259001

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84-2305

McINTYRE MINES (AUSTRALIA) PTY. LTD.

ANNUAL REPORT & STATEMENT OF EXPENDITURE

EXPLORATION LICENCE 17/68 & C.L. 105M/77

Period November 4th 1983 to November 3rd 1984

001

259002

McINTYRE MINES (AUSTRALIA) PTY. LTD.

EXPLORATION LICENCE 17/68 & C. L. 105M/77

COMPLETED WORK PROGRAMME & EXPLORATION EXPENDITURES

ANNUAL REPORT

PERIOD - NOVEMBER 4th 1983 - NOVEMBER 3rd 1984

C. H. WHITEHEAD.
McINTYRE MINES (AUSTRALIA) PTY. LTD.

3rd DECEMBER 1984.

002

259003

McINTYRE MINES (AUSTRALIA) PTY. LTD.

ANNUAL REPORT - E.L. 17/68

PERIOD - NOVEMBER 4th 1983 - NOVEMBER 3rd 1984.

INTRODUCTION

This report summarises details of the completed work programme within E.L. 17/68 and associated mining tenements for the twelve month period commencing 3rd November 1983. It is intended to supplement and be complementary to a report forwarded to the Department of Mines on 1st October 1984, entitled "Preliminary Summary Report of Completed Work and Statement of Expenditures, 4th November 1983 to 15th September 1984."

Work by McIntyre Mines (Australia) Pty. Ltd. was continuous during the current term until 16th October 1984. Activities were primarily designed at further evaluating the economic potential of the 75 sq. kms. of the E.L. area, and in this respect, work programmes have consisted of surface exploration and diamond drilling activities in the outside sections of the E.L. and also detailed investigations (mine planning, economic, etc.) of the main Kara WO_3 bearing skarns.

Attached Plan No. 1 shows the specific locations of the areas worked during the current exploration term ending November 3rd 1984.

Actual exploration expenditures incurred by McIntyre Mines (Australia) Pty. Ltd., for the 12 months period to November 3rd 1984 amounted to $178,428.

1. DIAMOND DRILLING PROGRAMME

A drilling programme consisting of 10 holes was completed by McIntyre Mines during the period mid March to mid August 1984.

The programme was entirely exploratory in nature, and intended to investigate a number of previously delineated prospective areas in the E.L. area.

Four such areas were investigated, and drill data statistics are shown in Table No. 1 overleaf.

KARA PROPERTIES - DIAMOND DRILLING 1984

TABLE NO. 1

DDH NO.	LOCATION	COORDINATES NORTH	COORDINATES EAST	R.L.	INCL.	AZIM	DEPTH DRILLED (m)
338	KARA SOUTH	4420.0	7680.2	523.3	87°	270°	23.77
339	KARA SOUTH	4424.1	7708.5	524.9	85°	85°	39.01
340	KARA SOUTH	4424.7	7719.4	524.9	85°	90°	47.24
341	KARA SOUTH	4298.0	7721.9	519.7	50°	82°	51.81
342	KARA SOUTH	4466.6	7692.9	530.2	55°	85°	14.33
343	KARA N. MAG. ANOM	7349.0	7478.6	425.3	55°	282°	182.35
344	COMPANION SKARN	6667.3	7271.6	429.5	50°	270°	72.85
345	COMPANION SKARN	6667.2	7272.2	429.5	80°	270°	70.72
346	KARA N. 266 ZONE	6898.8	7252.2	433.4	55°	270°	45.72
347	KARA N. 266 ZONE	6901.2	7236.0	434.5	65°	270°	81.38
							629.18 Metres

Drill logs and assay records for these ten holes (DDH's 338 to 347) are attached in Appendix No. 1A. (Drill logs, for DDH's 317, 318, 319 and 321 have likewise been recorded during the current exploration term, and are likewise appended as Appendix No. 1B.)

For summary results of these drilling programmes, the reader is referred to the "Preliminary summary report of completed work" forwarded to the Department of Mines on 1st October 1984.

2. GROUND MAGNETIC SURVEYS

In fill detailed ground magnetic surveys were completed in the region extending from the Loudwater Creek - Companion River junction north towards the Hampshire Magnetite skarn region.

Over an area of approximately 600m x 350m, grid lines were established at 40 metre intervals and readings spaced at 5 metres. Results are plotted and contoured on the attached Plan No. 2.

3. PRE DEVELOPMENT PROGRAMME

Studies constituting this programme were completed by McIntyre Mines in early December 1983, and final reports written during December 1983 and January 1984. Investigations were classified into seven categories (see below) for which seperate reports were written, namely:-

- Exploration work
- Infill - extension drill programmes
- Exploration drilling programmes
- Metallurgical investigations
- Ore Reserve studies
- Mine planning - Production - Economic Studies
- Miscellaneous studies - marketing, environmental.

A summary report entitled "Pre Development Programme, Kara Tungsten Project" is attached as Appendix No. 1.

The main objectives and results of the Programme were briefly described in the "Preliminary summary report of E.L. 17/68 completed work - 1st October 1984".

4. FEASIBILITY STUDY - MINE PLANNING STUDY

During the first quarter of the current term, McIntyre Mines affiliated Company - Superior Oil Minerals Division completed a feasibilty study of the Kara Properties. The main objective of the study was to assess the economic feasibility of the Kara No. 1 and Kara N deposits, and to evaluate the economic potential of the whole region covered by E.L. 17/68. This study and its results constituted the base parameters for developing a "detailed Production Plan and Financing Schedule" drafted by McIntyre Mines Ltd. during the period January to July 1984 (see below).

The feasibility study included the establishment of an ore reserve model for the Kara No. 1 and Kara North deposits, and subsequent mine planning study. This work was undertaken by Pincock, Allen and Holt of Tuscon, Arizona. To be incorporated in the final detailed Production Plan, and in view of subsequent depletion of ore reserves by Tasminex mine operations during the period 1st June 1983 to 15th March 1984, Pincock, Allen and Holt completed an additional mine planning study of the Kara No. 1 deposit in May - June 1984. Their report summarising this updated work is included as Appendix No. 3.

5. PRODUCTION PLAN - FINANCING SCHEDULE

The preparation of a detailed production plan and financing schedule, outlining the proposed development and mining of the Kara No. 1 and Kara N. deposits was completed by McIntyre Mines Ltd., during the period January to July 1984.

A full copy of this report was submitted to the Director of Mines on the 31st July 1984, and "report summary" is attached as Appendix No. 4.

6. KARA No. 1 SURVEYS

Topographical surveys of the overall Kara No. 1 area were completed in mid March 1984. A new base plan, contoured at 2.5 metre intervals, was completed at a scale of 1: 500. Sections of the area have since been modified by Tasminex mine operations, and these have subsequently been resurveyed.

The original base plan for Kara No. 1 is attached as Plan No. 3.

7. METALLURGICAL INVESTIGATIONS

Testwork on weathered tungsten ore and non magnetic tailings was completed by the Government Chemical Laboratories, Department of Mines, Western Australia, to test the possible application of the alkaline EDTA leach process for the extraction of tungsten.

The WO_3 content of the samples ranged from 0.45% to 2.50% WO_3, but the tungsten content was generally of a non-scheelite variety.

Two tailings dump samples were tested (TD2 - 4550ppm WO_3 and TD22 - 7000ppm WO_3) plus a sample of completely weathered tungsten ore (WO/1 - 2.50% WO_3) and weathered ore with scheelite (XO/1 - 1.37% WO_3). The experiments, particularly on the two tailing dump samples were disappointing, and all leach trials showed a low degree of tungsten extraction.

Appendix 5 provides results of the above test work.

8. PRE PRODUCTION DRILLING

During the period mid August 1984 to mid October 1984, a brief programme of pre production drilling was undertaken at the southern portion of the Kara No. 1 deposit. The objective of the programme was to obtain a better definition of ore grades and fresh ore contents in the proposed pre stripping and year 1 mine areas of the deposit.

Appendix 6 itemises the drill records and assay results of the drilling completed to mid October 1984.

9. STATEMENT OF EXPENDITURES

During the twelve month period to November 3rd 1984, McIntyre Mines (Australia) Pty. Ltd., incurred the following exploration expenditures on E.L. 17/68 and associated mining tenements.

	E.L. 17/68	C.L. 105M/77	TOTAL
	$	$	$
Office, rent and services	29,727	10,488	40,215
Camp construction, maintenance	386	461	847
Camp supplies, accommodation	1,261	953	2,214
Geology	30,064	14,920	44,984
Bulldozing	3,286	-	3,286
Ground Magnetometer	7,248	-	7,248
Geochemistry	4,259	74	4,333
Engineering - Company Costs	-	2,761	2,761
Engineering - Mine design	-	577	577
Metallurgy	867	1,117	1,984
Assays	2,397	360	2,757
Transportation	12,364	(6420)	5,944
Diamond Drilling	38,264	-	38,264
Geologic Consulting	2,111	738	2,849
Environmental	356	994	1,350
Assessment Work	5,765	4,163	9,928
Insurance	733	734	1,467
Lease Payments	4,658	-	4,658
Superior Oil - M.M.L. Costs	-	2,762	2,762
Totals	143,746	34,682	178,428

C. H. Whitehead,
McIntyre Mines (Australia) Pty. Ltd.

3rd December 1984.

