part of the silicate assemblage and are thus igneous sulphides. FOV = 3 cm.



MCDDH4 - 95.8 m. Aggregate of moderate to strongly altered clinopyroxene with intergranular, lobate opaque (pyrite). Crossed polars. FOV = 2.6 mm.



MCDDH4 - 95.8 m. Same field of view as above in reflected light showing intergranular, lobate aggregate of pyrite between clinopyroxene grains. This is a classic magmatic sulphide texture. Minor trace amounts of very fine grained ragged pyrite is secondary associated with alteration of clinopyroxene. Reflected light. FOV = 2.6 mm.

MC/ND 1

BIOTITE OLIVINE WEBSTERITE

Rock Chip, Mt Doom North

Polished Thin Section

<u>Mineralogy</u>	<u>mode %</u>
Clinopyroxene	45
Orthopyroxene	20
Biotite	15
Olivine	15
K-feldspar	5
Pyrite	tr
Chalcopyrite	mtr

Very fresh aggregate of anhedral grains of clinopyroxene (1 mm grain size), orthopyroxene (up to 4 mm) and olivine (1 mm) with intergranular biotite (1-4 mm). K-feldspar and trace sulphide. The larger biotite grains are poikilitic. Most biotite is dark red-brown in colour but a trace amount is green - the brown appearing to be altered green biotite. Olivine is very fresh although contains numerous fractures and opaque inclusions. These inclusions are symplectic intergrowths that are probably the result of exsolution. They appear to be composed of chromite as very thin grains are translucent dark red-brown in colour.

Pyrite and chalcopyrite form well defined lobate grains and aggregates, 0.1-0.2 mm across, intergranular to igneous silicates. Grain boundaries against igneous silicates are smooth and curved and the sulphides are very clearly part of the igneous assemblage.

MC/ND 2

BIOTITE OLIVINE WEBSTERITE

Rock Chip, Mt Doom North

Polished Thin Section

<u>Mineralogy</u>	<u>mode %</u>
Clinopyroxene	40
Orthopyroxene	20
Biotite	25
Olivine	15
K-feldspar	tr
Pyrrhotite	tr
Pyrite	tr
Chromite	tr
Magnetite	tr
Chalcopyrite	mtr

Very similar rock to MC/ND 1 with fresh clinopyroxene, orthopyroxene and olivine forming an aggregate of anhedral grains with intergranular biotite, K-feldspar and trace sulphide and chromite. The larger biotite grains are poikilitic. Most biotite is dark red-brown in colour but a trace amount is green - the brown appearing to be altered green biotite. Olivine is very fresh although contains numerous fractures and opaque inclusions. These inclusions are symplectic intergrowths that are probably the result of exsolution. They appear to be composed of chromite as very thin grains are translucent dark red-brown in colour. Chromite also forms lobate grains intergranular to coarser-grained igneous silicates.

Pyrrhotite, pyrite and chalcopyrite form well defined lobate grains and aggregates, 0.1-0.2 mm across, intergranular to igneous silicates. Grain boundaries against igneous silicates are smooth and curved and the sulphides are very clearly part of the igneous assemblage. A minute trace amount of the sulphides are intergrown with secondary magnetite and silicates.

MC/DM1

BIOTITE OLIVINE CLINOPYROXENITE

Rock Chip, Mt Doom South

Polished Thin Section

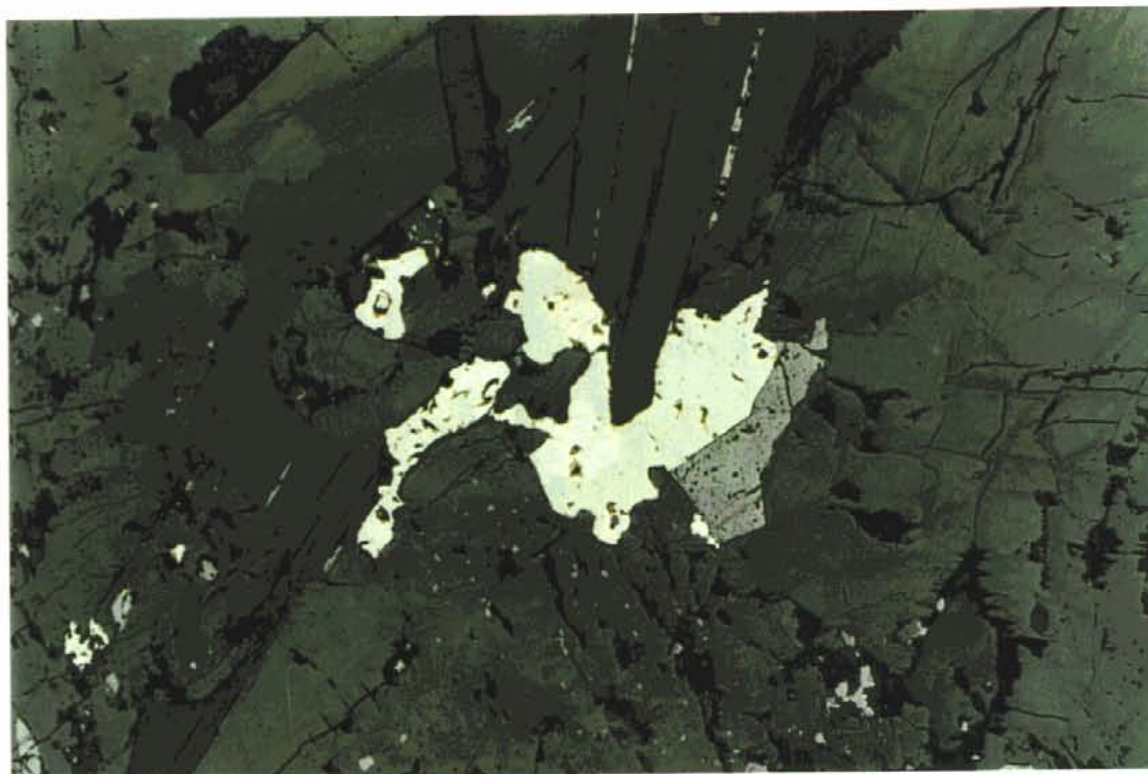
<u>Mineralogy</u>	<u>mode %</u>
Clinopyroxene	55
Biotite	20
Olivine	18
Orthopyroxene	5
Chromite	2
Pyrrhotite	tr
Pyrite	mtr
Magnetite	mtr
Chalcopyrite	mtr
Carbonate	mtr

Moderately banded rock defined by biotite-rich bands within an aggregate of anhedral clinopyroxene, olivine and minor orthopyroxene. The banding appears to be igneous flow banding. Clinopyroxene and olivine have similar size (3-4 mm) with orthopyroxene being considerably smaller (0.5 mm). Olivine is slightly altered to ragged magnetite and this accounts for all the magnetite in the rock. There are a few diffuse veinlets of carbonate and secondary silicates but otherwise the rock is very fresh.

The sulphides consist of pyrrhotite, pyrite and chalcopyrite which form well defined lobate grains and aggregates, 0.1-0.2 mm across, intergranular to igneous silicates. Grain boundaries against igneous silicates are smooth and curved and the sulphides are very clearly part of the igneous assemblage. A minute trace amount of the sulphides are intergrown with secondary magnetite associated with alteration of olivine.



MC - DM1. Biotite olivine clinopyroxenite with pale green, moderately altered clinopyroxene, generally fine-grained biotite and olivine (clear) with abundant fractures and opaque inclusions. Plane light. FOV = 2.6 mm.



MC - DM1. Aggregate of pyrrhotite (pale brown), pyrite (pale yellow) and magnetite (grey) in contact with clinopyroxene and biotite (strong cleavage). Very fine-grained scattered sulphide and magnetite are secondary, related to alteration of clinopyroxene. Reflected light. FOV = 2.6 mm.

MC/DM2

SERPENTINISED BIOTITE LHERZOLITE

Rock Chip, Mt Doom South

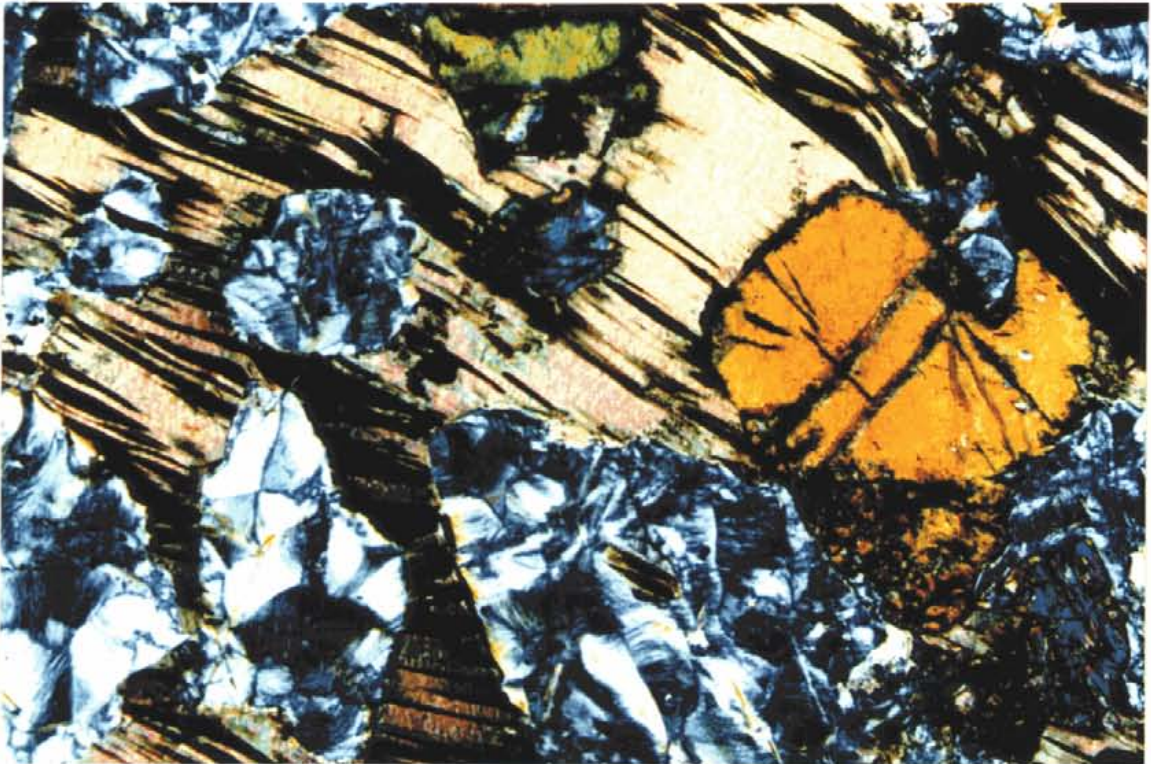
Polished Thin Section

<u>Mineralogy</u>	<u>mode %</u>
Serpentine	55
Biotite	20
Clinopyroxene	10
Chlorite	5
Magnetite	8
Chromite	2
Pentlandite	mtr

Olivine is entirely altered to serpentine and magnetite although the igneous grain shapes are well preserved. These were oval to anhedral grains about 3 mm across that formed a close packed aggregate. Large biotite grains up to 13 mm long are strongly poikilitic enclosing both olivine and clinopyroxene. Much of the biotite contains secondary magnetite stringers and other inclusions along cleavage traces. Clinopyroxene is fresh and forms anhedral grains up to 0.8 mm which are surrounded by serpentine.

Pseudomorphed orthopyroxene grains are defined by bastite textures of aligned antigorite and chlorite. Chromite forms lobate grains with somewhat ragged grain margins due to overgrowths of secondary magnetite. All magnetite in the rock appears to be related to serpentinisation or other secondary alteration. Minute traces of pentlandite occur as fine, ragged grains intergrown with magnetite. These sulphide grains appear to be secondary in origin forming from Ni released from altered olivine and S introduced with the alteration fluids.

The original rock was composed of olivine and pyroxene forming an aggregate of anhedral grains with well adjusted, smooth curved mutual grain boundaries with coarse-grained poikilitic biotite. The approximate mineral proportions were olivine (60%), clinopyroxene (10%), orthopyroxene (8%), biotite (20%) and chromite (2%).



MC - DM2. Serpentinitised biotite lherzolite with poikilitic biotite containing inclusions of anhedral clinopyroxene (green, yellow, blue) and oval to anhedral olivine pseudomorphed by serpentine (blue grey, antigorite) and magnetite. Crossed polars. FOV = 2.6 mm.

MC/BL

BIOTITE OLIVINE WEBSTERITE

Rock Chip, Outcrop on Base Line

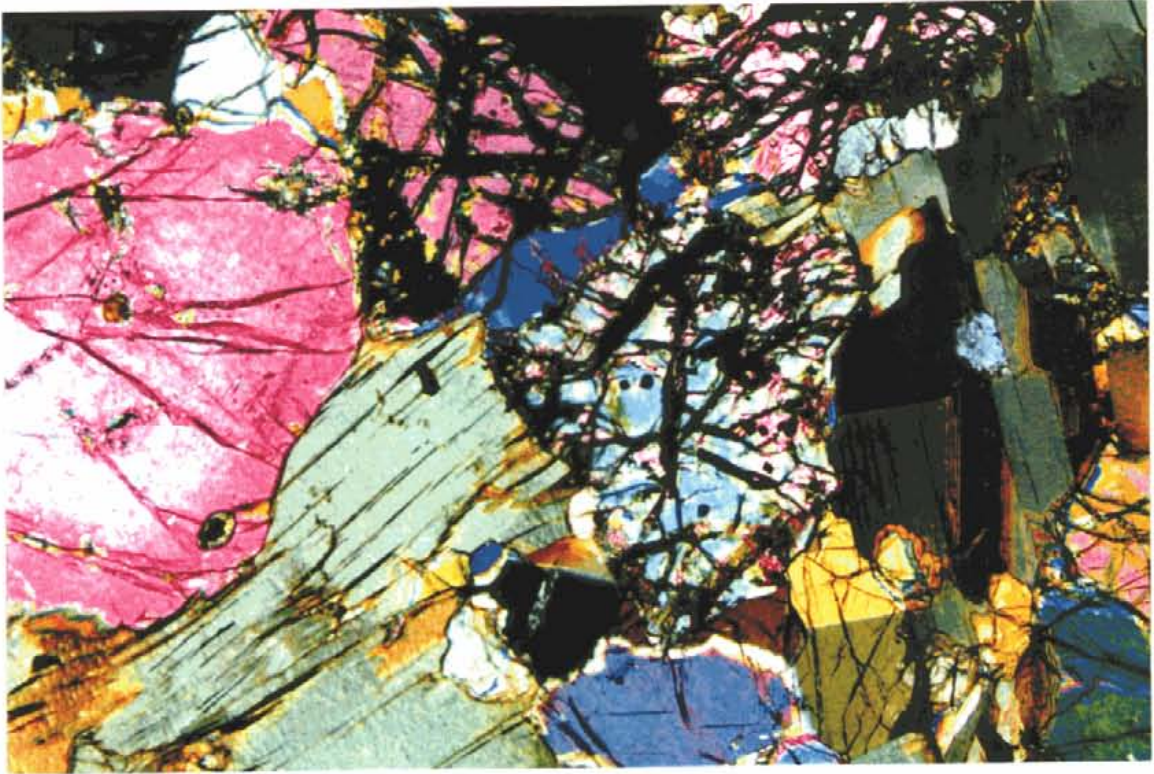
Polished Thin Section

<u>Mineralogy</u>	<u>mode %</u>
Clinopyroxene	45
Biotite	25
Olivine	20
Orthopyroxene	10
K-feldspar	tr
Pyrrhotite	tr
Pyrite	tr
Chromite	tr
Magnetite	tr
Chalcopyrite	mtr

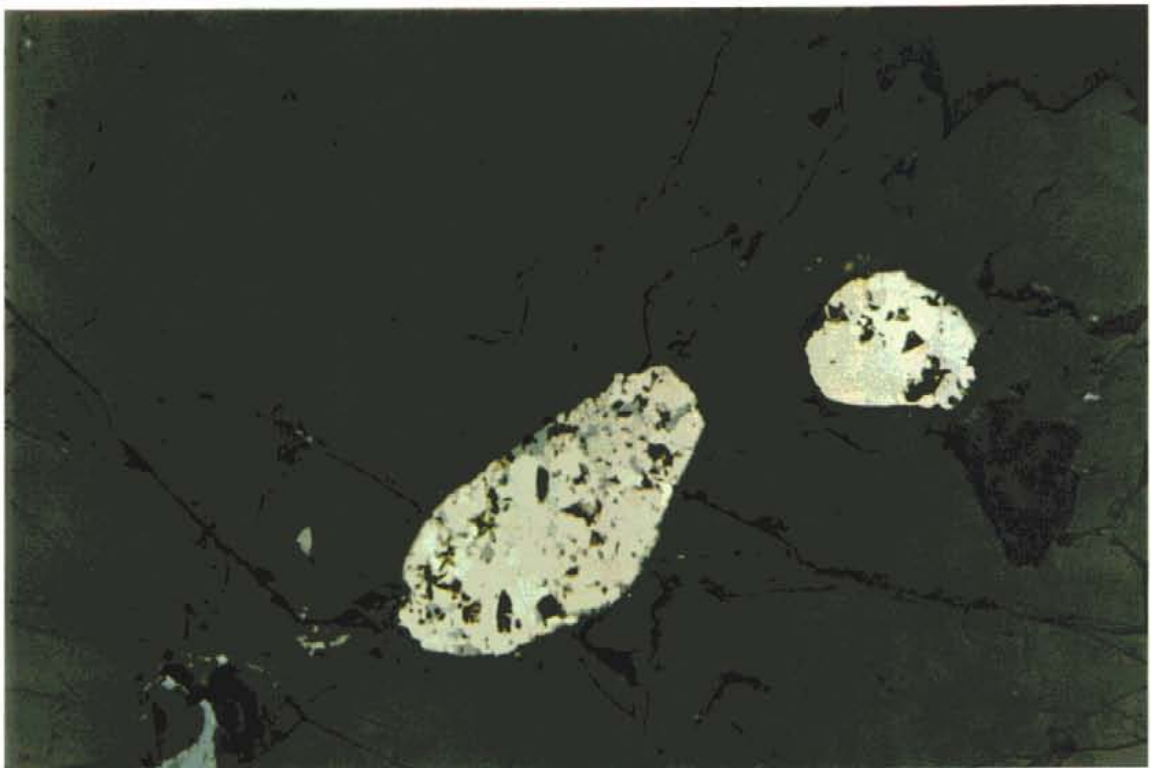
Patchily distribution of minerals with biotite-rich and clinopyroxene-rich domains.

The rock consists of an aggregate of mostly anhedral grains although biotite forms aggregates, up to 4 mm across, of decussate grains with the larger grains being weakly poikilitic. Orthopyroxene is fine grained (0.6 mm), clinopyroxene is mostly even grained with grain size of about 2 mm and rare, somewhat tabular grains up to 5 mm. Olivine has variable grain sizes of mostly 0.5 to 2 mm but with rare grains up to 7 mm. The rock is remarkably fresh with only a trace of secondary alteration of olivine. Olivine contains very fine inclusions of symplectic intergrowths of chromite as thin platelets. Biotite is mostly red-brown but a trace amount is green.

Pyrrhotite, pyrite and chalcopyrite form well defined lobate grains and aggregates, 0.1-0.2 mm across, intergranular to igneous silicates. Grain boundaries against igneous silicates are smooth and curved and the sulphides are very clearly part of the igneous assemblage. A minute trace amount of the sulphides are intergrown with trace amounts of secondary alteration.



MC - BL. Biotite olivine websterite with very fresh assemblage of highly fractured olivine (blue, pink), clinopyroxene (pink, blue, yellow, green), biotite and minor K-feldspar (grey). Crossed polars. FOV = 2.6 mm.



MC - BL. Blebby sulphide aggregate with smooth curved margins against igneous silicates. Sulphide aggregate consists of pyrrhotite (pale brown) and pyrite (pale yellow). Holes in sulphides are polishing pits. Sulphides are clearly part of the igneous assemblage. Reflected light. FOV = 0.65 mm.

APPENDIX VIII

EL 9371 MORDOR POUND

Pontifex and Associates Mineralogical Report

Pontifex & Associates Pty. Ltd.

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SOUTH AUSTRALIA 5067
A.C.N. 007 521 084

P.O. BOX 91, KENT TOWN
SOUTH AUSTRALIA 5071

MINERALOGICAL REPORT NO. 7123 **by A.C. Purvis, PhD**

June 18, 1996

TO :

CRA Exploration Pty Ltd
PO Box 39598
WINNELLIE NT 0821

Attention D.J. Louwrens

COPY TO :

CRA Exploration Pty Ltd
PO Box 39598
WINNELLIE NT 0821

Attention A.J. Webb

CRAE Information Systems
PO Box 3709
MANUKA ACT 2603

YOUR REFERENCE :

DPO No. 81933

MATERIAL :

10 Samples

IDENTIFICATION :

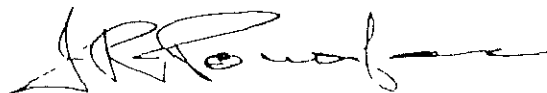
5488217 to 5488226

WORK REQUESTED :

Thin and polished thin section preparation,
petrographic description and report, with
comments as specified

SAMPLES & SECTIONS :

Returned to you with this report



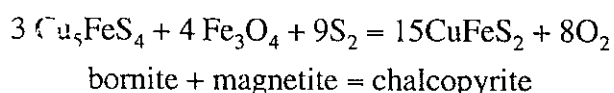
PONTIFEX & ASSOCIATES PTY. LTD.

SUMMARY COMMENTS

Ten rock samples, from the Mordor Igneous Complex in the Arunta Inlier in the Northern Territory, are described in this report. These were made into seven normal thin sections and three polished thin sections.

These samples represent ultramafic to felsic igneous lithologies, including a serpentinite after biotite-bearing dunite, biotite wehrlite to clinopyroxenite, mafic to magnetite-rich to felsic syenites, and a massive magnetite segregation. These samples may represent a subvolcanic plutonic system and are similar to subvolcanic complexes in New South Wales, at Mount Dromedary and Fifield. Broad similarities with igneous rocks in the Oslo Rift in Norway are also seen.

The pyroxenite to syenite samples are unusually rich in apatite, which they have in common with the Mount Dromedary and Fifield occurrences, but have magnetite apparently without any ilmenite, either as a primary mineral or exsolved. Traces of copper sulphide occur in the most magnetite-rich rocks (5488223-224), with chalcopyrite and/or bornite, largely enclosed in magnetite. This suggests $fO_2 - fS_2$ conditions outside the stability fields of pyrrhotite or pyrite, buffered by the reaction:

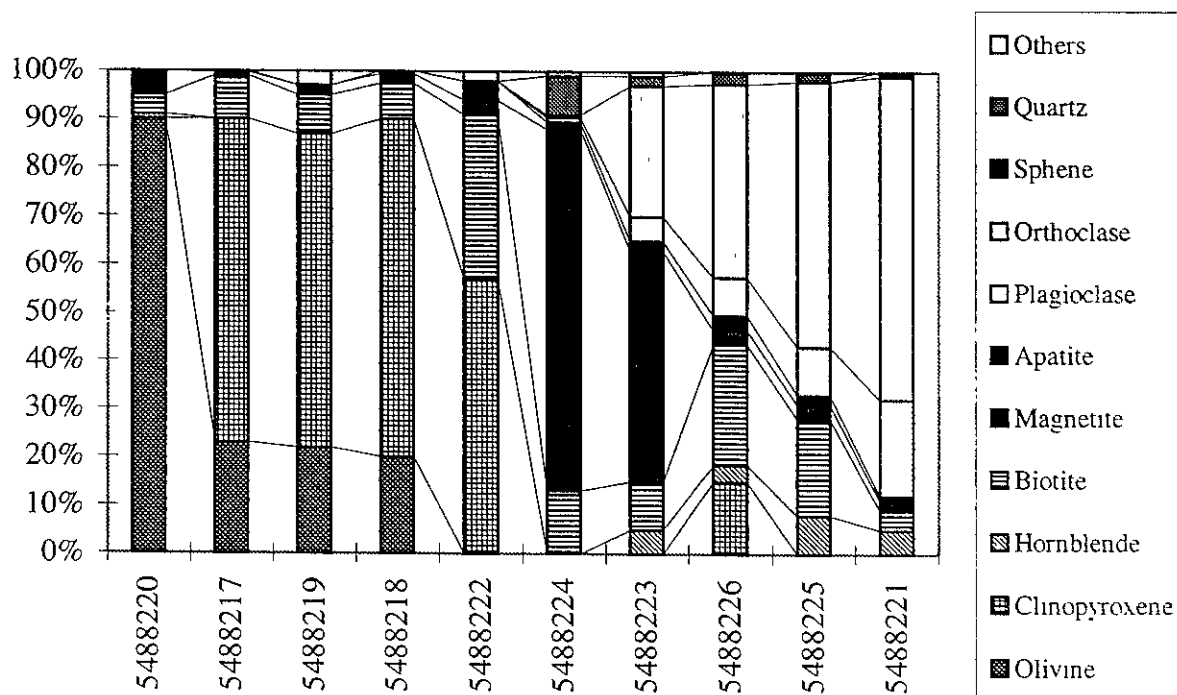


The parental magma would seem to be quite potassic, possibly shoshonitic to lamprophyric as the more evolved rocks have orthoclase > plagioclase and are syenites rather than monzonites as at Mount Dromedary. However in sample 5488226, the orthoclase has myrmekite-like inclusions which the writer has seen elsewhere only in monzonite from Mount Dromedary (from the quarry at Central Tilba, New South Wales).

A lamprophyric magma (possibly of lithospheric mantle origin) would result in rocks richer in Zr, Nb, Ba and rare earth elements than normal shoshonites, but poorer (relative to rare earth elements) in Sr and P. These alternatives would require whole-rock analyses for the elements in question, but lamprophyres (as at Mount Bundey in the Pine Creek Inlier and more widely in the Tennant Creek Inlier) may be to some extent prospective for microdiamonds, whereas Fifield suggests PGE prospectivity and Mount Dromedary has some

It is suspected that, by analogy with Mount Dromedary, the olivine in the wehrlites is relatively iron-rich ($\sim\text{Fo}_{70}$?) and that there are no primary unfractionated magmatic rocks in this batch. However it seems that the abundant biotite is of primary magmatic origin and is consistent with the presence of apatite-rich lithologies (both K and P are relatively incompatible elements and increase sympathetically with lower degrees of partial melting). It is also suspected that the biotite-rich lithologies may be rich in Ba (early formed biotite in these complexes may have $>1\%$ Ba, and early orthoclase may have several % Ba).

The mineralogy of the various samples is illustrated below, with the samples listed from most ultramafic to most felsic.



INDIVIDUAL DESCRIPTIONS

5488217 **Fresh biotite wehrlite with accessory magnetite, apatite and carbonate.**

This is essentially a biotite-wehrlite of cumulus origin with some very large oikocrysts of poikilitic biotite to 10 mm long, as well as granular clinopyroxene and olivine. The grainsize of the apparent cumulus minerals varies from 1 to 4 mm, with granular textures and equant to elongate habits. Fine-grained primary and secondary opaque oxides occur as accessories, the secondary opaque oxide being essentially all in the olivine. Very minor secondary carbonate is also evident and there is very minor apatite.

The visually estimated mineralogy is:

Clinopyroxene	65-70%
Olivine	20-25%
Biotite	8-10%
Magnetite	<1%
Apatite	tr
Carbonate	tr

5488218

Biotite wehrlite similar to 5488217 with less abundant biotite and olivine, and very minor hornblende.

This is a very similar wehrlite to that in the previous sample but has less abundant poikilitic biotite, and possibly less abundant olivine, generally to 3 mm grainsize and locally occurring as chains of crystals. Some of the clinopyroxene has been altered to patchy late magmatic hornblende or biotite, and there is some carbonate (<1%). There seems to have been some replacement of olivine and clinopyroxene by poikilitic biotite, with smaller and more rounded grains enclosed in biotite. This is not evident in the previous sample, however.

The visually estimated mineralogy is:

Clinopyroxene	70%
Olivine	20%
Biotite	7-8%
Magnetite	1-2%
Hornblende	<1%
Carbonate	<1%

**5488219 Microgranular wehrlite with minor biotite, possibly
recrystallised.**

This is a rather finer-grained wehrlite than those in the previous samples, with no grains larger than 2 mm. There is also rather more abundant serpentine veining in the olivine, which is not really evident in the previous samples. The disseminated biotite is also only weakly poikilitic due to its smaller size relative to the olivine and pyroxene. Primary magnetite seems to be more abundant, and there is secondary magnetite in the serpentine veins and also within relatively unaltered olivine. It is possible that this rock has been recrystallised, and the biotite has 'exsolved' some titaniferous lamellae (now leucoxene). Rare calcite and apatite are present.

The visually estimated mineralogy is:

Clinopyroxene	65%
Olivine	20-25%
Biotite	7-8%
Serpentine	2%
Magnetite	2%
Calcite	tr
Apatite	tr

5488220

Serpentinite after biotite-bearing dunite with minor chlorite and tremolite, also abundant primary and secondary opaque oxide (magnetite > chromite).

Mesh-textured serpentine dominates this sample and appears to have replaced olivine grains about 2 to 5 mm in size. There is minor serpentine which may be after pyroxene, and altered poikilitic biotite flakes to 5 mm long occur. There are also patches variously composed of fibrous chlorite and anhedral tremolite. Primary and secondary opaque oxides (chromite and magnetite respectively) are common, including lamellae of magnetite parallel to the cleavage of the altered biotite. The chromite occurs as rounded grains to 0.2mm in size, rarely rimmed by magnetite. The original lithology was apparently a biotite dunite.

The visually estimated mineralogy is:

Serpentine	90%
Altered biotite	4%
Magnetite	5%
Chlorite	1%
Tremolite	1%
Chromite	1-2%

5488221

Altered biotite-hornblende syenite with sericite, epidote and chlorite. Accessory magnetite, sphene and apatite.

Coarse orthoclase, as slightly rounded elongate laths to 12 mm long, is the main component in this rock, with lenses and bands of sericitised apparently granular plagioclase to 10 mm wide. The grain size of the altered plagioclase is not clear, but is possibly about 1-2 mm. There is locally some epidote in the altered plagioclase. Anastomosing foliae rich in ferromagnesian grains, largely tremolite-actinolite (possibly after clinopyroxene) and biotite, are also common. There are also abundant accessories, including opaque oxide, sphene and apatite, with some possible magnetite-ilmenite-apatite aggregates.

There are some epidote veins and some of the biotite has been altered to chlorite.

The visually estimated mineralogy is:

Orthoclase	65-70%
Altered plagioclase	20%
Amphibole	5%
Biotite	4%
Oxide	2%
Sphene	1%
Apatite	1-2%

This suggests an altered syenite.

5488222

Biotite pyroxenite, rich in apatite, also with talc possibly after olivine and minor magnetite.

This sample marks a return to an ultramafic composition, with more abundant biotite than in the previous samples of this type, and no fresh olivine. There may have been some olivine, but this has been altered to talc-magnetite aggregates. These are quite minor and also quite small (to 1 mm grainsize). The pyroxene seems to be all clinopyroxene as in the previous samples, and is granular to prismatic with a grainsize of up to 4 mm. The biotite seems to have been weakly deformed to recrystallised and is not clearly poikilitic as in the previous samples. There is some primary magnetite, but apatite is unusually abundant, locally in granular lenses to 2 mm in diameter.

The visually estimated mineralogy is:

Clinopyroxene	55-60%
Biotite	30-35%
Oxide	3%
Apatite	3-5%
Talc	1-2%

5488223

**Mafic magnetite syenite with hornblende, biotite,
abundant apatite and minor late magmatic quartz.**

Abundant magnetite occurs as an interstitial, probably late magmatic mineral in this sample, with abundant coarse orthoclase as in sample 5488221. This sample is more heterogeneous in hand-specimen and, indeed may seem to be a possible breccia. In thin section the magnetite-rich areas pass into lenses rich in partly poikilitic green hornblende and/or biotite to 5 mm in grainsize, and commonly abundant granular to prismatic apatite. Much of the minor late magmatic quartz which is seen in this rock is also present in magnetite-rich areas, but some is seen to be interstitial to orthoclase. The quartz is locally poikilitic and up to 3 mm in grainsize. In reflected light, it can be seen that there is no ilmenite but there are rare patches of chalcopyrite and/or bornite to 50 μ m in diameter. There is a trace of chalcopyrite in some of the hornblende as well as in the magnetite. Some secondary hematite occurs in the magnetite as thin lamellae, but ilmenite is apparently absent.

The orthoclase occurs as laths to 10 mm long, as can be seen on the stained offcut, and seems to be zoned and perthitic. Plagioclase, ranging from totally fresh to totally sericitised, occurs partly as separate laths, partly as irregular grains which seem to have been replaced to some extent by orthoclase. Patches of malachite to 1 mm long occur in and adjacent to biotite and magnetite grains and there are some small patches of colloform limonite, possibly after pyrite.

The visually estimated mineralogy is:

Oxide	45-50%
Orthoclase	25-30%
Biotite	10%
Hornblende	5%
Plagioclase	5%
Quartz	2-3%
Apatite	2-3%
Malachite, sulphide	<1%

5488224

Massive magnetite with lenses containing biotite, quartz, apatite, orthoclase, plagioclase and rare malachite.

Massive magnetite dominates this sample, with disseminated silicate lenses dominated by biotite and granular quartz. These lenses are up to 7 mm in maximum dimension and contain biotite and quartz to 3 mm grainsize. Fine granular apatite is common in some lenses and there are also rare grains of orthoclase, also clays apparently after plagioclase. There is a minor secondary porosity with some clays, limonite and rare malachite, as well as a patch of possible zeolite. The association of magnetite with biotite and quartz is to some extent similar to that seen in the previous sample. In reflected light, it can be seen that there is no ilmenite in or exsolved from the magnetite, but there is very minor lamellae hematite and rare disseminated patches of chalcopyrite $\pm$ bornite to 0.1 mm in size.

The visually estimated mineralogy is:

Magnetite	75%
Biotite	10-12%
Quartz	7-8%
Apatite	1-2%
Orthoclase	1%
Plagioclase	1%
Malachite, sulphides	
etc.	<1%

5488225

Mafic biotite-hornblende syenite with minor quartz, also abundant apatite.

This is a mafic syenite with fresh large grains of orthoclase to 15 mm in length and interstitial areas of ferromagnesian minerals, altered plagioclase, opaque oxides and apatite. The orthoclase locally has a domainal structure normal, locally weakly perthitic orthoclase and ragged domains within which there are myrmekite-like unidentified inclusions. Virtually identical textures are seen in monzonite at Mount Dromedary (Central Tilba Quarry) in New South Wales. The refractive index of the inclusions would be consistent with calcic plagioclase, but the mineral has not been identified either in this sample or at Mount Dromedary.

The main ferromagnesian mineral is biotite as weakly poikilitic flakes to 4 mm long, but there is less abundant green hornblende. These commonly include magnetite and apatite, and there are also rare patches of quartz in the hornblende. Plagioclase occurs in and adjacent to the ferromagnesian patches as highly sericitised laths to 4 mm long, and there is some late magmatic quartz as irregular poikilitic grains to 3 mm long. Minor quartz also occurs between orthoclase grains and very minor sphene occurs in the ferromagnesian aggregates.

The visually estimated mineralogy is:

Orthoclase	55%
Biotite	20%
Plagioclase	10%
Hornblende	7-8%
Quartz	2%
Magnetite	3%
Apatite	2%
Sphene	<1%

5488226

Mafic quartz-bearing biotite-clinopyroxene syenite rich in apatite.

Coarse poikilitic orthoclase dominates this rock, enclosing ferromagnesian aggregates and some altered plagioclase. Some of the orthoclase, generally the smaller grains, has myrmekite-like intergrowths with a fine indeterminate mineral. Virtually identical intergrowths occur in monzonite from Mount Dromedary in New South Wales, but these have not been identified mineralogically. The coarse orthoclase is up to 12 mm in grain size and is free of such intergrowths.

The ferromagnesian minerals are up to 4 mm in grain size and include clinopyroxene and biotite, with relatively quite minor green hornblende, partly as a secondary mineral altering clinopyroxene. Most of the very minor late magmatic quartz occurs interstitial to the ferromagnesian minerals and there is abundant apatite, locally as prisms to 2 mm long. The quite minor plagioclase also occurs in the ferromagnesian aggregates and has been almost totally altered to sericite. A grain size of up to 3 mm is suggested, with some grains euhedral against orthoclase. There is rare myrmekite. Opaque oxides are relatively minor and small, compared to the apatite.

The visually estimated mineralogy is:

Orthoclase	40%
Biotite	25%
Clinopyroxene	15%
Altered plagioclase	7-8%
Hornblende	3-4%
Oxides	3%
Quartz	2-3%
Apatite.	3%

This suggests a mafic quartz-bearing syenite.

APPENDIX IX

EL 9371 MORDOR POUND

Petrography of Hole DD96MD1 Mineralisation

Martin Gole and Associates

Geological and Petrological Services

8 Landor Road
Gooseberry Hill W.A. 6076
Telephone (09) 293 4958

TO : Steve Hulton, CRA Exploration, Darwin
DATE : 12 July 1996
SUBJECT : Petrography of Mordor sample DD96MO1 27.05 - 27.18 m

Sulphide-rich Mafic Shonkinite

Mineralogy	mode %
Hornblende	25
Tremolite-actinolite	25
Biotite	15
K-feldspar	15
Pyrite	14
Sphene	2
Apatite	2
Epidote	1
Chalcopyrite	1
Millerite	tr
Barite	mtr

Ragged, partly to strongly corroded clinopyroxene pseudomorphed by fine-grained pale green, fibrous tremolite-actinolite. Clinopyroxene formed tabular grains up to 3 mm long. These are mantled by dark green hornblende and contain numerous ragged inclusions of hornblende as well as being crowded with very fine-grained, crystallographically aligned opaques that appear to be exsolution products. Clinopyroxene reacted to form hornblende, probably during late-stage igneous fluid activity. Alteration of clinopyroxene to fibrous tremolite-actinolite appears to have been a later alteration, perhaps during regional metamorphism.

Intergranular, irregular shaped biotite grains are scattered throughout the rock. K-feldspar occurs as rounded to oval to anhedral grains and small aggregates in intergranular textural positions.

Sulphides and oxides form aggregates with slightly modified lobate shapes where the sulphide mode is low to moderate to blebby, massive aggregates with cusped margins where the sulphide mode is high. Shapes of aggregates, their generally smooth curved, moulded margins against igneous silicates (or their pseudomorphs) clearly indicate that the sulphides are part of the igneous mineral assemblage. The margins of the sulphide aggregates are in places somewhat ragged on a fine scale due to recrystallisation, particularly of the clinopyroxene to hornblende and to tremolite-actinolite.

Chalcopyrite forms anhedral, blebby to elongate grains within pyrite-rich aggregates and as inclusions within pyrite grains. Millerite generally occurs within pyrite aggregates and has well formed, cusped to anhedral grains with smooth curved grain boundaries with other phases - i.e. it certainly appears to be part of the igneous sulphide assemblage. Minute trace amounts of barite is present as small inclusions within pyrite.

The attached SEM backscattered electron image shows the general sulphide-silicate textural relationships, as well as chalcopyrite occurring as separate grains within the pyrite-rich aggregate and as inclusions in pyrite. On this image both pyrite and chromite have the same reflectivity as does chalcopyrite and millerite. Pyrite is lighter on the right-hand side than the left-hand side of the image.

Ant Jell



EHT=20.00 kV

WD= 31 mm

Mag= 69 X

100µm

Photo No.=64

Detector= Rbsd

PC

APPENDIX X

EL 9371 MORDOR POUND

Magnetic Susceptibility of NTGS core

MORDOR DIAMOND DRILLING (NTGS, 1975)

Magnetic Susceptibility Readings (1995)

MCDDH1

Depth (m)	Lithology	Core Size	Mag. Susc. (SI)	
			(Ave.)	(Max.)
0-7	Weathered Shonkinite	NQ	0.152	0.38
7-28	Porphyritic Shonkinite	NQ	0.38	0.57
28-31	Fgr. Shonkinite Dyke	NQ	0.076	0.095
31-48	Porphyritic Shonkinite	NQ/BQ	0.38	0.475
48-74	Melanocratic Syenite	BQ	0.315	0.525
74-81	Porphyritic Shonkinite	BQ	0.42	0.63
	Incl. 2.5m qz/fsp Vein	BQ	0.00063	0.00126
81-97	Mafic Shonkinite	BQ	0.315	0.42

MCDDH2

Depth (m)	Lithology	Core Size	Mag. Susc. (SI)	
			(Ave.)	(Max.)
7-16	Mica Dunite	1/2 NQ	0.044	0.11
16-23	Serpentinised Mica Dunite	1/2 NQ	0.176	0.22
23-40	Serpentinised Mica Wherlite	1/2 NQ	0.33	0.44
40-41.5	Serpentinised Mica Lherzolite	1/4 BQ	0.175	0.21
41.5-42.5	Serpentinised Websterite	1/4 BQ	0.175	0.21
48.5-52	Mica Lherzolite	1/2 BQ	0.156	0.26
55.5-59	Serpentinised Websterite	1/2 BQ	0.208	0.52
59-68.5	Shonkinite - Biotite Clinopyroxenite	1/2 BQ	0.52	0.65
68.5-74.5	Porphyritic Shonkinite	1/2 BQ	0.52	0.65
74.5-91	Mafic Shonkinite	1/2 BQ	0.52	0.65

MCDDH3

Depth (m)	Lithology	Core Size	Mag. Susc. (SI)	
			(Ave.)	(Max.)
0-22	Syenite	NQ	0.152	0.19
22-29	Banded Syenite	NQ	0.152	0.285
30-36	Banded Syenite	NQ	0.152	0.19
36-69.5	Syenite	BQ	0.126	0.315

MCDDH4

Depth (m)	Lithology	Core Size	Mag. Susc. (SI)	
			(Ave.)	(Max.)
7-42	Mafic Shonkinite	NQ	0.095	0.152
43-46	Biotite Websterite	NQ	0.038	0.076
48-64	Biotite Websterite	NQ	0.019	0.038
64-72	Biotite Pyroxenite	NQ	0.152	0.228
72-77	Banded Pyroxenite and Shonkinite	NQ	0.19	0.38
77-80	Biotite Pyroxenite	NQ	0.285	0.38
80-84	Banded Pyroxenite	NQ	0.038	0.076
84-89.5	Biotite Pyroxenite	NQ	0.038	0.076
89.5-92	Porphyritic Shonkinite	NQ	0.152	0.285
92-97.5	Banded Pyroxenite and Shonkinite	NQ	0.038	0.095

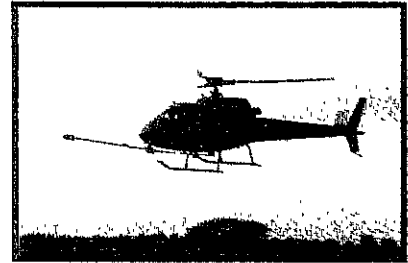
Field mag. susc. readings:

	SI
Shonkinite	0.04 - 0.08
Pyroxenite	0.02 - 0.03
Dunite	approx. 0.15

APPENDIX XI

EL 9371 MORDOR POUND

Heliborne Magnetic And Radiometric Survey Logistics Report
and "Quick-Look" Images



Operations Report

Helicopter Geophysical Survey

MORDOR POUND, Northern Territory

CRA Exploration Pty Ltd

18 Kilometre Post
Stuart Highway
Berrimah NT 0828

March 1996

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1. LOGISTICS

1.1 *OPERATING BASE AND DESCRIPTION OF AREAS FLOWN*

1.1.1 **Operating Base**

The crew were based at the Ross River Homestead at Ross River from 24 - 29 March, 1996. The helicopter was operated from Ross River Homestead.

1.1.2 **Areas Flown**

The survey area is located approximately 75 km East-North-East of Alice Springs and contains flat terrain surrounded by the rugged escarpments of the Georgina Range.

For a map of the area flown, see Appendix 1. A table of the area boundary coordinates is given as Appendix 2. The survey totalled 1,618 line kilometres, flown at 150m line spacing on flight lines oriented at 120° True. Full specifications are given in Section 2.1. The actual dates on which the area was flown are given in the Survey Progress Summary (Appendix 3).

1.1.3 **Project Identification**

The survey is identified as Geo Instruments Pty Ltd Job No.9608. Data processing was accomplished by Kevron Geophysics Pty Ltd in their Neutral Bay office as Job Number 1406.

1.2 *AIRCRAFT DETAILS AND NAMES OF FIELD CREW*

1.2.1 **Aircraft**

The helicopter contractor used for the complete survey was Heli-Aust Pty Ltd of Bankstown Airport.

Company	Make	Registration
Heli-Aust Pty Ltd	Bell Helicopter 206 B3 "Jet Ranger"	VH-JWF

1.2.2 **Field Crew**

The helicopter and the survey pilot were provided by Heli-Aust Pty Ltd of Bankstown Airport. The geophysical personnel were provided by Geo Instruments Pty Ltd of Sydney.

Pilot	David Shute
Dataman	Stephen Penfold
Operator	S. Penfold / Z. Beldi

2. SURVEY DETAILS

2.1 *FLYING SPECIFICATIONS*

	Direction deg. true
Flight line direction	120 - 300
Tie line direction	030 - 210

Flight line spacing	150 metres
Tie line spacing	1,500 metres
Magnetic sensor mean terrain clearance	30 metres
Spectrometer sensor mean terrain clearance	30 metres
Sampling interval (Magnetics)	0.10 second
	3m (mean)
(Radiometrics)	1.0 second
	about 30m

A tie line occurs within 500m of the outside edge of each survey area.

Area	Line km's
1	1,618
Total	1,618

2.2 *MAPPING*

Flight Planning was conducted by reference to Australian Map Grid Coordinates and area diagrams supplied by the client.

2.3 *FLIGHT PATH CONTROL*

Navigation was conducted primarily by reference to the positions provided by the Global Positioning System, hereafter referred to as GPS

Flight path recovery was obtained by differentially correcting the flight data with static data that were obtained from a fixed base station GPS receiver.

The position of the reference base station antenna was obtained from a statistical analysis of a minimum of 1 hours observation of GPS readings at the base station.

The GPS base station was located at the field camp, with the following coordinates;

Northing	-23°35'29.83087
Easting	134°29'35.34016
Elevation (asl)	484.32m

The above co-ordinates are referenced to the WGS84 Spheroid.

The NovAtel 951R receiver and associated antennae is a multi-channel system capable of tracking up to ten satellites simultaneously and deriving positions from all satellites in view at 0.2 second intervals. For this survey the GPS antenna was located on the top of the helicopter tail fin.

GPS coordinates were recorded with reference to the AGD84 spheroid.

2.4 MAGNETOMETER

The survey was flown using a Geometrics G-822A Ultra-high sensitivity Cesium Vapour Magnetometer sensor system. This sensor provides a Larmor signal within the range of 0.6 to 1.1Mhz that is processed by high precision counters embedded within the Geo Instruments G2000 Acquisition system (described in section 2.8).

The sensor and pre-amp were mounted in a "boom" attached to the helicopter. Compensation for the aircraft magnetic field was achieved by passive application of electromagnetic currents.

Survey Specifications were:

Sensitivity	0.01 nT
Still Air RMS Noise	0.05 nT
Digital Recording Resolution	0.01 nT
Magnetic Gradient Tolerance	>20,000 nT / metre
Sample Time	0.10 sec.
Sample Distance (Mean)	4 metres

2.5 SPECTROMETER

An Exploranium GR820 Differential Gamma Ray Spectrometer was used to measure the standard energy windows for the gamma radiation from TI-208, Bi-214, K-40, Total Count and Cosmic sources. Values were recorded at the end of each second, corresponding to each second fiducial.

The gamma ray spectrometer was interfaced to a NaI (TI) crystal detector with a volume of 16.4 litres. The detector pack in the "Jet Ranger" was mounted inside the helicopter in the baggage compartment clear of the helicopter fuel tanks.

The GR820 measures the pulses generated by the crystal detector and controls the gain of each individual detector element by reference to the natural radiation emanating from the ground. The isotope selected for the gain control is determined during the survey and depends on the concentration observed during flights covering tie lines. As the area has a prevalence of Thorium, this was primarily used as the stabilising element.

All 256 channels of radiometric data were recorded in addition to the five differential channel windows, defined as follows:

Element	Energy Level (keV)	Window No.
Total Count	404 - 2805	34 - 224
K - 40	1369 - 1574	111 - 127
Bi - 214	1652 - 1863	133 - 149
Tl - 208	2415 - 2812	191 - 221
Cosmic	3000 - 6000	

The digital data has been corrected for instrument dead-time but, otherwise, the digital recording contains uncorrected values for the channel windows.

2.6 ALTIMETER

A Sperry AA-210 Radar Altimeter system was used to measure ground clearance. The pilot's analogue indicator provides an absolute altitude display from 0 to 750 metres (0 to 2,500 ft.).

The reference height above mean sea level was derived from the height value provided by the GPS receiver.

A Rosemount barometric altimeter was also used to record height above mean sea level. The response of the instrument is linear and the digital resolution is better than 2.5% with a departure of 3m at 100m altitude discernible.

Altitude was recorded by the digital acquisition system, in synchronisation with the spectrometer, every second.

2.7 BASE STATION MAGNETOMETER

A Geometrics proton magnetometer, Model G-856AX with digital recording was used as the base station magnetometer for recording the diurnal variations and was run continuously throughout the survey flying period. The base station was sampled at a 5.0 second period. This base station magnetometer was located 25m northwest of the GPS base station (refer 2.3).

Diurnal activity was classed as moderate throughout much of the survey. There were no periods where the magnetic diurnal gradients exceeded the tolerance specifications of 5nT in 5 minutes.

2.8 DATA ACQUISITION SYSTEM

The Geo Instruments G2000 is a Digital Acquisition System based on the IBM PC AT architecture.

The system is fitted with several modules tailored to condition the input data from the various sensing instruments. A custom written software package facilitates the following;

- (a) Correct synchronisation of the data streams,
- (b) Formatting of all data received,
- (c) Extended error checking of all parameters,
- (d) Visual data presentation for monitoring purposes,
- (e) Generate and distribute synchronising Fiducial numbers,
- (f) Recording of data to magnetic media,
- (g) Calculation of position and provide steering display for pilot

An example of raw data format is provided in Appendix 5.

2.9 GPS NAVIGATION SYSTEM

The GPS navigation system was based on NovAtel 951R Receivers and associated antennae. These receivers are ten channel CA (coarse acquisition) code and carrier phase units capable of tracking up to ten satellites simultaneously and deriving positions from all satellites in view.

Positions were generated at 0.2 second intervals and internal recording capacities allow ten hours of positional data storage.

A real time differential solution was obtained with the aid of the "Omnistar" wide area differential GPS service. Corrections were transmitted at four second intervals to the helicopter to update navigation and position displays. Close to the Georgina Range escarpments some GPS dropouts were experienced.

GPS coordinates were recorded with reference to the AGD84 spheroid.

2.10 WEATHER DETAILS

Weather information, where relevant, was recorded on the daily flight logs.

The weather on this survey was hot and dry with strong winds from the north-east.

3. CALIBRATIONS

3.1 *MAGNETICS*

3.1.1 Magnetic Noise Envelope.

Post flight analysis indicated that the mean fourth difference noise level achieved was less than 0.05nTs over the whole of the survey.

3.1.2 Heading and Parallax Errors

A flight was performed before the survey, to test for parallax errors in the system, by flying over a metal shed in two opposing directions. It was determined that the digital readings lagged the camera recorded positions by about one sample. This averages about three metres (each way) and is corrected in the field during merging of the positions with the acquired data. Note that additional corrections may be applied during the processing to eliminate any residual herringbone effect visible in the data.

3.1.3 Magnetic Compensation Procedure for Boom-Mounted Sensor

Compensation was passive for this survey area, using orthogonal electromagnetic coils.

3.2 *RADIOMETRICS*

3.2.1 Cosmic Calibration

Two flights were made over the sea at barometric altitudes of 250m and 2250m to relate the cosmic-ray window to the combined cosmic and aircraft backgrounds of each window. The flying time at each altitude was a minimum of 10 minutes.

3.2.2 Radiometric Parallax

A correction of one sample (approximately 30m) was applied for all radiometric channels.

3.2.3 Pad Calibrations

Calibration factors were determined by observations at the Bairnsdale Test Range on 12 January 1996, (VH-JWF). Details are contained in Appendix 6.

The following stripping coefficients, derived from the calibration test data, were used for the subsequent correction of the digital data.

	VH-JWF
alpha	0.254816
beta	0.487227
gamma	0.727000
a	0.033974
b	0.005998
g	0.002918

3.2.4 Sensitivity and Height Attenuation Calibrations

A series of flights were made over the helicopter calibration site in Bairnsdale, Victoria, on 12 January 1996, to determine aircraft system sensitivities and height attenuation coefficients (refer to details in Appendix 6). The calibration range was surveyed with a calibrated 256 channel portable spectrometer on the same day as the calibration flights.

The following altitude and background correction factors were determined for each of the radiometric channels by flying at high altitude, beyond the influence of radon:

VH-JWF (Jet Ranger)	TC	K	U	Th
Altitude attenuation coefficients	0.006958	0.008911	0.006510	0.006878
Aircraft background cps	123.29	12.70	2.73	5.64
Cosmic background coefficients	1.189847	0.068170	0.058473	0.053956

3.2.5 Daily, Pre and Post Flight Checks

All crystals were aligned prior to each day's flight using Cs137 sources and checked for drift at the conclusion of the day. Drift values were kept to a minimum by the correction mechanisms built into the GR820 spectrometer. An alarm is generated whenever the gain drift exceeds nominal tolerances and the GR820 is unable to correct the drift. An unresolved alarm will preclude further flying, however none was generated during this survey.

Pre and post flight checks of stability were undertaken using a pure Uranium and a pure Thorium sample. The background was recorded first with the samples well out of the way, then with the Thorium and Uranium sources in turn, and then background again.

Both pre and post flight sample checks were recorded in analogue and digital forms.

3.2.6 Flight Calibrations

A test line was flown before and following each day's surveying to assess the repeatability of the system pre- and post- data collection. A test line that exhibited some radiometric expression was selected. The location of the test line followed the road from Ross River homestead, overflying the main runway. The data are recorded in the Operator's Flight Reports (Appendix 6) and the data tapes.

4. DATA PROCESSING

4.1 RECOVERY INFORMATION

The GPS position information was merged with the geophysical data by the operators in the field and then subjected to a number of checks to ensure the data met survey specifications. These include;

- (a) Speed correlation checks.
- (b) Identification of spikes, dropouts and noise bursts in all data streams.
- (c) Verification that flight path coverage is within specified parameters.

4.2 DIGITAL DATA

The final data processing was subcontracted to Kevron Geophysics of Sydney, NSW, under the supervision of Mark Baigent, Data Processing Manager. All data had previously been checked for abnormalities by an in-field data verification system that checks conformity of all parameters within a band of acceptable values.

4.2.1 Flight Path Recovery

Processing of the differential GPS location data entailed the following steps:

- (a) A parallex correction of four fiducials is applied.
- (b) No fiducial synchronisation is required.
- (c) Post flight differential GPS corrections are not required. This is done in real time with the Omnistar system.
- (d) Non-linear filtering with a window width of 9.
- (e) Conversion of the coordinate system as appropriate.

4.2.2 Magnetic Processing

Having verified all data in the field, the final processing sequence is reduced to the following steps;

- (a) Convert all variables to common base levels.
- (b) Normalise base station magnetometer levels.
- (c) Subtract normalised base station magnetometer from magnetometer values acquired along each line.
- (d) Subtract the IGRF Model from the magnetic datum.
- (e) Level and micro-level the survey data.
- (f) Grid the data using a 50 metre square grid mesh. The gridding method is as described in Briggs (1974), utilising a four times line spacing search/scan radius.

The IGRF Model 1995 and the secular variation model 1995-2000 were used. The regional magnetic field was calculated for March 1996.

Standard levelling entailed two stages:

- (a) Least squares DC bias adjustment to remove residual heading and constant errors.
- (b) Either fitting of a polynomial to remaining misties and limiting the correction or fitting a least squares polynomial to the remaining misties.

Micro-levelling is summarised as three steps:

- (a) Extracting pseudo-tielines from the grid at a nominated distance along the grid.
- (b) Low pass filtering.
- (c) Treating misties between pseudo-ties and traverses by either a least squares adjustment or a polynomial fit.

The details of the micro-levelling procedure are proprietary to Kevron Geophysics. No filters were applied to the data prior to gridding.

4.2.3 Radiometrics

The one second 256 channel spectrometer data were first corrected for system deadtime and then energy calibrated using the standard technique of Minty et al (1990). Four channel data were created by summing adjacent channels of deadtime corrected and energy calibrated data over the four windows specified in section 2.6.

The windowed radiometric data (i.e. Total Count, Potassium, Uranium and Thorium) were normalised to counts per second and checked for steps, spikes and noise.

The data sets were then corrected for the following:

- (a) aircraft and cosmic background.
- (b) energy stripping of K-40 ,Bi-214 and Tl-208.
- (c) altitude variation.
- (d) atmospheric Radon.

Levelling and micro-levelling of the four radiometric data sets followed the procedures described for the magnetic data in Section 4.2.2.

(a) Background Removal

Kevron Geophysics made adjustments for the influence of aircraft background radiation using the values given in section 3.2.4. These values were obtained by flying at high altitude beyond the influence of radon. Cosmic radiation was measured in the spectrometer window of 3 MeV and above. Corrections to the Total Count, Potassium, Uranium and Thorium channels were applied using the cosmic background coefficients given in Section 3.2.4.

(b) Correction for Compton Scattering

Channel interaction corrections (stripping) are applied to correct for Compton scattering. The stripping coefficients were determined by measurement over the Bairnsdale calibration pads and are presented in Section 3.2.3 of this report. The three principle stripping ratios (α , β and γ) increase with altitude above the ground. The rate of increase is given by Grasty and Minty (1995) as follows:

Stripping ratio α increases at 0.00049 per metre
 Stripping ratio β increases at 0.00065 per metre
 Stripping ratio γ increases at 0.00069 per metre

Following adjustment of the stripping ratios for altitude, the corrected (stripped) count rates in the potassium, uranium and thorium channels (N_{KC} , N_{UC} and N_{ThC}) are given by Grasty and Minty (1995) as follows:

$$N_{KC} = \frac{[N_{Th}(\alpha\gamma - \beta) + N_U(a\beta - \gamma) + N_K(1 - a\alpha)]}{A},$$

$$N_{UC} = \frac{[N_{Th}(g\beta - \alpha) + N_U - N_Kg]}{A},$$

$$N_{ThC} = \frac{[N_{Th}(1 - g\gamma) - N_Ua + N_Kag]}{A},$$

where

$$A = 1 - g\gamma - a(\alpha - g\beta).$$

and N_{Th} , N_U and N_K are counts measured in the thorium, uranium and potassium channels respectively.

(c) Altitude Variation

Adjustments for variation in altitude were made using the formula:

$$N_c = N_o e^{-\mu(H-h)}$$

Where N_o = uncorrected counts,

N_c = count rate normalised to height H ,

h = measured height above the ground,

H = nominal flight height,

μ = attenuation coefficient for the channel being corrected.

Attenuation coefficients for each channel are given below:

$$\mu_{\text{total count}} = 0.008877$$

$$\mu_{\text{potassium}} = 0.011455$$

$$\mu_{\text{uranium}} = 0.008333$$

$$\mu_{\text{thorium}} = 0.008543$$

Kevron Geophysics have corrected the radiometric data to a constant 80m above ground level.

(d) **Atmospheric Radon**

The influence of atmospheric Radon has been minimised using the spectral ratio method described by Minty (1992).

4.2.4 Digital Elevation Model

The digital elevation model is generated by the following processing steps:

1. Removal of spikes or dropouts in the radar altimeter and GPS elevation data.
2. Correction of the GPS elevation data for the vertical separation between the GPS antenna and the radar altimeter antenna.
3. Subtraction of radar altimeter values from the GPS height of the aircraft above the reference ellipsoid.
4. Application of the AUSLIG model for the geoid-ellipsoid separation to produce terrain heights above mean sea level.
5. Levelling and micro-levelling of the terrain height data.
6. Gridding on a 40m square mesh by the method of Briggs (1974) using a four times line spacing search/scan radius.

5. DELIVERED ITEMS

- (a) 1:25,000 Scale Final Mylar Maps of the following :

Flight Path.
Total Magnetic Intensity Contours.
TMI Reduction to Pole Contours.
Stacked Profiles.
TC Contours.
K Contours.
U Contours.
Th Contours.
U/K Ratio Profiles.
U/Th Ratio Profiles.

- (b) Digital Data on CD-ROM

Gridded Files
RTP Mag.
DEM.
TC, K, U, Th.
Equiv K, U, Th.
RGB U/Th, U/K.

Located Data
XYZ.

- (c) 1:25,000 Hard copy Laminated Images.

RTP.
RGB.
U/K.
U/Th.

- (d) Flight Reports (original un-edited)

6. REFERENCES

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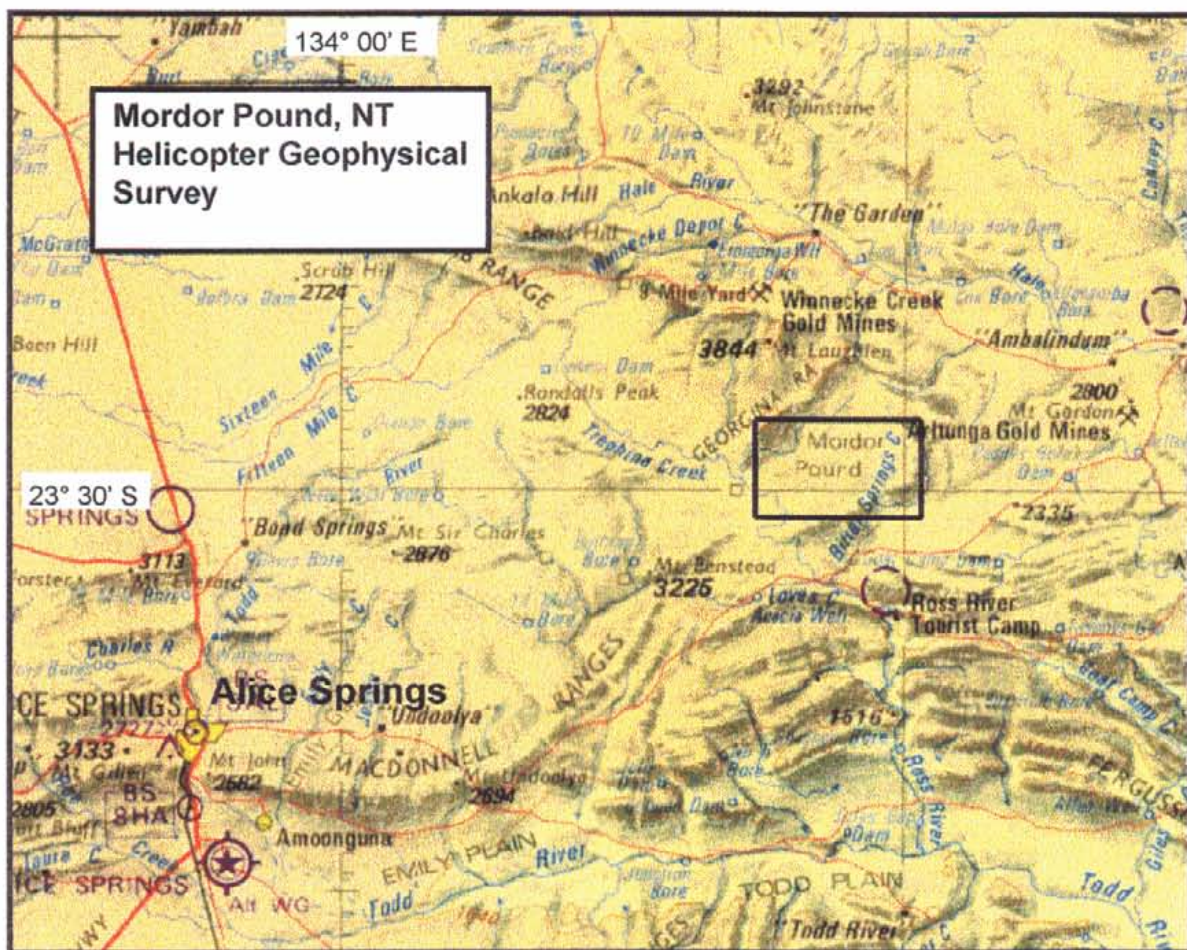
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APPENDIX 1

MAP OF AREA FLOWN

Helicopter Geophysical Survey Mordor Pound, Northern Territory



Scale 1:1 000 000

1

50

100 Km

APPENDIX 2

TABLE OF AREA BOUNDARY LINES

APPENDIX 3

SURVEY PROGRESS SUMMARY

FIELD STATUS REPORT: CRA HELICOPTER SURVEY, MORDOR POUND

Job No. 9608		Area - MORDOR POUND	
DOY	Date	Flt Nos.	Remarks
84	24-Mar	1	1.0 Alice CAL MAG. 0.5 ferry, Alice to Ross R
85	25-Mar	2	
86	26-Mar	3,4	New spectrometer
87	27-Mar	5,6	
88	28-Mar	7-9	Area complete
89	29-Mar	10	CRA Geo ops in area

APPENDIX 4

DATA DISK AND TAPE FORMATS

LOCATED DATA TAPE FORMAT

1. DATA FORMAT FOR 0.1 s DATA FILES:

line number	a8	
date	a8	
fiducial	f10.0	-9999999.00
easting	f11.1	-9999999.00
northing	f11.1	-9999999.00
latitude	f10.5	-999.00
longitude	f10.5	-999.00
raw magnetics	f9.2	-99999.00
diurnal	f9.2	-99999.00
levelled magnetics	f9.2	-99999.00
radar altimeter	f7.1	-999.00
gps height	f7.1	-999.00
digital terrain model	f7.1	-999.00
gps latitude	f10.5	-999.00
gps longitude	f10.5	-999.00
local time	f10.5	-999.00
first vertical derivative	f9.4	-999.00
agc filter	f9.4	-999.00
linefeed character		

logical record length of 165 bytes

LOCATED DATA TAPE FORMAT

2. DATA FORMAT FOR 1.0 s DATA FILES:

line number	a8	
date	a8	
fiducial	f10.0	-9999999.00
easting	f11.1	-9999999.00
northing	f11.1	-9999999.00
latitude	f10.5	-999.00
longitude	f10.5	-999.00
levelled magnetics	f9.2	-99999.00
radar altimeter	f7.1	-9999.00
gps height	f7.1	-9999.00
dtm	f7.1	-9999.00
raw total count	f7.0	-9999.00
raw potassium	f5.0	-999.00
raw uranium	f5.0	-999.00
raw thorium	f5.0	-999.00
corrected total count	f7.0	-99999.00
corrected potassium	f5.0	-999.00
corrected uranium	f5.0	-999.00
corrected thorium	f5.0	-999.00
percentage potassium	f6.3	-9.00
equivalent uranium	f6.3	-9.00
equivalent thorium	f6.3	-9.00
cosmic	f5.0	-999.00
gps latitude	f10.5	-999.00
gps longitude	f10.5	-999.00
local time	f10.5	-999.00
temperature	f6.1	-999.00
linefeed character		

logical record length of 202 bytes

APPENDIX 5

RADIOMETRIC CALIBRATION RANGE DATA

Radiometric Calibration Utilising Test Pads and Hover Range

1. Rationale

Radiometric test pads are required to determine the Compton scattering coefficients to be applied to the raw spectrometer counts during the processing of the data. The test pads consist of four 1m x 1m x 0.3m concrete blocks manufactured by CSIRO Division of Exploration Geoscience. Three pads have high concentrations of either K, U or Th, while the fourth pad has low background values. For this survey the pads used are located at the Bairnsdale airport, at a site with uniformly low background K, U and Th counts. The location of the test pad site is shown in Figure 1 of this Appendix.

The hover test range is required for the determination of sensitivity factors which relate the concentration of radioactive elements in the ground to the number of counts measured at survey altitude. The test site should be free of vegetation, relatively flat but well drained, and have a relatively high and uniform concentration of the three radioactive elements. A suitable site, close to Bairnsdale, was established on a dairy flat SE of Bruthen. The test site had been previously surveyed with a calibrated ground spectrometer by Geoterrex Pty. Limited. The location of the hover range is shown in Figure 2.

In addition, it is desirable to determine the contribution from the aircraft and cosmic radiation by flying at a number of elevations over a large expanse of water. Although this is frequently difficult to achieve over much of Australia, in this case the Gippsland Lakes are conveniently situated close to the test area.

2. Test Procedure

The following procedure was carried out with the helicopter to obtain the data necessary to derive the corrections that need to be applied to the radiometric data acquired during routine survey operations.

- (a) Perform standard pre-flight calibration at the operational base prior to leaving, and then fly the local test line.
- (b) At Bairnsdale airport, ensure the spectrometer is still stabilised. Note the weather conditions. Park the helicopter (facing N) and place, in turn, each of the calibration pads directly beneath the spectrometer crystal in the aircraft. Record for 2 minutes with each pad in place.
- (c) Proceed to the Hover Test Range and position over the central marker peg. Hover and record data from 100ft (30m) to 600ft (180m) above ground level (agl) in 50ft (15m) increments. Record for 2 minutes at each elevation.
- (d) Fly out over Lake King (about 5 minutes flying time S of Bairnsdale) and record data in hover for 5 minutes between 100ft and 600ft in 50 ft increments. While still over water, climb between 1000ft and 10,000ft, recording data at each 1000ft level.
- (e) Verify data validity.
- (f) Perform a full post-flight calibration.

3. Calibration sheets for the helicopter are included in this Appendix.

CALIBRATION REPORT

BAIRNSDALE HOVER TEST RANGE VICTORIA

Aircraft **VH-JWF** 12 Jan 1996 Exploranium GR820 with 1000 cubic inch detector

	COSMIC COEFFICIENTS	AIRCRAFT BACKGROUND	HEIGHT ATTENUATION
TOTAL COUNT	1.189847	123.29	0.006958
POTASSIUM	0.06817	12.70	0.008911
URANIUM	0.058473	2.73	0.00651
THORIUM	0.053956	5.64	0.006878

Stripping ratios:

Alpha = 0.254816

Beta = 0.487227

Gamma = 0.72700

a = 0.033974

b = 0.005998

g = 0.002918

Conversion coefficients from cps to %k and ppm

Ground concentrations from the range are: %k = 1.68, Uppm = 2.85, Thppm = 13.66

ALT m	K cps	U cps	Th cps	%K	eU ppm	eTh ppm
25	168.10	26.08	66.86	100.06	9.18	4.89
55	124.69	19.55	53.75	74.22	6.86	3.93
41	141.06	23.07	59.75	83.96	8.31	4.37
69	109.51	18.80	48.90	65.18	6.60	3.58
84	91.47	17.67	42.94	54.48	6.21	3.14
99	82.75	15.43	38.26	49.26	5.41	2.80
114	73.14	13.74	35.89	43.54	4.82	2.63
128	65.22	13.45	31.12	38.82	4.72	2.29
143	55.92	12.44	27.80	33.29	4.36	2.04
154	52.44	10.65	28.17	31.12	3.74	2.06
172	43.80	9.75	24.32	26.07	3.42	1.78

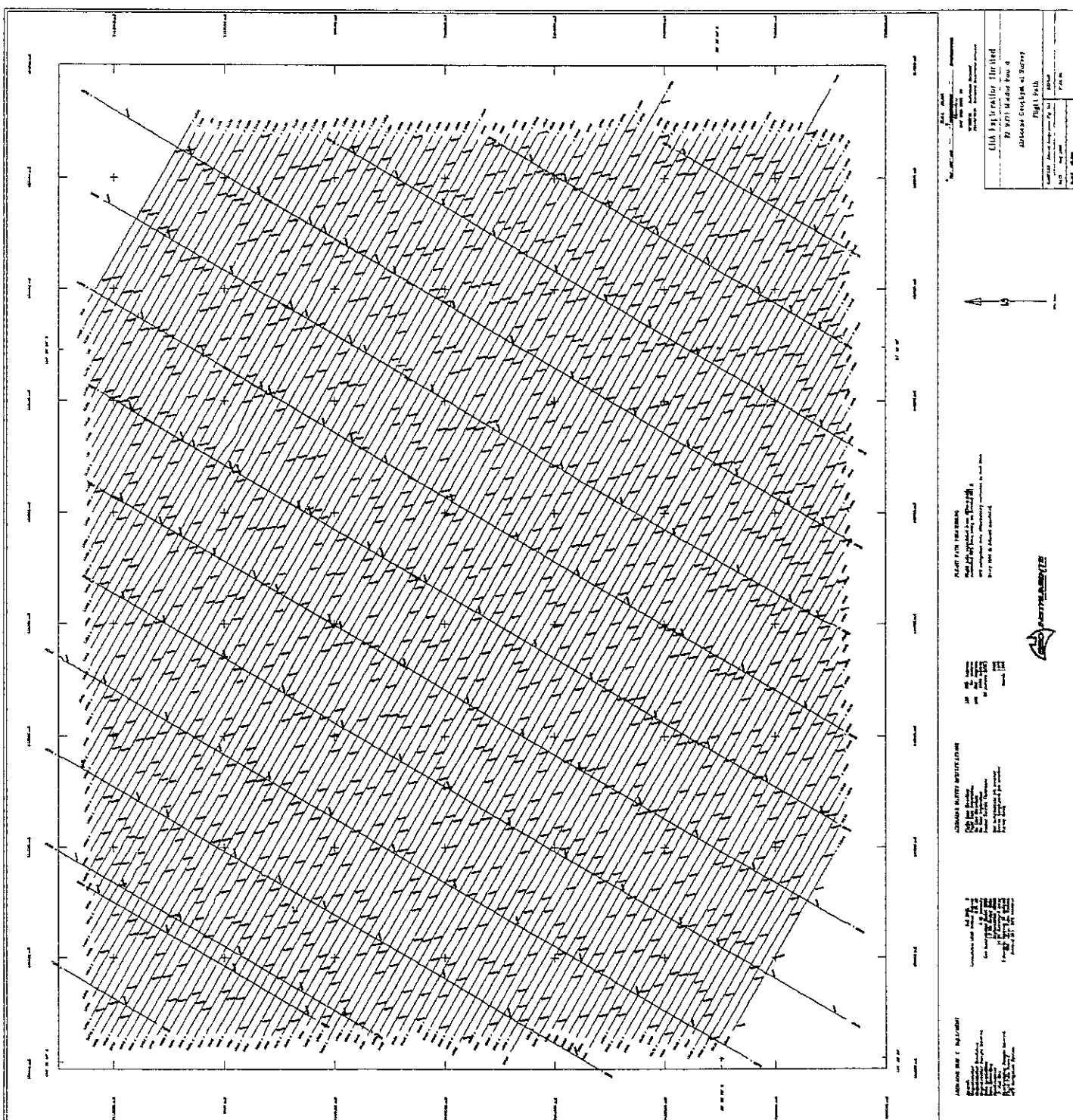
APPENDIX 6

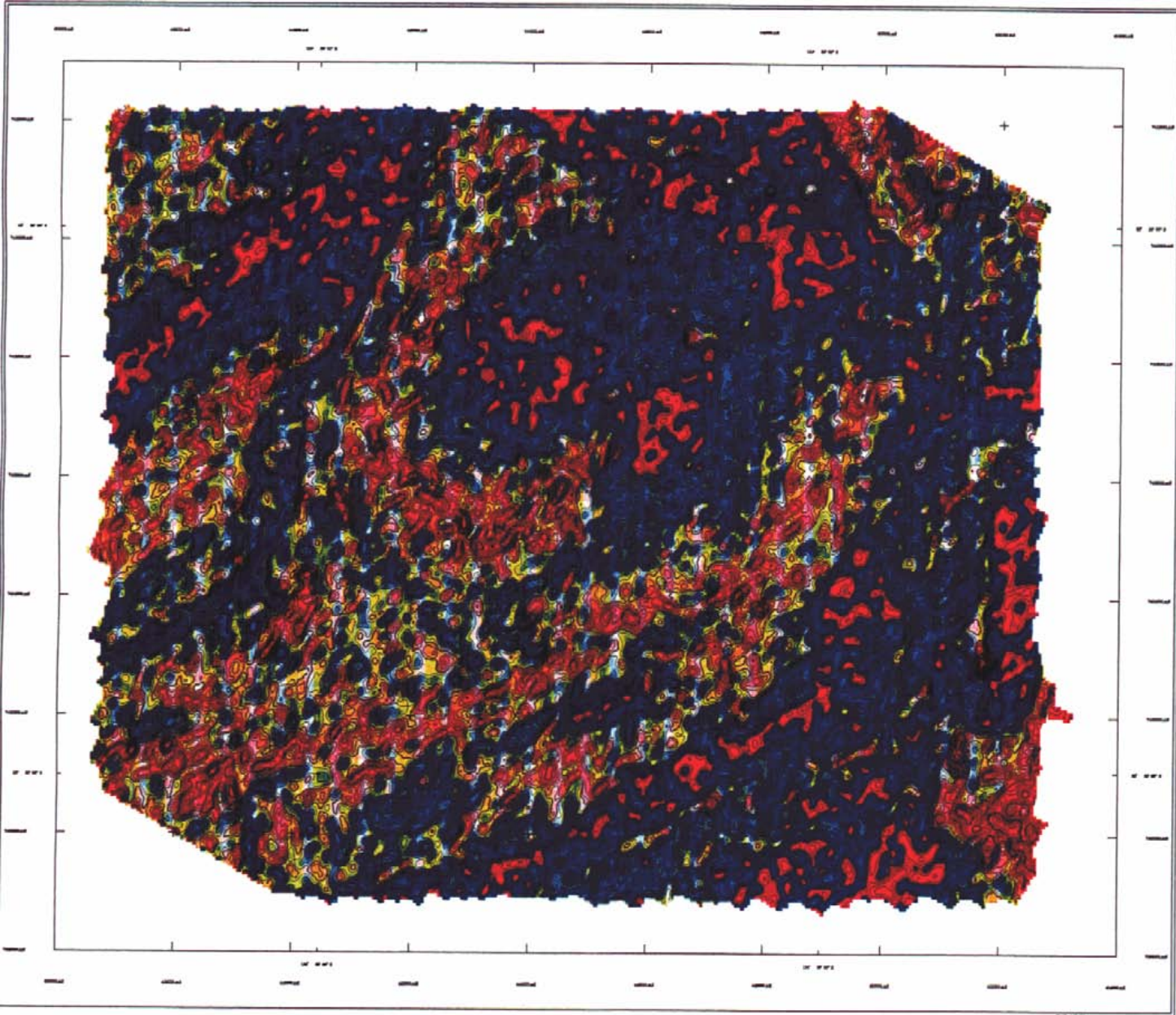
OPERATOR'S FLIGHT REPORTS

APPENDIX 7

MAP REDUCTIONS

Flight Path
Total Count Contours
Thorium Contours
Potassium Contours
Uranium Contours
TMI Contours
RTP Contours
TMI Stacked Profiles
U/K Profiles
U/Th Profiles





ALBERTA COAST COASTLINE

Source:
Geological Survey of Canada
Geological Survey of Canada
Geological Survey of Canada
Geological Survey of Canada
Geological Survey of Canada
Geological Survey of Canada
Geological Survey of Canada
Geological Survey of Canada
Geological Survey of Canada
Geological Survey of Canada

Scale: 1:50,000
Projection: UTM
Datum: NAD 83
Units: Meters
Elevation: 0 to 1000
Contour Interval: 100
Map Scale: 1:50,000
Sheet Size: 10 cm x 10 cm
Sheet Number: 1000000

ALBERTA COAST COASTLINE

Scale: 1:50,000
Projection: UTM
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Units: Meters
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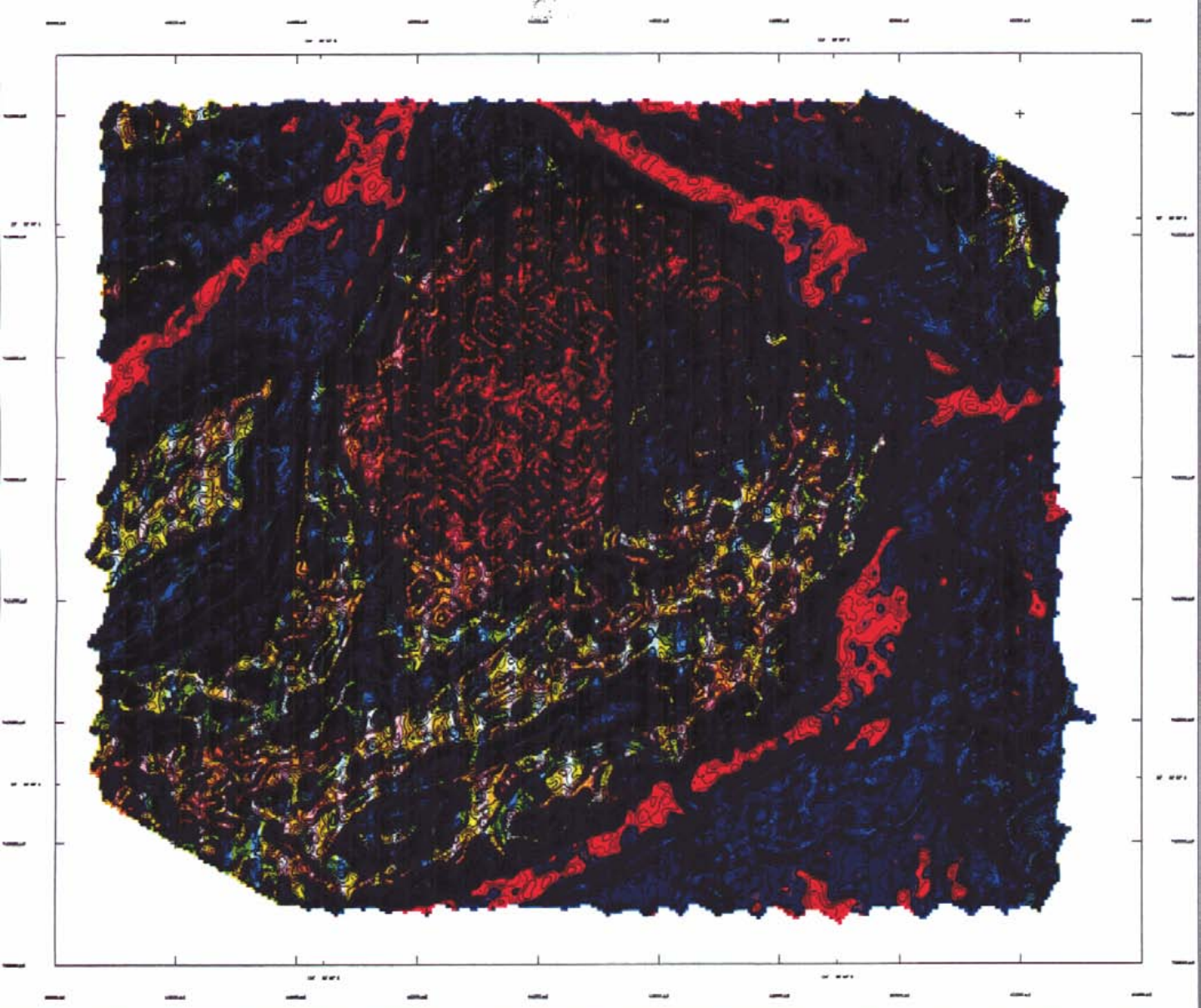
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ALBERTA COAST COASTLINE

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Projection: UTM
Datum: NAD 83
Units: Meters
Elevation: 0 to 1000
Contour Interval: 100
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Projection: UTM	
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Elevation: 0 to 1000	
Contour Interval: 100	
Map Scale: 1:50,000	
Sheet Size: 10 cm x 10 cm	
Sheet Number: 1000000	
C.R.A. Exploration Pty. Ltd.	
B. 1071 Marine Road	
Alberta Geological Survey	
Urbain Coast Coastline	
Copyright: Alberta Geological Survey, Ltd.	1999
Scale: 1:50,000	Page 10



GENERAL MAP INFORMATION

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Scale: 1:50,000
Projection: UTM
Datum: WGS 84
Units: Meters
Map Date: 2000
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Map Editor: [Name]
Map Reviewer: [Name]
Map Approval: [Name]

GENERAL MAP SPECIFICATIONS

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Map Editor: [Name]
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Map Approval: [Name]

GENERAL MAP SPECIFICATIONS

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Projection: UTM
Datum: WGS 84
Units: Meters
Map Date: 2000
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Map Editor: [Name]
Map Reviewer: [Name]
Map Approval: [Name]

GENERAL MAP SPECIFICATIONS

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Projection: UTM
Datum: WGS 84
Units: Meters
Map Date: 2000
Map Author: [Name]
Map Editor: [Name]
Map Reviewer: [Name]
Map Approval: [Name]

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Datum: WGS 84
Units: Meters
Map Date: 2000
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Map Editor: [Name]
Map Reviewer: [Name]
Map Approval: [Name]