008

259009

APPENDIX 1A

DRILL LOGS/ASSAY RECORDS

DDH 338 TO 347 (Inclusive)

009

258010

5 cm

SCALE 1:100

LENGTH 23.75m NORTHING 4426.0
AZIMUTH 270° EASTING 7680.2
DIP AT COLLAR -87° ELEVATION 5233
LOCATION KARA SOUTH

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 338 PAGE 1 OF 1

PROJECT KARA

% CORE RECOVERY	CORE SPLIT	FEATURE SAMPLE INT/No.	FEATURE ppm WO3	FRACTURING	BEDDING	GEOLOGY	MINERAL
NC SLOUGHED		3.66				Nc	
4.57		4.57					
94.77							
6.10		1.10				XTm	
4.56		7.62					
8.53							
7.49						XTu	
9.14		9.14					
10.82		10.67					
11.25							
96.66							
11.52		11.17					
90.82							
14.63						Tgl	
85.46							
17.37							
8.26							
15.39							
96.74 M.A.							
16.0						Tem	
21.73							
10.0						Tgl	
21.64							
15.64							
22.25							
85.57						Gr	
23.15							

MINERALISATION

W = 0.00 - 4.57m
X = 4.57 - 10.10 m
Y = 10.10 - 18.95 m.
F = 18.95 - 23.77m

0.00 - 21.70 - SKARN
21.70 - 23.75 - GRANITE

NIL FLUORESCENCE

17.26 - SPECKS SCHEELITE.

19.45 - 19.5 - SMALL ISOLATED SPECKS SCHEELITE

GEOLOGY

NX CASING TO 4.57m.
SLUDGE SAMPLES (0.00 - 12.19m.)

W — 4.57m

OVERBURDEN AND WEATHERED SKARN

OXIDISED MAGNETITE SKARN
MASSIVE, BUT FRIABLE, SOOTY
MAGNETITE HOMOGENEOUSLY DISTRIBUTED BUT GRADATIONALLY DECREASING OVER LAST 30cm OF RUN.

X — 7.32m

UNDIFFERENTIATED SKARN
LIMONITIC - NO MAGNETITE EXCEPT ALONG FRACTURES.
BROWNISH - FAWN COLOUR
SOFT FRIABLE.

10.10m

GARNET DIOPSIDE SKARN
PARTIALLY WITHERED, MASSIVE.
BROWNISH GREY COLOUR
BLOCKY, LITTLE MAGNETITE ALONG FRACTURES
15-20% MAGNETITE AT 11.28 - 12.10m

Y — 18.95m

EPIDOTISED (MAGNETITE) SKARN
GREYISH GREEN, HARD. BLOCKY
SED REMNANTS.

20.52m

FRESH MASSIVE GARNET DIOPSIDE SKARN HOMOGENEOUS. SOME GARNETS WITHERED

F — 21.70m

GRANITE.
HOMOGENEOUS, HARD.
EPIDOTISED.
GRADATIONAL UPPER CONTACT.

23.75m

E.O.H 23.75m

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA

CONTRACTOR McINTYRE MINES / P. McCORMACK
CORE NX
CASING NX

LOGGED BY CHW DATE 26.3.84.
STARTED MARCH 21 1984
FINISHED MARCH 22. 1984.

010

259011

5 cm

SCALE 1:100

LENGTH 39.61m NORTHING 44241
AZIMUTH 70°E5° EASTING 7708 5
DIP AT COLLAR 85° ELEVATION 524.9
LOCATION KARA SOUTH

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT

HOLE № 339 PAGE 1 OF 1 / 2

PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE		FRACTURING	BEDDING	GEOLOGY	MINERAL
NC		D334/10 366	880			NC	
4.57		D337 11 4.57	310				
83.6 5.18 47.3 2.49							
15 49							
7.62							
45.8							
2.24							
49 6							
10.06							
40 74							
11.58							
77.69						N	
13 41							
100							
14.63							
94.62							
17.68							
100							
21.13							
100							
21.95						Iw	
100		1	40				
23.77		D339 2	4000			Ted	
		3	5600				

MINERALISATION

Levels of oxidation
W = 0.00 - 4.57
X = 4.57 - 19.50
Y = 19.50 - 23.80
F = 23.80 - 34.01

NIL MINERALISATION.

SPECKS SCHEELITE @ 21.47 VEIN

SCHEELITE MINERISATION / YELLOW FLUORESCENCE FROM 22.65m.
BEST (0.6%) MINERAL AS HOMOGENEOUS DISSEMINATIONS FROM 23.50 TO 23.75

GEOLOGY

0.00 - 4.57 - NX CASING
NO CORE.
SLUDGE SAMPLES 0.00 - 12.19m.

4.57m

SILTSTONE / SANDSTONE.
WEATHERED, ORANGE BROWN COLOR.
FINE GRAINED, SOFT
HEAVILY IMPREGNATED WITH Fe ALONG JOINTS.
NON BANDED

7.50m

BANDED SILTSTONE - MUDSTONE UNIT
TAN BROWN / GREY COLOUR.
FINELY BANDED
SOFT FRIABLE, SLIGHTLY KAOLINISED.

10.98m.

COMPACT ORANGE BROWN SILTSTONE - MUDSTONE.
FINE GRAINED
MASSIVE + HOMOGENEOUS.
Fe IMPREGNATED ALONG JOINTS. (ESPECIALLY 10.70 - 11.58m).
GREYER, LESS OXIDISED AFTER 17.68m.
SLIGHTLY COARSER GRAINED AFTE 20.0m

21.80m.

22.15m. SILICIFIED, SKARNIFIED CORDIERITE
EPIDOTE DIOPSIDE SKARN
VERY HARD UNOXIDISED GREYISH-GREEN SKARN
GARNETS (CRYSTALLINE) INFREQUENT
FINE TO MEDIUM GRAINED
MAGNETITE OCCURRING OVER LAST 2m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.

CONTRACTOR McINTYRE MINES (PATTERSON LACK)
CORE NX
CASING NX

LOGGED BY CLW DATE MARCH 24 1984
STARTED MARCH 23 1984
FINISHED MARCH 26 1984

011

259012

5 cm

SCALE 1:100

LENGTH 39.01 NORTHING 4424.1
AZIMUTH 46°25' EASTING 7109.5
DIP AT COLLAR 85° ELEVATION 5249
LOCATION KARA SOUTH

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 339 PAGE 2/2

PROJECT. KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE	FEATURE %	FRACTURING	BEDDING	GEOLOGY	MINERAL
100		4	525			Ted	
26.82		5	430				
		6	1240				
100		7	3240			Tm	
29.87		8	5100			55	
30		9	340				
100							
32.00							
100						Q.	
32.92							
100							
35							
35.36							
100							
36.27							
100						Tc	
39.01						Cr	

MINERALISATION

FROM 23.75 - SCHEELITE AS ISOLATED SPECKS AND VERY COARSE (3/4") CRYSTALS ALSO SPECKS ALONG FRACTURES.

COARSE (1/4") CRYSTALS OF ISOLATED SCHEELITE

NIL. AFTER 31.66 m.

FEW ISOL SPECKS.

FEW SPECKS SCHEELITE ALONG FRACTURES

GEOLOGY

Ted continued.
ONLY LITTLE MAGNETITE AS VEINLETS + BLEBS EPIDOTISED ESPECIALLY AT TOP 30cm + BOTTOM 20cm.
21.66m. GRADATIONAL CONTACT.

MAGNETITE SKARN.
FRESH, FINE TO MEDIUM GRAINED
BANDED.
MAGNETITE HOMOGENEOUS 55-60%
CHALCOPYRITE COMMON.

F 31.66

QUARTZITE.
31.66 - 32.6 TRANSITIONAL ZONE (SKARNIFIED EPIDOTISED QUARTZITE.
32.66 - 36.66 - SILICIFIED ALTERED QUARTZITE.
HIGHLY EPIDOTISED
QUARTZ FILLED FRACTURES CONTAINING ISOLATED WO3 SPECKS
VERY HARD BRITTLE.

B 36.66

EPIDOTE ROCK.
GREENISH, HARD, MEDIUM GRAINED
37.65 HIGHLY FRACTURED

GRANITE.
FINE-MEDIUM GRAINED PINKISH
MAFICS AV.

E.O.H
39.01m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES (P.N.G.) PTY.
CORE NQX
CASING NX.

LOGGED BY CHW DATE MARCH 29 1974
STARTED MAR 23 1974
FINISHED MAR 27 1974

LS SURFACE + ½ CORE SAMPLES

012

259013

JOB NO.

D.D.H. 334

SECTION:

Edge Ft	Feet	Metres Interval	Lgth	% WO_3	ASSAY ppm WO_3	AVE: INVL	LGTH SM-½	WT AR AV	AVE: INVL	LGTH SM-½	WT AR AV
		SURFACE SAMPLES									
D334 10		0·00 - 3·66	3·66		880						
334 11		3·66 - 4·57	0·91		310.						
		4·57 - 6·10	1·53								
		6·10 - 7·62	1·52								
		7·62 - 9·14	1·52								
		9·14 - 10·67	1·53								
		10·67 - 12·19	1·52								
		CORE SAMPLES.			ppm WO_3						
D334 1		22·15 - 22·80	0·65		40.						
2		22·80 - 23·80	1·00		4000						
3		23·80 - 24·80	1·00		5600						
4		24·80 - 25·80	1·00		3580						
5		25·80 - 26·80	1·00		430						
6		26·80 - 27·80	1·00		1240						
7		27·80 - 28·80	1·00		3240						
8		28·80 - 29·80	1·00		5100						
9		29·80 - 31·10	1·30		340						

INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE

COMMENT

PROJECT

013

259014

5 cm

SCALE 1:100

LENGTH	47.24m	NORTHING	44247
AZIMUTH	56°	EASTING	7714
DIP AT COLLAR	85°	ELEVATION	5249
LOCATION	KARA SOUTH.		