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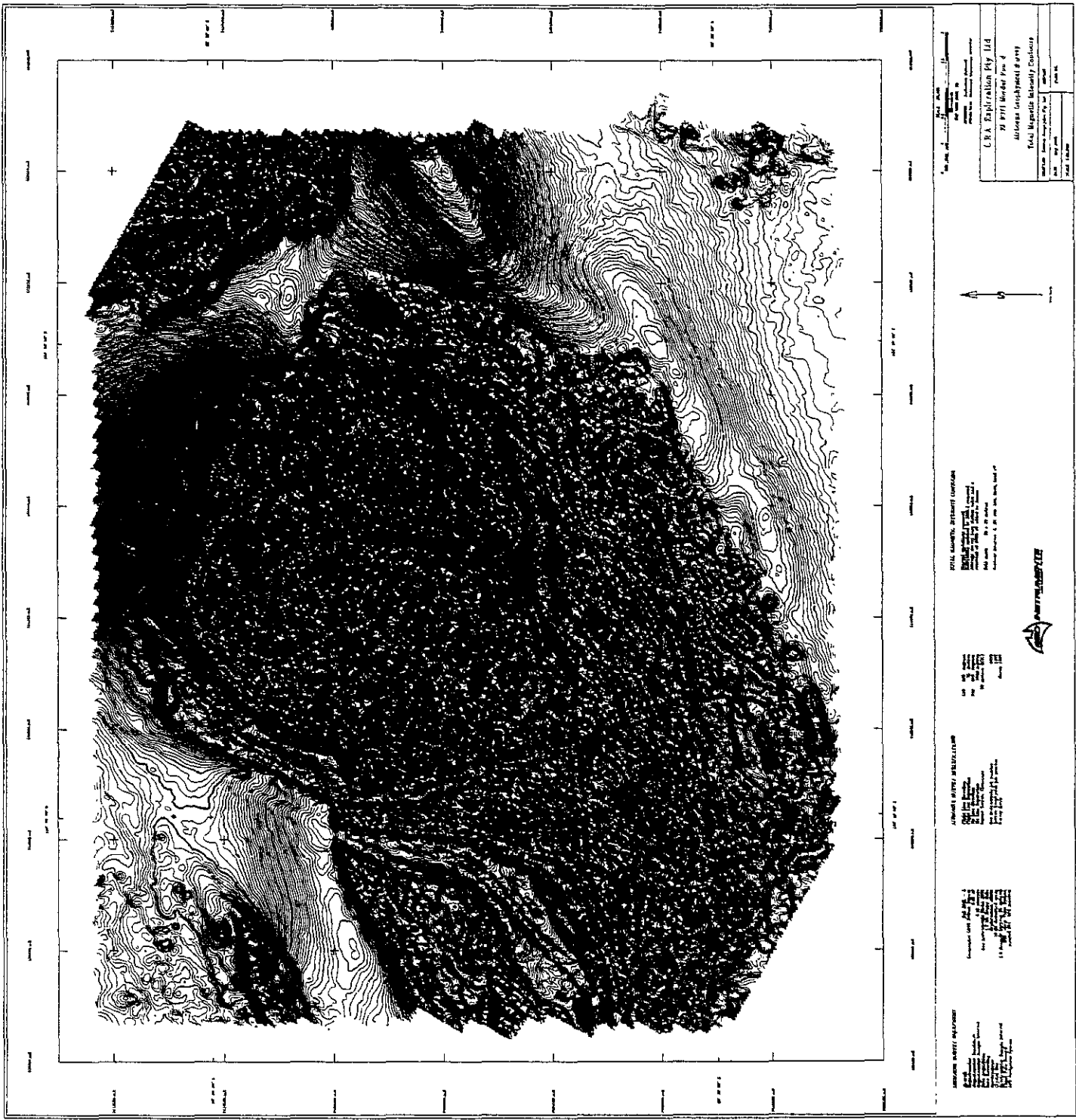
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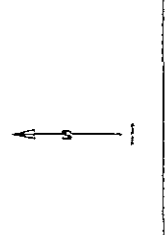
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Map Editor: [Name]
Map Reviewer: [Name]
Map Approval: [Name]



C.B.A. Exploration Pty. Ltd.	
15, 6071 Marine Parade	
Aurora Geophysical Survey	
Petroleum Grant Contours	
000100: Aurora Geophysical Pty. Ltd.	000000
0001: 000 000	000000



Scale 1:50,000
Projection UTM
Datum WGS 84
Units Meters
Contour Interval 10 Meters
Spot Height Interval 5 Meters
C.R.A. Exploration Pty Ltd
No. 1711 Street, 4
Telok Ayer Steng, Singapore 699504
Telok Ayer Steng, Singapore 699504
Telok Ayer Steng, Singapore 699504
Telok Ayer Steng, Singapore 699504
Telok Ayer Steng, Singapore 699504

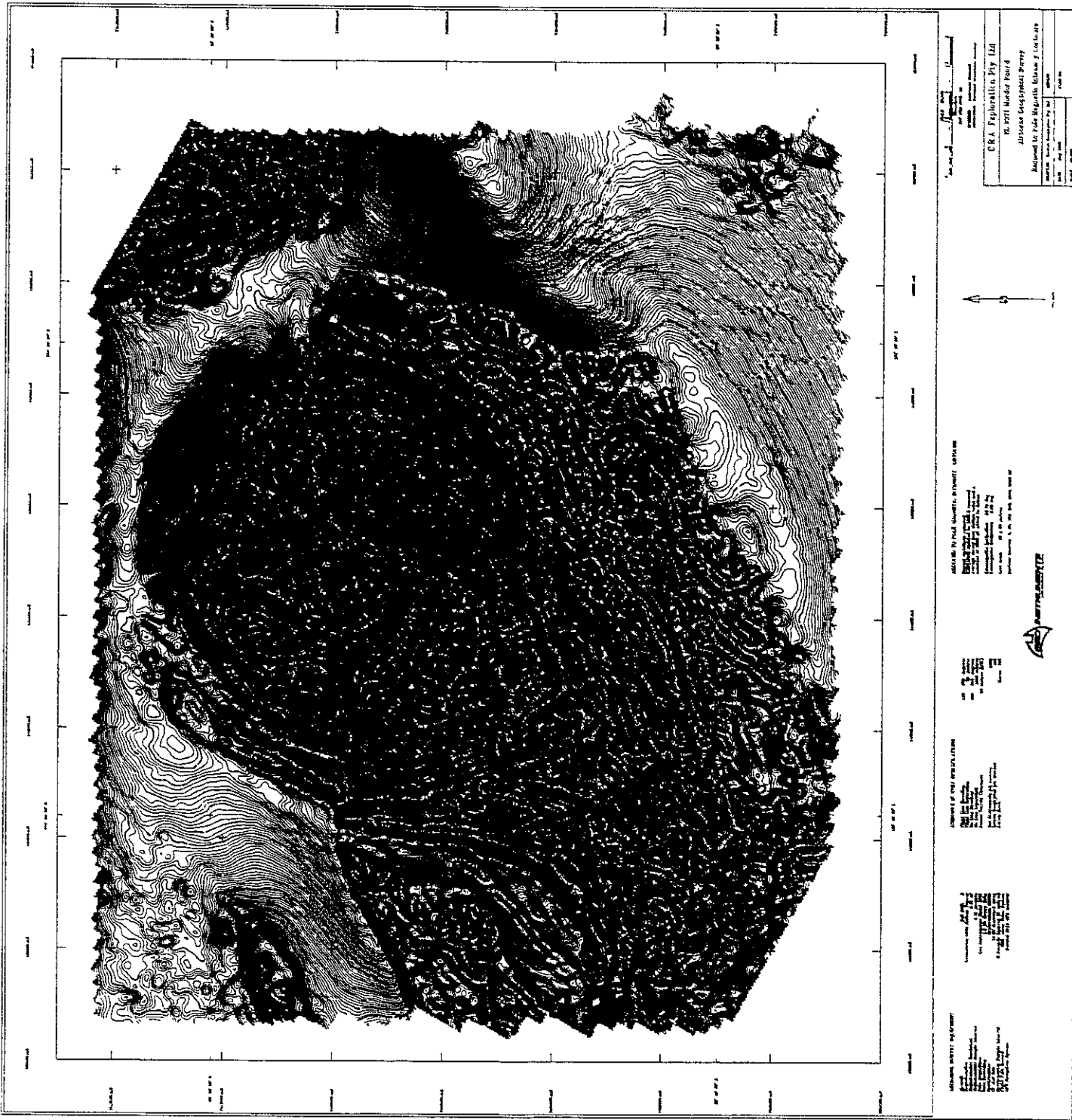


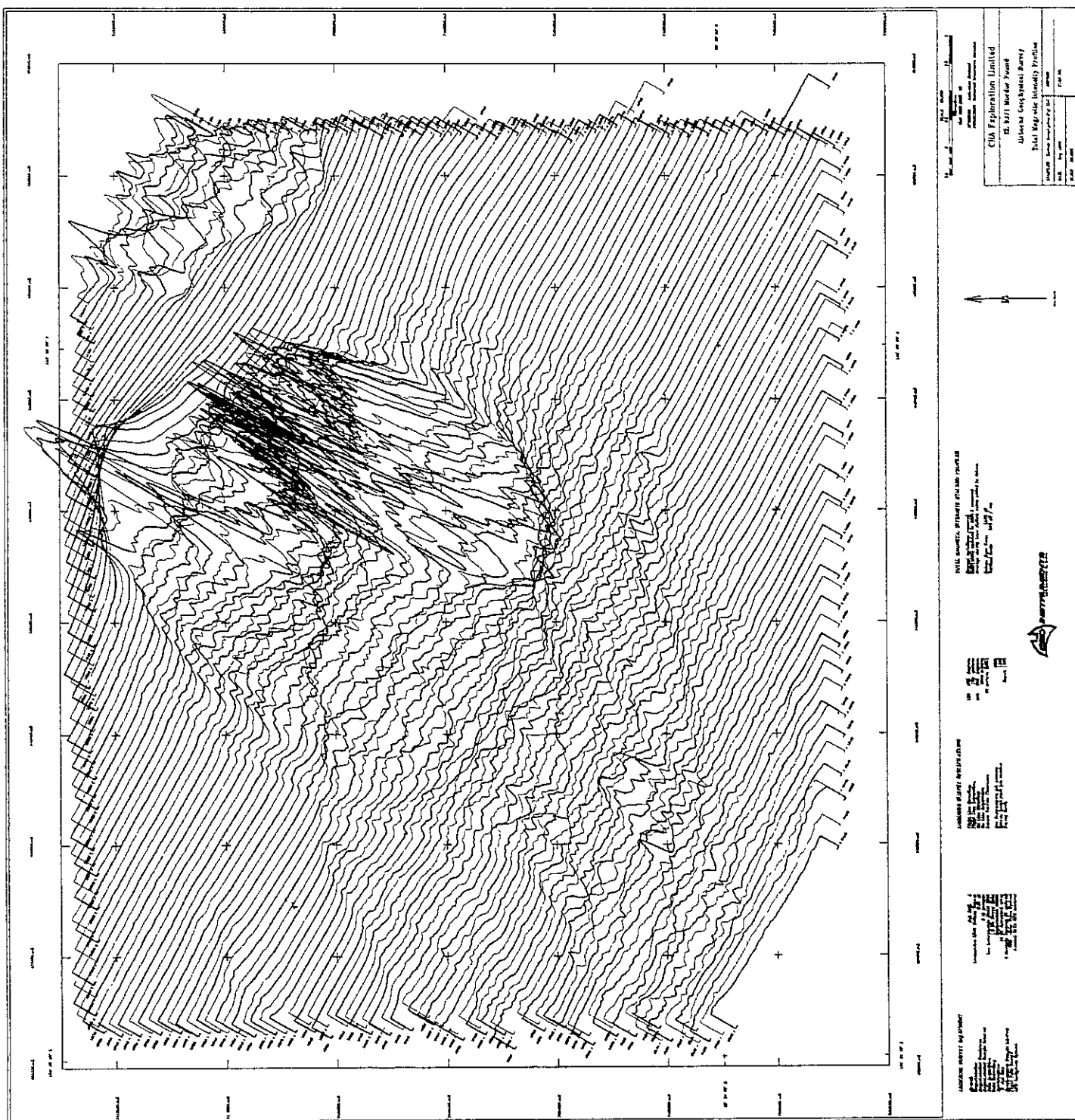
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SPOT HEIGHT INTERVAL: 5 METERS

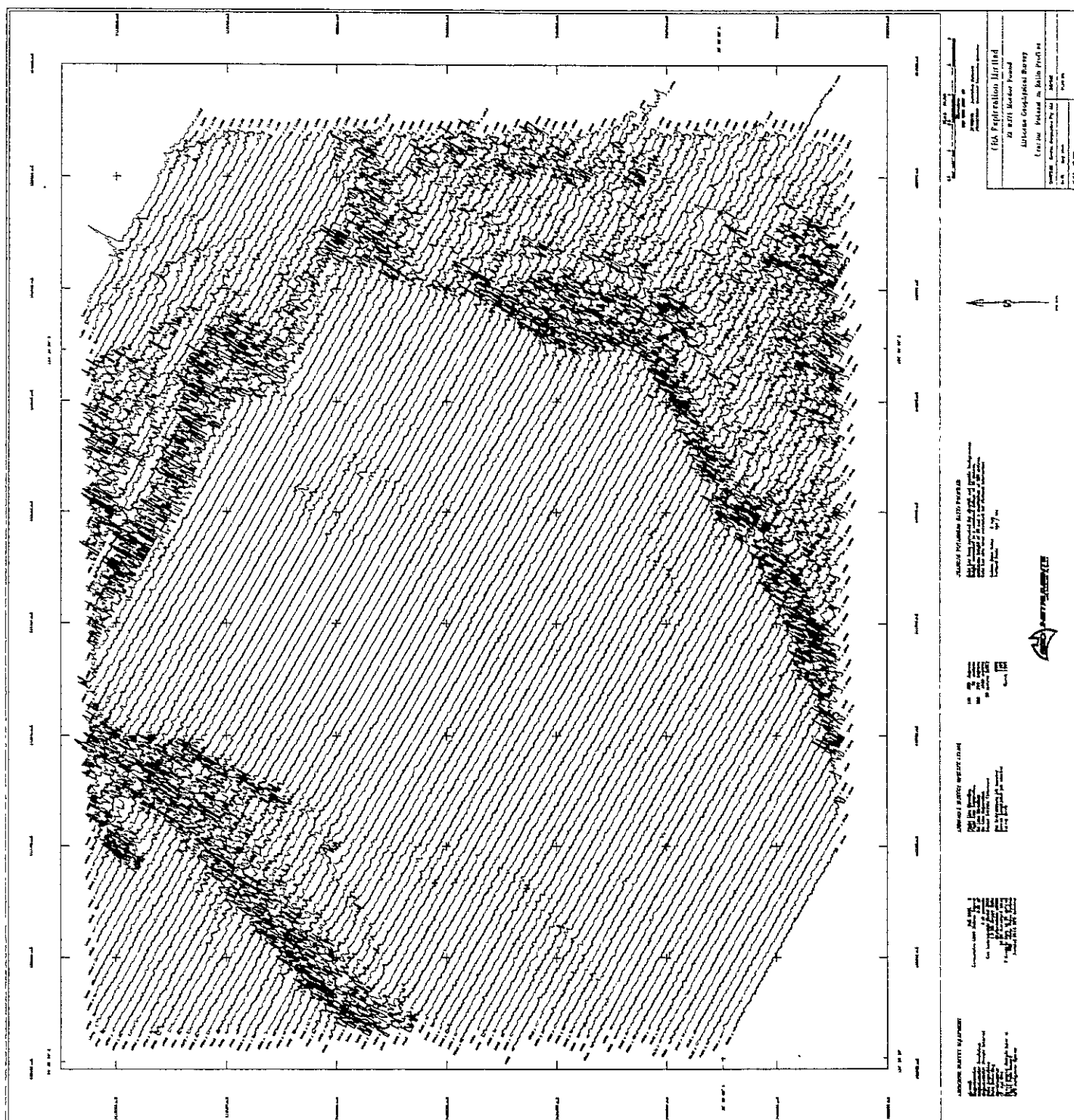
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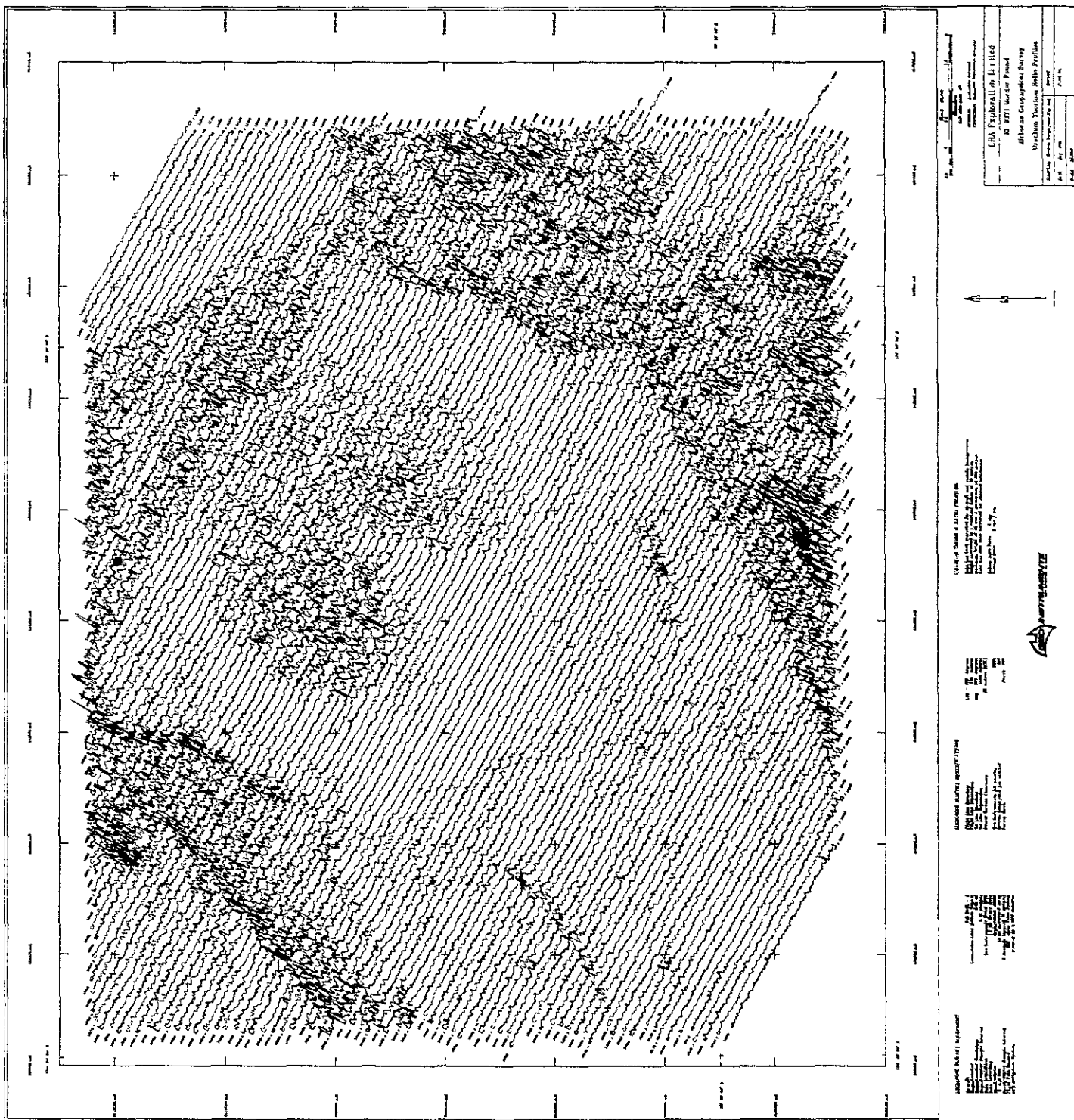
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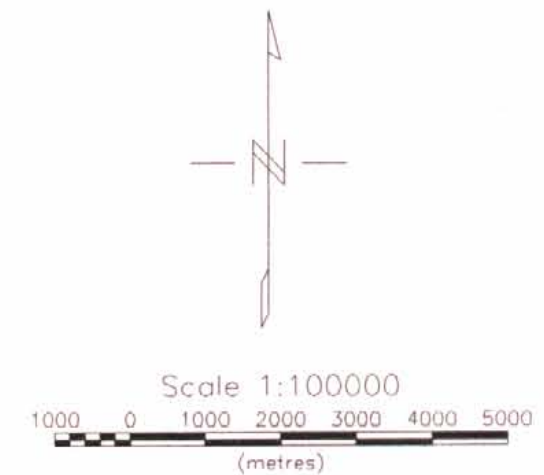
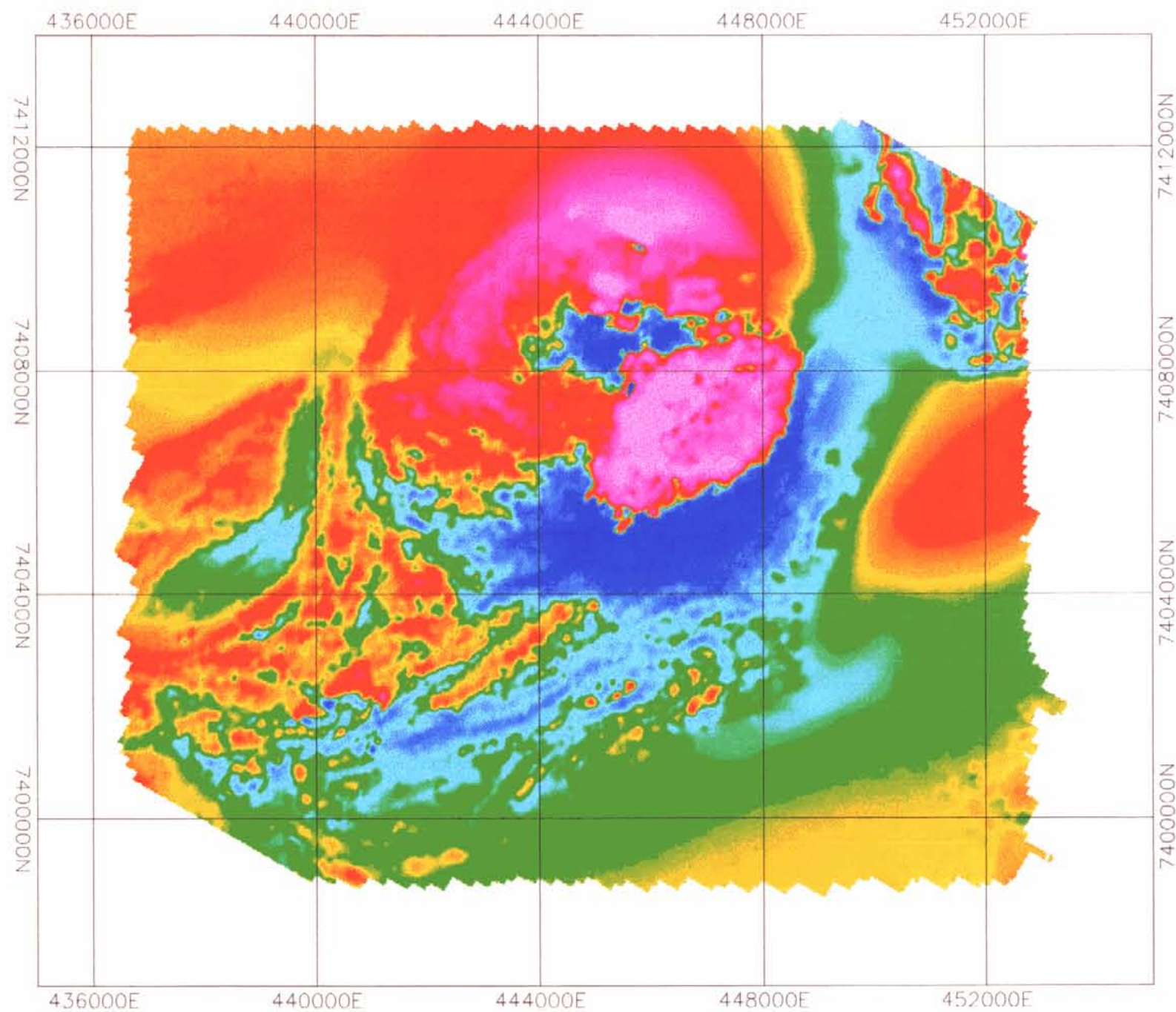
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SPOT HEIGHT INTERVAL: 5 METERS











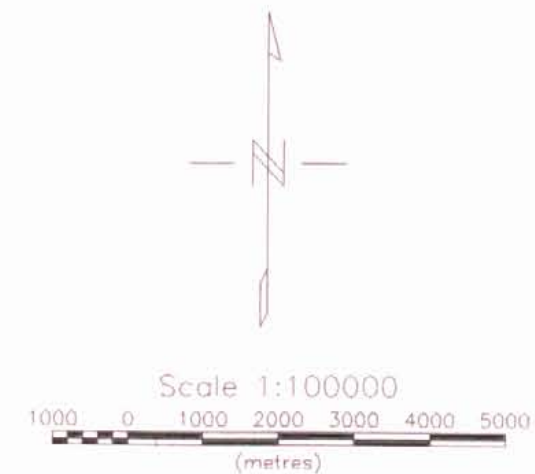
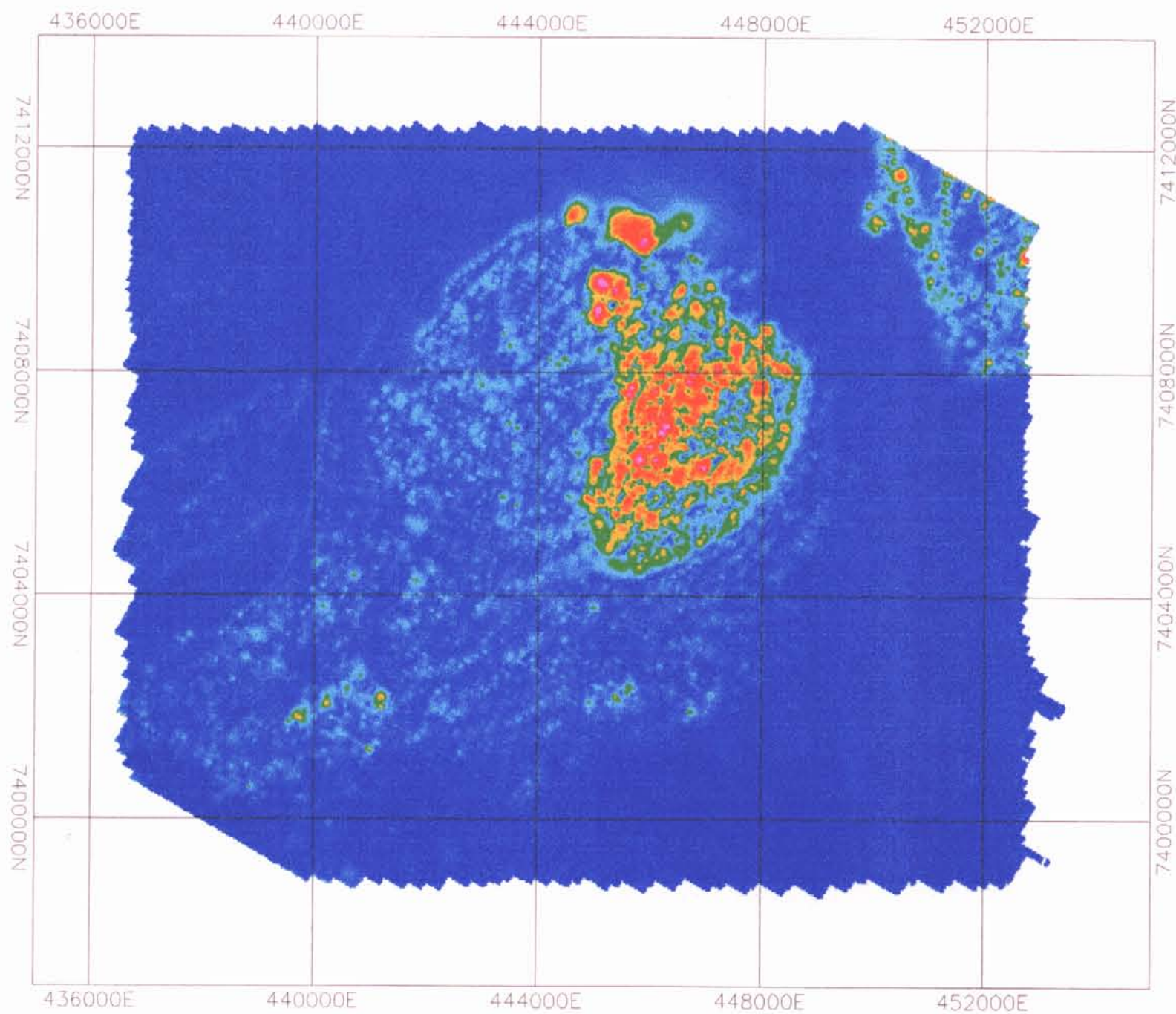
CRA EXPLORATION PTY LIMITED

EL 9371 MORDOR POUND

HELIBORNE MAGNETICS

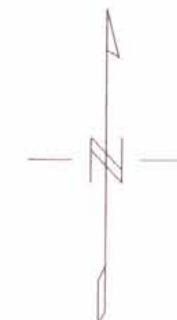
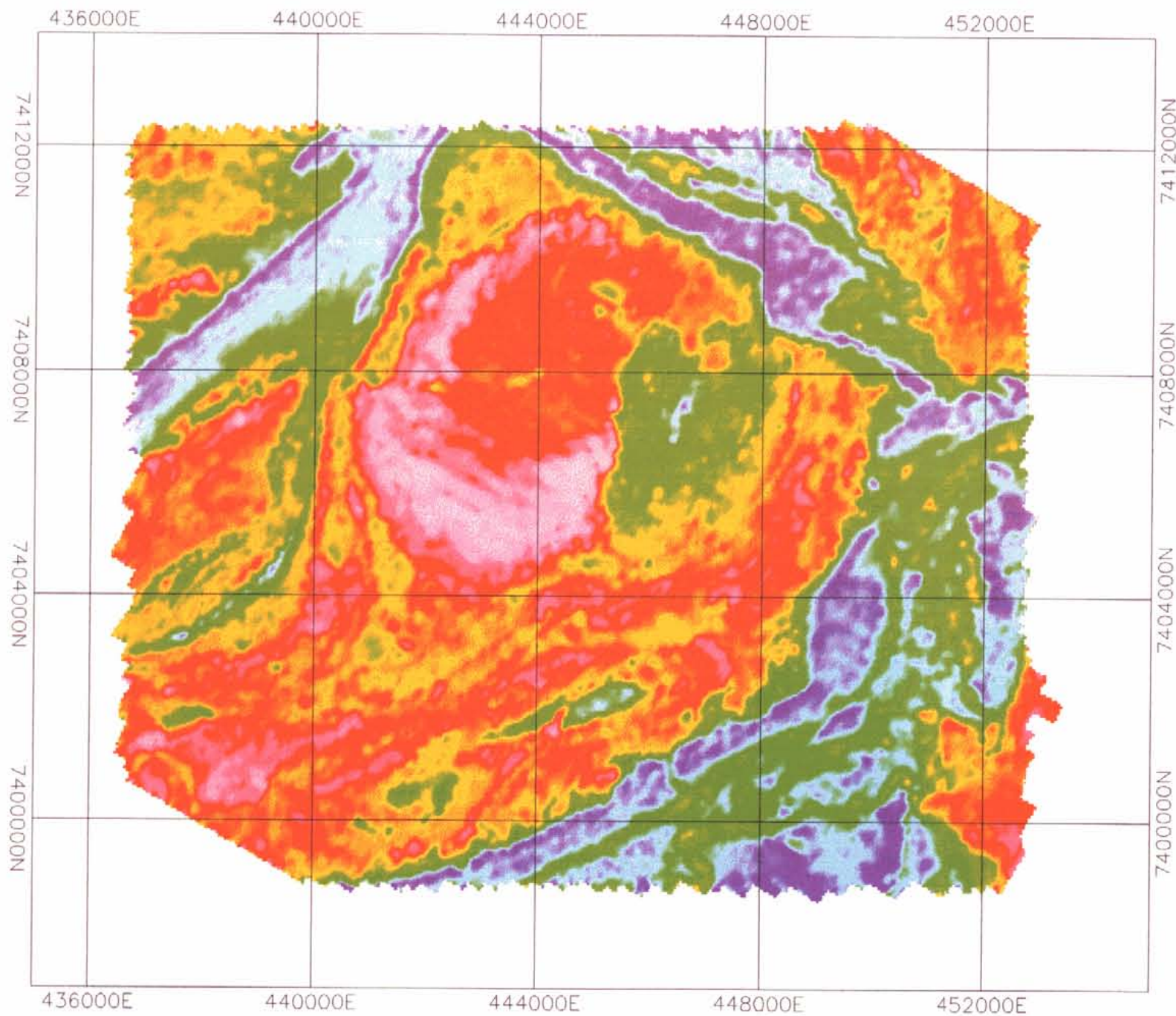
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SCALE	1:100,000	DATE	22nd November 1996
AUTHOR	Angus McCoy	REPORT	22570
DRAWN	Angus McCoy	PLAN No.	NTd



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EL 9371 MORDOR POUND
HELIBORNE MAGNETICS
ANALYTIC SIGNAL

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AUTHOR	Angus McCoy	REPORT	22570
DRAWN	Angus McCoy	PLAN No.	NTd

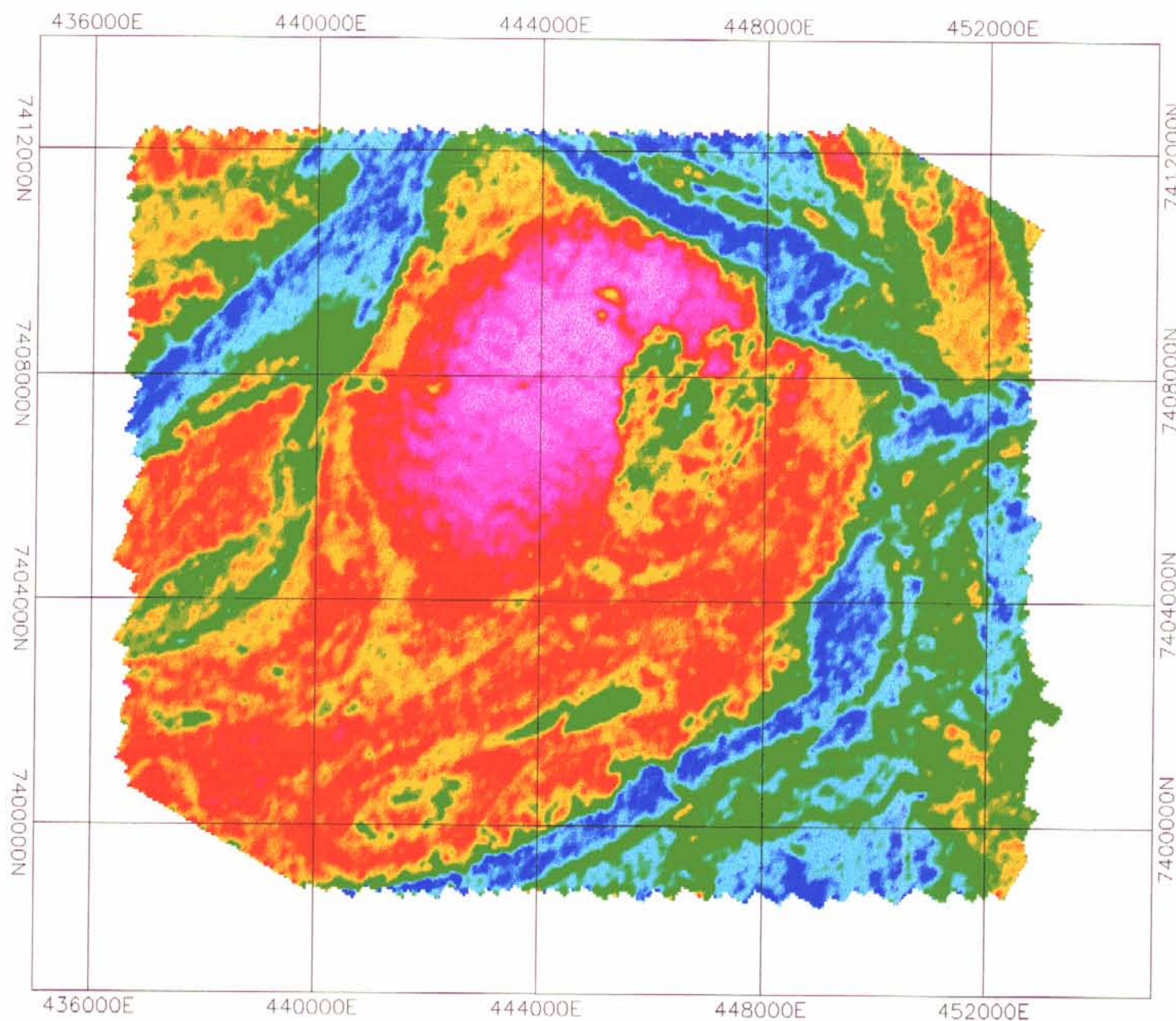


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 (metres)



CRA EXPLORATION PTY LIMITED
 EL 9371 MORDOR POUND
HELIBORNE RADIOMETRICS
 TOTAL COUNT IMAGE

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SCALE	1:100,000	DATE	22nd November 1996
AUTHOR	Angus McCoy	REPORT	22570
DRAWN	Angus McCoy	PLAN No.	NTd

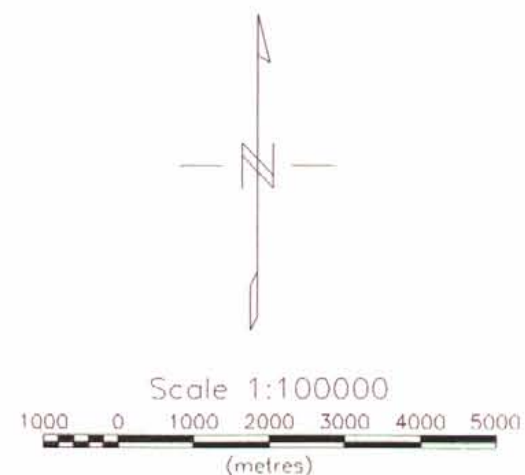
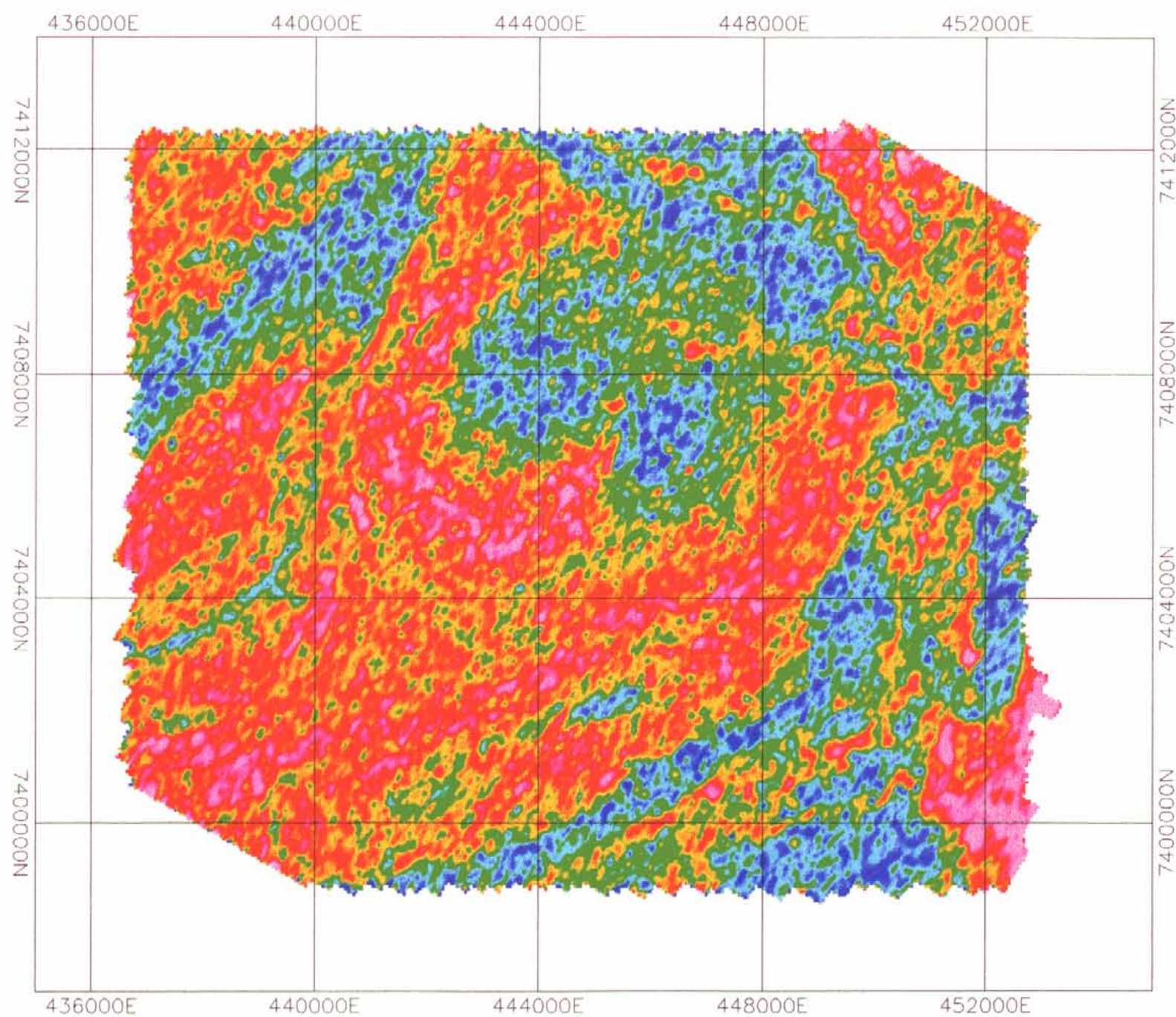


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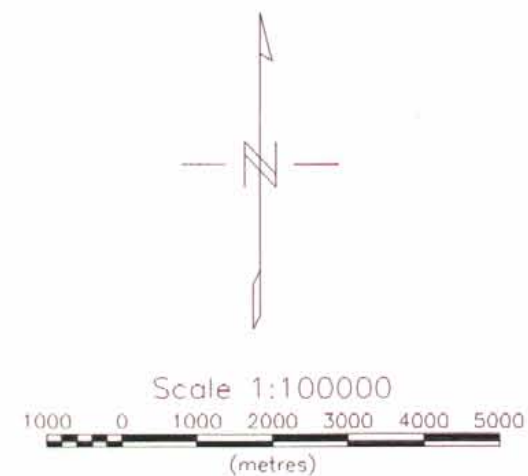
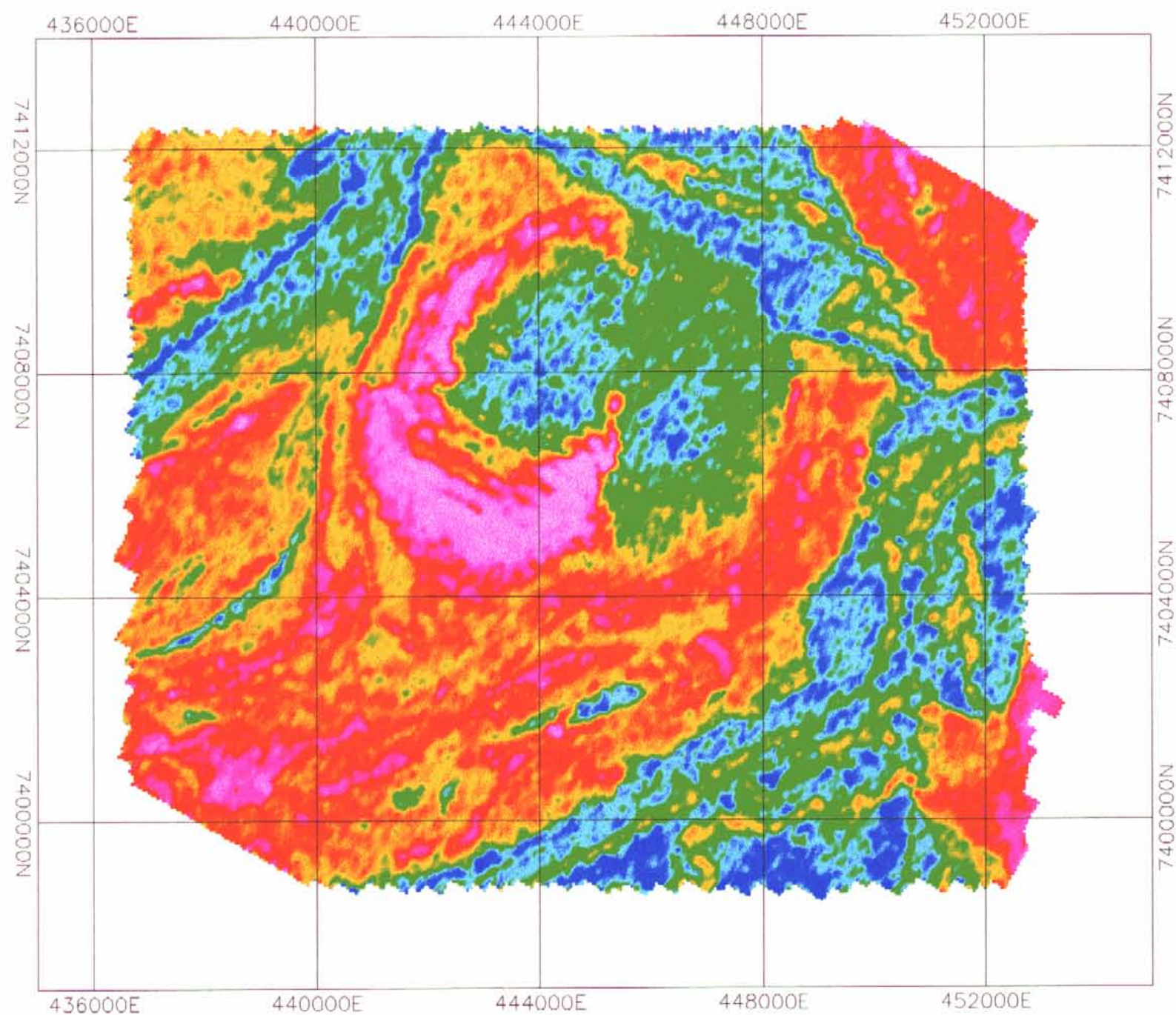
CRA EXPLORATION PTY LIMITED
EL 9371 MORDOR POUND
HELIBORNE RADIOMETRICS
POTASSIUM IMAGE

REFERENCE	ALICE SPRINGS SF 53-14		
SCALE	1:100,000	DATE	22nd November 1996
AUTHOR	Angus McCoy	REPORT	22570
DRAWN	Angus McCoy	PLAN No.	NTd



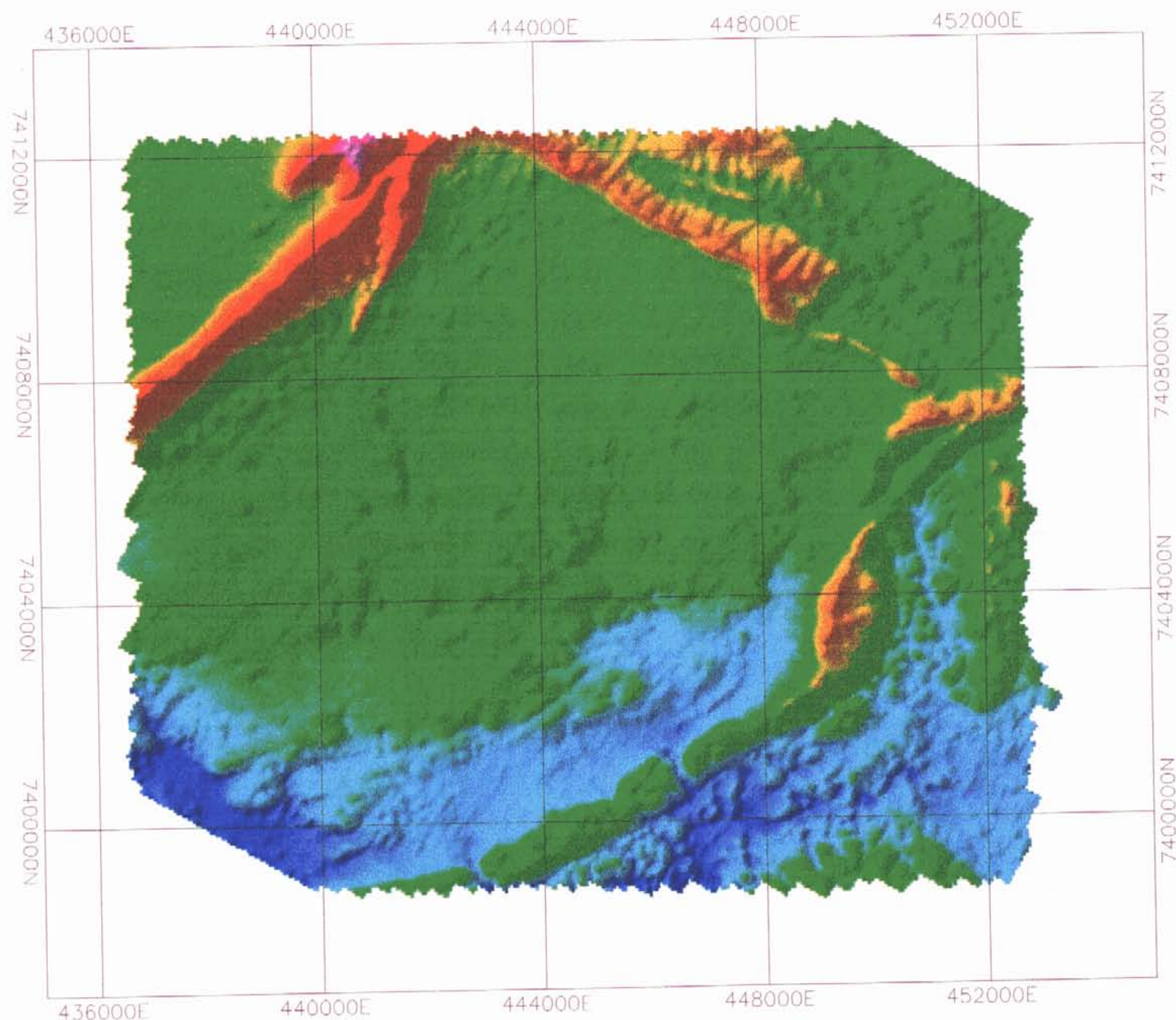
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EL 9371 MORDOR POUND
HELIBORNE RADIOMETRICS
URANIUM IMAGE

REFERENCE	ALICE SPRINGS SF 53-14		
SCALE	1:100,000	DATE	22nd November 1996
AUTHOR	Angus McCoy	REPORT	22570
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HELIBORNE RADIOMETRICS
THORIUM IMAGE

REFERENCE	ALICE SPRINGS SF 53-14		
SCALE	1:100,000	DATE	22nd November 1996
AUTHOR	Angus McCoy	REPORT	22570
DRAWN	Angus McCoy	PLAN No.	NTd



CRA EXPLORATION PTY LIMITED
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HELIBORNE SURVEY
 SHADED DIGITAL ELEVATION IMAGE

REFERENCE	ALICE SPRINGS SF 53-14		
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AUTHOR	Angus McCoy	REPORT	22570
DRAWN	Angus McCoy	PLAN No.	NTd

APPENDIX XII

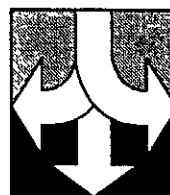
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**GEOTEM Airborne TEM Survey Logistics Report
and "Quick-Look" Images**

**LOGISTICS REPORT
FOR A GEOTEM_{DEEP} AIRBORNE
ELECTROMAGNETIC AND MAGNETIC SURVEY
OVER MORDOR POUND, NEAR ALICE SPRINGS,
NORTHERN TERRITORY,
FOR CRA EXPLORATION PTY LTD**

JOB NO. 7-755

June, 96



Compiled by:
Michael Hallett
GEOTERREX PTY. LTD.
7-9 GEORGE PLACE,
ARTARMON NSW 2064
AUSTRALIA

ABSTRACT

A **GEOTEM_{DEEP}** time-domain airborne electromagnetic and magnetic survey was flown by Geoterrex Pty Ltd for CRA Exploration Pty Ltd over Mordor Pound, Northern Territory, during April and May 1996.

Data were collected using the **GEOTEM_{DEEP}** airborne electromagnetic and magnetic system, with a base operating frequency of 25 Hz, employing a two component electromagnetic receiver (X and Z axes). GPS and Doppler velocity data were used for navigation. The survey aircraft was a CASA C212-200 Turbo Prop (VH-TEM).

GEOTEM_{DEEP} field data was processed to remove atmospheric and system noise. Algorithms were applied to create Amplitude Decay Index (ADI) and altitude corrected data sets for both X and Z components. A high level of data processing was carried out in the field, reading raw **GEOTEM_{DEEP}** data directly on to UNIX workstations and applying advanced GMAPS software. High quality presentations of data were provided to CRA Exploration Pty Ltd directly from the field as well as preliminary **GEOTEM_{DEEP}** data.

The final processed data were recorded as located data and grids on Exabyte tapes. Hard copies of the processed data were produced as multi-parameter profile plots at 1 : 25 000 scale, 1 : 25 000 magnetic contour maps, flightpath maps and X and Z component ADI colour images.

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1. INTRODUCTION

From the 29th of April to the 1st of May, 1996, Geoterrex Pty Ltd conducted a **GEOTEM_{DEEP}** airborne electromagnetic survey over Mordor Pound, NT, for CRA Exploration Pty Ltd. The base of operations was Alice Springs. This report summarises the logistics, survey parameters, calibration procedures and processing details of the survey.

In total, 761 line kilometres of **GEOTEM_{DEEP}** electromagnetic data were collected in 3 flights over the survey area at a base operating frequency of 25 Hz. Traverse lines were flown 050 - 230° with a 250 metre line spacing. Four lines were flown orthogonally to the direction of the main part of the survey, in the northern part of the survey area.

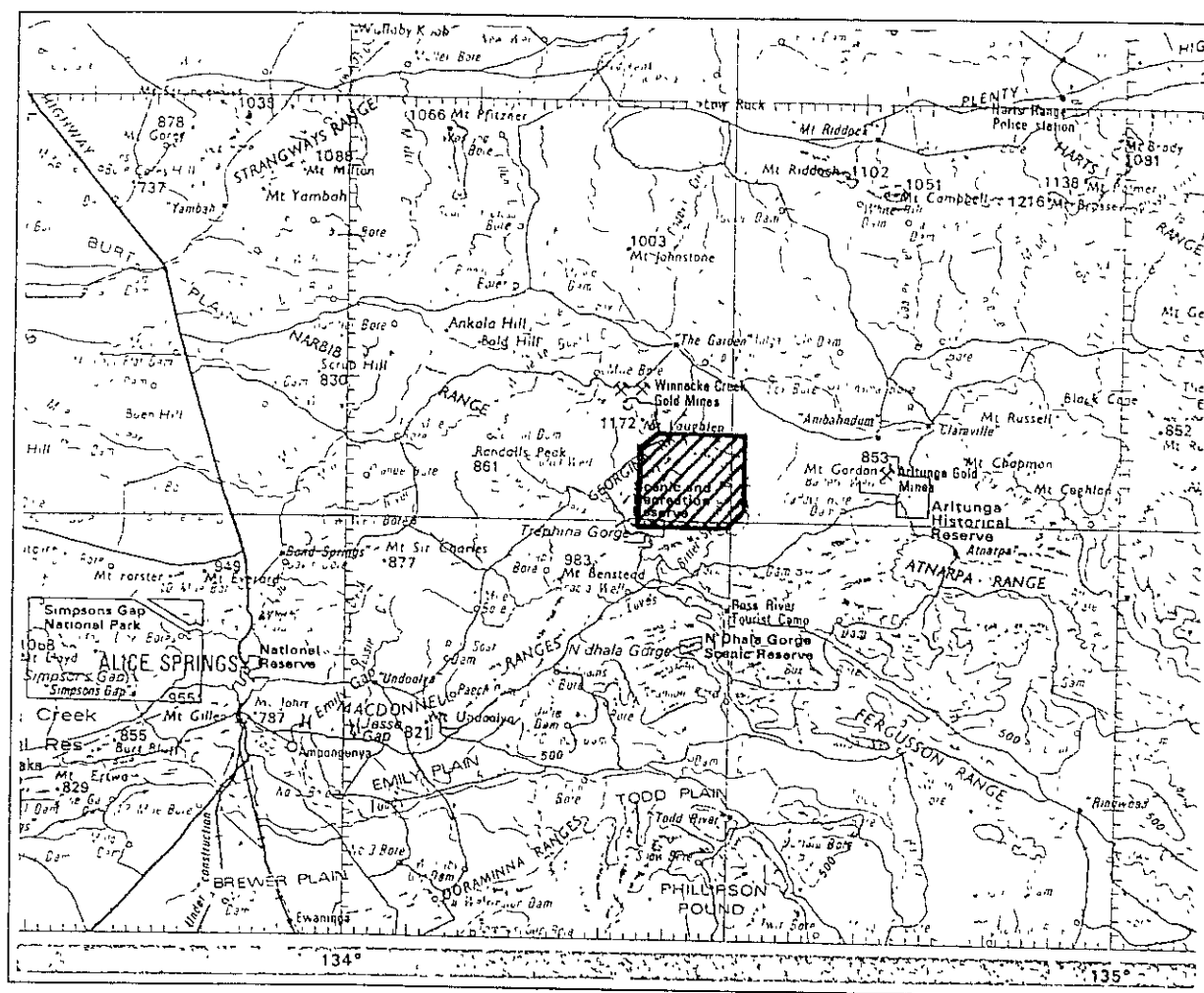


Figure 1: LOCATION MAP: Mordor Pound, NT.
Scale: 1 : 1 000 000



2. SURVEY OPERATIONS SUMMARY

Table 1: SURVEY PROGRESS

Date	Progress
29.04.1996	Survey production initiated
30 04 1996	Production flying
01.05 1996	Production flying, survey completed

Table 2: Field Personnel

Field Personnel	Crew Manager	A. Cole
	Pilots	T. Haldane, H. Thompson
	Electronics Technician	T. Green
	Geophysicist/Processor	M. Cooper

3. SURVEY EQUIPMENT

Table 3: Airborne Equipment Specifications

System Parameters		GEOTEM _{DEEP} Specifications
Navigation		GPS / Doppler
Nominal aircraft speed (m/s)		65
Geometry	Transmitter height above ground level (m agl) (Nominal terrain clearance)	105
	Receiver Bird Height (agl, m)	62
	Tx-Rx horizontal separation (m)	120
Transmitter	Coil Axis	Vertical
	Signal	Half sine wave current pulse
	Base frequency (Hz)	25
	Repetition rate (pulses per second)	40
	Pulse width (microseconds)	4108
	Loop area (square metres)	231
	Number of turns	6
	Peak Current (amps)	480
	Tx loop dipole moment (Am ²)	6.65 x 10 ⁶
Receiver	Coil Axes	X and Z
	Sample Interval (seconds)	0.25
	Channel times	see Table 5

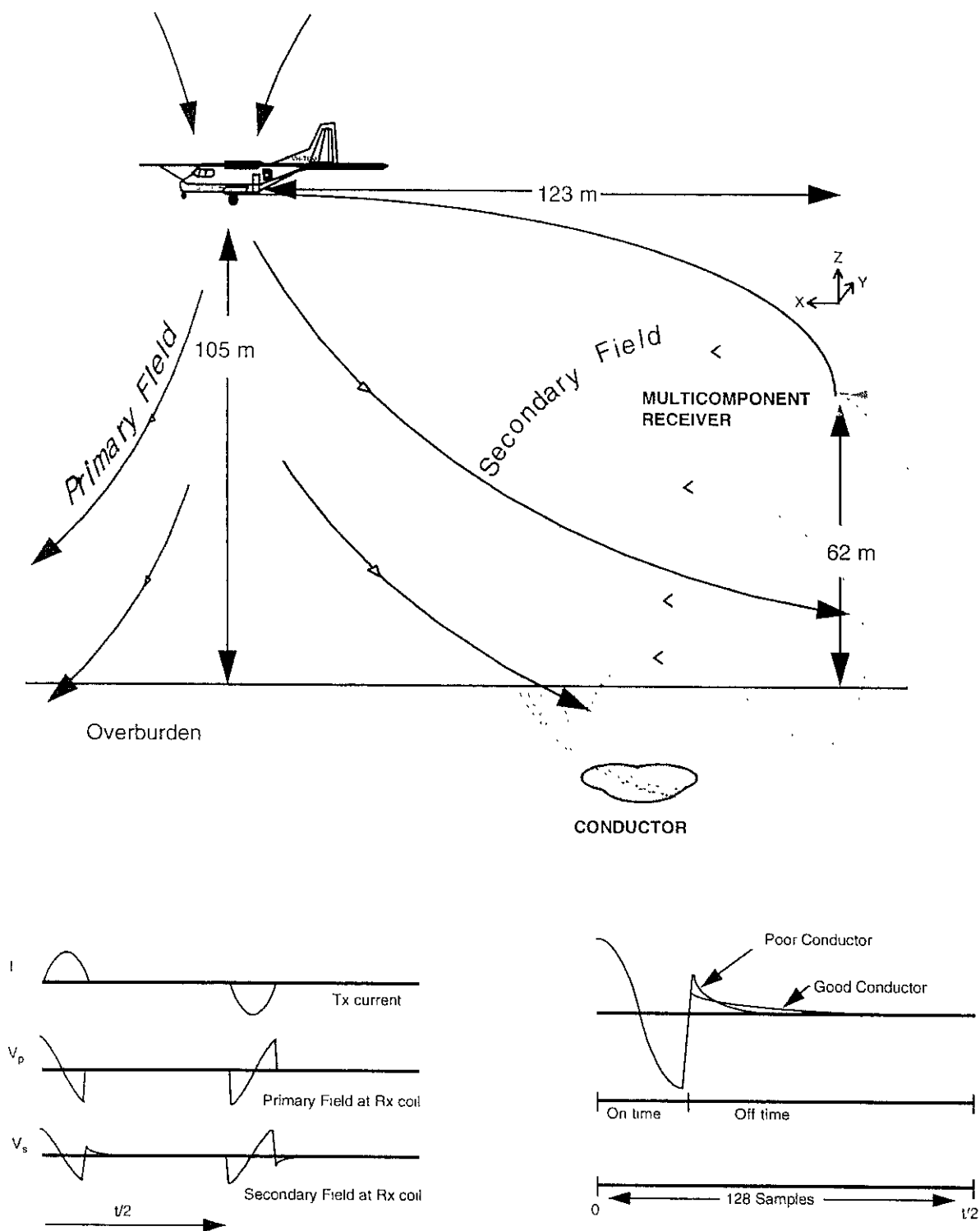
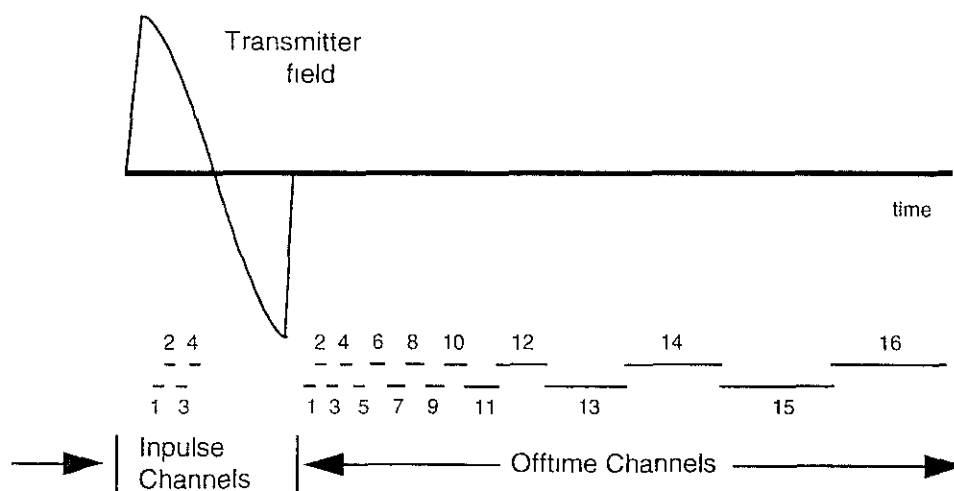
Figure 2: GEOTEM_{DEEP} System Geometry And Waveform

Table 4: X and Z Component Channel Positions

Channel	Channel Centre μsec after Tx	Channel Width μsec
Impulse 1	3 788	313
Impulse 2	-3 476	313
Impulse 3	3 163	313
Impulse 4	-2 851	313
Offtime 1	352	156
Offtime 2	509	156
Offtime 3	665	156
Offtime 4	899	313
Offtime 5	1 212	313
Offtime 6	1 602	469
Offtime 7	2 071	469
Offtime 8	2 615	625
Offtime 9	3 321	781
Offtime 10	4 181	938
Offtime 11	5 196	1 094
Offtime 12	6 368	1 250
Offtime 13	7 774	1 563
Offtime 14	9 493	1 875
Offtime 15	11 681	2 500
Offtime 16	14 337	2 813

Figure 3: X and Z Component Channel Positions



3.1 Electromagnetic Acquisition System

Model: Geoterrex Pty Ltd GEODAS

The GEODAS is a computer-based software system using a rugged field PC, which runs multiple DOS programs in a multi tasking environment. The modular design of the GEODAS allows for reconfiguring of the system to record different types of surveys by adding, removing or changing task modules.

The GEODAS is currently installed in a rugged, totally enclosed, moisture and dust proof system, originally designed for military use. Data are recorded on hard disks and a cartridge tape system is used for data transfer to the field processing centre.

The following are recorded digitally using the GEODAS.

Each second	Flight number Navigation data Total magnetic field Fiducial number (Time in seconds) Barometric pressure Altitude (Radar and Barometer) Temperature outside the cabin in degrees Celsius
Each 0.25 secs	20 X & Z Component GEOTEM_{DEEP} Channels X & Z Component Transmitter primary field Power Line Noise Monitor (X & Z Component) Earth Field Monitor (X & Z Component) Earth Field Correction

3.2 Magnetometer

Model: Cesium vapour optical absorption magnetometer
Mounting: Tail stinger
Sample period: 50 milliseconds
Sample interval: 1.0 seconds *
Sensitivity: 0.01 nanoTeslas (nT)

* To operate both the **GEOTEM_{DEEP}** system and the magnetometer system simultaneously, the transmitter is switched off for a period of 200 milliseconds every second to allow for a noise free magnetometer reading.

Base Station magnetometer

Model: G856 Proton Precession
Sample interval: 5 seconds
Sensitivity: 0.1 nT

3.3 Tracking Camera

Model: Sony DXC101P Video Camera

The tracking camera is equipped with a 4 mm wide-angle lens. The video tape is synchronised with the geophysical record by a digital fiducial display that increments every tenth of a second. These fiducials

are recorded on the video tape and displayed on the bottom left of the video screen. Times are recorded from the digital information provided by the GEODAS system.

3.4 Altimeter

Barometric Altimeter

Model: Geoterrex Barometric Altimeter (SENSYM 142SC15A)
 Sample Interval: 1.0 seconds
 Sensitivity: 0.24 mV/foot (6.5 mV/mb)

Radar Altimeter

Model: Sperry Stars AA200 radio altimeter system
 Sample interval: 1.0 second
 Accuracy: +/- 3% of indicated altitude.

The Sperry radio altimeter is a high quality instrument whose output is factory calibrated. It is fitted with a test function which checks the calibration of a terrain clearance of 100 feet and altitudes which are multiples of 100 feet.

3.5 Electronic Navigation

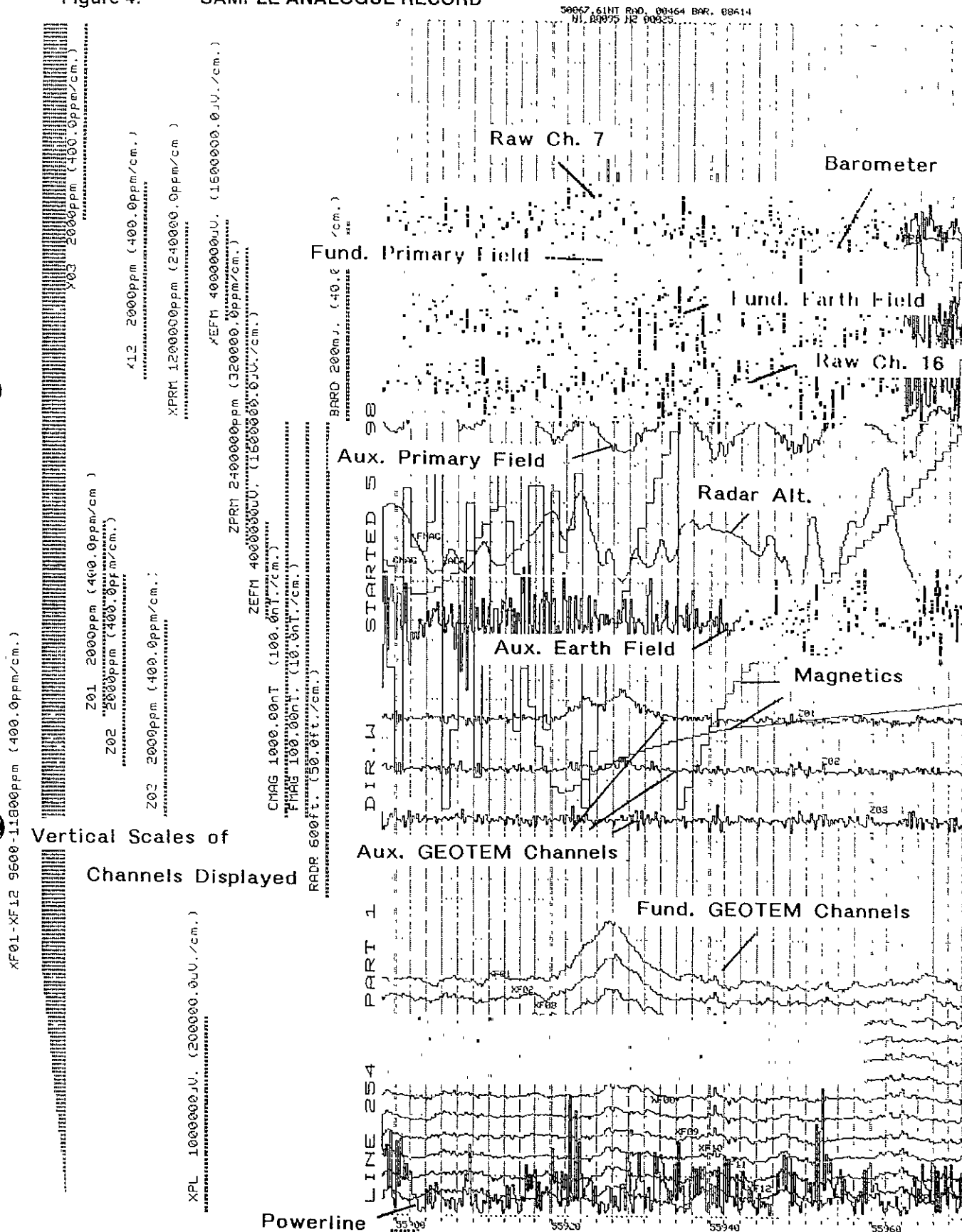
GPS Equipment: Sercel NR103 GPS receiver and antennae mounted in aircraft and equipped with steering indicators.
 Sample Rate: 0.6 seconds
 Base Station: Sercel NR103 base station receiver with laptop data logger.
 Doppler Equipment: Singer Kearfott AN/ASN 128, Sperry VG 14 Vertical Gyroscope, Sperry C-12 Compass.
 Sample Rate: 1.0 seconds

3.6 Analogue Recorder

Model: RMS GR33 Thermal Dot Matrix Printer
 Chart speed: 11 cm/minute; time increases from left to right
 Chart width: 30.5 cm
 Event marks: 20 second marks are recorded on the bottom of the chart with the associated fiducial numbers being printed at the base of the chart.
 GEOTEM_{DEEP} Traces: The scales for the GEOTEM_{DEEP} traces are displayed on the analogue charts. The zero line for each channel is separated by 0.5 cm with the latest channel always being plotted closest to the bottom of the page.
 Synchronisation: A lag of approximately 5.0 seconds occurs between the GEOTEM_{DEEP} channels and the magnetometer and altimeter traces.
 Channels Displayed: Channel 7 noise monitor
 X Component Primary Field Monitor
 Z Component Primary Field Monitor
 X and Z Component Earth Field Monitors
 Channel 16 noise monitor
 Total Magnetic Field - Fine Scale

Total Magnetic Field Coarse Scale
Terrain Clearance - Radar
Barometer
GEOTEM_{DEEP} X channels 5-16
Powerline Monitor

Figure 4: SAMPLE ANALOGUE RECORD



4. PRODUCTS AND PROCESSING

4.1 Field Processing

Raw **GEOTEM_{DEEP}** data were read directly onto a UNIX workstation where advanced UNIX GMAPS processing software was applied to the data. In this way, an improved delivery schedule for final processed data was achieved

An A0 plotter was used in conjunction with the UNIX workstation and was able to provide high quality contour maps of the magnetic field and ADI grids as well as profile plots displayed either as stacked profile or plan maps. The increased efficiency in plotting improved Geoterrex' ability to analyse flightpath and **GEOTEM_{DEEP}** data and create specific plots for other purposes, such as Channel amplitude profile plans, powerline monitor profile plans and barometric altimeter profile plans.

An Exabyte drive used with the UNIX workstation was compatible with CRA's requirement. This facility allowed data to be delivered directly from the field processing centre to the client where profile and grid analysis of **GEOTEM_{DEEP}** data could begin immediately. Therefore decisions regarding survey parameters, additional areas to fly, or areas of lesser value, could be made more quickly and effectively prior to the end of the survey.

The field processing centre also included a desktop PC for additional tasks and a laptop PC for recording GPS data and downloading diurnal base station files.

Field Processing Equipment

- UNIX Workstation
- 3.5 Gb Hard Disk
- Exabyte cartridge tape drive
- QIC150 Mb cartridge tape drive
- A0 high speed plotter
- High speed PC
- Laptop PC
- GMAPS for UNIX **GEOTEM_{DEEP}** processing software

4.2 Electromagnetics

Levelling

Since the **GEOTEM_{DEEP}** receiver constantly normalises and calibrates during data acquisition there is no levelling of data at the post-survey processing stage.

Synchronisation Lag

All **GEOTEM_{DEEP}** and auxiliary geophysical data has been synchronised with the navigation data so that there is no "peak position" offset between the responses obtained from lines flown in opposite directions over a narrow vertical conductor.

Noise Reduction

Noise reduction in the digital data is accomplished by identification of the noise type (atmospheric, system or cultural), analysis of the spectral content of the entire signal (geological + noise) and selective filtering.

Atmospheric Noise The first stage of processing is atmospheric (sferic) noise removal which is achieved by using a method based loosely on cross correlation and non linear filtering, since most sferic events are single reading (impulse response) features which cannot be properly removed by linear filtering.

Cultural noise Cultural noise (which includes sources such as 50 Hz powerlines, electric fences, cathodic protected metal structures) is measured by the 50 Hz monitor. Normally cultural noise is not removed during processing.

System noise System noise is removed by filtering using strict amplitude and wavelength thresholds to correctly isolate noise from geological signal. The filter shape and amplitude thresholds are determined on a flight by flight basis from raw data plots of at least 2 flight lines flown in opposite directions at the beginning and end of the flight. This allows customised filtering for directional, diurnal and flight noise, ensuring that the minimal amount of filtering is performed so that real signal is not degraded by using a "lowest common denominator" philosophy of applying one filter (usually the maximum) for all noise conditions.

4.3 Magnetics

Diurnal Levelling

The base station data is edited so that all significant spikes, level shifts and null data are eliminated. It is resampled and synchronised to the airborne fiducial system prior to subtraction from the airborne magnetic readings.

Synchronisation Lag

A lag of 14 samples was applied to synchronise the magnetic data with the navigation data.

4.4 Flight Path Recovery

A GPS receiver mounted in the survey aircraft uses 3D triangulation of satellite signals to calculate both the position of the aircraft in real time and to provide pilots with steering information. The GPS data are read into the field computer and plotted on a daily basis to ensure data quality control and determine any necessary reflights. The positioning data are stored digitally as Latitudes and Longitudes and later converted to Australian Map Grid (AMG) co-ordinates.

The Doppler system is a radar velocity sensor that determines the three components of aircraft velocity from measurements of the Doppler frequency shift in radar energy transmitted toward, and received back from the ground. These velocity data considered with the heading data from the aircraft's compass are used to determine the aircraft position.

To obtain the optimum level of positioning accuracy the Doppler velocity information is combined with the GPS coordinates using least squares techniques. The integrated solution has greater accuracy and repeatability than either of the individual components. The integrated aircraft track was plotted on a daily basis at 1 : 25 000 scale to ensure data quality and to determine any necessary reflights.

4.5 Survey Products

4.5.1 Multi Parameter Profile Plots

Final **GEOTEM_{DEEP}** data (and the altitude corrected **GEOTEM_{DEEP}** data) are presented as multi-parameter profiles plotted at suitable scales from top to bottom, as listed below. The x-axes of alternate sections of each plot are annotated with fiducial numbers or AMGs. The scales for the **GEOTEM_{DEEP}** traces vary according to the channel, to allow resolution in late channels whilst keeping early channels on scale. The base level for each channel is separated by 0.5 cm with the latest channel always being plotted closest to the bottom of the page. Each plot has a title containing line number, job number, area name, frequency, pulse width and average northing or easting.

Table 5: Multi-Parameter Profile Plot Scales (1 : 25 000 horizontal scale)

AXIS	Channel	Trace Colour	Scale
1 (top)	Residual Magnetics Coarse Scale	Red	500nT/cm
	Residual Magnetics Fine Scale	Green	25nT/cm
	Barometric Altimeter	Black	50m/cm
	Radar Altimeter	Blue	20m/cm
2	Z Impulse Channel 1 Z Impulse Channel 2 Z Impulse Channel 3 Z Impulse Channel 4	Black Blue Green Red	2500 ppm/cm
3	ADI (1 - 5) Z Component	Red	100 units/cm
	Z Offtime Channels 1-4	Black	1000 ppm/cm
	Z Offtime Channels 5-8	Blue	800 ppm/cm
	Z Offtime Channels 9-11	Green	400 ppm/cm
	Z Offtime Channels 12-16	Red	200 ppm/cm
4	50 Hz Monitor - Z Component	Blue	0.1 volts/cm
	X Impulse Channel 1 X Impulse Channel 2 X Impulse Channel 3 X Impulse Channel 4	Black Blue Green Red	2500 ppm/cm
5 (bottom)	ADI (1 - 5) X Component	Red	100 units/cm
	X Offtime Channels 1- 4	Black	1000 ppm/cm
	X Offtime Channels 5- 8	Blue	800 ppm/cm
	X Offtime Channels 9-11	Green	400 ppm/cm
	X Offtime Channels 12-16	Red	200 ppm/cm
	50 Hz Monitor - X Component	Blue	0.1 volts/cm

4.5.2 Flight Path Maps

Flight path maps were produced on film at 1 : 25 000 scale. These were annotated with line numbers, flight direction and fiducial position.

4.5.3 Magnetic Contours

Magnetic data were gridded and used to create 1 : 25 000 contour maps that were printed on film.

4.5.4 ADI Images

ADI images were produced on laminated paper at 1 : 25 000 scale. Images were made for both X and Z components. The calculated ADI values were used to produce a 50 x 50 metre grid. The ADI maps were created from Channels 8 to 13

4.5.5 Data Tapes And Format

A set of located data files were produced and copied to 8mm Exabyte tape in 8505 uncompressed format. The gridded data used to create magnetic contours and ADI images were provided in ERMMapper format on Exabyte tape.

4.5.6 Items Delivered

The following products were delivered for the survey area:

FIELD:

- Preliminary flight path maps
- Diurnally levelled magnetic contours
- Preliminary **GEOTEM_{DEEP}** data

FINALS:

- Multi-parameter profile plots at 1 : 25 000 scale
- Flight path maps at 1 : 25 000 scale on film
- X and Z component ADI colour images at 1 : 25 000 scale, laminated
- Magnetic contours at 1 : 25 000 scale on film
- Located data on Exabyte cartridge and associated documentation
- Gridded data in Geosoft format on 3.5" diskettes
- Analogue Charts
- Logistics report
- Videotape records of the aircraft track
- Flight logs
- Mileage list
- Final flight line list

Table 6: Located Data Tape Format - Processed Data

Columns	Field	Description
1 - 4	1	Flight number
5 - 10	2	Line identifier
11 - 18	3	Fiducial
19 - 26	4	AMG Zone 53 Easting - metres
27 - 34	5	AMG Zone 53 Northing - metres
35 - 42	6	X Inpulse Channel 1 - ppm
43 - 50	7	X Inpulse Channel 2 - ppm
51 - 58	8	X Inpulse Channel 3 - ppm
59 - 66	9	X Inpulse Channel 4 - ppm
67 - 74	10	X GEOTEM Channel 1 - ppm
75 - 82	11	X GEOTEM Channel 2 - ppm
83 - 90	12	X GEOTEM Channel 3 - ppm
91 - 98	13	X GEOTEM Channel 4 - ppm
99 - 106	14	X GEOTEM Channel 5 - ppm
107 - 114	15	X GEOTEM Channel 6 - ppm
115 - 122	16	X GEOTEM Channel 7 - ppm
123 - 130	17	X GEOTEM Channel 8 - ppm
131 - 138	18	X GEOTEM Channel 9 - ppm
139 - 146	19	X GEOTEM Channel 10 - ppm
147 - 154	20	X GEOTEM Channel 11 - ppm
155 - 162	21	X GEOTEM Channel 12 - ppm
163 - 170	22	X GEOTEM Channel 13 - ppm
171 - 178	23	X GEOTEM Channel 14 - ppm
179 - 186	24	X GEOTEM Channel 15 - ppm
187 - 194	25	X GEOTEM Channel 16 - ppm
195 - 202	26	X GEOTEM ADI Chs 1-5 units
203 - 210	27	Z Inpulse Channel 1 - ppm
211 - 218	28	Z Inpulse Channel 2 - ppm
219 - 226	29	Z Inpulse Channel 3 - ppm
227 - 234	30	Z Inpulse Channel 4 - ppm
235 - 242	31	Z GEOTEM Channel 1 - ppm
243 - 250	32	Z GEOTEM Channel 2 - ppm
251 - 258	33	Z GEOTEM Channel 3 - ppm
259 - 266	34	Z GEOTEM Channel 4 - ppm
267 - 274	35	Z GEOTEM Channel 5 - ppm
275 - 282	36	Z GEOTEM Channel 6 - ppm
283 - 290	37	Z GEOTEM Channel 7 - ppm
291 - 298	38	Z GEOTEM Channel 8 - ppm
299 - 306	39	Z GEOTEM Channel 9 - ppm
307 - 314	40	Z GEOTEM Channel 10 - ppm
315 - 322	41	Z GEOTEM Channel 11 - ppm
323 - 330	42	Z GEOTEM Channel 12 - ppm
331 - 338	43	Z GEOTEM Channel 13 - ppm
339 - 346	44	Z GEOTEM Channel 14 - ppm
347 - 354	45	Z GEOTEM Channel 15 - ppm
355 - 362	46	Z GEOTEM Channel 16 - ppm
363 - 370	47	Z GEOTEM ADI Chs 1-5 units
371 - 378	48	GEOTEM 50Hz Monitor
379 - 386	49	Radar Altimeter - metres
387 - 394	50	Barometric Altimeter - metres
395 - 404	51	Diurnally Levelled Magnetics - nT
405 - 405		<newline>

Table 7: Located Data Tape Format - Altitude Corrected Data

Columns	Field	Description
1 - 4	1	Flight number
5 - 10	2	Line identifier
11 - 18	3	Fiducial
19 - 26	4	AMG Zone 53 Easting - metres
27 - 34	5	AMG Zone 53 Northing - metres
35 - 42	6 X	GEOTEM Altitude Corrected Channel 1 ppm
43 - 50	7 X	GEOTEM Altitude Corrected Channel 2 ppm
51 - 58	8 X	GEOTEM Altitude Corrected Channel 3 ppm
59 - 66	9 X	GEOTEM Altitude Corrected Channel 4 ppm
67 - 74	10 X	GEOTEM Altitude Corrected Channel 5 - ppm
75 - 82	11 X	GEOTEM Altitude Corrected Channel 6 - ppm
83 - 90	12 X	GEOTEM Altitude Corrected Channel 7 - ppm
91 - 98	13 X	GEOTEM Altitude Corrected Channel 8 ppm
99 - 106	14 X	GEOTEM Altitude Corrected Channel 9 - ppm
107 - 114	15 X	GEOTEM Altitude Corrected Channel 10 ppm
115 - 122	16 X	GEOTEM Altitude Corrected Channel 11 - ppm
123 - 130	17 X	GEOTEM Altitude Corrected Channel 12 - ppm
131 - 138	18 X	GEOTEM Altitude Corrected Channel 13 ppm
139 - 146	19 X	GEOTEM Altitude Corrected Channel 14 - ppm
147 - 154	20 X	GEOTEM Altitude Corrected Channel 15 ppm
155 - 162	21 X	GEOTEM Altitude Corrected Channel 16 - ppm
163 - 170	22 Z	GEOTEM Altitude Corrected Channel 1 - ppm
171 - 178	23 Z	GEOTEM Altitude Corrected Channel 2 - ppm
179 - 186	24 Z	GEOTEM Altitude Corrected Channel 3 - ppm
187 - 194	25 Z	GEOTEM Altitude Corrected Channel 4 ppm
195 - 202	26 Z	GEOTEM Altitude Corrected Channel 5 ppm
203 - 210	27 Z	GEOTEM Altitude Corrected Channel 6 - ppm
211 - 218	28 Z	GEOTEM Altitude Corrected Channel 7 - ppm
219 - 226	29 Z	GEOTEM Altitude Corrected Channel 8 ppm
227 - 234	30 Z	GEOTEM Altitude Corrected Channel 9 - ppm
235 - 242	31 Z	GEOTEM Altitude Corrected Channel 10 ppm
243 - 250	32 Z	GEOTEM Altitude Corrected Channel 11 - ppm
251 - 258	33 Z	GEOTEM Altitude Corrected Channel 12 - ppm
259 - 266	34 Z	GEOTEM Altitude Corrected Channel 13 - ppm
267 - 274	35 Z	GEOTEM Altitude Corrected Channel 14 ppm
275 - 282	36 Z	GEOTEM Altitude Corrected Channel 15 - ppm
283 - 290	37 Z	GEOTEM Altitude Corrected Channel 16 ppm
291 - 298	38	GEOTEM 50Hz Monitor
299 - 306	39	Radar Altimeter - metres
307 - 314	40	Barometric Altimeter metres
315 - 324	41	Final Magnetics - nT
325 - 325		<newline>

5. GEOTEM BACKGROUND INFORMATION

5.1 The GEOTEM_{DEEP} Multi-Coil System:

GEOTEM_{DEEP} is a time domain towed bird electromagnetic system incorporating a high speed EM receiver. The primary electromagnetic pulses are created by a series of discontinuous half-sine current pulses fed into a multi turn transmitting loop surrounding the aircraft and fixed to the nose, tail and wing tips. The pulse repetition rate is 25 Hz (40 bipolar pulses per second).