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 340 PAGE 1 OF 1/2

PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ANGLE TO CORE AXIS	FRACTURING	BEDDING	GEOLOGY	MINERAL
NR		340/15 3.66	120			S	
4.57		25 0.91	131				
94.86		35 1.53	033				
6.71		45 1.52	244C			Te	
7.92		55 1.52	271C			Tu	
9.75		65 1.53	045C			Tm	
11.58		75 1.52	131C				
11.89							
12.34							
13.11							
13.72							
14.94							
17.37							
19.35						Q.	
19.81							
20.42							
22.40							
23.71							

MINERALISATION
LEVELS OF OXIDATION

W = 0.00 - 4.60m
X = 4.60 - 5.50m
Y = 5.50 - 20.40m
Z = 20.40 - 47.24m.

SCHEELITE MINERALISATION IN FOLLOWING SLUDGE SAMPLES.
340/45, 55, 65

NIL MINERALISATION.

GEOLOGY

NO CORE
NX CASING TO 4.57m.
SLUDGE SAMPLES TO 12.19m.

4.57m
SANDSTONE/MUDSTONE UNIT
ORANGE BROWN MOTTLED RUBBLY, FRIABLE, SOFT
LITTLE Fe IMPREG ALONG JOINTS

6.70m
Transitional zone to 7.75m
7.75m Weathered epidote skarn/ alteration unit
SKARN ZONE.
7.75 - 8.80, UNDIFFERENTIATED SKARN -
8.80 - 11.55 - MAGNETITE SKARN
REC. CORE RECOVERY
SOFT + FRIABLE 8.00 - 10.50m
OTHER ZONE MAG. CONTENT - 50%.
SHARP UNDERLYING CONTACT.

11.55m
11.55 - 20.40 - QUARTZITE

TAWN - LIGHT BROWN QUARTZITE.
HEAVILY EPIDOTISED & SILICIFIED AT UPPER CONTACT WITH SKARN TO 13.20m.
RUBBLY - BLOCKY BETWEEN 11.45 - 19.35m.
SLIGHT STAINING WITH IRON.
PARTIALLY MINED.

20.40m.
20.40 - 21.45
21.45 TRANSITIONAL ZONE INTO GREY QUARTZITE. CONTAINS SILICIFIED REMNANT NODULES
21.45 - 43.50
GREY QUARTZITE

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY ADA

CONTRACTOR McINTYRE MINES (P.N.G.) PTY. LTD.
CORE NX
CASING NX

LOGGED BY CDW DATE APRIL 9 1982
STARTED APRIL 2 1982
FINISHED APRIL 6 1982

014

259015

5 cm

SCALE 1: 100

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
97 1						
26.52						
100						
29.57						
77						
30.18						
100						
32.00						
100						
32.92						
100					Q	
34.14						
93.44						
35.07						
100						
39.01						
39.32						
100						
42.06						
100					QE	
45.11						
100					Gr.	
47.24						

LENGTH 47.24m NORTHING 44247
AZIMUTH 90° EASTING 77194
DIP AT COLLAR 85°E ELEVATION 6249
LOCATION KARA. SOUTH

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 540 PAGE 1 OF 2/2

PROJECT KARA.

MINERALISATION

NIL

MINERALISATION

GEOLOGY

HARD MEDIUM GREY QUARTZITE CONTINUED

FINE GRAINED, MASSIVE, HOMOGENEOUS UNIT

EPIDOTISED WHERE FRACTURED

SOME FINE GRAINED MAGNETITE SKARN ALSO ALONG FRACTURES AND AS BLEBS

NO SULPHIDES

39.52-43.30 - MORE SILICIFIED AND EPIDOTISED.

43.30m

EPIDOTISED CONTACT ENDOSKARN. MED TO COARSE GRAINED TEXTURE

45.05m

GRANITE

MEDIUM CRYSTALLINE MASSIVE HOMOGENEOUS ANK - MNLT LITTLE MAFICS

47.24m.

EOH 47.24m

ANGLE READ

ANGLE CORRECTED

AZIMUTH

DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES / A.C.D. (CANADA)

CORE NX

CASING NX

LOGGED BY CHW DATE APRIL 21 1984

STARTED APRIL 21 1984

FINISHED APRIL 6 1984

015

259016

SECTION :

Sludge Ft	Feet	Metres Interval	Lgth	% WO_3	ASSAY ppm WO_3				AVE: INVL	LGTH WO_3	WT AV	AVE: INVL	LGTH WO_3	WT AV
		SURFACE SAMPLES												
340 S		0.00 - 3.66	3.66		120									
S		3.66 - 4.57	0.91		180									
S		4.57 - 6.10	1.53		880									
S		6.10 - 7.62	1.52		2440									
55		7.62 - 9.14	1.52		8730									
S		9.14 - 10.67	1.53		4590									
75		10.67 - 12.19	1.52		1890									

VL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE

COMMENT

PROJECT

016

259017

5 cm

SCALE 1:100

LENGTH 51.61m	NORTHING 4296.0
AZIMUTH 62°	EASTING 7721.9
DIP AT COLLAR 50°E	ELEVATION 5197
LOCATION KARA SOUTH	

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 341 PAGE 1 OF 1/3

PROJECT KARA.

% CORE RECOVERY | CORE SPLIT | FEATURE | FRACTURING | BEDDING | GEOLOGY | MINERAL

NOT SAMPLED FOR ASSAY.

3.66
6.10
7.32
8.53
11.28
11.58
12.82
13.72
14.63
15.84
16.50
17.37
18.59
20.42
23.16
23.47
24.38

Tu
NC
Q
Te
Tgd
Tu
N
Tm
N/a

MINERALISATION

LEVELS OF OXIDATION.

X = 0.00 TO 11.80m
Y = 11.80m TO 29.50m
(× 16.50 TO 23.52)
F = 29.50m TO 51.61m.

MAIN LITHOLOGICAL UNITS.

0.00 - 7.32 - SKARN
7.32 - ~~20.40~~ 15.45 - SST/Q
15.45 - 17.37 - SKARN
17.37 - 20.40 - SILT
20.40 - 23.52 - SKARN
23.52 - 51.61 - SLTS/QUARTZITE

NIL MINERALISATION.

NIL SCHEELITE MINERALISATION

GEOLOGY

0.00 - 7.32m - UNDIFFERENTIATED SKARN.

INITIALLY (3.m) VERY WEATHERED VARIABLE SKARN UNIT, BETWEEN MAGNETITE (< 30%) SKARN AND WEATHERED GARNET DIOPSIDE SKARN WITH MAGNETITE.

GRADATIONAL WITH UNDERLYING ARENACEOUS UNIT FROM 6.10m

7.32m

NO CORE (LOSS DRLG)

8.53m

8.53 - 15.45m. QUARTZITE

MASSIVE FAWN QUARTZITE UNIT

GRADATIONAL WITH ABOVE IN ITALY TO 4.70m STRONGLY FERRUGINOUS

MEDIUM GRAINED TEXTURE

MASSIVE, MONOGENEOUS, NOT FRACTURED SEVERELY

GRADATIONAL LOWER CONTACT AND BEDDING.

15.45m SKARN UNIT

16.50 Epidote skarn.

16.50 GARNET DIOPSIDE SKARN COARSE GRAINED.

17.37 GREYISH BROWN CLAY (SKARN?)

SILTSTONE UNIT

GREYISH BROWN, FINE GRAINED

IRON IMPREGNATIONS ALONG FRACTURES

20.40

SKARN
20.40 - 23.52m.

MAGNETITE SKARN

PURELY, SOFT, WEATHERED. EXTREMELY POOR CORE RECOVERY.

23.52

SILTSTONE UNIT
23.52 - 24.52m

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY POL

CONTRACTOR McINTYRE MINES (CONTRACTOR)
CORE NX / 3.66
CASING

LOGGED BY CHN. DATE 4th APRIL 1984
STARTED 4th APRIL 1984
FINISHED 15th APRIL 1984

017

259018

5 cm

SCALE 1:100

LENGTH 51.81m NORTHING 4296-C

AZIMUTH 60° EASTING 7221.4

DIP AT COLLAR 50°E ELEVATION 594.7

LOCATION KARA SOUTH

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 341 PAGE 2 OF 3

PROJECT KARA

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
25.76						
26.52					N/O	
28.95						
29.57						
31.37						
31.94						
32.31						
33.63						
34.44						
34.90						
35.51						
36.88						
38.40					Q.	
39.31						
40.53						
40.98						
42.26						
42.67						
43.26						
43.69						
44.60						
46.02						
47.24						

MINERALISATION

NIL.
FLUORESCENCE.

GEOLOGY

SILTSTONE CONTINUED.
GREENISH GREY, FINE GRAINED TEXTURE.
RUBBLY FRACTURED.

Little Fe impregnation along fractures.

29.50m QUARTZITE.

29.50 - 51.81m
FINE GRAINED, LIGHT GREY QUARTZITE.
Generally undeformed.
Hard, fresh, unweathered and strongly indurated.
Not extensively fractured except 39.40 - 42.50m
Little sulphide/pyrite along joint faces.