The EM sensor is an orthogonal pair of cored coils mounted in a "bird", towed behind the aircraft on a cable. The cable is demagnetised to reduce noise levels. Two coil orientations are available, the X component has a horizontal axis in the direction of flight and the Z component which has a vertical axis, the receiver coil being coplanar with the transmitter coil.

Time-domain airborne electromagnetic systems have historically measured the in-line horizontal (X) component using a coaxial receiver coil. New versions of the electromagnetic systems are designed to collect two additional components (the vertical component (z) and the lateral horizontal component (y)) to provide greater diagnostic information.

In areas where lithological strike is near horizontal, the z-component response provides greater signal-to-noise, particularly at late delay times. This allows the conductivity to be determined at greater depth. In a layered environment, the symmetry implies that the y component will be zero; hence a non-zero y-component indicates lateral inhomogeneity.

The three components, x, y and z can be combined to give the "energy envelope" of the response. Over a vertical plate, the response profile of this envelope has a single positive peak and no side lobes. The shape of the energy envelope is dependent on flight direction, but less so than the shape of the x-component response profile.

In the interpretation of discrete conductors, the z-component data may be used to ascertain the dip and depth to the conductor using simple rules of thumb. When the profile line is perpendicular to the strike direction and over the centre of the conductor, the y component will be zero; otherwise it appears to be a combination of the x and z-components. The extent and contamination of the y-component by the x and z components can be used to ascertain the strike direction and lateral offset of the target respectively.

Having the z and y-component data increases the total response when the profile line has not traversed the target. This increases the possibility of detecting a target located between adjacent flight lines or beyond a survey area.

The primary current pulses may cause eddy currents in subsurface conductors which decay following cessation of each pulse. Decaying earth currents can induce voltages in the receiver coils which are proportional to the electromagnetic field. These voltages are sampled over 20 time gates, the centres and widths are variable and may be placed anywhere within or outside the transmitter pulse.

The time varying EM signals received at the sensor pass through anti-aliasing filters and are then digitised with an A/D converter. The digital data stream from the A/D converter passes into an array processor where all the numerically intensive processing tasks are carried out. The array processor is under control of a multi-tasking minicomputer. The on-board processing sequence is as follows:

Transient Analysis: Transient analysis enables the separation of noise from signal in real time;

Digital Stacking: The stacking of transients to produce 1 recorded reading, of which 4 are recorded every second;

Windowing of Data The transient is initially sampled over 128 time windows which are then binned to form 20 channels.

5.2 System Calibration

All checks and adjustments are performed at high altitude at the start of each flight to allow for automatic compensation and calibration at survey altitude. The calibrations and compensations are as follows:

Compensation

During the flight, the transmitter creates eddy currents within the structure of the aircraft that have measurable effects at the receiver coil. Compensation for this signal is effected numerically within the receiver by a statistical analysis of the signal at the bird in the absence of ground response (by flying at an altitude in excess of 600 m above ground level). The observed signal is used to define a compensation signal that is removed from the observed signal to produce a null and thus effectively buck out any response due to changing geometry between receiver and transmitter (ie between the bird and the aircraft);

Normalisation

All EM response channels are automatically calibrated and reduced to parts per million of the primary field in the receiver

Appendix. RMS Thermal Paper Storage Instructions**Storage**

Ambient Temperature.	Less than 25°C
Relative Humidity:	Less than 65%
Storage Location:	In darkness before and after exposure.

Under these conditions, the paper should retain its characteristics and the printed images will remain legible for at least 5 years, although in the case of blue image paper, there may be some slight fading.

To Eliminate Premature Paper Development:

Colour development begins at temperatures between 70 to 100°C, and reaches saturation density between 80 and 120°C. Premature development of the paper may occur at lower temperatures, and particularly if the humidity is greater than 65%.

eg. If the paper is stored for 24 hours at a temperature of 60°C, some development may occur. Or if the paper is stored for 24 hours at a temperature of 45°C when the relative humidity is 90%, development may also occur.

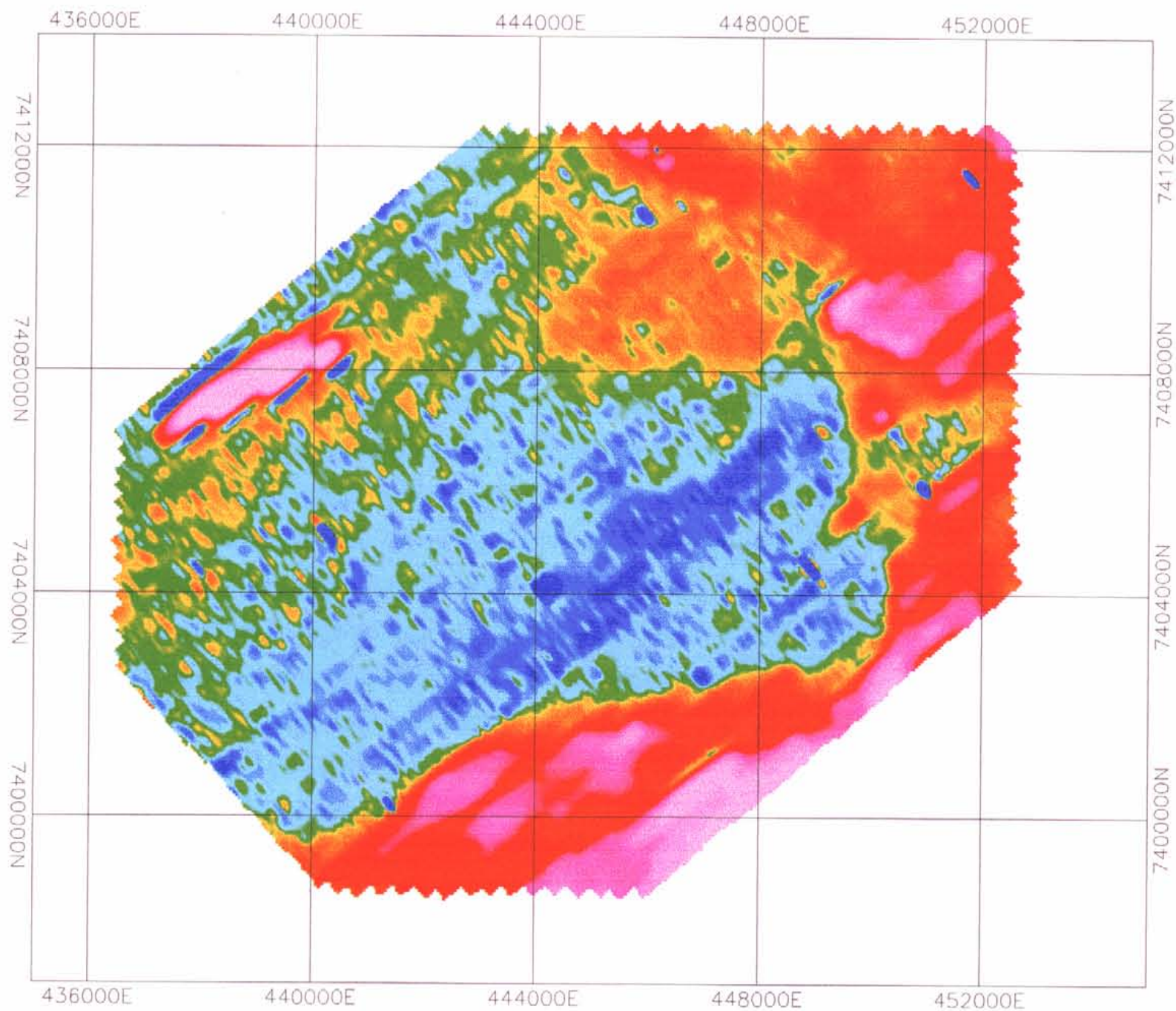
Avoid use of solvent type adhesives. Adhesives containing volatile organic solvents such as alcohol, ester, ketone, etc causes colour formation and therefore rubber-type adhesives etc should not be used. Starch, PVA and CMC type adhesives are recommended.

Frictional heat generated by rubbing a finger nail or sharp object over the surface will cause images to develop.

- Thermal paper will develop colour if brought into contact with freshly processed Diazo copying paper.

To Eliminate Paper Fading:

- Thermal paper will turn yellow, and blue printed images will fade if exposed to direct sunlight or to fluorescent lighting for long periods. File exposed paper in the dark immediately after exposure. Do not store paper near windows.
- Prolonged contact with PVC film containing plasticisers such as ester phthalate will reduce the image forming ability of the paper and cause printed images to fade. We recommend that files made of polyethylene, polypropylene, polyester, etc be used.
- Self adhesive cellophane tapes containing an alcohol type plasticiser will cause the image to fade. Double-sided adhesive tape is recommended for use instead of paste.
- Handling thermal paper with dirty or sweaty fingers may cause images to fade.
- Do not store developed paper with the sensitised surfaces touching as images might be transferred from one sheet to another.

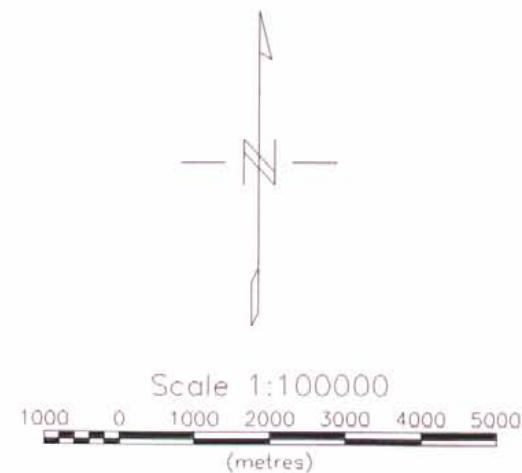
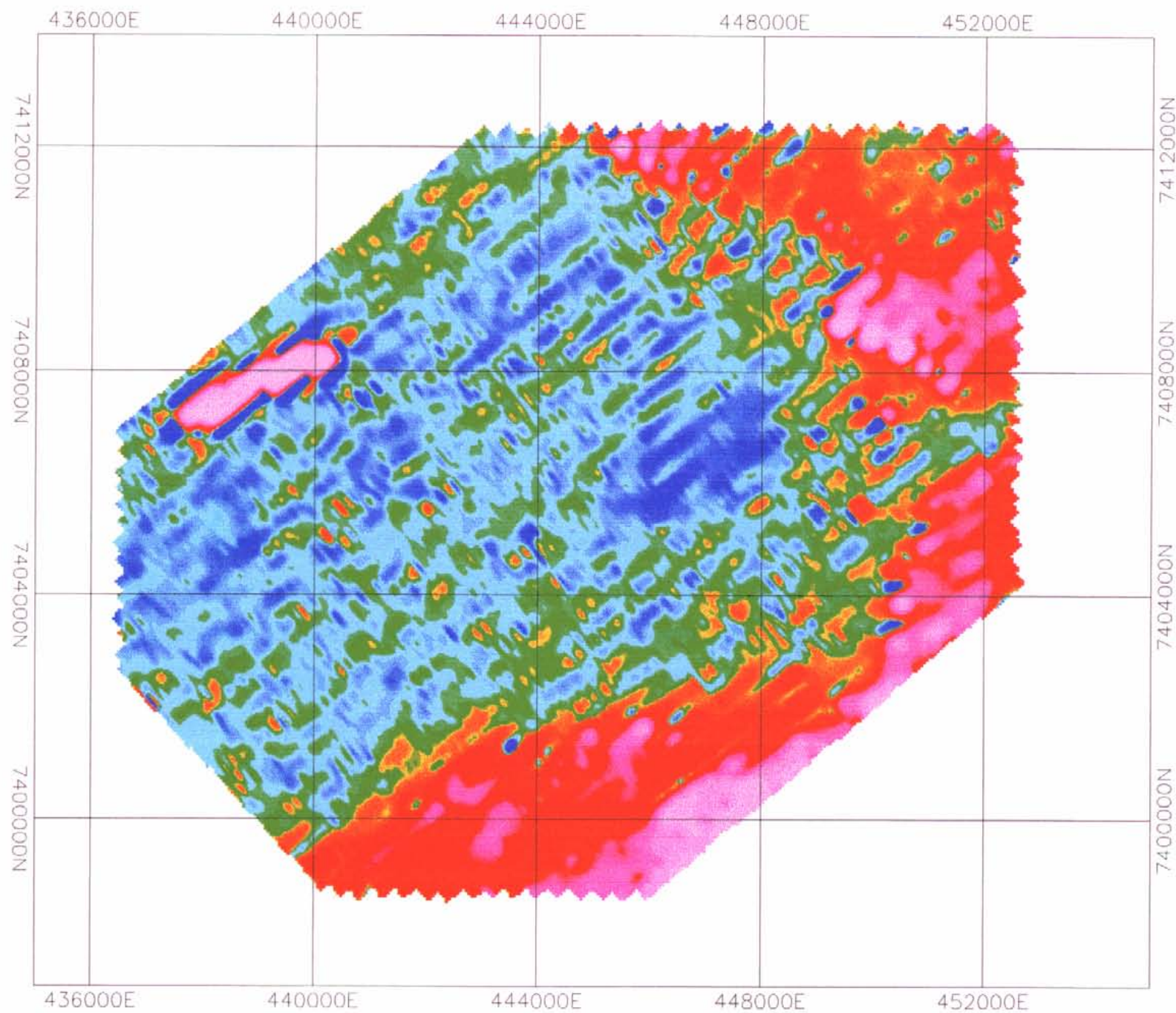


Scale 1:100000
1000 0 1000 2000 3000 4000 5000
(metres)



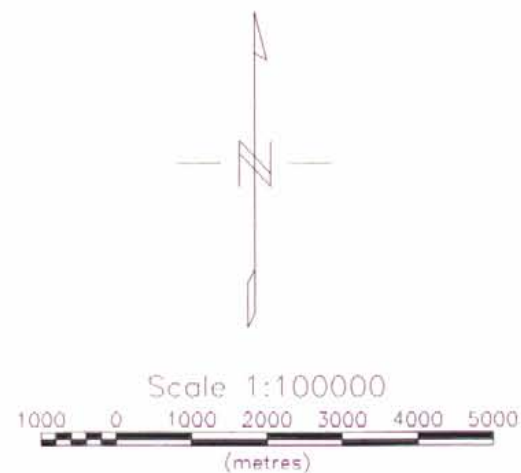
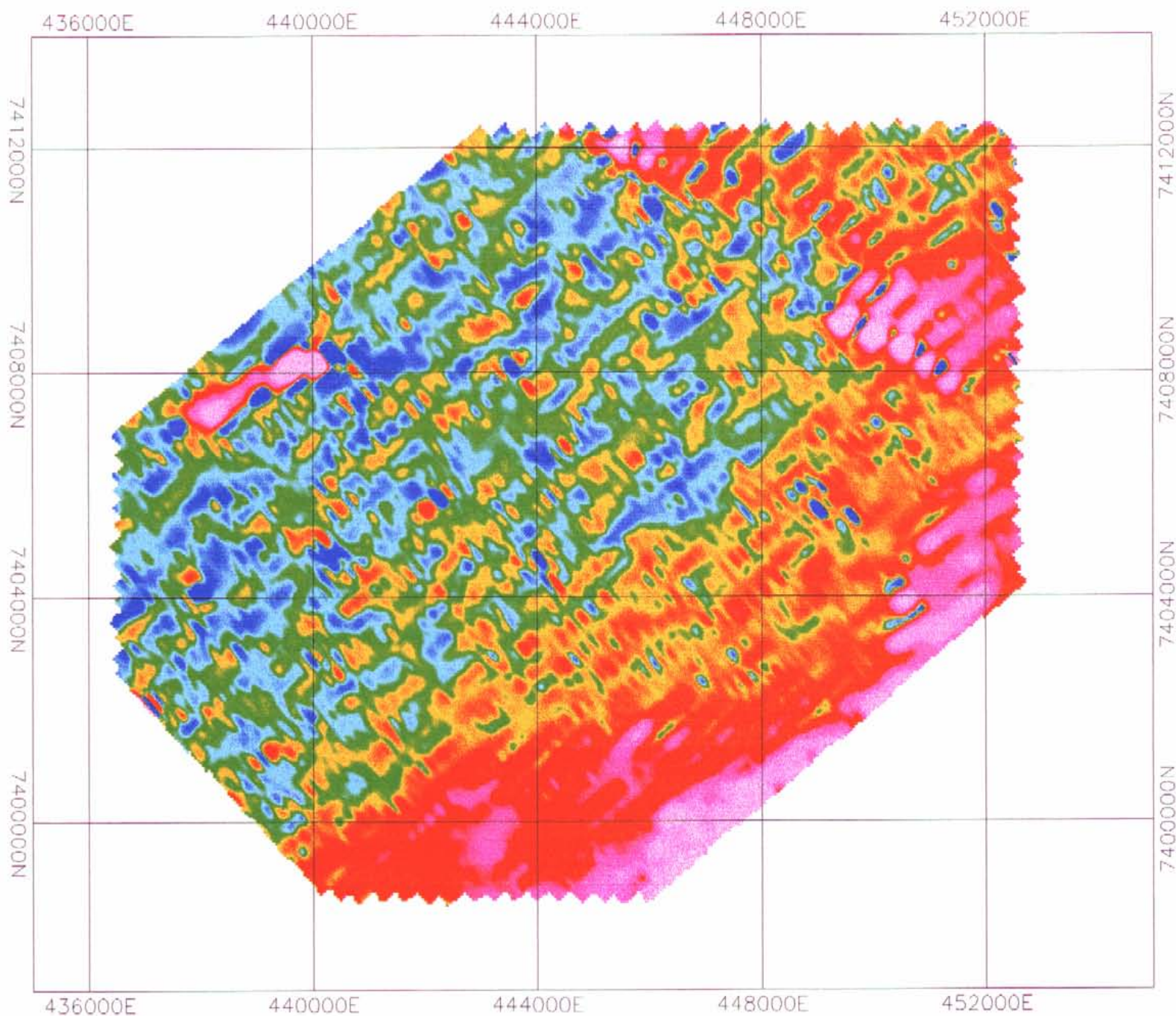
CRA EXPLORATION PTY LIMITED
EL 9371 MORDOR POUND
GEOTEM
Z IN-PULSE CHANNEL 1 IMAGE

REFERENCE	ALICE SPRINGS SF 53-14		
SCALE	1:100,000	DATE	22nd November 1996
AUTHOR	Angus McCoy	REPORT	22570
DRAWN	Angus McCoy	PLAN No.	NTd



CRA EXPLORATION PTY LIMITED
 EL 9371 MORDOR POUND
GEOTEM
 X GEOTEM CHANNEL 2 IMAGE

REFERENCE	ALICE SPRINGS SF 53-14		
SCALE	1:100,000	DATE	22nd November 1996
AUTHOR	Angus McCoy	REPORT	22570
DRAWN	Angus McCoy	PLAN No.	NTd



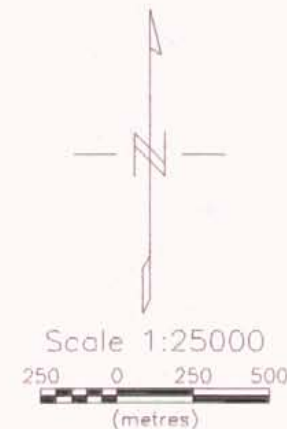
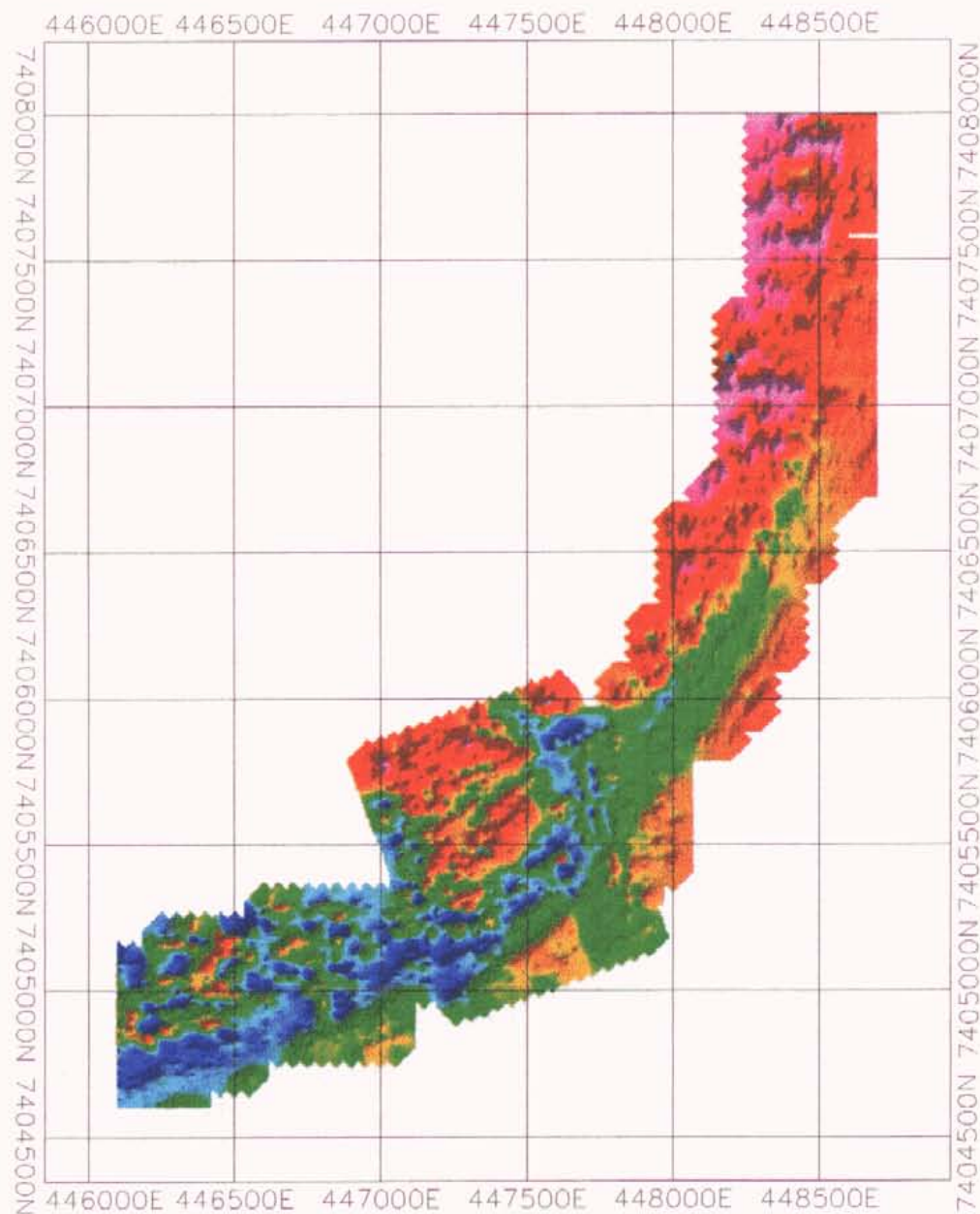
CRA EXPLORATION PTY LIMITED
EL 9371 MORDOR POUND
GEOTEM
X GEOTEM CHANNEL 5 IMAGE

REFERENCE	ALICE SPRINGS SF 53-14		
SCALE	1:100,000	DATE	22nd November 1996
AUTHOR	Angus McCoy	REPORT	22570
DRAWN	Angus McCoy	PLAN No.	NTd

APPENDIX XIII

EL 9371 MORDOR POUND

Ground Magnetic Data Image and Model Results

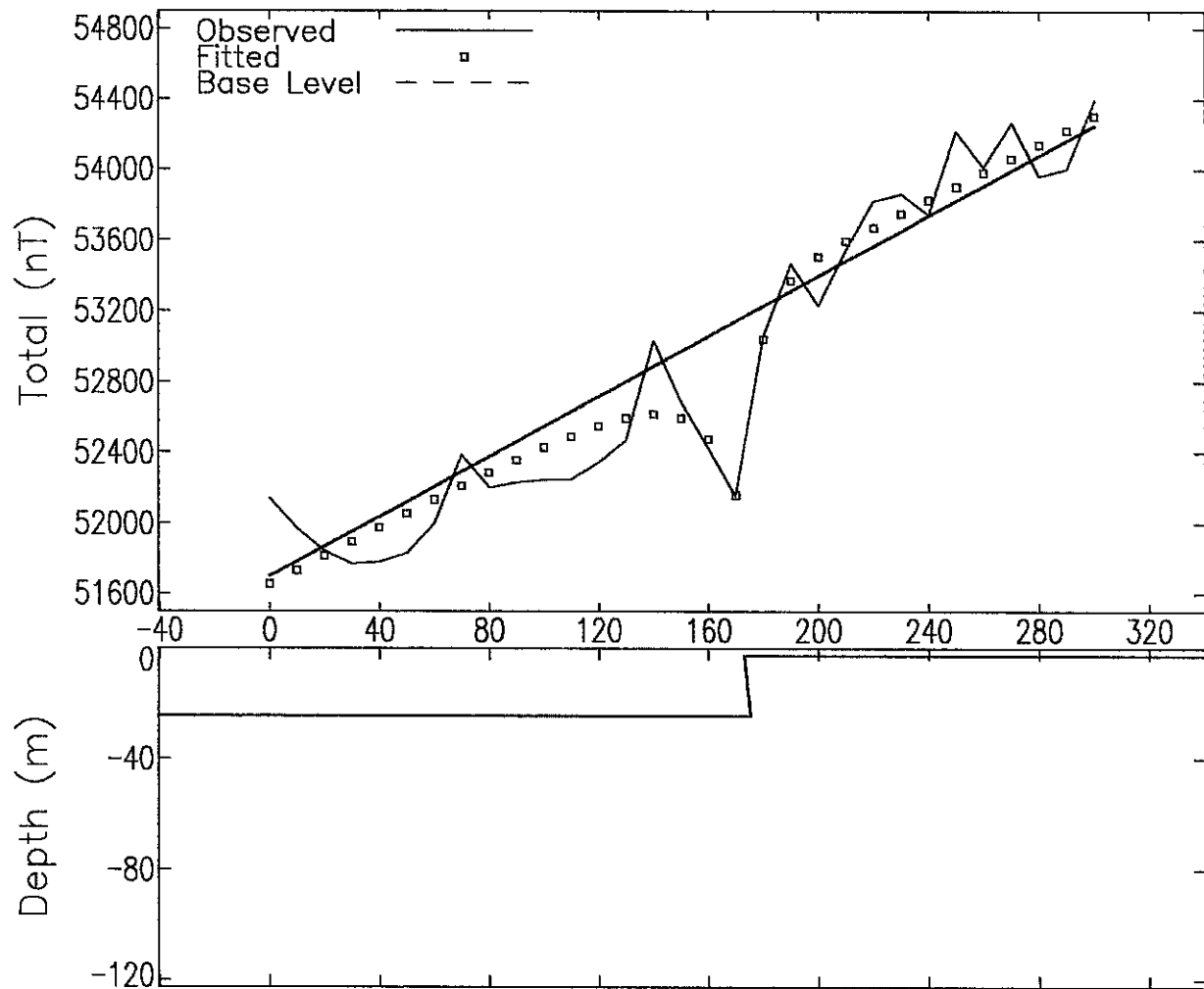


CRA EXPLORATION PTY LIMITED
EL 9371 MORDOR POUND
GROUND MAGNETICS
SHADED TOTAL MAGNETIC INTENSITY IMAGE

REFERENCE	ALICE SPRINGS SF 53-14		
SCALE	1:25,000	DATE	22nd November 1996
AUTHOR	Angus McCoy	REPORT	22570
DRAWN	Angus McCoy	PLAN No.	NTd

Soil line 5 – groundmag model

Step response



MODEL PARAMETERS:

Model Type	L	Step
Depth	L	2.61 m
Thickness	F	21.6 m
Dip	F	84 deg
Susceptibility	F	0.00610 emu
Remnance Ratio	X	0
Remnance Incl	X	0 deg
Remnance Decl	X	0 deg
Main Position	F	172.9283 m
Cross Position	X	500 m
Base Level	F	53168.99 nT
Base Slope	F	8.506727 nT/m
Base Curvature	X	0 nT/m ²

(F-fitted, X-fixed, L-limit)

GEOMAGNETIC FIELD:

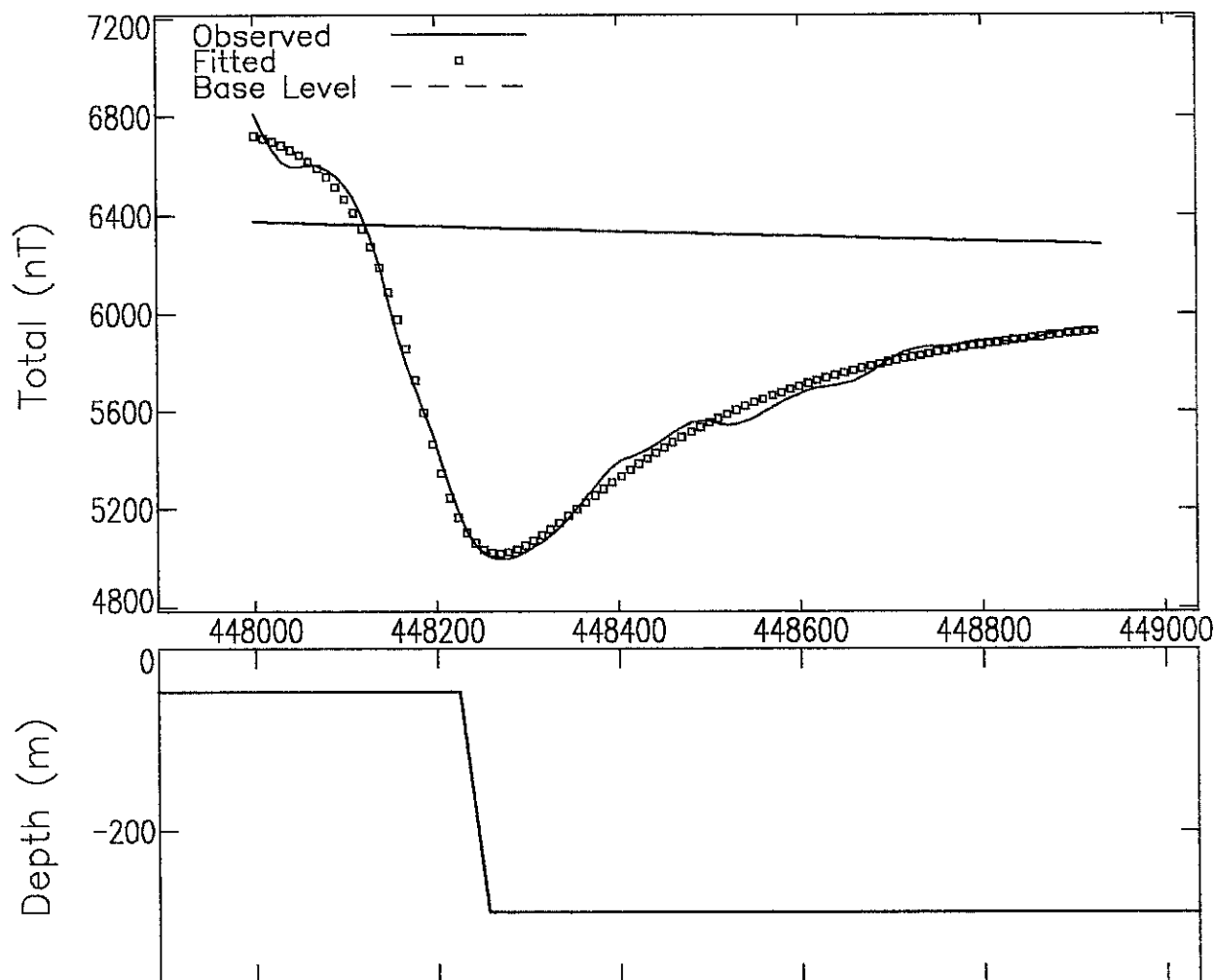
Field Strength	53000 nT
Inclination	-56 deg
Declination	4 deg

COORDINATES:

Sensor Height	0 m
Strike Perp	315 deg
Line Direction	315 deg
Main Direction	315 deg
Main Offset	
Cross Direction	45 deg
Cross Offset	

Line 10810 - Aeromagnetic model

"Pearl" at 448200mE 7406420mN



MODEL PARAMETERS:

Model Type	F	Step
Depth	F	46.6 m
Thickness	F	243 m
Dip	F	97 deg
Susceptibility	F	0.0160 emu
Remnance Ratio	X	0
Remnance Incl	X	0 deg
Remnance Decl	X	0 deg
Main Position	F	448224.4 m
Cross Position	X	7406546 m
Base Level	F	6353.536 nT
Base Slope	F	-0.099217 nT/m
Base Curvature	X	0 nT/m ²

(F-fitted, X-fixed, L-limit)

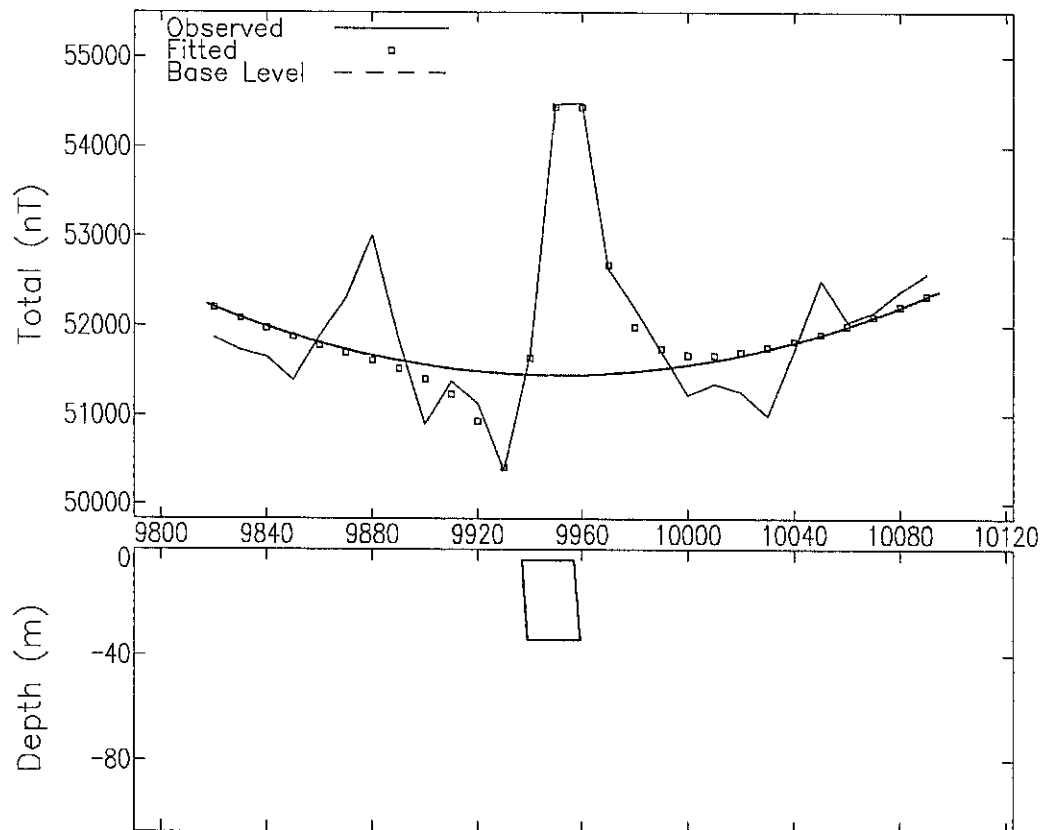
GEOMAGNETIC FIELD:

Field Strength	53000 nT
Inclination	-56 deg
Declination	4 deg

COORDINATES:

Sensor Height	30 m
Strike Perp	300 deg
Line Direction	120 deg
Main Direction	120 deg
Main Offset	
Cross Direction	30 deg
Cross Offset	

MORDOR GOSSAN - GROUND MAGNETIC MODEL LINE 1100E



MODEL PARAMETERS:

Model Type	L	Tabular2
Depth	F	4.11 m
Half Width	F	10.00 m
Half Length	X	13.0 m
Offset	X	0 m
Dip	F	86 deg
Thickness	X	30.0 m
Susceptibility	F	0.0300 emu
Remnance Ratio	X	0
Remnance Incl	X	0 deg
Remnance Decl	X	0 deg
Main Position	F	9946.819 m
Cross Position	X	1100 m
Base Level	F	51451.38 nT
Base Slope	F	-0.2651873 nT/m
Base Curvature	X	0.0450 nT/m ²

(F-fitted, X-fixed, L-limit)

GEOMAGNETIC FIELD:

Field Strength	54000 nT
Inclination	-56 deg
Declination	5 deg

COORDINATES:

Sensor Height	3 m
Strike Perp	340 deg
Line Direction	340 deg
Main Direction	340 deg
Main Offset	
Cross Direction	70 deg
Cross Offset	

APPENDIX XIV

EL 9371 MORDOR POUND

Dipole-Dipole IP Results and Inversion Images

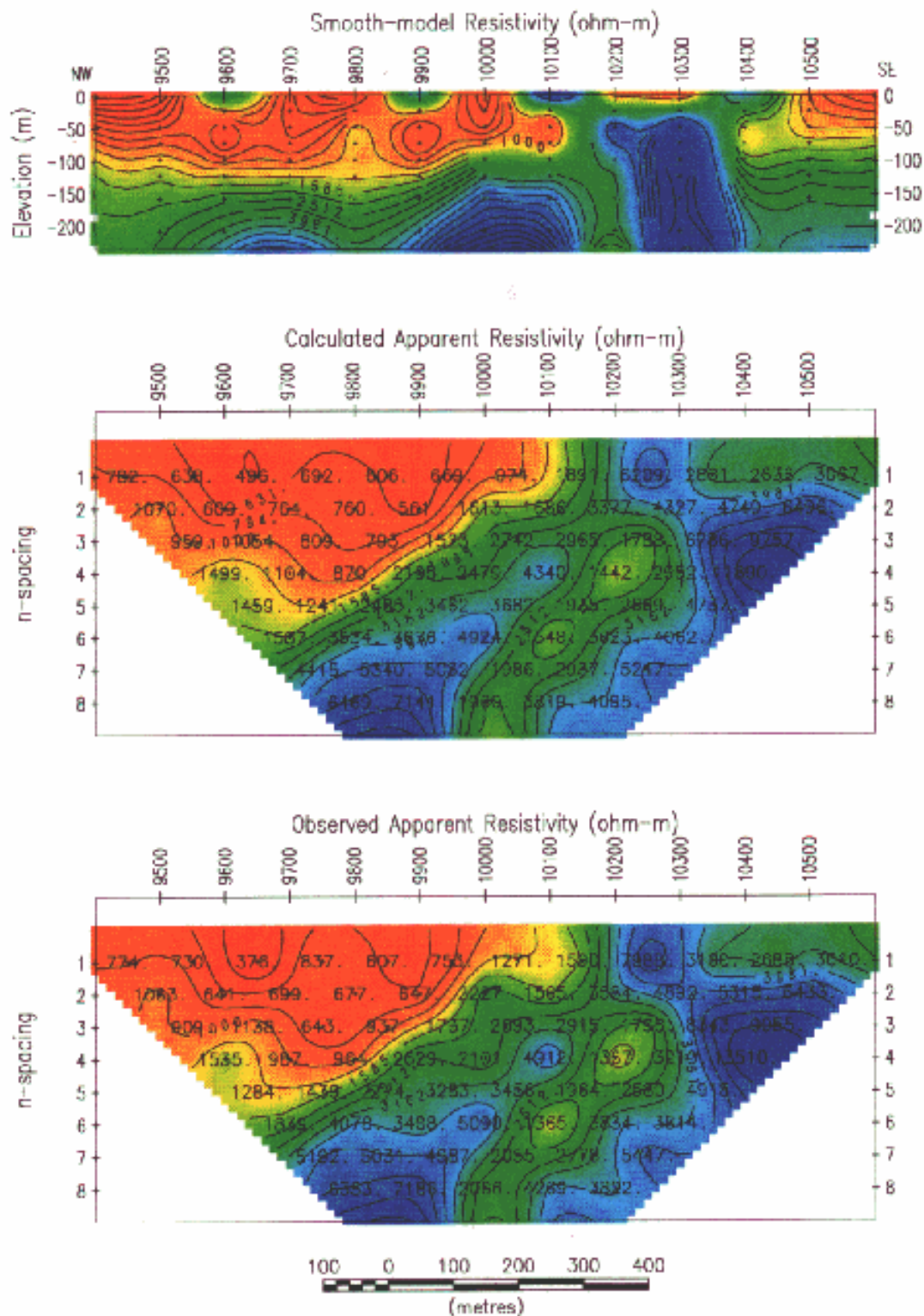


Figure 1.1 - Line 1 100 m a-spacing inversion results with equal weighting. Apparent resistivity parameter.