Hole completed in quartzite unit.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.H.

CONTRACTOR McINTYRE MINES (P.N.G.) LTD.
CORE NX
CASING NX

LOGGED BY GWW DATE 21 April 1976
STARTED 2nd April 1976
FINISHED 12th April 1976

018

259019

5 cm

SCALE 1:100

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
2.27					Q	
51.71						

LENGTH 51 Elm NORTHING 4270
AZIMUTH 62° EASTING 7721.9
DIP AT COLLAR -50°E ELEVATION 514.7
LOCATION KARA SOUTH.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 341 PAGE 1 OF 3 1 3

PROJECT KARA.

MINERALISATION

GEOLOGY
Quartzite continued.

E.O.H 51 Elm.

ANGLE READ

ANGLE CORRECTED

AZIMUTH

DEPTH

SURVEY POM.

CONTRACTOR McIntyre Mines (Aust) P.T.Y. Ltd.
CORE NX
CASING NX

LOGGED BY CMW. DATE 21 April 1982
STARTED 21st April.
FINISHED 22nd April 1982

019

259020

5 cm

SCALE 1:100

LENGTH 14.33m NORTHING 4466.6
AZIMUTH 95 EASTING 7642.9
DIP AT COLLAR -55° ELEVATION 530.2
LOCATION NARA SOUTH

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 342 PAGE 1 OF 1/1

PROJECT NARA.

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
54.64						
3.66						
100					xTc	
4.88						
80.26						
6.40						
77.05						
7.01						
100						
7.92						
75.40						
8.53						
75.41						
9.75						
100						
10.67						
100					Gr	
13.11						
100						
14.33						

NX - Complete - for assay.

MINERALISATION

Zones of oxidation
X = 0.00 - 8.50m.
F = 8.50 - 14.33m.

Nil

Sulphide

Fluorspar

Nil.

GEOLOGY

ALLUVIUM.
Weathered (X type)
Brownish-orange colour.
Hard and soft alternating bands
Limonite / goethite product.

3.66m
As above - undifferentiated
Alum.
Fractured fractured.

4.88
5.60m
Silicified strengthened
Assemblages until 4.88 - 5.60

Undifferentiated X type
Alum.

8.50m

Granite to 8.50m.
To 10.50m - fine to medium
grained pink homogeneous
granite. Very hard.
10.50m NX fracture - slight fracturing

10.50m to 14.33.
Predominantly fine grained
light grey homogeneous granite
Extremely difficult drilling
penetration.
14.33m Mafic more apparent.

E.O.H = 14.33m

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY 209

CONTRACTOR McINTYRE MINES (CONTRACTOR)
CORE NX
CASING NX.

LOGGED BY CHW DATE NOV 1964.
STARTED 26 APRIL 1964
FINISHED 27 APRIL 1964

020

259021

5 cm

SCALE 1:100

LENGTH	122.35m
AZIMUTH	222.
DIP AT COLLAR	55°
LOCATION	LARA. N. MAG ANOMALY
NORTHING	7344 C
EASTING	74 72 E
ELEVATION	4253

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 343 PAGE 1 OF 1.8

PROJECT LARA.

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
2.66					NC	
10.97						
14.02					W SL	
17.07						
20.12						
21.03				20/		
23.16						

MINERALISATION

Very rare speck of asbolite.

GEOLOGY

No core.

3.66m

CLAY

(representing weathered Cardon Limestone unit).

Clay - off white through to yellowish brown to brown friable material.

Shows vague remains of limestone intersected (Clay)

Fracture zones and zones of alteration apparent locally.

Clay interpretated as represented heavily altered Limestone.

Fracture surfaces often exhibit a sheen possibly due to the development of asbolite.

Low recovery section.

ANGLE READ

ANGLE CORRECTED

AZIMUTH

DEPTH

SURVEY POR

CONTRACTOR McINTYRE MINES (AUST.) PTY. LTD. (EXPLORATION DEPT.)

CORE NX

CASING 3.66m

LOGGED BY C.J.W.I. DATE

STARTED MAY 16 1984

FINISHED JUNE 7 1984

021

259022

5 cm

SCALE 1:100

LENGTH 172.35m NORTHING 7349 0
AZIMUTH 282° EASTING 7476
DIP AT COLLAR 55° ELEVATION 425.3
LOCATION KARA N. MAGNETITE ANOMALY

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 343 PAGE 1 OF 2/6
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
26.27						
27.26						
32.31					W SL.	
35.36						
37.38						
37.43						
100						
40.34						
100						
41.45						
100						
44.5						
100						
47.5						
100						

MINERALISATION

Strongly fluorescent mineral from 42-50m.
Altered zone - mineral not identified

GEOLOGY

Weathered Cst / clay as above.

Fault zone with development of slickensides on curved surfaces - i.e. very irregular fault zone.

35.10

LIMESTONE.

Pale grey to med grey and locally very dark grey fine grained to medium grained limestone.

Locally recrystallised where it would be called marble.

Bedding is generally well preserved and in the range of 30-45°

Dark grey bands are possibly graphitic.

Fracturing is usually associated with some alteration which extends up to 10cms from fractures.

46.5-46.7m - Clay gouge fault zone with a few rock fragments.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA

CONTRACTOR McINTYRE MINES (Geomarch)
CORE NIX
CASING 36dia.

LOGGED BY CWW DATE
STARTED May 17th 1974
FINISHED June 7, 1974

022

259023

5 cm

SCALE 1:100

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL

LENGTH 182.35 NORTHING 7349 C
AZIMUTH 282° EASTING 7476
DIP AT COLLAR -55° ELEVATION 4253
LOCATION KARA N. MAGNETITE AIRMAG PROJECT KARA

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 343 PAGE 1 OF 3

50 100 52.63 100 53.64 55 100 57.69 100 59.74 60 100 61.79 67.54 65 68.84 13.11 67.56 100 68.89 70 97 71.32 71.94 94.75

MINERALISATION

Trace of disseminated brownish pyrite - local concentrations to 1%.

GEOLOGY

As above - LIMESTONE to 74.7m.

Strongly fluorescent zone appears to be associated with some alteration around the joints in parts it is also related to bedding

Sequence from 51m is partly clumpy breccia. Alteration consists partly of chlorite and blotchy pattern as accentuated under U.V. light

Development of an irregular patchwork of an undetermined pale brown mineral is common

At 71m - fault zone.

Irregular small sheared zones from 72 m.

74.7m ALTERED LIMESTONE

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.

CONTRACTOR McINTYRE MINES (CONTRACTOR)
CORE NX
CASING NX

LOGGED BY Chris DATE
STARTED MW/PDA 16.1.84
FINISHED JUNE 7. 1984

023

259024

5 cm

SCALE 1:100

LENGTH 182.35m	NORTHING 7349.0
AZIMUTH 282°	EASTING 7478.6
DIP AT COLLAR 66°	ELEVATION 425.3
LOCATION KARA. N. MAGNETITE ANOMALY	PROJECT. KARA

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 343 PAGE 1 OF 4

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
100				45°		
100				55°	Tad	
100				60°	Sl.	
100			1F	70°	Tmd. 50°	
100				60°	Tdg	
100				80°	Tmd	

MINERALISATION

Magnetite 10%

Overall magnetite content 50% - locally up to 80%

Rare specks of sphalerite

GEOLOGY

74.7m - 80.05.
ALTERED LIMESTONE.
A variable sequence of bands of partly recrystallised limestone, with diopside rich patches and some silicification. Local development of a light brown carbonate.

80.05m
LIMESTONE Pale grey sandy recrystallised calcite with veins of calcite alteration.

80.80m
AMPHIBOLE - CARBONATE - DIOPSIDE (GARNET) SKARN - A generally well banded sequence of fine grained skarn with rare magnetite. Bedding 45°-60°. Rare quartz.

83.3m
LIMESTONE.
Fine grained white to dark grey partly recrystallised limestone. Blotchy appearance from 84-85m.

85.80m
GARNET, AMPHIBOLE, DIOPSIDE (MAG) SKARN well banded (mineralised) zone

86.7m
MAGNETITE - DIOPSIDE - CARBONATE SKARN.
Possesses (also) minor garnet rich bands. Variably banded skarn with magnetite 'beds' often formed from subrounded aggregates of crystals.
Skarn is fine to medium grained with local strong compositional banding.
Garnet bands are quite discrete eg 90.3m.
Possible fault zone @ 89.2m
Red fluorescent mineral common

93.10m
DIOPSIDE - CARBONATE - GARNET SKARN
Fine grained, poorly banded skarn with blotchy alteration (dissolution)

94.40m
MAGNETITE - DIOPSIDE SKARN.
Possesses minor calcite and garnet.
Magnetite varies from coarse to fine grained dissemination.
Some soft sediment deformation around 95.5 to 96.5m. Cleavages
Local alteration developed

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.H.

CONTRACTOR McINTYRE MINES (UNDERGROUND)
CORE NX
CASING NX

LOGGED BY CWN DATE
STARTED APRIL 16, 1984
FINISHED JUNE 7, 1984

024

259025

5 cm

SCALE 1:100

LENGTH 102.35m NORTHING 7349 0
AZIMUTH 262° EASTING 7478
DIP AT COLLAR 55°E ELEVATION 4253
LOCATION LARA N. MAG ANOMALY

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 343 PAGE 1 OF 5/8
PROJECT. KARA

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL	MINERALISATION	GEOLOGY
100				20	Tmd		Rare speck of scheelite	As above. Some well bedded sect ons suggest top of sequence is up hole eg 102-2. At 106 E - red fluorescent hydrogarnet.
103.41				45	Tgm		Rare scheelite	105.20m DIOPSIDE - MAGNETITE - GARNET SKARN Has minor actinolite and carbonate Generally well bedded sect on with strong compositional bandings Bands up to 5mm.
100								107.50m
108.54				45	Tm 50		very fine disseminated scheelite.	MAGNETITE - DIOPSIDE SKARN. Well banded skarn varying to massive magnetite which locally can attain 90%. Bedding is fairly well developed from about 112-5m Minor garnet and carbonate are present. Red fluorescent hydrogarnet common at 111-115m From 108m - skarn develops a more jointed pattern.
100				60				
111.54								
100				60				
114.67				80				
100				70	Tda		Rare scheelite	116.10m DIOPSIDE - AMPHIBOLE - CARBONATE MAGNETITE SKARN Fairly bedded skarn with some sub circular garnet aggregates - rare carbonate veins. Magnetite generally fine grained. 117-118 abundant hydrogarnet
117.69								118.20m
100					Tmd		Rare scheelite.	MAGNETITE - DIOPSIDE - CARB SKARN Some minor amphibole. Similar to preceding unit as for mineral properties changes. Minor garnet as blebs + subcircular aggregates
120.74								120.30m
					Tdm 15			DIOPSIDE - MAGNETITE - CARB SKARN Poorly bedded skarn varying from green to khaki in colour - Carbonate occurs as aggregates
				40				122.0m
123.74					Tmd 60			MAGNETITE DIOPSIDE - CARBONATE SKARN Magnetite is now more coarser grained (up to 15mm) Fluorescent calcite + hydrogarnet common.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY P.D.H.
CONTRACTOR McINTYRE MINES (P.N. 'OSBORNE) AIR
CORE CASING 346m
LOGGED BY CHW DATE MAY. 16 1984
STARTED JUNE 7 1984
FINISHED

025

259026

5 cm

SCALE 1:100

LENGTH 182.35m NORTHING 7349 C
AZIMUTH 222° EASTING 7478.6
DIP AT COLLAR 55°E ELEVATION 425.3
LOCATION KARA. N. MAGNETITE ANOMALY

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 343 PAGE 6/8

PROJECT. KARA

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL	MINERALISATION	GEOLOGY
100					Tmd			As above - 126.6 - 126.8m : - slump breccia
126.80								126.80m
				70	Tdm			DIOPSIDE MAGNETITE GARNET SKARN Thinly bedded to brecciated skarn - minor carbonate present.
100								127.20m
129.87								MAGNETITE - DIOPSIDE SKARN with minor carbonate and local zones rich in garnet. Fine grained amphibole also suspected. Minor fine grained carbonate occurs locally. Grain size in skarn increases from about 1cm to 5cm.
100								
132.44				70	Tmd 50			
100							Rare scheelite.	
135.49								
				70				
130								
137.04					Tay			137.5m
								AMPHIBOLE - GARNET (CARBONATE) SKARN. Fine grained dark green skarn with minor coarse grained sections. at 139.4 carb - mag vein
100								140.20m
142.04				50				GARNET - AMPHIBOLE - CARB SKARN with alternating bands of amphibole skarn. Several thin bands of coarse grained radiating aggregates of tremolite occur, eg 142.6-145.0
100					Tya		Fine disseminated scheelite.	Minor magnetite developed in thin bands + occasional aggregates.
145.14								Red fluorescent carbonate present locally
100				60				147.5m
148.19					SL			LIMESTONE Medium grained, pale to med grey crystalline limestone. Massive to bedded
100					Tc		Fine grained disseminated scheelite	149.10m AMPHIBOLE - CARBONATE SKARN Banded & bedded irregularly

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY POG

CONTRACTOR McINTYRE MINES (PTY) LTD
CORE NX 360m
CASING

LOGGED BY [illegible] DATE
STARTED 24th May 1974
FINISHED 7 June 1974

026

259027

5 cm

SCALE 1:100

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
151.24						
100				50		
154.29						
100				50		
157.34						
100				60		
160.39					L	
100						
163.45				70		
100						
166.49						
100						
169.54						
100						
172.59						
100					Tra	

LENGTH 182.35 NORTHING 7349 0
AZIMUTH 282° EASTING 7476
DIP AT COLLAR 55° ELEVATION 425 3
LOCATION KARA. NORTH MAGNETITE ANOMALY PROJECT. KARA

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 343. PAGE 1 OF 7/8

MINERALISATION

152-154 - trace of disseminated pyrrhotite. Rare scheelite

Rare scheelite specks

Minor disseminated scheelite, locally to 0.4%.

Rare scheelite.

GEOLOGY

168.35 altered skarn with minor fine grained scheelite + thin bands of tremolite

168.35 - 173.90m - LIMESTONE

Medium grained crystalline limestone showing banding and some minor skarn minerals to 153m (eg garnet + amphibole).

From 154m - limestone shows only minor variations with occasional alteration near joints. Some thin bands of amphibole rich material

Around 161m, scheelite appears to be associated with increase in tremolite in the limestone.

173.90 MAGNETITE - AMPHIBOLE - GARNET CARBONATE SKARN 173.90 - 179.56.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY POOR

CONTRACTOR McINTYRE MINES (P.N.G.) PTY. LTD.
CORE NX
CASING 3.66m

LOGGED BY CSM DATE —
STARTED MAY 16 1974
FINISHED JUNE 7 1974

027

259028

5 cm

SCALE 1" = 10'

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
175.64						
100					T_{mf}	
178.69						
100						
182.73					Qe	
100						
182.35					Gr	

LENGTH 182.35m NORTHING 7340
AZIMUTH 282° EASTING 7478
DIP AT COLLAR -55° ELEVATION 4253
LOCATION KARA. NORTH MAGNETITE PROJECT. KARA.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 343 PAGE 1 OF 8/8

MINERALISATION

Rare specks of sphalerite.

GEOLOGY

As above. Fine grained, locally massive magnetite often with bands of amphibole and garnet. Also disseminated carbonate, pervasive and also thin veinlets.
Magnetite overall averages 60%, locally up to 90%.

174.5'

ALBITITE ETC. ROCK. - Fine to medium grained with epidote and/or sometimes uniform quartz grain

181.05 181.05 - 181.45 - transitional

GRANITE - Pink medium grained minor epidote - appears silicified near contact - Zoning - pyroxene + Epidote & Quartz

E.O.H. 182.35'

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.O.A.

CONTRACTOR McINTYRE MINES (A'SIAN) LTD.
CORE NX 36.6m
CASING

LOGGED BY CNW DATE
STARTED MAY. 10. 1975
FINISHED JUNE 7 1975

028 259029 1/2 CORE-AMDEL AT 4CE2/84 343 1/4

SECTION:				ASSAY					AVE:			AVE:		
	Feet	Interval	Lgth	ppm AWO	ppm Sn	ppm Bi	Zn	Cu	INVL	LGTH %M-%	WT AV	INVL	LGTH %M-%	WT AV
3	CORE	89.0 - 90.0	1.0	20	160	290	240	40	170	< 1	< 1			
	"	90.0 - 91.0	1.0	< 10	205	150	170	20	76	< 1	< 1			
3	"	91.0 - 92.0	1.0	15	245	210	190	28	76	< 1	< 1			
	"	92.0 - 93.0	1.0	10	530	38	170	4	20	< 1	< 1			
5	"	93.0 - 94.0	1.0	20	345	58	66	4	16	< 1	< 1			
	"	94.0 - 95.0	1.0	< 10	335	58	100	6	26	< 1	< 1			
	"	95.0 - 96.0	1.0	< 10	0250	14	120	4	10	< 1	< 1			
8	"	96.0 - 97.0	1.0	< 10	4600	14	120	< 2	6	< 1	< 1			
	"	97.0 - 98.0	1.0	< 10	2160	20	170	2	26	< 1	< 1			
10	"	98.0 - 99.0	1.0	15	1740	130	180	24	60	< 1	< 1			
11	"	99.0 - 100.0	1.0	30	0760	730	150	76	150	< 1	1			
	"	100.0 - 101.0	1.0	25	380	325	170	18	140	< 1	1			
13	"	101.0 - 102.0	1.0	20	510	205	150	8	70	< 1	< 1			
	"	102.0 - 103.0	1.0	25	790	365	130	28	110	< 1	< 1			
15	"	103.0 - 104.0	1.0	30	375	195	120	6	110	< 1	< 1			
16	"	104.0 - 105.0	1.0	40	360	840	170	26	86	< 1	< 1			
	"	105.0 - 106.0	1.0	30	235	110	90	2	120	< 1	< 1			
18	"	106.0 - 107.0	1.0	< 10	280	24	120	4	36	< 1	< 1			
	"	107.0 - 108.0	1.0	10	310	26	180	4	20	< 1	< 1			
20	"	108.0 - 109.0	1.0	< 10	200	< 4	200	2	6	1	< 1			
21	"	109.0 - 110.0	1.0	20	220	30	130	2	6	< 1	< 1			
22	"	110.0 - 111.0	1.0	< 10	245	16	190	2	16	< 1	< 1			
23	"	111.0 - 112.0	1.0	25	265	310	230	14	40	< 1	< 1			
24	"	112.0 - 113.0	1.0	< 10	230	155	180	4	50	< 1	< 1			
25	"	113.0 - 114.0	1.0	< 10	215	630	130	44	130	< 1	< 1			
26	"	114.0 - 115.0	1.0	< 10	220	270	160	12	80	< 1	< 1			

INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE

029 259030 1/2 CORE - AMCEL AC 4682 343

2/4

SECTION:

FT	Feet	Material	Lgth	ASSAY ppm %WO3	ppm Sn	ppm Bi	Zn	Cu	AVE: Pb INVL	Mo LGTH %M-%	Mo WT AV	Ag INVL	AVE: LGTH %M-%	WT AV.
27		115.0 - 116.0	1.0	20	395	170	160	12	50	<1	<1			
28		116.0 - 117.0	1.0	10	345	120	86	12	66	<1	<1			
29		117.0 - 118.0	1.0	15	200	62	78	12	46	<1	<1			
30		118.0 - 119.0	1.0	25	265	96	340	12	80	2	<1			
31		119.0 - 120.0	1.0	25	200	260	230	38	280	1	2			
343														
32		120.0 - 121.0	1.0	NA										
33		121.0 - 122.0	1.0	NA										
34		122.0 - 123.0	1.0	NA										
35		123.0 - 124.0	1.0	NA										
36		124.0 - 125.0	1.0	NA										
37		125.0 - 126.0	1.0	NA										
38		126.0 - 127.0	1.0	NA										
39		127.0 - 128.0	1.0	NA										
40		128.0 - 129.0	1.0	NA										
41		129.0 - 130.0	1.0	NA										
42		130.0 - 131.0	1.0	NA										
43		131.0 - 132.0	1.0	NA										
44		132.0 - 133.0	1.0	NA										
45		133.0 - 134.0	1.0	NA										
46		134.0 - 135.0	1.0	NA										
47		135.0 - 136.0	1.0	NA										
48		136.0 - 137.0	1.0	NA										
49		137.0 - 138.0	1.0	NA										
50		138.0 - 139.0	1.0	NA										
51		139.0 - 140.0	1.0	NA										
FT	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE

030 259031 40 core AMREK AC

343

314

TION:

	Feet	Metres	Lgth	ppm Ag WDS	ppm Sn	ppm Bi	Zn	Cu	Pb INVL	Pb LGTH %N-S	Pb WT AV	AVE: INVL	AVE: LGTH %N-S	AVE: WT AV
53		140.0 - 141.0	1.0	NA										
55		141.0 - 141.85	0.85	NA										
54		141.85 - 142.2	0.35	30	90	<4	140	26	210	3	1			
55		142.2 - 143.0	0.80	40	15	12	390	12	140	2	<1			
56		143.0 - 144.0	1.0	130	210	22	540	10	120	6	<1			
57		144.0 - 145.0	1.0	200	255	54	670	16	250	5	1			
58		145.0 - 146.0	1.0	170	285	120	200	8	36	5	<1			
59		146.0 - 147.0	1.0	150	175	94	840	14	110	4	1			
60		147.0 - 147.8	0.80	400	14	42	2300	22	1200	6	4			
61		147.8 - 148.5	0.70	15	<4	4	40	10	46	1	<1			
62		148.50 - 149.22	0.70	40	<4	12	1400	10	930	3	3			
63		149.20 - 150.20	1.0	750	10	46	3100	20	1400	12	6			
64		150.20 - 151.2	1.0	110	26	12	700	38	610	15	2			
65		151.20 - 152.20	1.0	280	14	<4	24	32	<5	11	<1			
66		152.20 - 153.20	1.0	100	54	<4	22	50	6	35	<1			
67		153.20 - 154.7	1.0	130	72	<4	22	76	6	50	<1			
68		154.20 - 155.20	1.0	10	<4	<4	18	10	6	2	<1			
69		155.20 - 156.20	1.0	<10	<4	<4	16	6	6	1	<1			
70		156.20 - 157.20	1.0	<10	<4	<4	30	4	<5	1	<1			
71		157.20 - 158.20	1.0	<10	<4	<4	10	4	6	1	<1			
72		158.20 - 159.20	1.0	10	<4	<4	20	4	6	1	<1			
73		159.20 - 160.20	1.0	<10	12	<4	20	8	40	1	<1			
74		160.20 - 161.20	1.0	<10	6	<4	120	8	40	1	<1			
75		161.20 - 162.20	1.0	<10	<4	<4	76	8	16	<1	<1			

INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE

031

259032

½ CORE
ANGEL AK

343.

4/4

ION :

	Feet	Interval	Lgth	ASSAY Mo % WO3	Mo Sn	Mo Bi	Zn	Ca	AVE: INVL	Mo LGTH Sn-3	Mo WT AV	AVE: INVL	LGTH Sn-3	WT AV.
54	CORE													
70	"	165·20 - 166·20	1 0	60	10	< 4	16	12	10	36	< 1			
7	"	166·20 - 167·20	1 0	45	58	< 4	22	20	6	70	< 1			
78	"	167·20 - 168·20	1 0	210	72	< 4	28	4	6	20	< 1			
79	"	168·20 - 169·20	1 0	70	76	< 4	20	4	6	11	< 1			
0	"	169·20 - 170·20	1 0	260	540	12	36	10	16	11	< 1			
1	"	170·20 - 171·20	1 0	650	100	< 4	20	22	6	35	< 1			
2	"	171·20 - 172·30	1 1	35	20	< 4	24	4	10	5	< 1			

	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE
12															

032

259033

5 cm

SCALE 1:100

LENGTH	72.65m
AZIMUTH	276°
DIP AT COLLAR	-50
LOCATION	COMPANION RIVER LOCATION.
NORTHING	6667.3
EASTING	7271.6
ELEVATION	429.5

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 344 PAGE 1 OF 1/3

PROJECT. COMPANION - KARA

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL	MINERALISATION	GEOLOGY
					NC			NOT CORED.
3.66								3.66m
								3.90m QUARTZITE FRAGMENT 7cms - fresh, light grey
7.42								CLAY. Yellow brown to orange clay. Appears to have rock texture after skarn. From approx 14ms, Fe staining after magnetite increases until at 24.5m, some fresh magnetite occurs.
10.41								
14.02					wTu			
17.07								
21.12								
23.17								23.20m WEATHERED SKARN Weathered breccia and some vein stained magnetite deposits
24.08					W/m			

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY POG

CONTRACTOR McINTYRE MINES (P.N.G.) PTY. LTD.
CORE NX
CASING NX

LOGGED BY CHW. DATE
STARTED June 12. 1974
FINISHED June 25. 1974

033

259034

5 cm

SCALE 1:100

LENGTH 285m NORTHING 6607 3

AZIMUTH 290° EASTING 7271 6

DIP AT COLLAR 50° ELEVATION 4295

LOCATION COMPANION RIVER SKARN.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 344 PAGE 1 OF 2/3

PROJECT. KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
72·2						
16·21						
100						
27·13						
93·4						
28·04						
100						
29·26						
67·5						
32·00						
100				70		
31·31						
100					Tdg	
34·44						
35·46						
35·3						
100						
36·57						
37·19				45		
100						
39·40						
100				70		
41·45			1/20	50	Tdm	
100					Tdgm 10	
41·50					Tdg	
100			1/20			
47·14						
100					Q	
48·16						
100			1			

MINERALISATION

Minor scheelite in fractured zone

Rare scheelite specks.

34·4 – 35·0 scheelite estimated to average 0·1% WO3

No scheelite.

GEOLOGY

The magnetite tot-als approx 3% of skarn. Locally garnet bearing.

27·13m

DIOPSIDE – GARNET SKARN

Very fine grained pale green through to dark green and pale brown green skarn, generally massive, but locally showing degree of bedding.

Local alteration, causing bleaching around 31·5, 34·0, 35·8 and 36·5m.

Core fresh from 29·0m.

Only trace amounts of carbonate are present.

35·50m

DIOPSIDE MAGNETITE SKARN.

Medium to coarse grained green to brown skarn. Brown colour due to presence of garnet. Diopside colour variable – in places, bright green (eg 39·6) – also light green especially in recrystallised veins around garnet eg 41·1m

42·00m

DIOPSIDE – GARNET – MAGNETITE. SKARN

Massive to vaguely bedded. Green to brown. up to 10% magnetite. Generally fine grained. Very broken zone 42·8 – 43·0

43·80m

DIOPSIDE – GARNET – SKARN

Fine grained texture

45·00m

QUARTZITE.

– altered quartzite –

a sequence of heavily silicified rocks which have been subsequently altered to variety of yellowish-and yellowish green pleses.

alteration appears to have moved along fractures from granite front.

Also + amphibole introduced at

ANGLE READ

ANGLE CORRECTED

AZIMUTH

DEPTH

SURVEY PDR.

CONTRACTOR McINTYRE MINES (P.N. EXPLORATION) NV Nx

CORE CASING

LOGGED BY CHW DATE JUNE 12. 1954

STARTED

FINISHED

034

259035

5 cm

SCALE 1:100

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
100						
100						
100						
100						
100						
100						
100					Gr.	
100						
100						
100						
100						

LENGTH 72.85m NORTHING 6667.3
AZIMUTH 270° EASTING 7271.6
DIP AT COLLAR -50° ELEVATION 4246
LOCATION COMPANION RIVER SAARN

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 344 PAGE 2 OF 3

PROJECT KARA

MINERALISATION

No fluorescent mineralisation.