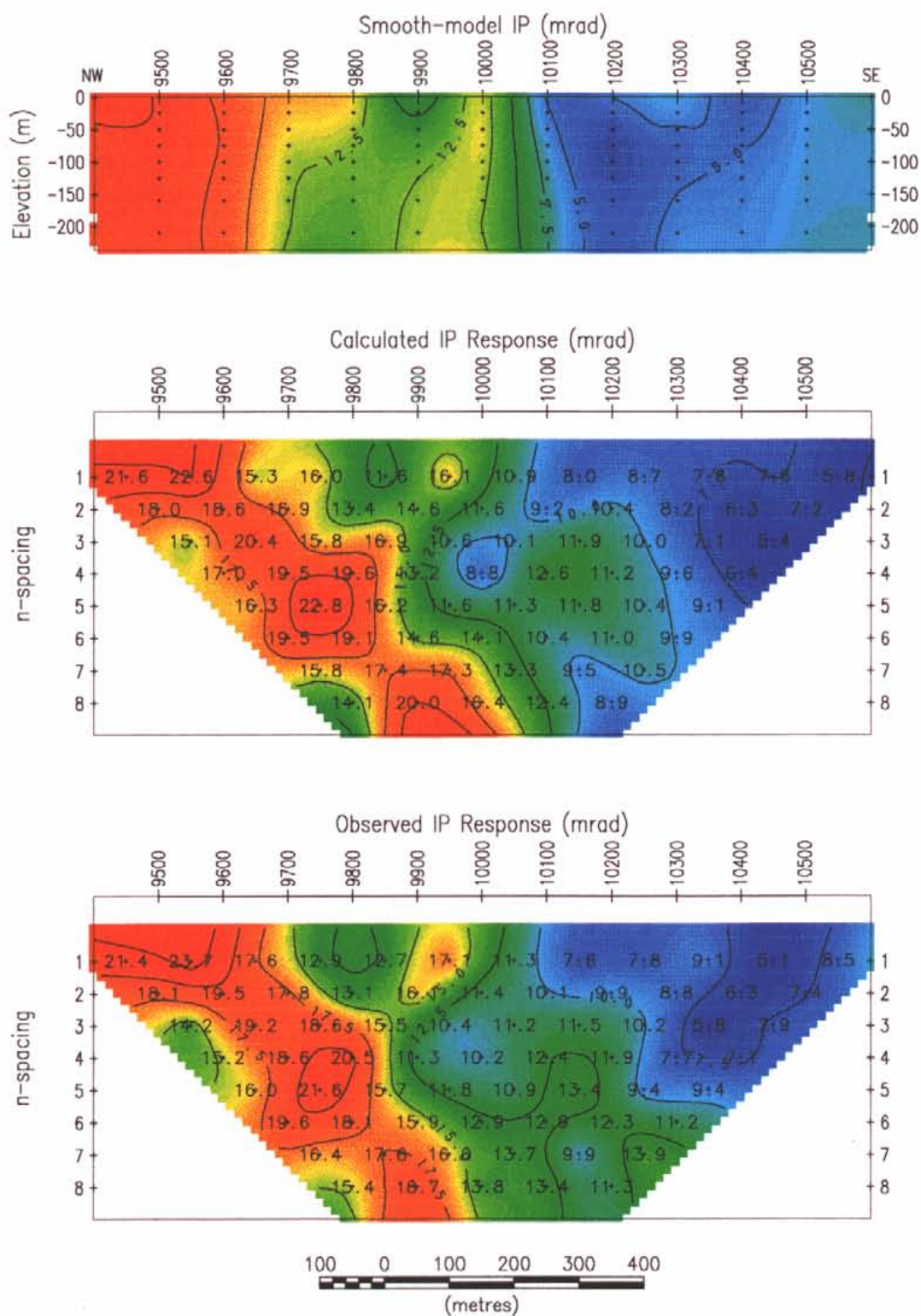


Figure 1.2 - Line 1 100 m a-spacing inversion results with equal weighting. Chargeability parameter.

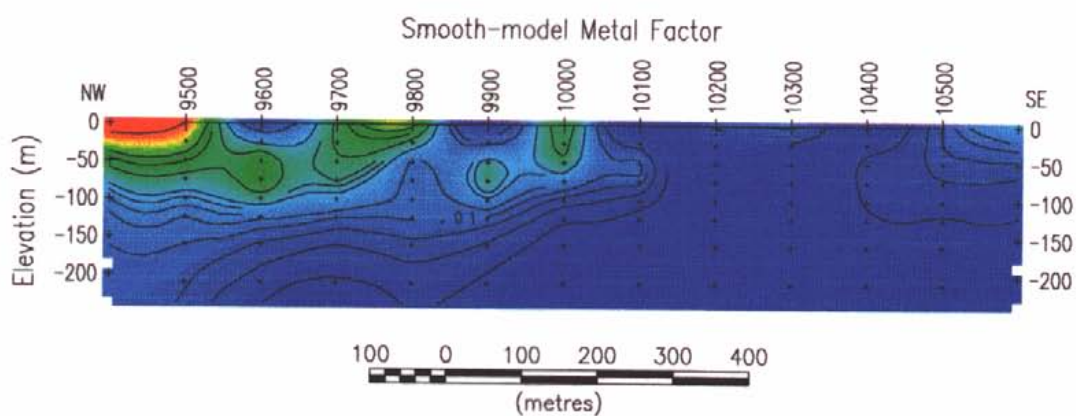


Figure 1.3 - Line 1 100 m a-spacing inversion results with equal weighting.
Metal Factor parameter.

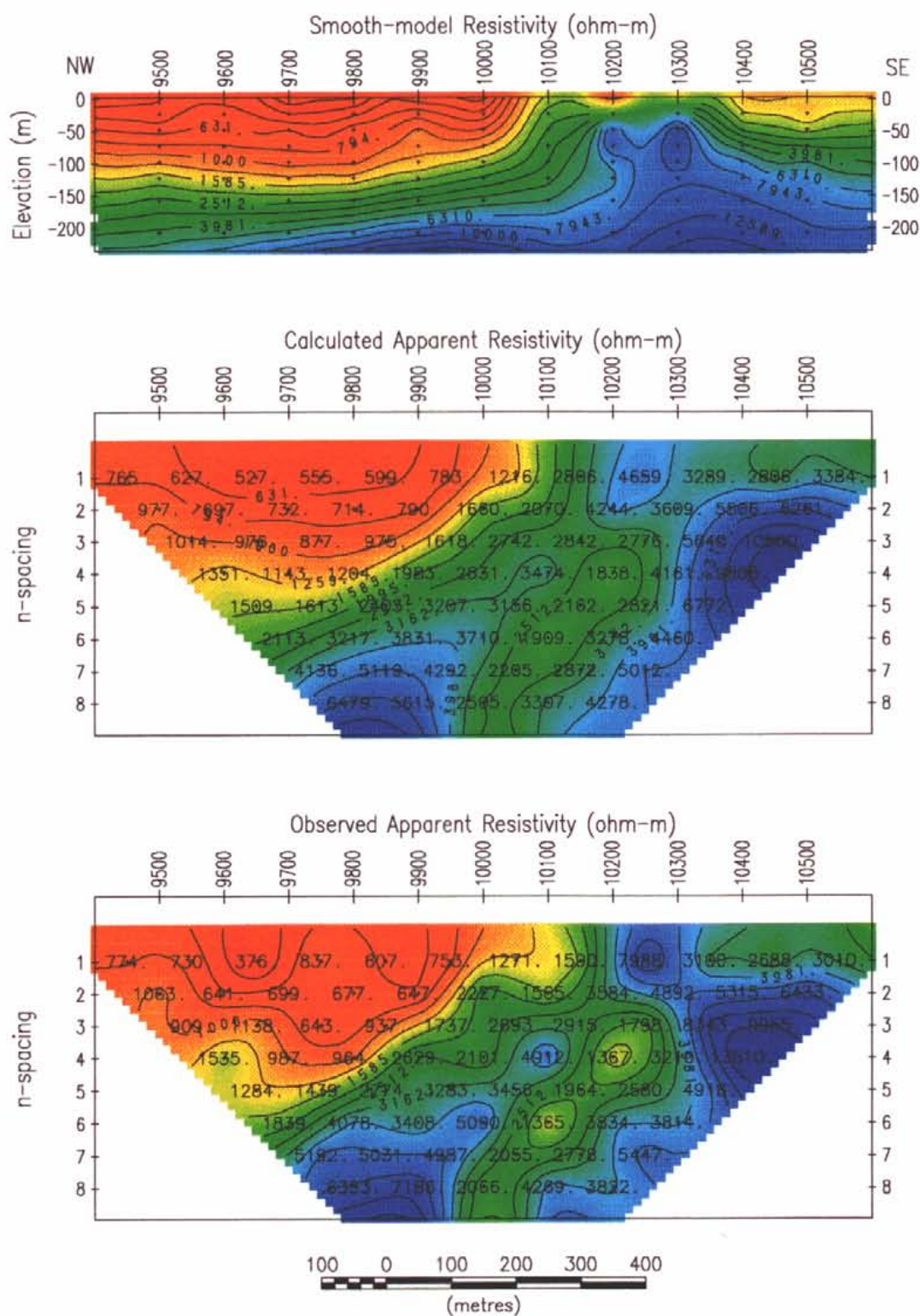


Figure 2.1 - Line 1 100 m a-spacing inversion results with vertical weighting. Apparent resistivity parameter.

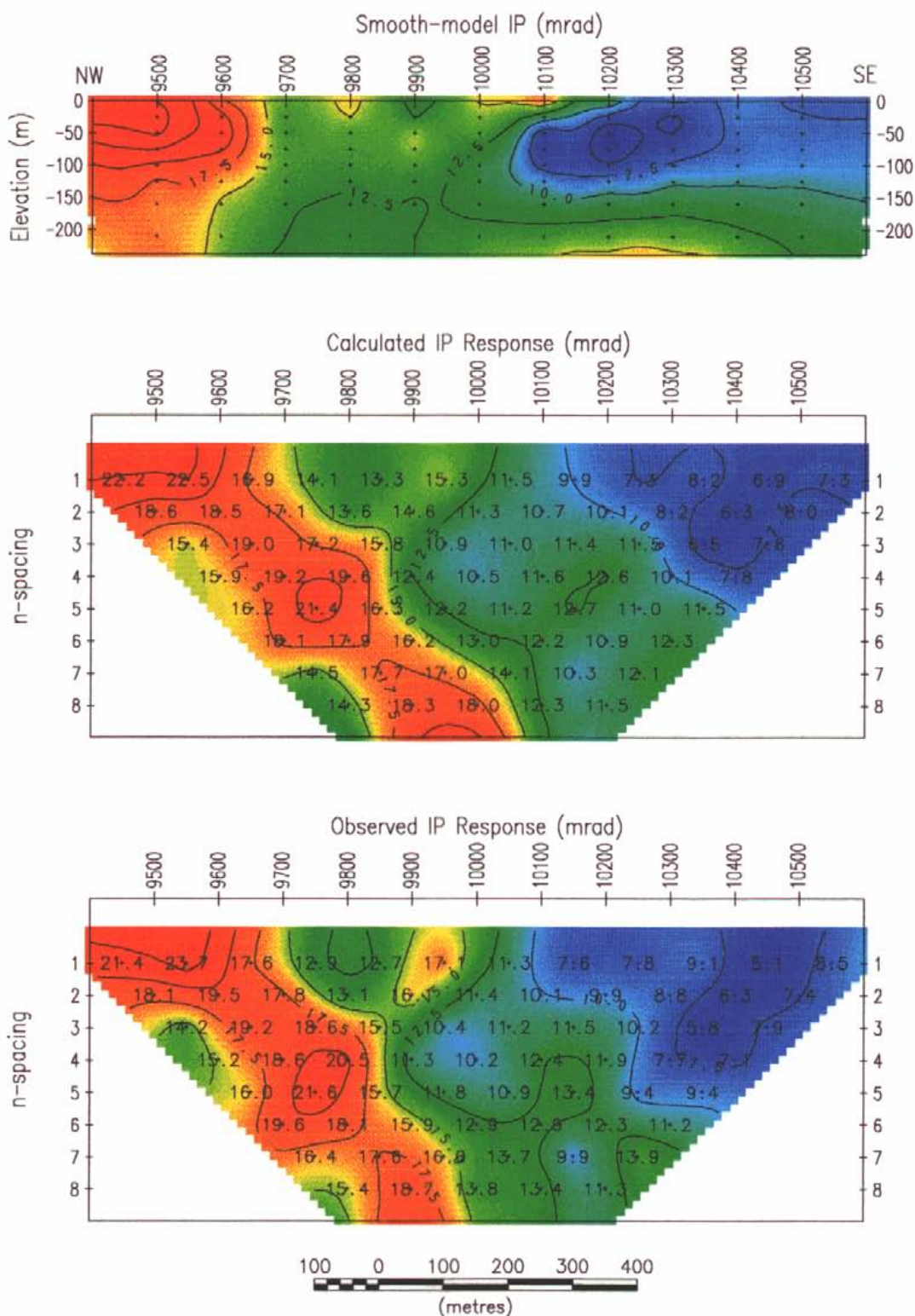


Figure 2.2 - Line 1 100 m a-spacing inversion results with vertical weighting. Chargeability parameter.

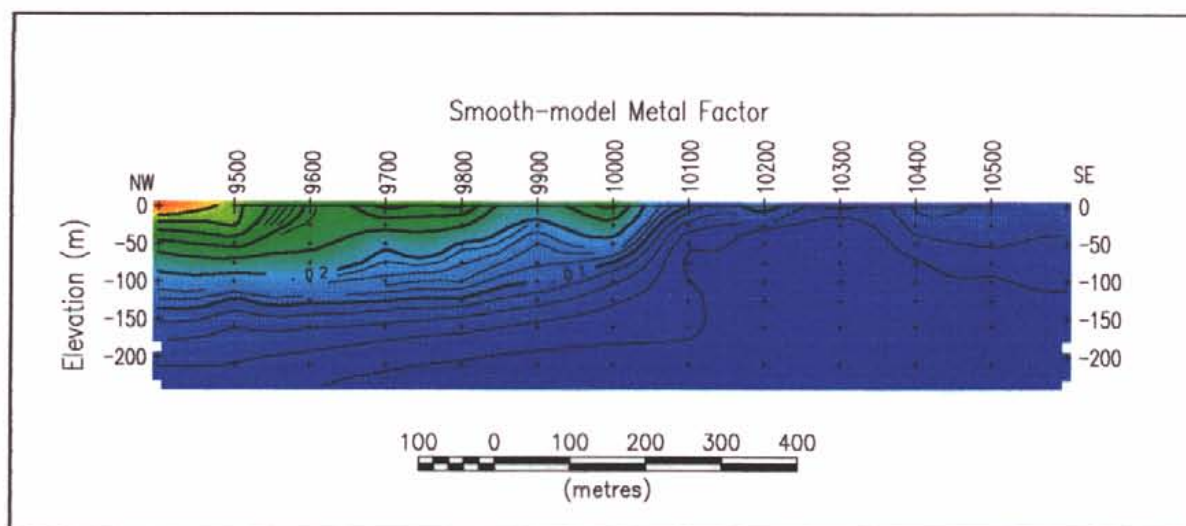


Figure 2.3 - Line 1 100 m a-spacing inversion results with vertical weighting.
Metal Factor parameter.

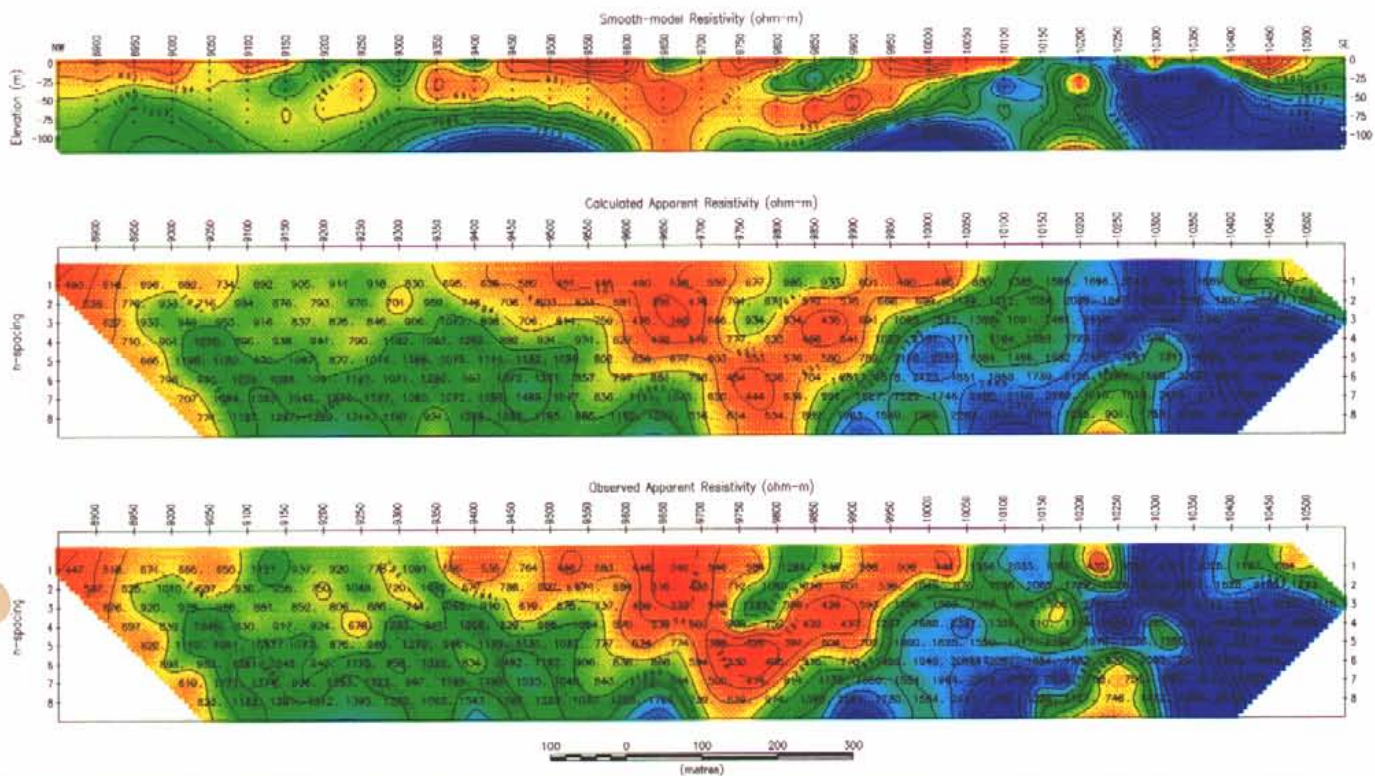


Figure 3.1 - Line 1 50 m a-spacing inversion results with equal weighting. Apparent resistivity parameter.

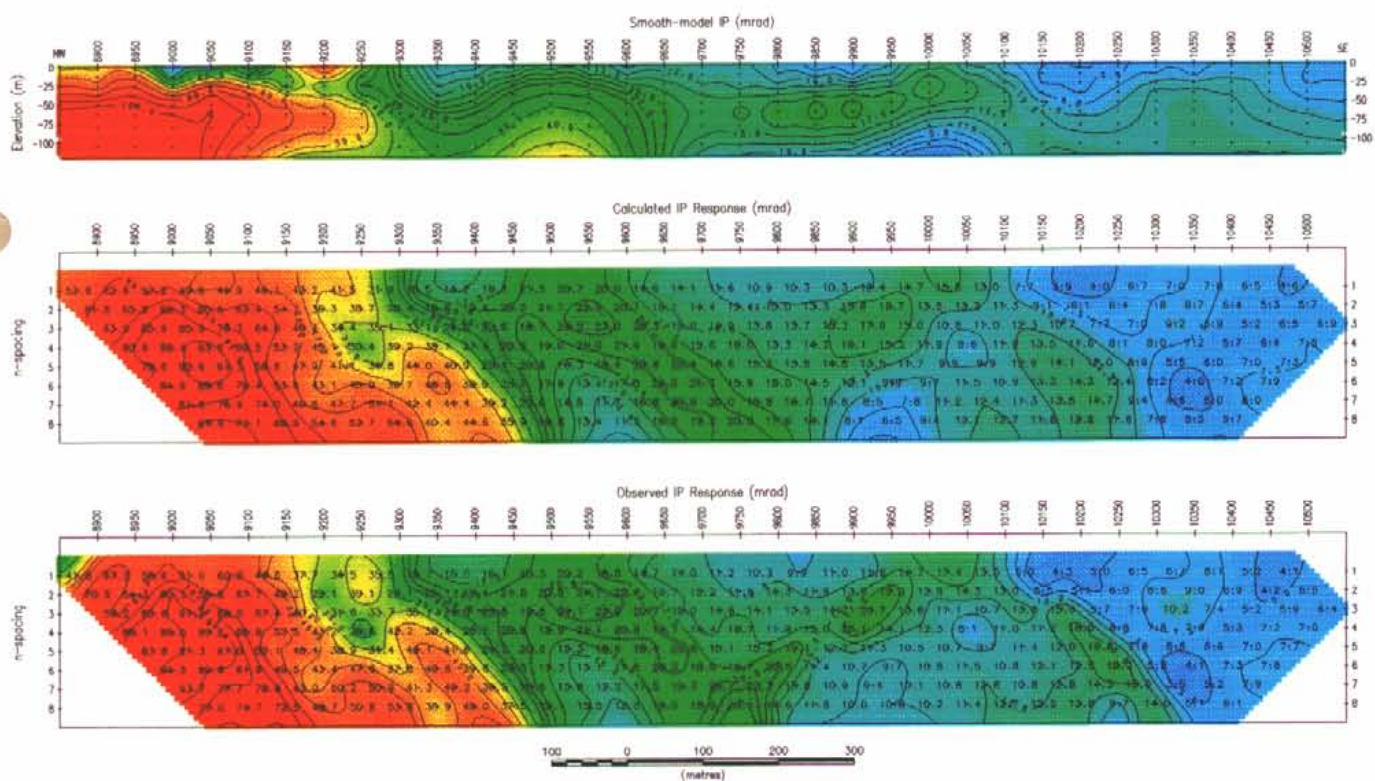


Figure 3.2 - Line 1 50 m a-spacing inversion results with equal weighting. Chargeability parameter.

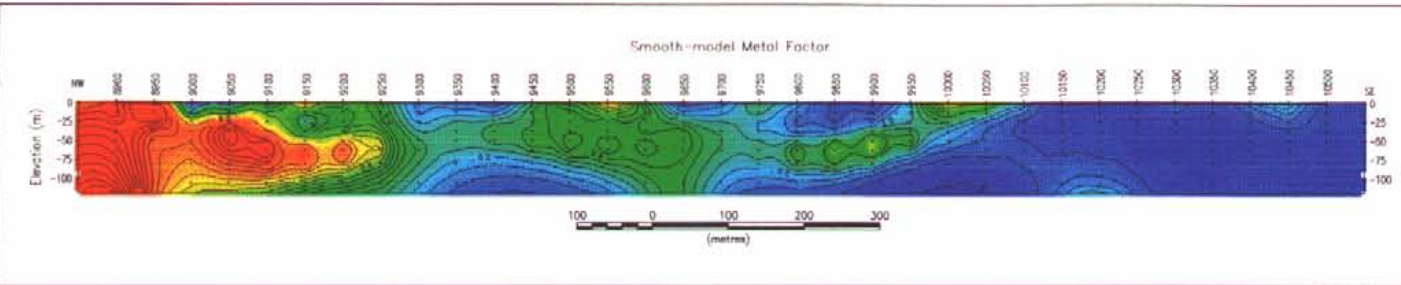


Figure 3.3 - Line 1 50 m a-spacing inversion results with equal weighting.
Metal Factor parameter.

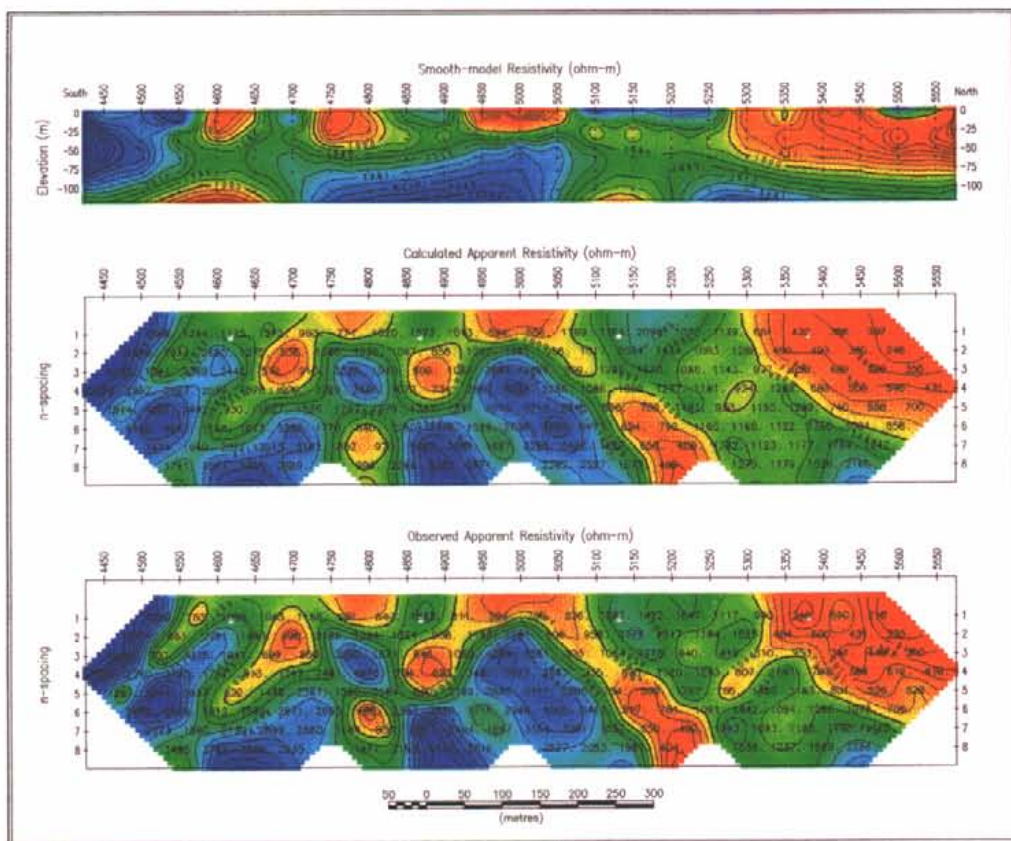


Figure 4.1 - Line 446300 mE inversion results with equal weighting. Apparent resistivity parameter.

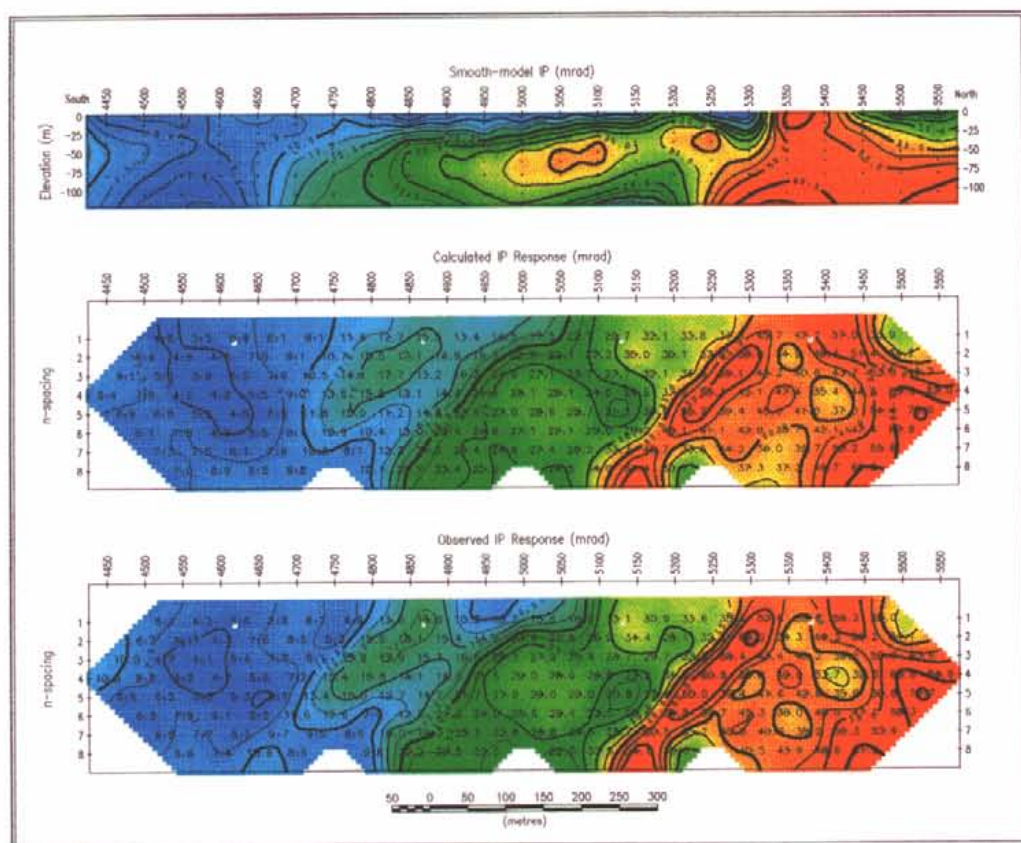


Figure 4.2 - Line 446300 mE inversion results with equal weighting. Chargeability parameter.

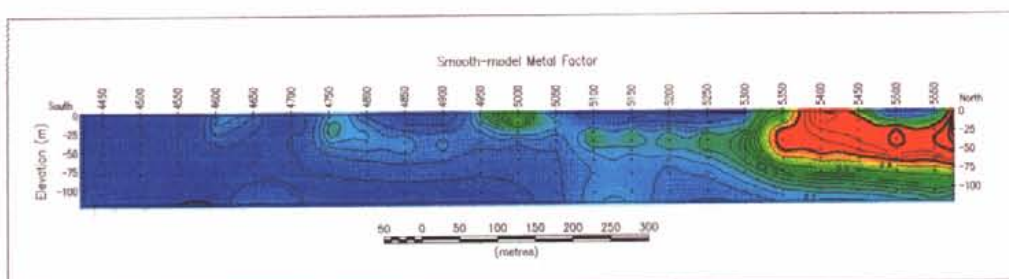


Figure 4.3 - Line 446300 mE inversion results with equal weighting.
Metal Factor parameter.

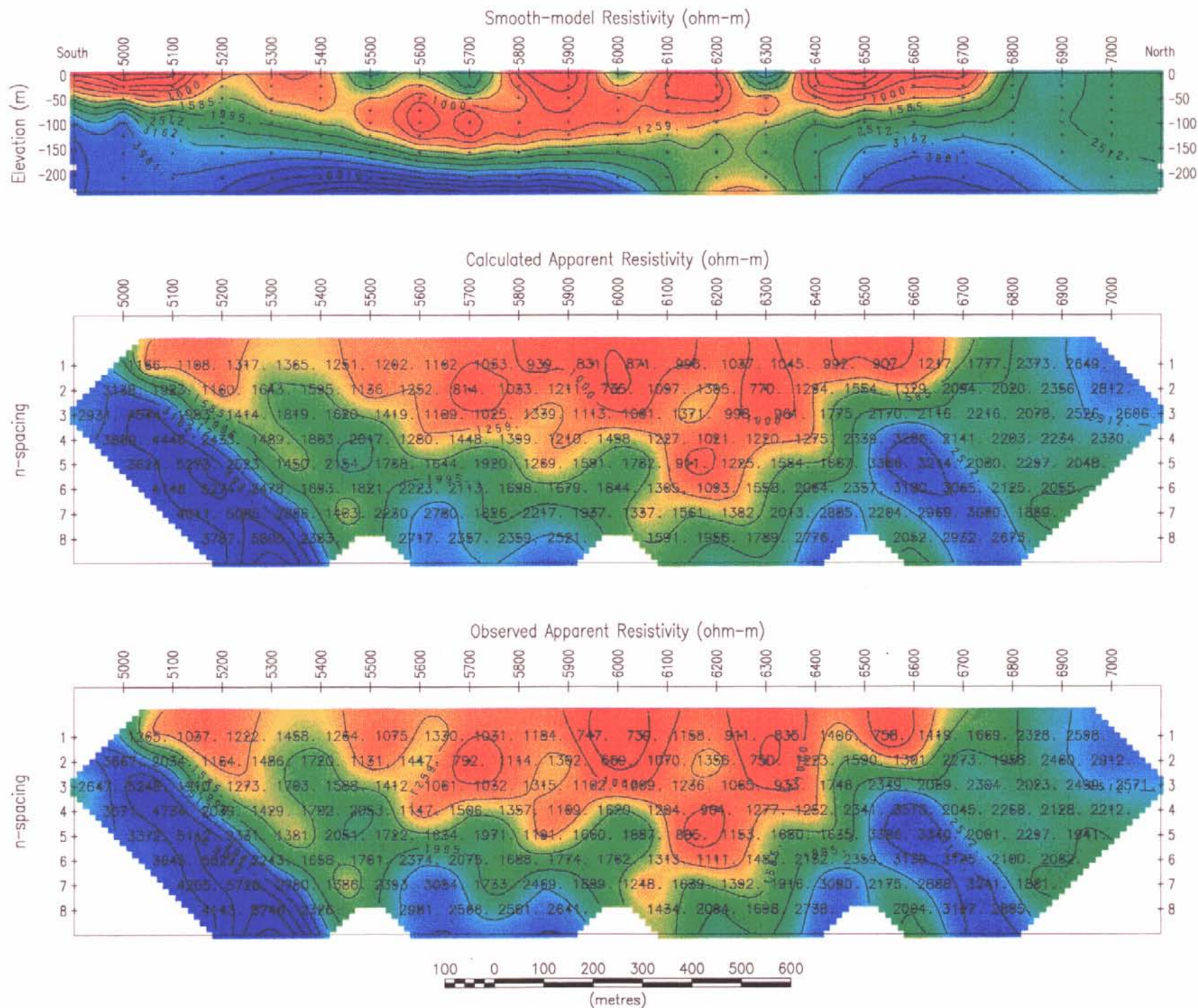


Figure 5.1 - Line 447000 mE inversion results with equal weighting.
Apparent resistivity parameter.

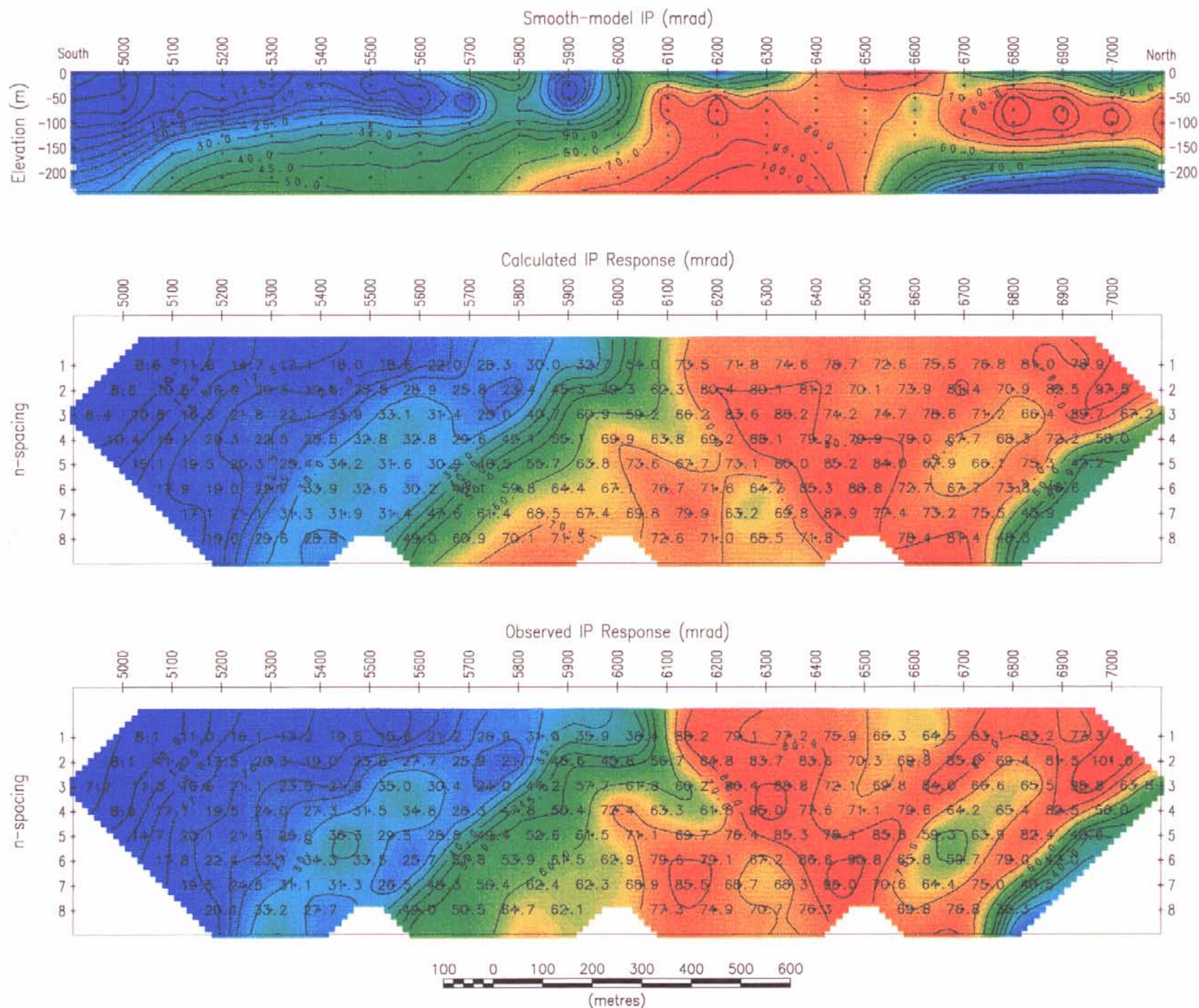


Figure 5.2 - Line 447000 mE inversion results with equal weighting.
Chargeability parameter.

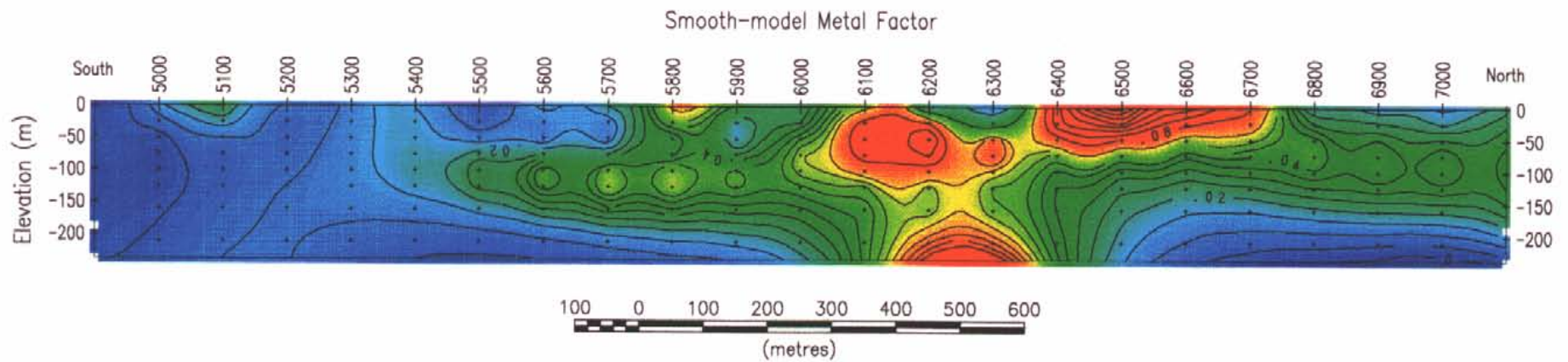


Figure 5.3 - Line 447000 mE inversion result with equal weighting.
Metal Factor parameter.

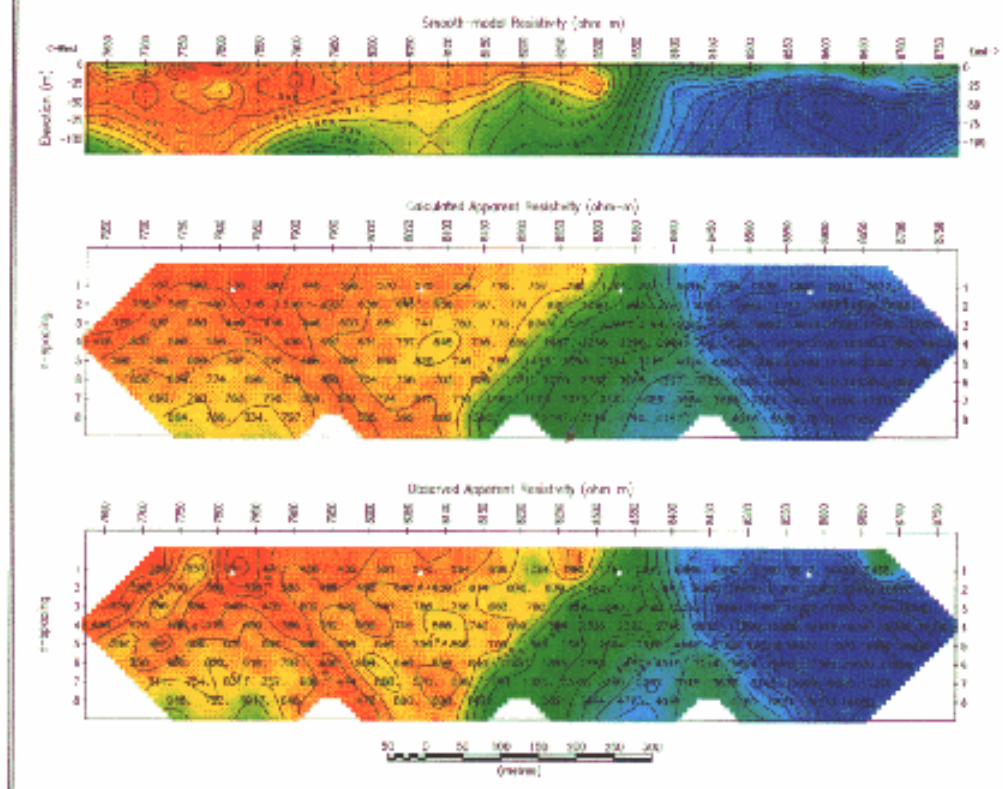


Figure 6.1 - Linc 7406500 mE inversion results with equal weighting. Apparent resistivity parameter.

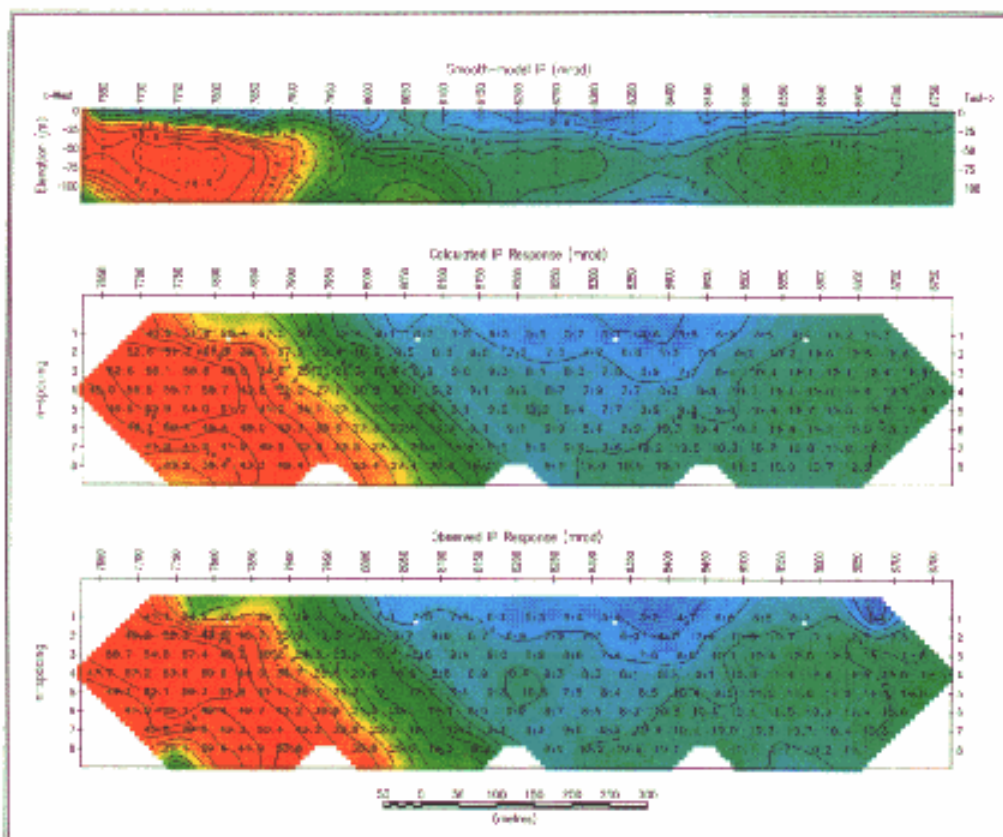


Figure 6.2 - Linc 7406500 mE inversion results with equal weighting. Chargeability parameter.

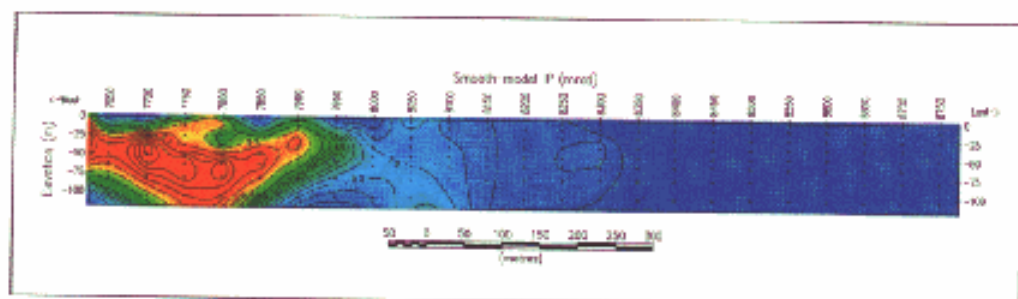


Figure 6.3 - Line 7406500 mE inversion results with equal weighting.
Metal Factor parameter.

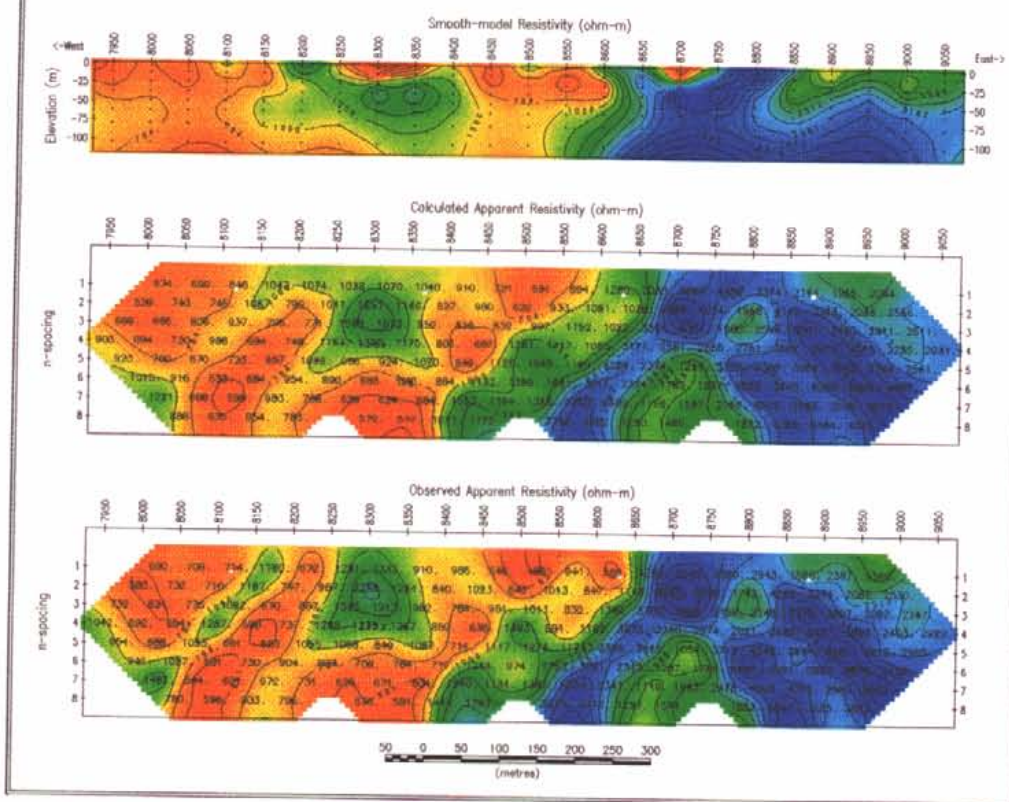


Figure 7.1 - Line 7407800 mE inversion results with equal weighting. Apparent resistivity parameter.

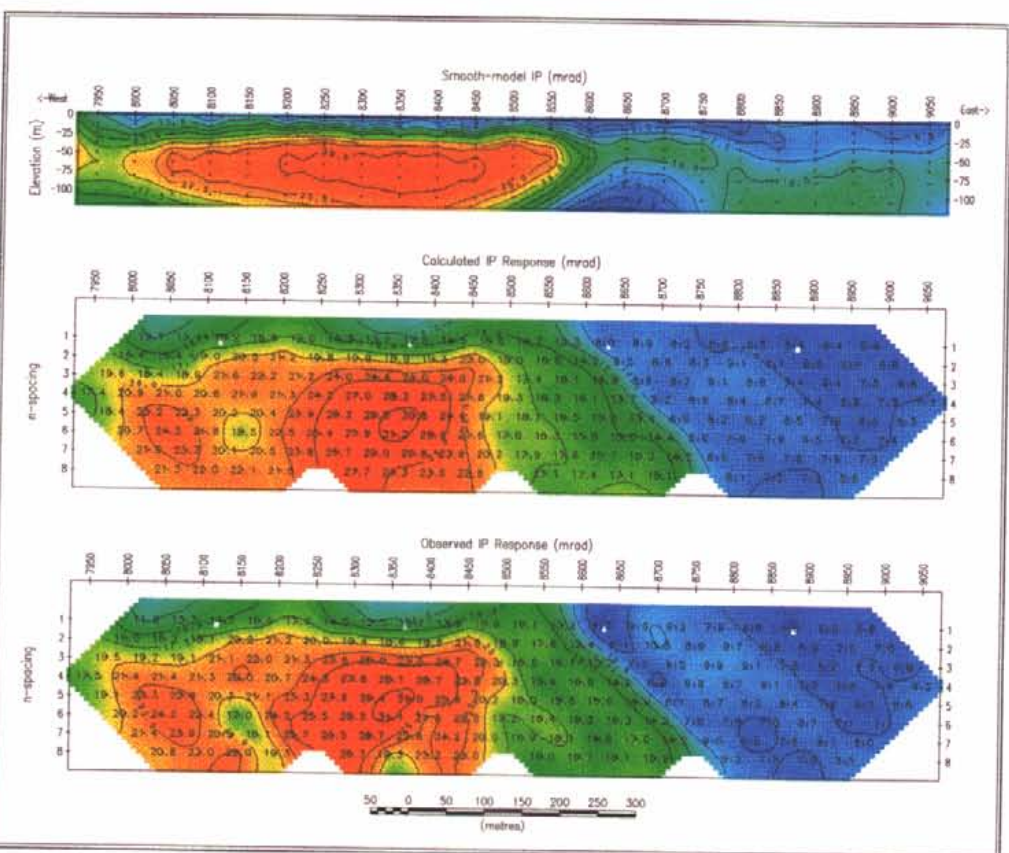


Figure 7.2 - Line 7407800 mE inversion results with equal weighting. Chargeability parameter.

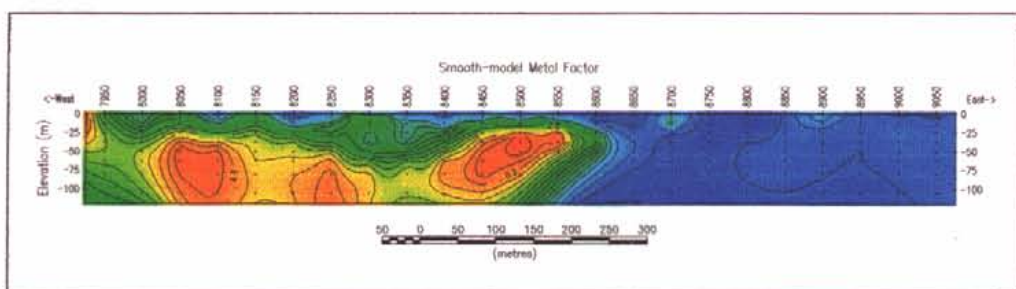
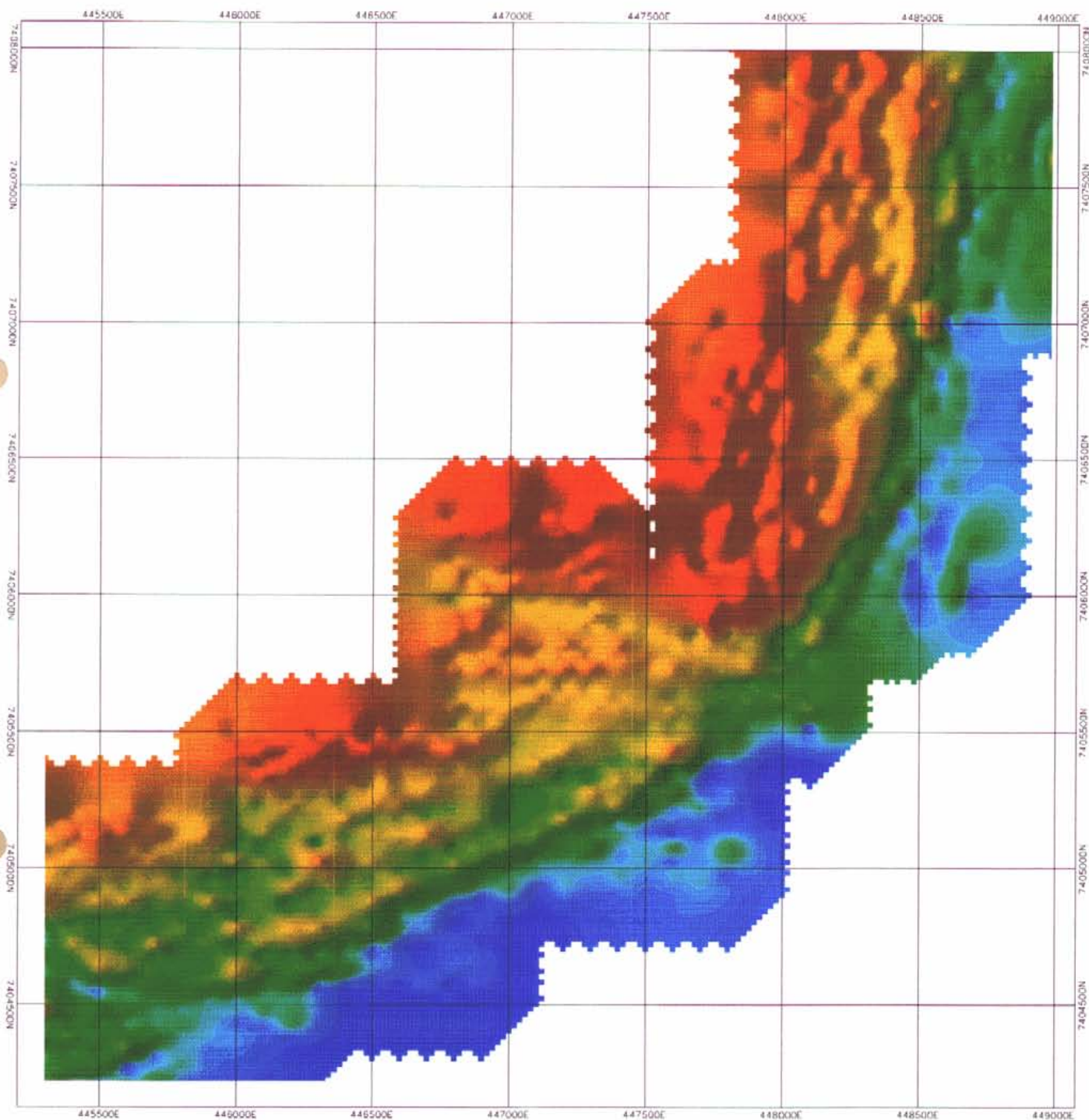


Figure 7.3 - Line 7407800 mE inversion results with equal weighting. Metal Factor parameter.

APPENDIX XV

EL 9371 MORDOR POUND

Composite Gradient Array IP Images



EQUIPMENT SPECIFICATIONS

Transmitter : GGT-25kVA
Receiver : GDP-16 channel
Tx Electrodes : Foil in 2m pits
Rx Electrodes : Ceramic CuSO Pota

SURVEY SPECIFICATIONS

Line Direction : N-S and E-W
Line Spacing : 100 metres
Station Spacing : 50 metres
Tx Spacing : 2000 metres (grid centred)
Tx Current : 3 to 6 Amps
Tx Base Frequency : 0.125 Hz
Method : Standard Zonge Gradient IP
Data : Non-reference Complex Resistivity



Scale 1:10000
100 0 100 200 300 400 500 600 700
(metres)



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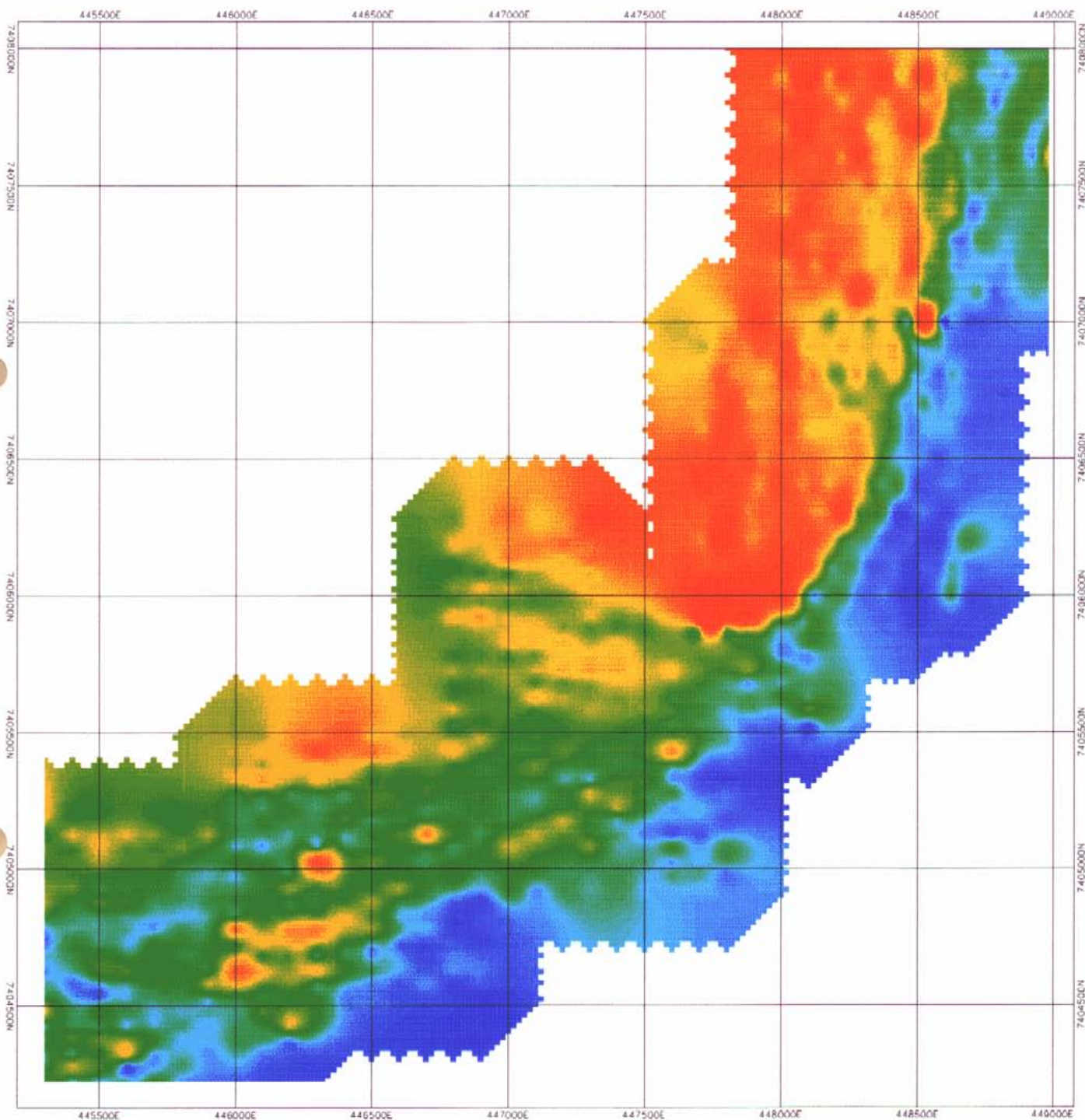
EL 9371 MORDOR POUND
INDUCED POLARISATION
GRADIENT ARRAY
METAL FACTOR

REFERENCE ALICE SPRINGS SF 53-14

SCALE	1:10,000	DATE	22nd November 1996
AUTHOR	Angus McCoy	REPORT	22570
DRAWN	Angus McCoy	PLANS	

CONTRACTOR : ZONGE ENGINEERING

Survey Date : October 1996



EQUIPMENT SPECIFICATIONS

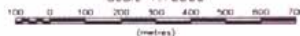
Transmitter : OGT-25kVA
 Receiver : GDP-16 channel
 Tx Electrodes : Foil in 2m pits
 Rx Electrodes : Ceramic CuSO Pots

SURVEY SPECIFICATIONS

Line Direction : N-S and E-W
 Line Spacing : 100 metres
 Station Spacing : 50 metres
 Tx Spacing : 2000 metres (grid centred)
 Tx Current : 3 to 6 Amps
 Tx Base Frequency : 0.125 Hz
 Method : Standard Zonge Gradient IP
 Data : Non-reference Complex Resistivity



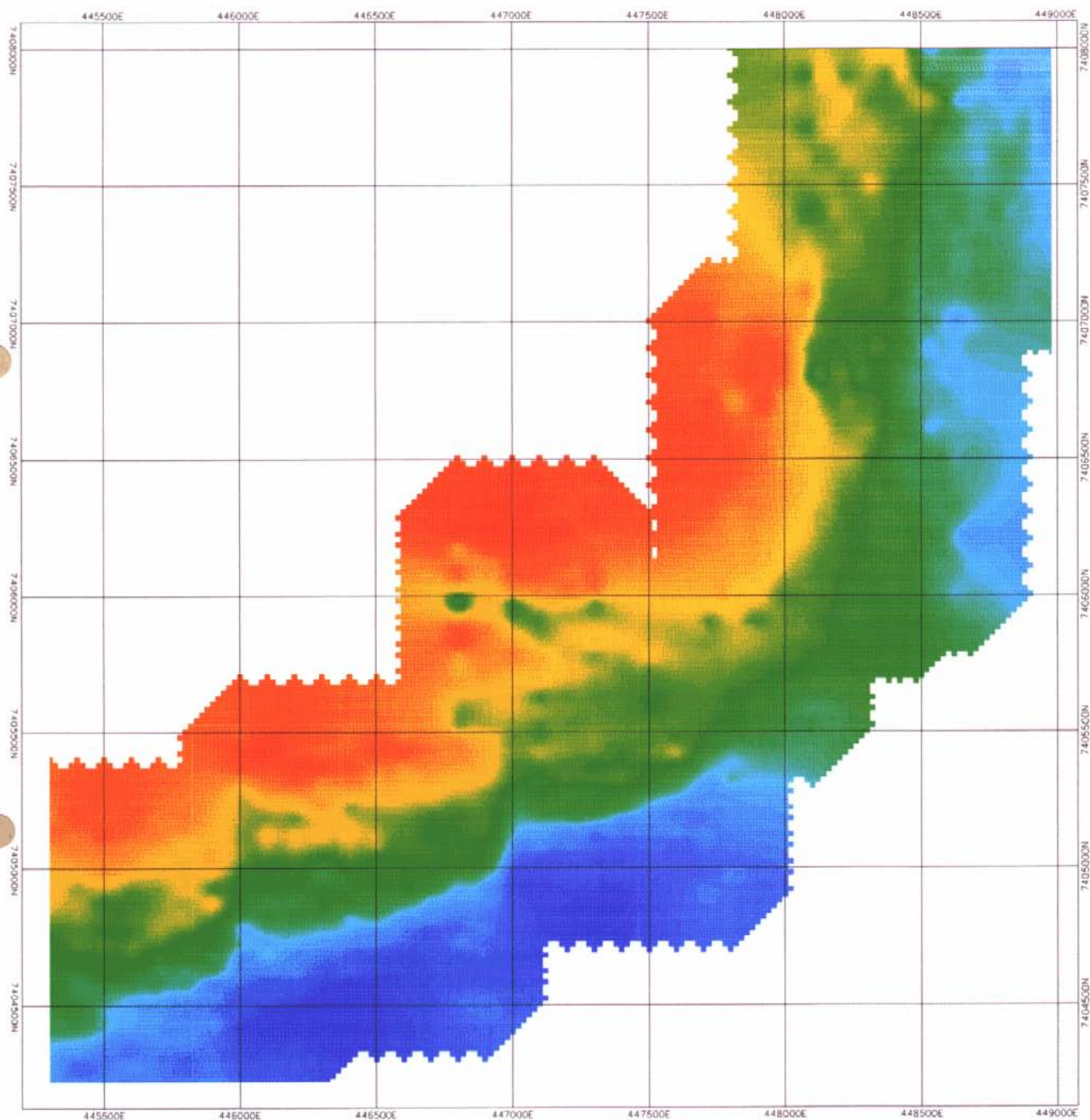
Scale 1:10000



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EL 9371 MORDOR POUND
 INDUCED POLARISATION
 GRADIENT ARRAY
 APPARENT CONDUCTIVITY

REFERENCE	ALICE SPRINGS SF 53-14	DATE	22nd November 1996
SCALE	1:10,000	AUTHOR	Angus McCoy
		REPORT	22576



EQUIPMENT SPECIFICATIONS

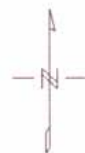
Transmitter : GGT-25kVA
Receiver : GDP-16 channel
Tx Electrodes : Foil in 2m pits
Rx Electrodes : Ceramic CuSO Pots

SURVEY SPECIFICATIONS

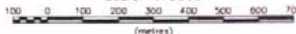
Line Direction : N-S and E-W
Line Spacing : 100 metres
Station Spacing : 50 metres
Tx Spacing : 2000 metres (grid centred)
Tx Current : 3 to 6 Amps
Tx Base Frequency : 0.125 Hz
Method : Standard Zonge Gradient IP
Data : Non-reference Complex Resistivity

CONTRACTOR : ZONGE ENGINEERING

Survey Date : October 1996



Scale 1:10000



CRA EXPLORATION PTY LIMITED

EL 9371 MORDOR POUND
INDUCED POLARISATION
GRADIENT ARRAY
CHARGEABILITY

REFERENCE		ALICE SPRINGS SF 53-14	
SCALE	1:10,000	DATE	22nd November 1996
AUTHOR	Angus McCoy	REPORT	22570
DRAWN	Angus McCoy	PLAN No	

APPENDIX XVI

EL 9371 MORDOR POUND

Petrophysical Measurement Results

**PETROPHYSICAL RESULTS
MEASURED LABORATORY DATA**

*Systems Exploration (NSW)
Pty Limited*

Postal Address: Box 6001
Dural Delivery Centre
NSW 2158

Telephone: (045) 791 183
Fax: (045) 791 290
email: systems@pnc.com.au

**Induced Polarisation Data
Time Domain System**

STUDY:	CRAE Pty Ltd	(Project #9661)
DATE	17 September 1996	AREA: not specified
REFERENCE:	A McCoy	P.O. No. L13134
METHODS: Four electrode water bath, Pt/Pt potential electrodes High input impedance preamplifier and probe tips Current ON/OFF : 2 secs Decay recorded digitally with voltage integration. 450-1150 msecs Samples vacuum saturated with 0.25g/l NaCl solution ($\rho_w 20 \Omega m$, 25°C) Sample surface treated with silicone sealant to minimise surface conduction See accompanying notes Ten (10) variably mineralised shonkinites		

Important Note: These petrophysical data results relate to laboratory measurements on small samples. The extrapolation of these results to large masses of in situ material should take account of sampling statistics, rock texture, structure (e.g. jointing) and other relevant variables e.g. water saturation in electrical studies.

PETROPHYSICS STUDIES

Physical Characterisation Studies of Rocks, Ores, Concretes, Unconsolidated and Weathered Materials, Soils and Minerals from a variety of geological environments carried out by arrangement. Drill core, full or split, drill cuttings and bulk specimens can be handled

- 1 Sample preparation: Cleaning, trimming, blocking, coring, silicone potting.
- 2 Mass properties: Dry bulk density, Apparent Porosity (vacuum saturation), Total Porosity, Grain Density, Air Permeability, Helium and Mercury Injection Porosities, Capillary pressure (mercury), Overburden cell facility for porosity and permeability. Fracture studies.
- 3 Magnetic Susceptibility: Bulk k , dual frequency - 0.43 & 4.3 kHz, grain size studies.
Anisotropic k - k_1, k_2, k_3
- 4 Remanent Magnetization: low NRM - I, D, I and subsequent AF demagnetization, Koenigsberger Ratio.
- 5 Thermomagnetic Properties: Curie point, etc. - by arrangement.
- 6 Electrical properties at specified fluid saturations:
 - (a) Complex resistivity: frequency: 1 mHz - 10 kHz, 4-electrode method; higher frequencies by 2 electrode method. PTH, phase to 1 milliradian
 - (b) Electrical resistivity and phase: galvanic, 2 electrode, 100Hz to 100 megaHz, bridge techniques.
 - (c) Time domain studies: Decay curve, chargeability, DC resistivity
 - (d) Inductive (EM) Conductivity: inductive, non contact, 100 kHz and 2.5 MHz. Heterogeneity Effects - Inductive and galvanic measurement comparison
 - (e) Groundwater Conductivity and pH.
 - (f) Non-Linearity studies: Harmonic, Hilbert, amplitude
- 7 Dielectric Constant (Permittivity): in vacuo tests lossy rocks at low (audio) frequencies and high frequencies, 100 Hz to 100 megaHz.
- 8 Thermal Conductivity, comparator system - steady state axial gradients. Thermal Diffusivity.
- 9 Acoustic (ultrasonic) velocity: V_p 63 kHz, 200 kHz, 500 kHz, 1 MHz; V_s 33 kHz, 100 kHz, 500 kHz, 1 MHz; Dynamic Elastic Constants from (9) and (2). Velocities measured under variable uniaxial load.
- 10 Nuclear properties: K, U, Th (lead castle).
- 11 Fluorescence studies: by special arrangement.
- 12 Mechanical properties: unconfined compression and point load tests.
- 13 High Pressure / Temperature measurements: by special arrangement.
- 14 Anisotropy studies: physical property tensor determination: electrical, thermal conductivities; permeability.
- 15 Effects of pollutants on physical properties. Environmental Studies.
- 16 Commentary and / or interpretation of results and relation to Petrology and Structure.
- 17 Field calibration studies and in situ checks.
- 18 Applied research on specific aspects of physical properties of rocks and their implications for field studies.

Some of this work may be done in conjunction with other organisations and laboratories.

contact : D.W. EMERSON BE MSc PhD FAusIMM FAIG Hon Member ASEG.
BOX 6001, Dural Delivery Centre, NSW, 2158.
Phone : (045) 791 183, Facsimile : (045) 791 290

SYSTEMS EXPLORATION (NSW) PTY LIMITED										Data Sheet 1 of 1		
Postal Address Box 6001 Dural Delivery Centre NSW 2158 Telephone (045) 791 183 Fax (045) 791 290										Date 17 September 1996 (Project #9661)		
STUDY CRAE mass magnetic electrical em TECHNIQUES REFERENCE A McCoy (ONo L13134)												
PHYSICAL PROPERTIES												
SAMPLES		subsamples						subsamples				
		dry bulk		apparent		mag k		NRM		Qn		
		density		porosity		cgx10 ⁻⁴		J _{NRM}		K. Ratio		
		DBD		P _A		(for SI x		μG		J _{NRM}		
		g/cm ³		percent		by 4π)		(mA/m si)		J _{IND}		
		t/m ³		subsamples		(av. & approx.		core axis)				
		(whole				whole core)						
		core)										
split core		apparent		density		g/cm ³		lithology		depth		
#		density		g/cm ³		msec		EM		galv. res		
		induced		conduct		Ωm		sat		pbc		
		450-1150		comments								
1	MO1-1	120.30	2.69	2.65	0.01	(5000)	606	0.6	23783	<0.1	14665	9
2	MO1-2	65.95	2.97	2.91	0.04	(190)	70	0.1	1531	<0.1	711	18
3	MO1-3	64.38	2.84	2.83	0.04	(1600)	1121	0.4	1119	<0.1	347	17
4	MO1-4	48.91	2.88	2.75	0.01	(6000)	861 low S ⁺		1863	<0.1	1157	35
5	MO2-1	80.12	3.99	3.12	0.02	(7100)	3806		0.013	600 (central zone)	8*	58
6	MO2-2	73.75	3.13	3.12	0.02	(1900)	597		3761	<0.1	1365	13
7	MO2-3	80.90	3.33	3.23	0.02	(30500)	23810		76	~4 (hetero)	147*	78
8	MO2-4	100.65	2.96	3.02	0.03	(110)	70	0.2	5621	<0.1	2049	14
9	MO2-5	152.69	2.97	2.97	0.03	(110)	51		1311	<0.1	242	12
10	MO2-6	180.18	3.13	3.09	0.02	(5400)	5130		3378	<0.1	794	16
(some cores quite heterogeneous and this leads to variations in density mag k and texture effects in emσ)												
* these p's affected by term Z @ core ends - use (emσ) or galv dry p for intrinsic p												

SPECIMEN No. W.C. of Waterbath DATE:- 9/9/96

AREA = 20.1 sq. cms LENGTH = 7.43 cms

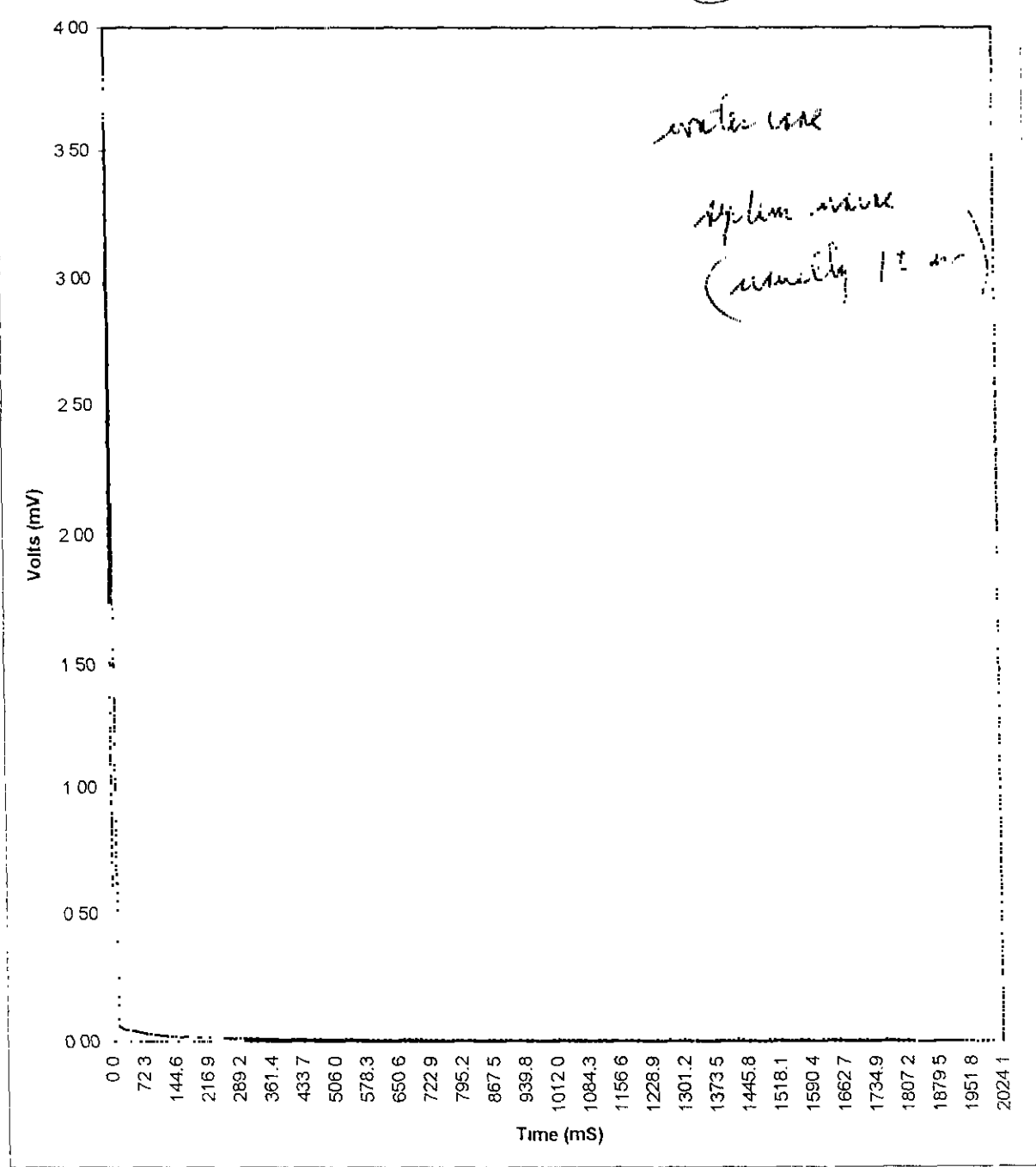
A/L = 2.71 cm+1

CURRENT I = 5 uA J Current Density = 2.49E-07 amp/cm2

ρ_{DC} = 20.56 Ω m 2.49E-03 amp/m2

ΔV Primary = 3.8 mV CHARGEABILITY M = 10.5 mV sec/ volt (msec)
(0 - 2000 ms)

Core ohms = 760 (450 - 1150 ms) 1.25 mV sec/ volt (msec)



SPECIMEN No. 1 of CRAE #9661 DATE:- 6/9/96

AREA = 14.2 sq. cms LENGTH = 11.58 cms

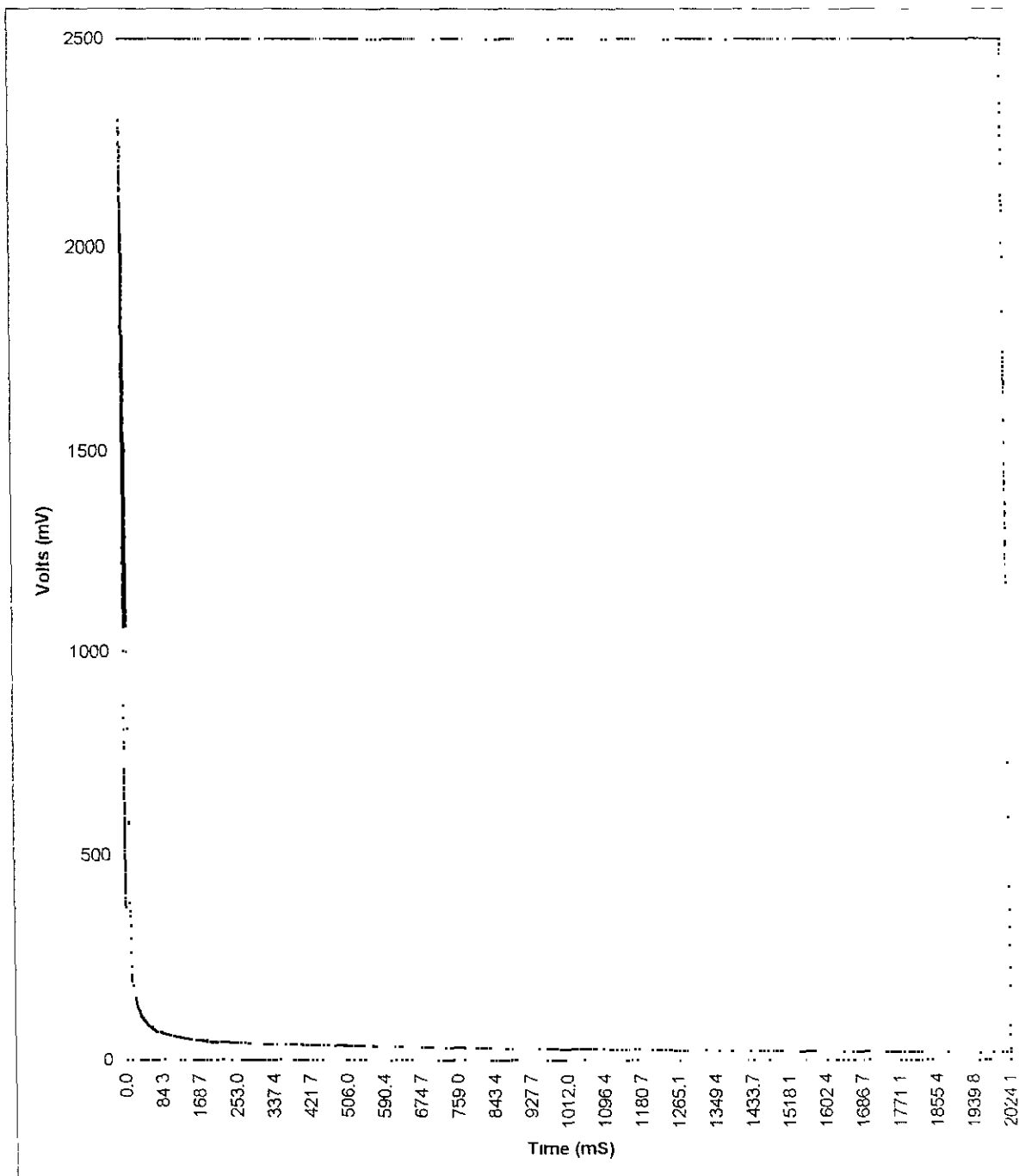
A/L = 1.23 cm+1

CURRENT I = 2 uA J Current Density = 1.41E-07 amp/cm2

ρ_{DC} = 14665.36 Ω m 1.41E-03 amp/m2

ΔV Primary = 2391.9 mV CHARGEABILITY M = 33.7 mV sec/ volt (msec)
(0 - 2000 ms)

Core ohms = 1195950 (450 - 1150 ms) 9.45 mV sec/ volt (msec)



CRAE1 661

SPECIMEN No. 2 of CRAE #9661 DATE:- 6/9/96

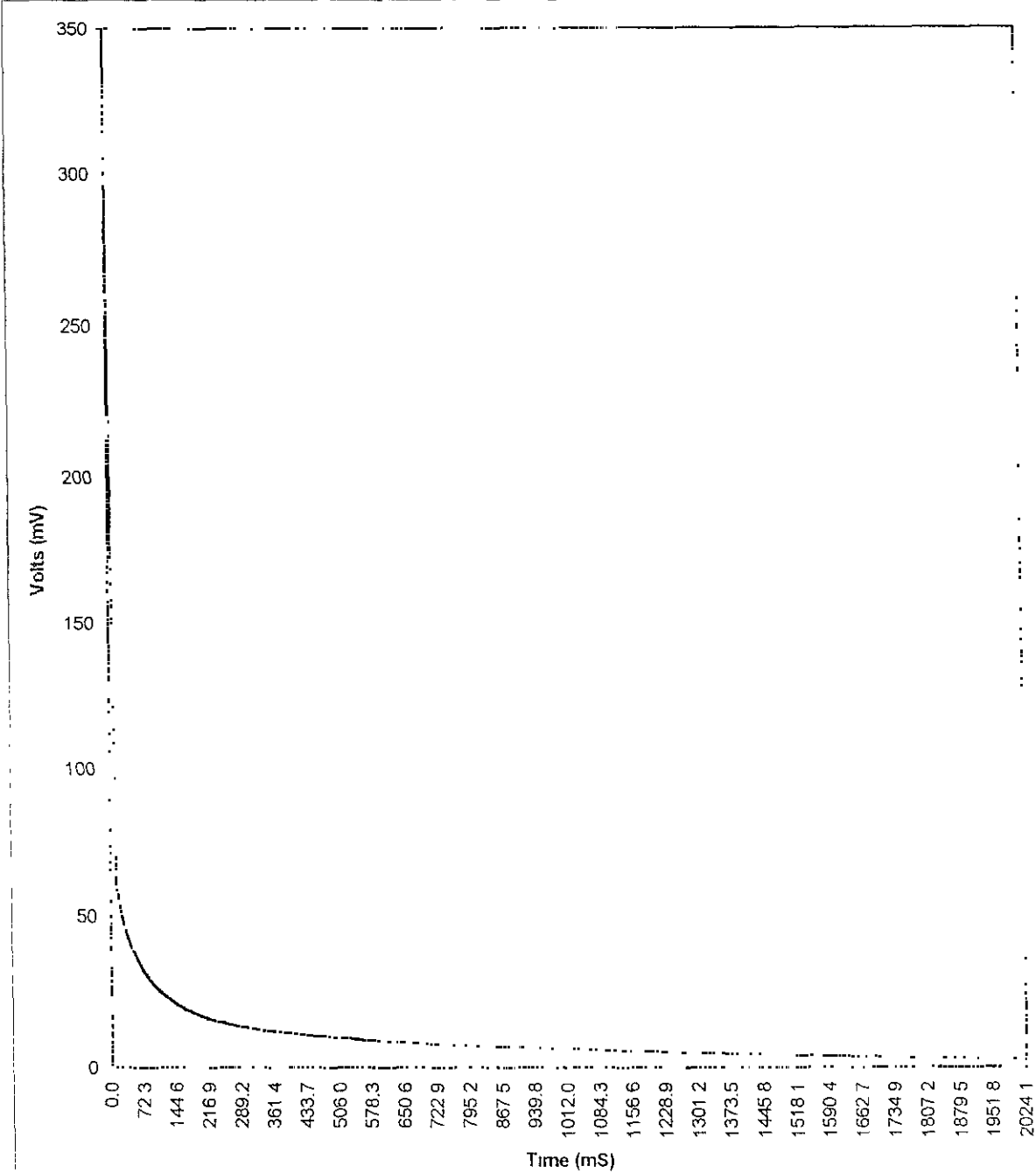
AREA = 14.2 sq. cms LENGTH = 12.29 cms
A/L = 1.16 cm+1