GEOLOGY

Five thin (< 3cm) bands of 51-60m jasper at 57.40m.

GRANITE.

Medium grained to coarse grained, pink, two feldspar granite.

Orthoclase generally dominant over plagioclase estimated at approx 3:1.

Kaolinised zone at 66.20m.

Kaolinised zone along joint set at 64.9 to 65.1m.

70.5-71.1m - fine grained phase with sharp contacts. Microgranite dyke?

EOH 72.85m.

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES (CANADA)
CORE NX
CASING NX

LOGGED BY _____ DATE _____
STARTED June 12 1982
FINISHED June 23 1982

035

259036

5 cm

SCALE 1:100

LENGTH 70.12m. NORTHING 00672
AZIMUTH 270° EASTING 72722
DIP AT COLLAR -60° ELEVATION 4045
LOCATION COMPANION SKARN

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 345 PAGE 1 OF 11.3

PROJECT. AARN

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
NC					NC	
3.66						
8.23						
15.4						
11.28						
9.47						
14.33					Tu	
35.4						
17.31						
41.1						
26.42						
100				70		
23.47						
1.20				60		

MINERALISATION

TRACE OF DISSEMINATED FINE GRAINED SCHEELITE.

• RARE STOCK OF SCHEELITE.

GEOLOGY

NOT CORED

3.66m

3.66 TO 31.60m
WEATHERED UNDIFFERENTIATED SKARN

Extremely weathered pale to moderate brown skn. Original composition difficult to determine, but possibly a fine magnetite amphibole skarn with garnet

Predominant minerals are now biotite, sericite and iron oxides

From 20 metres onwards, there is an increase in the darker Fe oxides.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY DDH

CONTRACTOR McINTYRE MINES (PIONEER)
CORE NX
CASING NX (3.66m)

LOGGED BY CHW/ DATE
STARTED 26 JUNE 1984
FINISHED 27 JUNE 1984

036

259037

5 cm

SCALE 1:100

LENGTH 76.72m NORTHING 66672
AZIMUTH 276° EASTING 7272.2
DIP AT COLLAR 86 ELEVATION 4295
LOCATION COMPANION SKARN

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 345 PAGE 2 OF 3
PROJECT KARA

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL	MINERALISATION	GEOLOGY
100								
26.52								
91.34					Tc		RARE SPECKS OF SCHEELITE	As above (weathered often).
29.57								
47.88								
31.76								31.60m
71.43				30				GARNET AMPHIBOLE SKARN.
32.81					Tga			Fine to medium grained mid green to grayish green often Garnet-often Gormmy in aggregate Bedding angle vague but estimated at 30°-35°
100				35				Faint carbonate response only
35.25								35.25m
100				40				AMPHIBOLE - MAGNETITE SKARN. Probably two zone fine intermixed deposit. Magnetite content 2%, but locally can attain 70%. Rare narrow carbonate veins
38.71					Tam			
100				52	3c			
41.76								40.60m
100				60			RARE SCHEELITE SPECKS	GARNET - DIOPSIDE - MAGNETITE SKARN. Pale brown green medium to coarse grained. Irregular texture and some banding. Strong compositional banding developed.
				45	Tgdm			
44.81				50				44.00m
100					Tgd		RARE SCHEELITE SPECK.	GARNET - DIOPSIDE SKARN. Partial development of amphibole. Banding poorly developed. 45.1 - 45.8 garnet rich zone coarse grained + pitted. Similar to pre existing texture with strong compositional banding
47.85								47.60m
100					Tdm		47.9 - 48.2 - 2.0% WO3 LARGE SCHEELITE FRAGMENTS	DIOPSIDE - MAGNETITE SKARN. Dark green to black, fine grained skarn. Poorly banded. Several fractures of garnet + occasional carbonate vein
								48.15m

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA

CONTRACTOR McINTYRE MINES LP NX COMPOSITE
CORE NV
CASING NX

LOGGED BY CWN DATE JUNE 26 1984
STARTED JULY 3 1984
FINISHED

037

259038

5 cm

SCALE 1:100

LENGTH	70.72m.
AZIMUTH	270°
DIP AT COLLAR	60°
LOCATION	COMPANION RIVER SKARN
NORTHING	66672
EASTING	72722
ELEVATION	4295

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 345 PAGE 1 OF 3

PROJECT. KARR.

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL	MINERALISATION	GEOLOGY
50				50°				GARNET-DIOPSIDE SKARN. 50.90m.
50.40								GARNET-AMPHIBOLE SKARN VARIABLY banded when with carbonate locally dominant. 52.10m
100				50°	Tga			
53.45							Occasional scheelite speck.	QUARTZ DIOPSIDE AMPHIBOLE SKARN Variably textured when with abundant quartz often very fine grained. Garnet is anisotropic. Quartz veinery occasionally seen - eg 52.4 & 66.3 often carbonate veins locally present. Patches of red jasper/red mineral from 53m onward. Local alteration around carbonate veinlets. 59.3m.
100					Tgda			
57.20				60°				
46.70								
SEE 2							Trace of disseminated scheelite	
100								
54.77								DIORSIDE - AMPHIBOLE SKARN Generally fine grained & massive Some banded when contains minor garnet and possibly fine grained granitic phase Minor quartz veins and some silicification close to main granite contact 60.5-61.5 - fine grained quartzite 63.0-65.0 - quartz feldspar veins up to 1cm. 62.5-62.8 - minor fractures. 66.0m.
48.64								
61.72		25					Minor trace of scheelite	
100					Tda			
65.84		30						
100								GRANITE - Pink, medium grained granite - mainly orthoclase with only minor plagioclase Ferromagnesian - biotite and amphibole. Zone 1.5m - are fine grained and partly kaolinised. 70.72m
100		35			Gr		NS scheelite	
70.72		15						
							E.O.H 70.72m	

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY POD
CONTRACTOR McINTYRE MINES (P/L 17 CONTRACT) NX
CORE NX
CASING

LOGGED BY CHW DATE JUNE 26 1974
STARTED McINTYRE MINES
FINISHED July 3 1974

038

259039

5 cm

SCALE 1:100

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL

LENGTH 45.72m. NORTHING 25 92 E
AZIMUTH 270° EASTING 7252 2
DIP AT COLLAR 55° ELEVATION 4334.
LOCATION KARA N 266 - COMPANION

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 346 PAGE 1 OF 1/2
PROJECT KARA

MINERALISATION

GEOLOGY

NC

NOT CORED

6.71

WEATHERED SKARN.

Extremely weathered to weathered skarn with original composition difficult to determine

Rock is generally a pale brown variety with an occasional pinkish tinge.

Original rock appears to have been fine grained with local coarse grained pockets.

8.23-9.75 - Quartz rich rock with Fe oxide after ?

16.0 — 10cm of quartz rich skarn

17.4m - quartz rich rock

From 21.0m - Very broken skarn with alternating quartz rich bands and crumbly pale brown weathered skarn.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA

CONTRACTOR McINTYRE MINES COREHOLDER.
CORE NX
CASING NX

LOGGED BY SLW DATE
STARTED JULY 4. 1964
FINISHED JULY 18 1964

039

259040

5 cm

SCALE 1:1

LENGTH 45.72m NORTHING [illegible]
AZIMUTH 270° EASTING 7252.2
DIP AT COLLAR 65° ELEVATION 4433 N
LOCATION KARA N 266 - COMPANION S PROJECT. KARA

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 346 PAGE 1 OF 2

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL	MINERALISATION	GEOLOGY
4.42							RARE SCHEELITE AT 26-28m.	Weathered skarn as above.
26.21								
26.52								
80.26								
28.04								
44 28.40								
28 28.24								
4.58								
31.72								31.70m
N.C								NO CORE.
33.22				20/				33.20m
100							No scheelite fluorescence observed.	AMPHIBOLE SKARN. Very dark green fine grained amphibole skarn - texture medium. Blebs of quartz + occasionally diopside. Magnetite also present as stringers and small <2mm disseminations. Magnetite <1% overall. Minor disseminated calcite (up to 2%) developed locally. From 43.6m - traverse in crystalline vesuvianite (up to 40%)
35.36					Tic.			
71.31								
36.56								
100								
38.40								
100				45/				
1145								
100								
43.84								
70.16								
45.72								E.O.H 45.72m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES (LEATHERHAMMER)
CORE NX
CASING NX

LOGGED BY CAW DATE
STARTED JULY 4. 1984
FINISHED JULY 19 1984.

040

259041

5 cm

SCALE 1:100

LENGTH 51.35 NORTHING 6701.2

AZIMUTH 296° EASTING 7230.0

DIP AT COLLAR 65° ELEVATION 434.5

LOCATION KARA N. 266 ZONE - COMPARISON PROJECT KARA

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 347 PAGE 1 OF 1/4

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
3.66						
5.49						
7.92					Tu	
10.97						
12.50			53°			
14.02						
15.24				50		
17.07						
19.51				70		
21.95						

MINERALISATION

GEOLOGY

No core.
NX casing.

3.66m

WEATHERED SKARN

Very weathered pale brown to buff coloured leached skarn. Original composition unidentifiable at 7.0m rock becomes predominantly kaolinite - sericite with iron staining patchily developed.

Jointing weakly developed at angles from 50 - 70°
Note - In places core is less than normal NQ diameter.