CURRENT I = 5 uA J Current Density = 3.52E-07 amp/cm2

ρ_{DC} = 710.81 Ω m 3.52E-03 amp/m2

ΔV Primary = 307.6 mV CHARGEABILITY M =
(0 - 2000 ms) 64.8 mV sec/ volt (msec)

Core ohms = 61520 (450 - 1150 ms) 18.35 mV sec/ volt (msec)



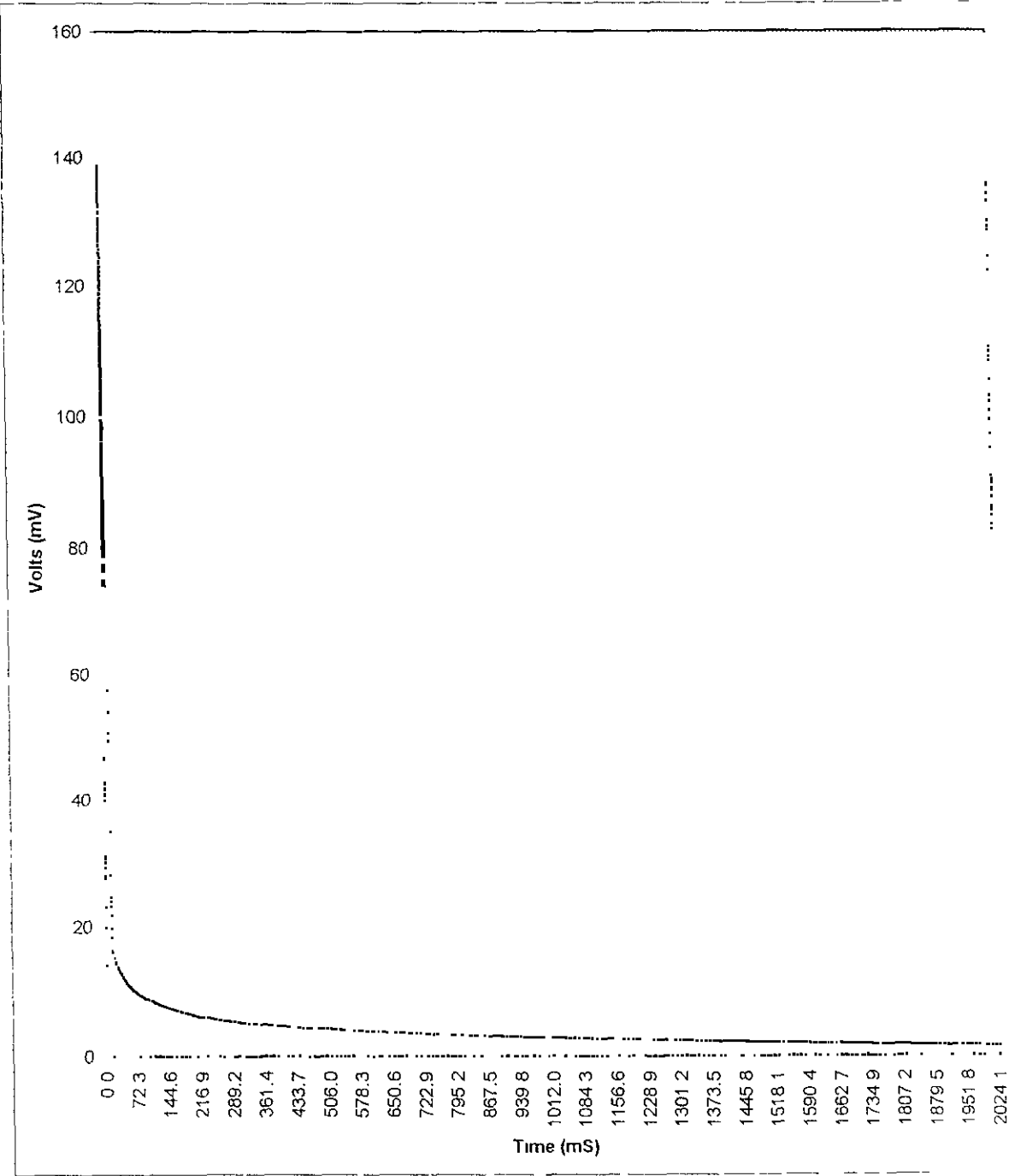
SPECIMEN No. 3 of CRAE #9661 DATE:- 6/9/96

AREA = 14.2 sq. cms LENGTH = 11.88 cms
A/L = 1.20 cm+1

CURRENT I = 5 uA J Current Density = 3.52E-07 amp/cm2

ρ_{DC} = 347.35 Ω m 3.52E-03 amp/m2

ΔV Primary = 145.3 mV CHARGEABILITY M =
(0 - 2000 ms) 55.8 mV sec/ volt (msec)
Core ohms = 29060 (450 - 1150 ms) 16.93 mV sec/ volt (msec)



SPECIMEN No. 4 of CRAE #9661 DATE:- 6/9/96

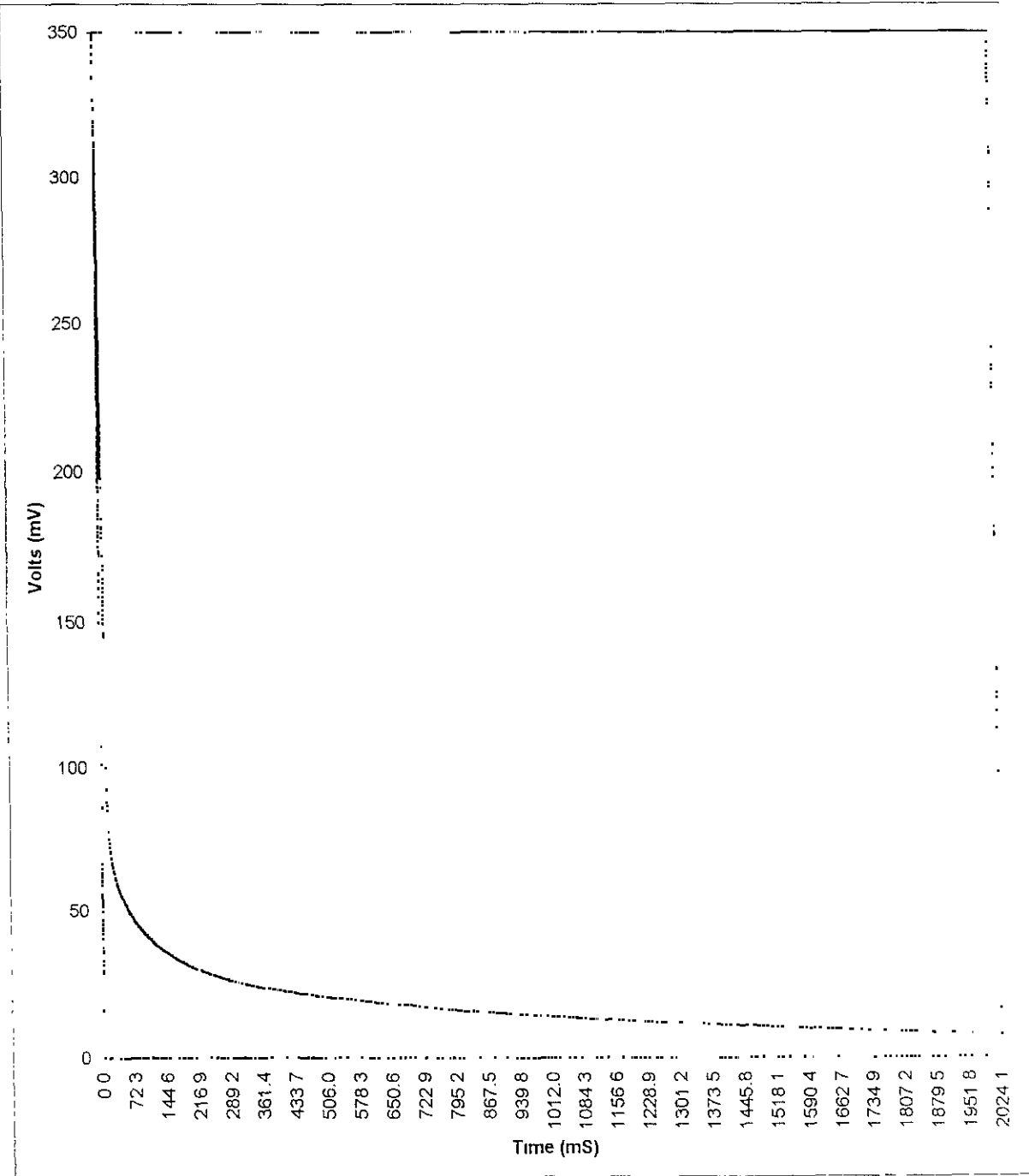
AREA = 14.2 sq. cms LENGTH = 8.46 cms
A/L = 1.68 cm+1

CURRENT I = 5 uA J Current Density = 3.52E-07 amp/cm2

ρ_{DC} = 1156.91 Ω m 3.52E-03 amp/m2

ΔV Primary = 344.63 mV CHARGEABILITY M = (0 - 2000 ms) 108.5 mV sec/ volt (msec)

Core ohms = 68926 (450 - 1150 ms) 34.93 mV sec/ volt (msec)



SPECIMEN No. 5 of CRAE #9661 DATE:- 6/9/96

AREA = 8.75 sq. cms LENGTH = 7.17 cms

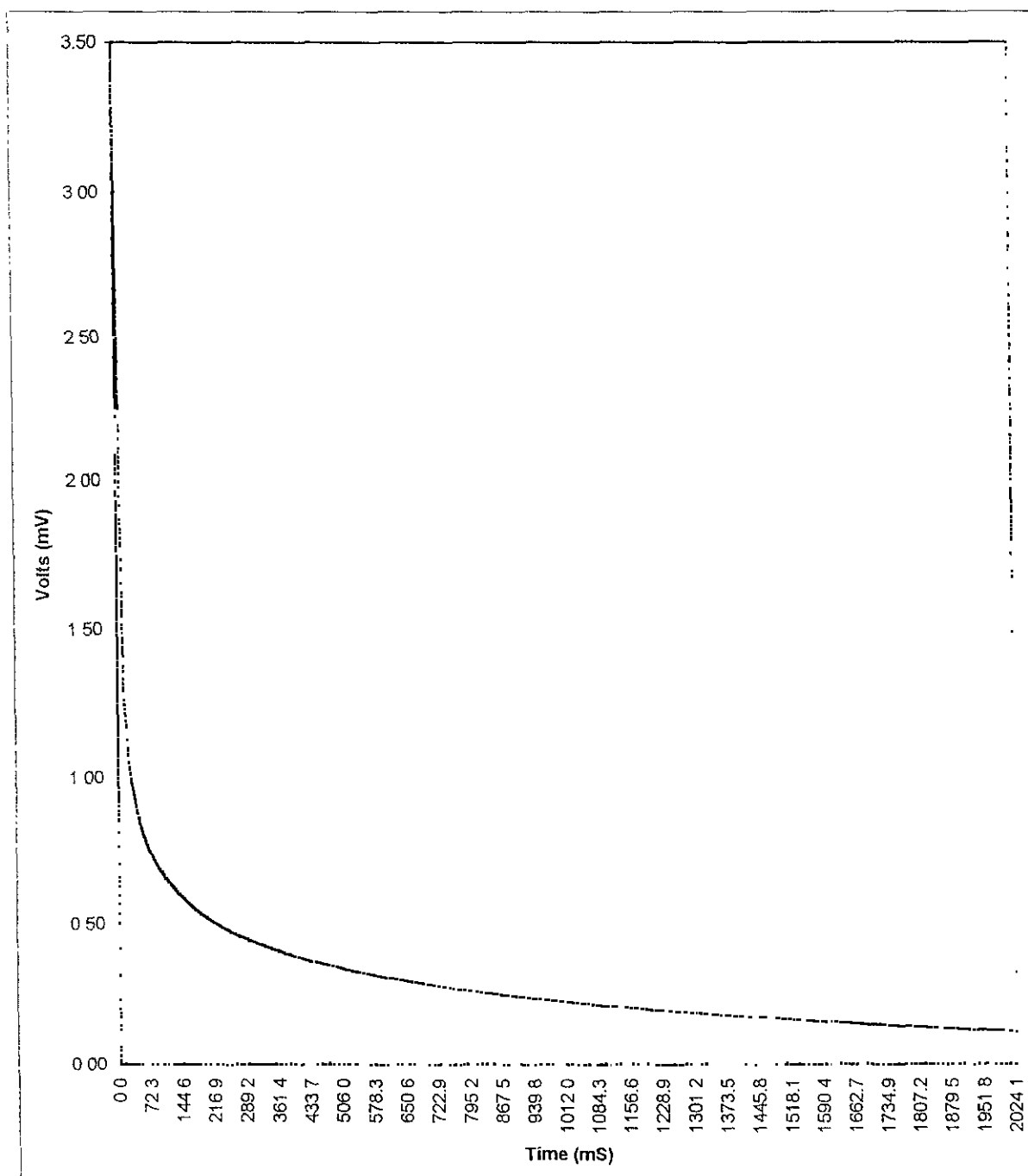
A/L = 1.22 cm+1

CURRENT I = 5 uA J Current Density = 5.71E-07 amp/cm2

ρ_{DC} = 8.30 Ω m 5.71E-03 amp/m2

ΔV Primary = 3.4 mV CHARGEABILITY M =
(0 - 2000 ms) 174.9 mV sec/ volt (msec)

Core ohms = 680 (450 - 1150 ms) 58.20 mV sec/ volt (msec)



CRAE5.661

SPECIMEN No. 6 of CRAE #9661 DATE:- 6/9/96

AREA = 8.75 sq. cms LENGTH = 7.18 cms

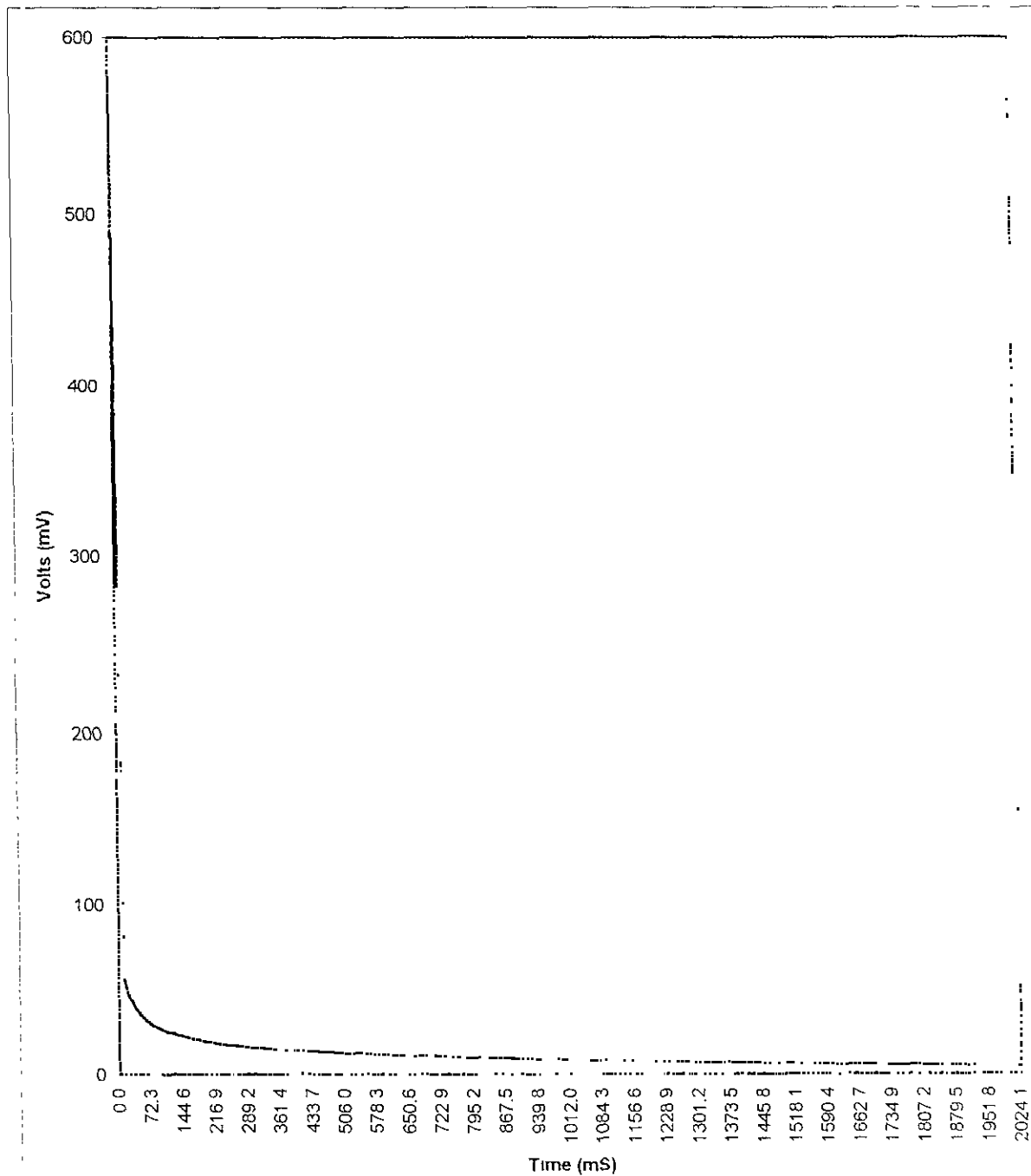
A/L = 1.22 cm+1

CURRENT I = 5 uA J Current Density = 5.71E-07 amp/cm2

ρ_{DC} = 1364.90 Ωm 5.71E-03 amp/m2

ΔV Primary = 560 mV CHARGEABILITY M =
(0 - 2000 ms) 45.1 mV sec/ volt (msec)

Core ohms = 112000 (450 - 1150 ms) 13.15 mV sec/ volt (msec)



CRAE6 661

SPECIMEN No. 7 of CRAE #9661 DATE:- 6/9/96

AREA = 8.75 sq. cms LENGTH = 7.22 cms

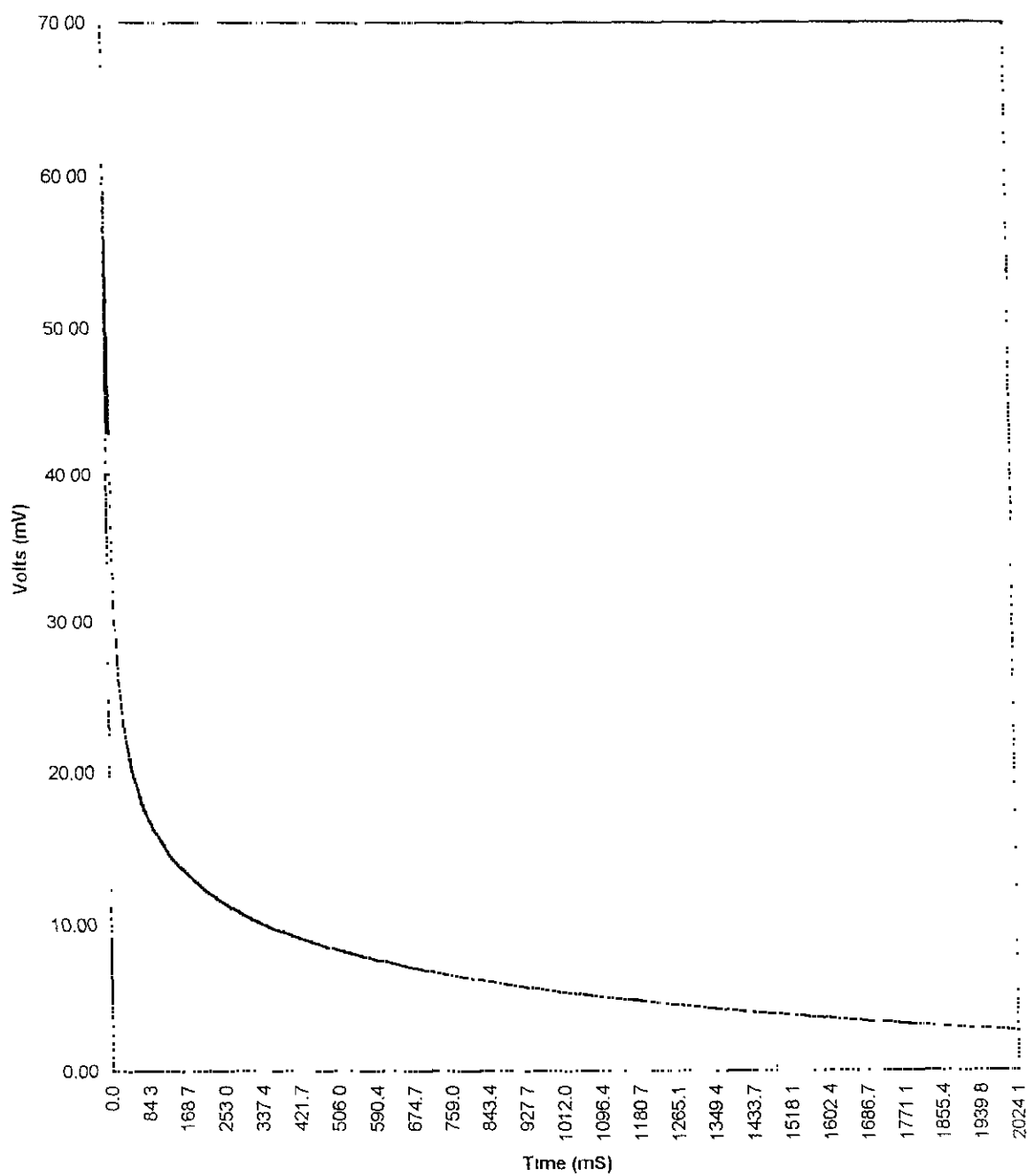
A/L = 1.21 cm+1

CURRENT I = 5 uA J Current Density = 5.71E-07 amp/cm2

ρ_{DC} = 147.37 Ω m 5.71E-03 amp/m2

ΔV Primary = 60.8 mV CHARGEABILITY M =
(0 - 2000 ms) 233.3 mV sec/ volt (msec)

Core ohms = 12160 (450 - 1150 ms) 78.34 mV sec/ volt (msec)



CRAE7 661

SPECIMEN No. 8 of CRAE #9661 DATE:- 6/9/96

AREA = 8.75 sq. cms LENGTH = 7.19 cms

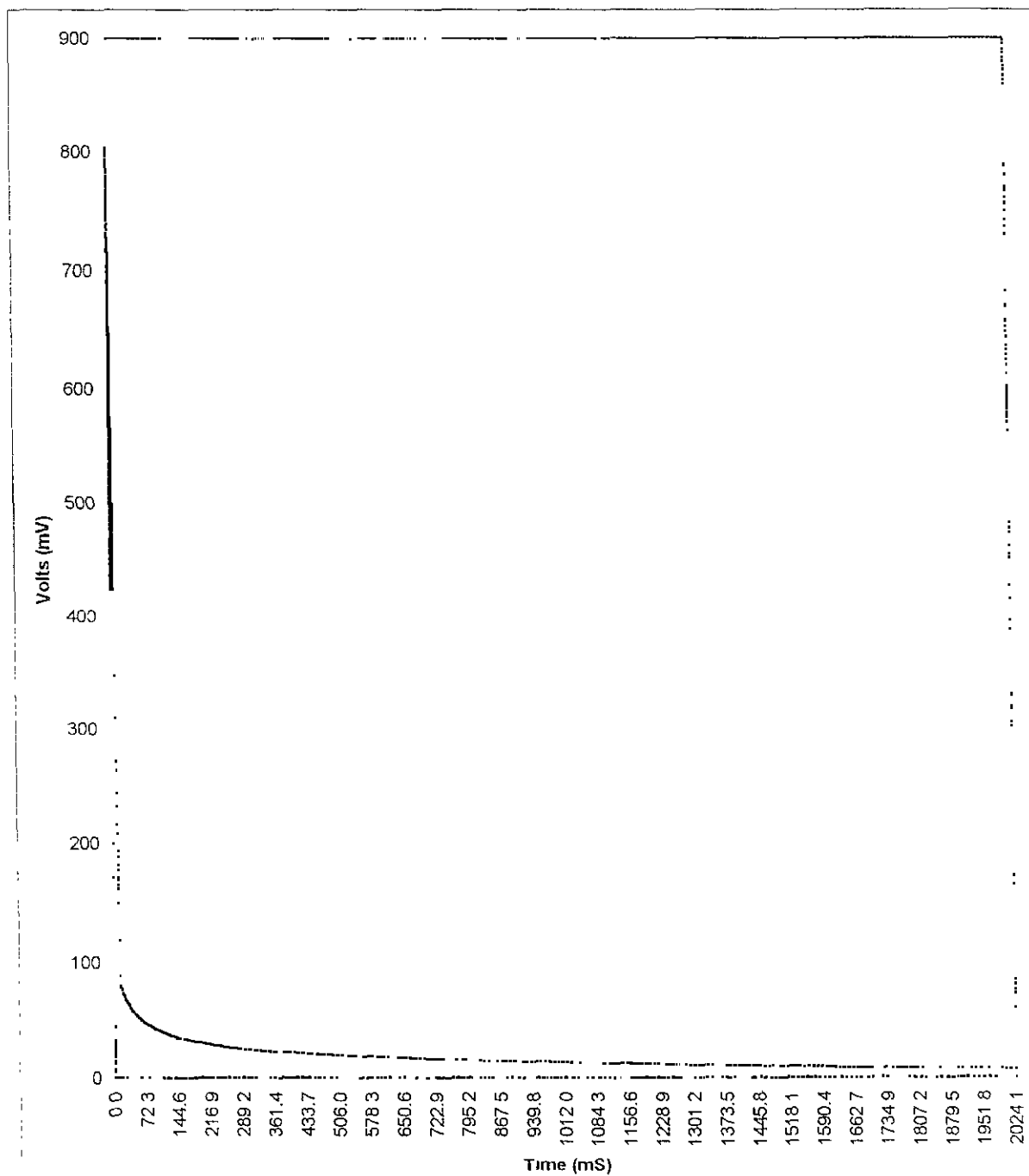
A/L = 1.22 cm+1

CURRENT I = 5 uA J Current Density = 5.71E-07 amp/cm2

ρ_{DC} = 2048.64 Ω m 5.71E-03 amp/m2

ΔV Primary = 841.7 mV CHARGEABILITY M =
(0 - 2000 ms) 46.9 mV sec/ volt (msec)

Core ohms = 168340 (450 - 1150 ms) 13.84 mV sec/ volt (msec)



CRAE8 661

SPECIMEN No. 9 of CRAE #9661 DATE:- 6/9/96

AREA = 8.75 sq. cms LENGTH = 11.93 cms

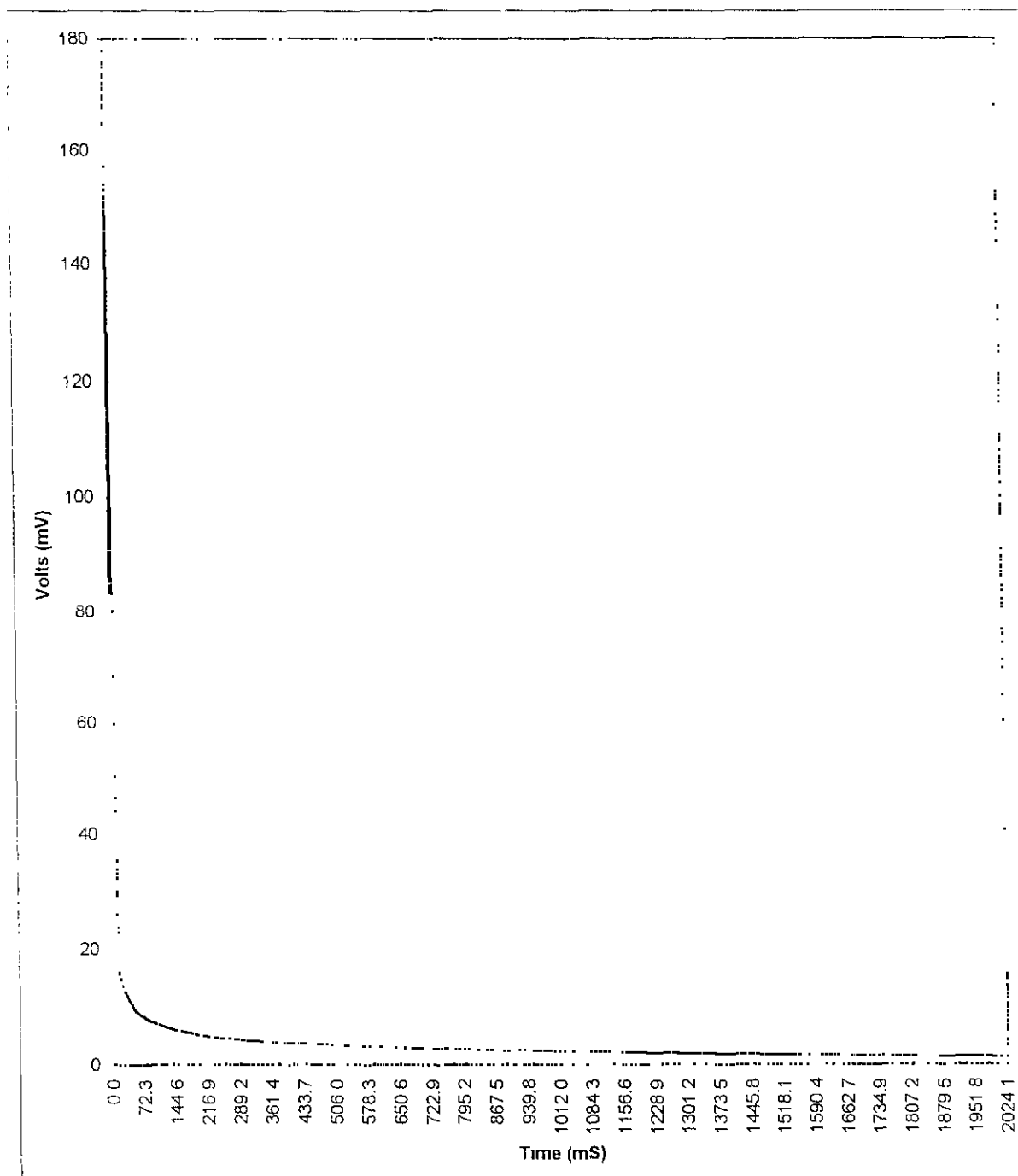
A/L = 0.73 cm+1

CURRENT I = 5 uA J Current Density = 5.71E-07 amp/cm2

ρ_{DC} = 241.89 Ω m 5.71E-03 amp/m2

ΔV Primary = 164.9 mV CHARGEABILITY M = 42.5 mV sec/ volt (msec)
(0 - 2000 ms)

Core ohms = 32980 (450 - 1150 ms) 12.23 mV sec/ volt (msec)



CRAE9 661

SPECIMEN No. 10 of CRAE #9661 DATE:- 6/9/96

AREA = 8.75 sq. cms LENGTH = 7.24 cms

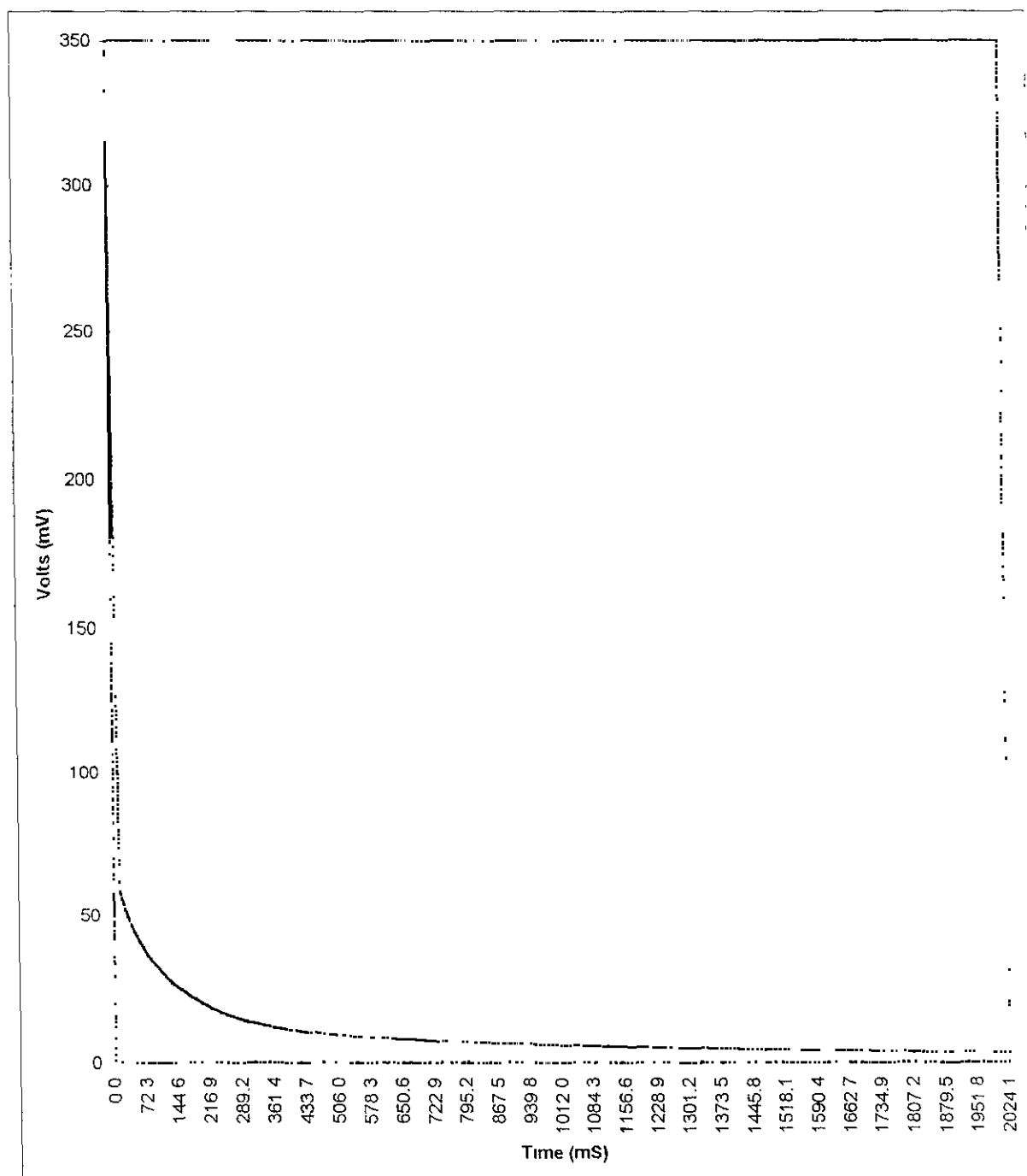
A/L = 1.21 cm+1

CURRENT I = 5 uA J Current Density = 5.71E-07 amp/cm2

ρ_{DC} = 794.27 Ωm 5.71E-03 amp/m2

ΔV Primary = 328.6 mV CHARGEABILITY M =
(0 - 2000 ms) 62.9 mV sec/ volt (msec)

Core ohms = 65720 (450 - 1150 ms) 16.05 mV sec/ volt (msec)



CRAE10 661

NOTES ON IP measurements and data

1. The following quantities are usually cited either on the summary data sheet or on the IP decay curve sheet

ρ_{DC}	the water saturated DC resistivity
M	the chargeability in mV sec/volt (m sec) measured by integration in the 450-1150 msec decay window
MF	the Metal Factor $MF = (M/\rho_{DC})1000$
j	the current density in A/m ²
τ	the time constant of the tail end of the decay curve
wc	the results of a test on a tube of water - a water core, to give an idea of the system noise

2. In measurements on massive sulphides with heavily mineralised end faces interfacing the water bath, the DC ρ is greatly affected by the surface termination impedances at the ends of the cores. The measurement is valid, but the resistivity is not indicative of the internal sulphide resistivity. Rather, it is much less and better obtained from EM or four electrode dry galvanic resistivity measurements. Any DC ρ 's thought to be so influenced are marked with an asterisk. The chargeabilities, similarly, are a surface and not a volume effect.

3. High resistivity generally means somewhat high IP chargeabilities and this can be misleading. Chargeability is essentially a measure of the relative effects of unblocked and (sulphide, clay)blocked pore paths. If there are very limited pore paths, as in a tight rock, a small amount of mineralisation can produce a relatively large IP effect. On the other hand, shearing can open up many unblocked paths and decrease the observed IP effect.

The metal factor, MF, endeavours to represent only the effects of the blocked paths and may be a better measure of metallic mineralisation. However, care should be taken in assigning significance to MF's generated from small chargeabilities. Indeed, in assessing the metallic mineralisation content of any sample cognisance should be taken of ρ_{DC} , M, MF, j, any EM conductivity &/or four electrode dry galvanic measurement data and density and magnetic susceptibility information.

4. The IP effect varies with current density (j). The higher the current density, the lower the chargeability (and resistivity). Usually 5 μ A is used in the energising pulse in these experiments which typically gives a current density of around 10^{-2} A/m².

5. The decay curve can be modelled as a sum of two or three exponentials. This has to be done numerically, but an approximate graphical estimate is usually possible for the time constant of the tail of the decay curve

$$\tau = (t_2 - t_1) / (\ln V_s, t_1 - \ln V_s, t_2) \quad \text{where } V_s \text{ is the decay voltage at time } t$$

6. Very approximate equivalents for frequency and time domain are:
1% PFE $\approx$ 6 milliradians phase lag $\approx$ 6 msec chargeability

7. In some well studied areas empirical relationships between IP effect and mineralisation grademay be formulated, e.g. a "rule" sometimes used for disseminated mineralisation is:
weight percent sulphide = chargeability/10 (weight percent is about twice the volume percent)
Any such rules of thumb should be used with caution

8. In the laboratory, auxiliary EM conductivity measurements can only measure conductivities exceeding 0.1 S/m for large cores and 1 S/m for small cores, owing to the limitations of measurement bridges

9. Some important considerations in evaluating IP laboratory measurements:

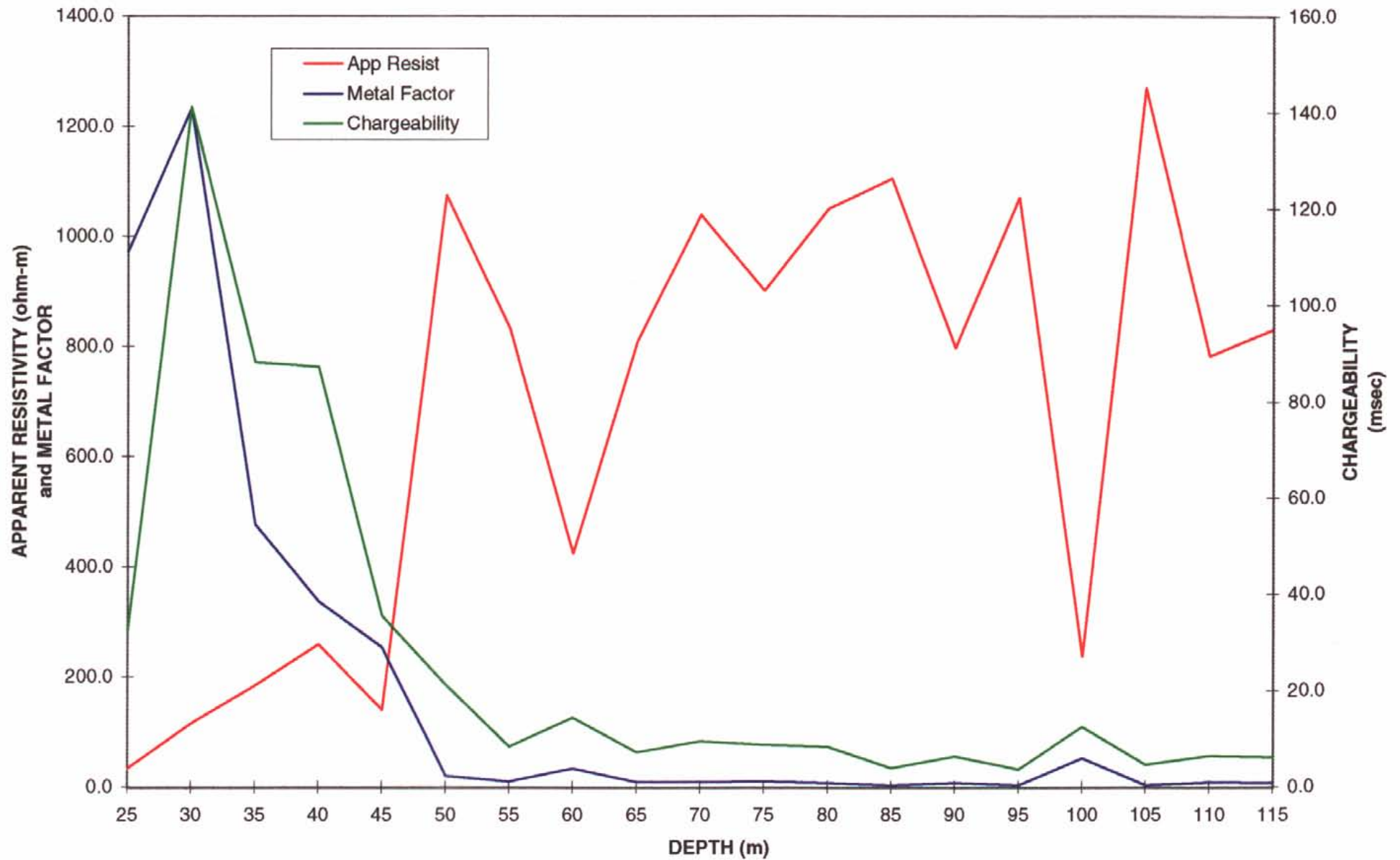
- a) Cognisance of redox (metallic and ionexchange (clay) characteristics.
- b) In the case of well mineralised samples, appreciation of the difference between a measured intrinsic internal response, where the polarisable surfaces are distributed through the sample, and a measured response dominated by termination impedance where polarisation is influenced by the external surfaces of the sample (surface polarisation).
- c) Variables.
 - current density
 - electrolyte nature and concentration
 - electrolyte saturation
 - temperature
 - pressure
- d) Rock Characteristics.
 - grain size
 - polarisable mineral content
 - porosity
 - rock matrix resistivity

APPENDIX XVII

EL 9371 MORDOR POUND

Down-hole IP logs

DOWN-HOLE IP SURVEY
DD96MD1



DOWN-HOLE IP SURVEY
DD96MD2