14.02m

WEATHERED SKARN.

Very weathered skarn similar to preceeding section but with better developed banding and more heavily iron stained, varying from mid brown to almost black.

21.6 - 21.95 - Brown clay gouge.

22.0m

NO CORE

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES (C.C.N. COMPANY)
CORE NX
CASING NX.

LOGGED BY LWL DATE
STARTED 20th JUNE 1984
FINISHED 21st JUNE 1984

041

259042

5 cm

SCALE 1:100

LENGTH 447.32m NORTHING 6401.2
AZIMUTH 270° EASTING 7236.0
DIP AT COLLAR 65° ELEVATION 434.5
LOCATION KARA N 266 ZONE - COMPANION

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

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PROJECT KARA

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL	MINERALISATION	GEOLOGY
—								NO CORE.
27.13								27.13m.
21 cc					Tg			SILICEOUS SKARN — fragments of siliceous skarn with Aquinite staining. Brown clay always present.
25.46								32.40m.
24.54							No scheelite observed.	WEATHERED SKARN. Very weathered dark grey to olive black weathered skarn with local developed mineralogical banding - sub parallel to core axis around 31-32m.
31.09					Tu			
96.65				10/				
32.61								
10 cc								
33.53								33.60m.
97.32							No scheelite observed.	DIOPSIDE SKARN. Fine grained dark green locally banded skarn with patchy development of garnet as single crystals and small aggregates producing banding. Also fine grained magnetite up to about 5% developed throughout diopside skarn. Thin carbonate veinlets
35.66					Td			37.00m around 33.6 - 33.8m.
100				1/20				GARNET - DIOPSIDE SKARN. Green to brownish banded skarn fine to medium grained with garnets forming some subrounded aggregates. Occ diopsen content.
35.71							No scheelite observed.	40.37m. Minor patchy magnetite.
100				60/	Tgd			DIOPSIDE GARNET SKARN Dark green fine grained diopside garnet skarn with strong distinct of very fine grained magnetite with patchy fine grained garnets. Banding weakly developed.
41.76								44.20m.
42.46				35/	Tdg		No scheelite observed.	GARNET SKARN Medium to coarse grained predominantly garnet skarn with minor (<10%) diopside and local aggregates of magnetite. Brown + partially weathered
44.81			TZ					47.00m.
72.73								44.20m MAGNETITE SKARN / MINOR HORNFELS
46.02								GARNET, MAGNETITE SKARN
100 46.94					Tg			
100 47.55								
100								
					Tmg			

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY PDG
CONTRACTOR L.P. McCORMACK
CORE McINTYRE NI 1
CASING
LOGGED BY CH NJ DATE
STARTED 20 JULY 1981
FINISHED 4 Aug 1981

042

259043

5 cm

SCALE 1:100

LENGTH 81.35m NORTHING 6001.2
AZIMUTH 270° EASTING 7232.0
DIP AT COLLAR 65° ELEVATION 434.5
LOCATION KARA N-266 ZONE COMPANION PROJECT KARA

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 347 PAGE 1 OF 3 1/4

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
50						
50.6						
100						
53.64						
55				35°		
100					Tmd	
57.69					m= 60°	
100						
59.74						
60						
100						
62.76						
65				70°		
100						
65.89						
71.44					Tdy	
68.88				20°		
70					Tdm	
73.45						
70.72						
100						
72.24						
100					Tmd	

MINERALISATION

63-65 - Minor disseminated sphalerite

Minor disseminated sphalerite and associated aggregates.

68-75m estimated 0.02-0.05% zinc

GEOLOGY Fine to medium grained garnet with mag increasing to end of section.

50-71 MAGNETITE DIOPSIDE SKARN

Fine to medium grained magnetite diopside skarn with magnetite predominating

Magnetite contact usually 90°, but overall about 60°.

Diopside forms as fine grained patches with very irregular borders. From 54-58, the diopside appears to have formed reaction zones in the magnetite

Locally actinolite forms up to 10% of the rock in fine disseminated form.

Weak carbonate reaction indicating up to 5% as disseminated

The diopside is often altered and soft - cut easily with knife

56-60m - Slump breccia textures appears to have affected the texture, and also present are many examples of irregular concentric structures.

66.05m

DIOPSIDE GARNET MAGNETITE SKARN
Pale green to brownish - fine grained garnet forms irregular aggregates

67.86m

DIOPSIDE - MAGNETITE SKARN
Broken section - fine to medium grained, locally friable + weathered. Slump breccias.
68.6 - garnets disclosed.

71.0m

MAGNETITE - DIOPSIDE SKARN
Very dark green to black fine to medium grained skarn with diopside often showing alteration.
a dark emerald green amphibole is also present (tremolite)
Pyrrhotite first noted at sphalerite at 73.6

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA

CONTRACTOR McINTYRE MINES (P.N.G.) PTY. LTD.
CORE NX
CASING NX

LOGGED BY CMW DATE
STARTED 26th JULY 1974
FINISHED 2nd AUG 1974

043

259044

5 cm

SCALE 1:100

% CORE RECOVERY	CORE SPLIT	FEATURE	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
75							
75.71					45°		
77.33					30		
80							
81.35					45°		

LENGTH 81.35 NORTHING 6701 2

AZIMUTH 090° EASTING 11 36 C

DIP AT COLLAR 65° ELEVATION 4345

LOCATION KARA N - 26 ZONE COMPANION. PROJECT KARA.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT

HOLE No 347 PAGE 4 OF 4

MINERALISATION

Disseminated sulphide with some fragments up to 7mm across

75-80.m - estimated 0.1 - 0.15% sc.

GEOLOGY

From 77 to E.O.H.: dolomite is very pale green to almost grey white, although often bordered by the dark greenish variety

Soft clayey zones noted from 79m

Serpentine bubbles at 80°

E.O.H = 81.35m

Abandoned.

ANGLE READ

ANGLE CORRECTED

AZIMUTH

DEPTH

SURVEY MD

CONTRACTOR McINTYRE MINES (LITTLEMORE)

CORE NX

CASING NX

LOGGED BY _____ DATE _____

STARTED 20 JULY 1967

FINISHED 21 JULY 1967

044

APPENDIX 1B

DRILL LOGS/ASSAY RECORDS

DDH's 317, 318, 319 and 321.

045

259046

5 cm

SCALE 1 : 100

LENGTH 80.60m	NORTHING 7088.2
AZIMUTH 268° 56'	EASTING 7348.0m
DIP AT COLLAR 60°N	ELEVATION 420.7m
LOCATION KARA-NORTH. MAGNETITE ANOMALY	PROJECT KARA.

MINTARE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT

HOLE No 317 PAGE 1 OF 1/4

% CORE RECOVERY | CORE SIZE | FEATURE: INTERVAL | FEATURE: ITEM No. | FRACTURING | BEDDING | GEOLOGY | MINERAL

NC. CASED

4.57

6.32

6.90

12.89

14.63

NC.

AL.

SL.

MINERALISATION
ZONES OF WEATHERING.

W/X - 0.00 TO 26.50m

Y = 26.50 TO 34.50

F = 34.50m.

GEOLOGY

NOT CORED

NX CASING.

DRILL SITE OVERBURDEN & RUBBLE.

3.66m

ALLUVIAL RUBBLE.
CONSISTS OF HORNFELS & CONGLOMERATE - PROBABLY RIVER COBBLES. SOME HAVE SMOOTH WATER WORN FACES. POOR RECOVERY.

7.55m

PROBABLY ALLUVIAL CONTIN.
MAINLY HORNFES (MID GREY & SILICEOUS. OXIDISED ALONG JOINTS.

10.70m.

10.80 - 25.60m.
WEATHERED LIMESTONE/SANDS.
SOFT SILTS & YELLOW CLAYS

14.63m.

NO CORE COLLECTED
14.63m TO 25.60m.

SLUDGE SHOWS YELLOW SILTS & CLAYS., GENERALLY SOFT UNCONSOLIDATED MATERIAL.
DRILLING CHANGE AT 26.10m

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PAD.

CONTRACTOR MINTARE MINES (P. McGRATH)
CORE
CASING

LOGGED BY _____ DATE _____
STARTED 16. FEBRUARY 1972.
FINISHED 3. MARCH 1972.

046

259047

5 cm

SCALE 1 : 100

LENGTH 80.60m BEARING 7083.2

AZIMUTH 267° 21' EASTING 7396.0m

DIP AT COLLAR 68°N ELEVATION 420.7m

LOCATION KARA NORTH MAGNETITE ANOMALY.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT

HOLE No 317 PAGE 1 OF 2 1/4.

PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	SAMPLE INTERVAL	SAMPLE No	FRACTURING	BEDDING	GEOLOGY	MINERAL
NC							
25.60							
100							
26.83							
100		1.43	230				
27.43							
NC.							
CORE LOSS		2.75 SLUDGE	210			Tm 40.	
30.18							
100		0.82	1550				
31.09							
86.89		1.0	85		60		
32.81							
98.91		1.0	80		75		
		1.0	50			Td	
35.06							
		1.0	300				
87.32		1.0	70				
97.19		1.0	90		70		
96.15							
		1.0	190				
89.81		1.0	130				
90.16		1.0	480				
41.45		1.0	2250				
100.		1.0	110			Tm_{40}	
43.89		1.0	230				
		1.0	2450				
100		1.0	430				
46.44		1.0	90				
		1.0	300		55		
98.75		1.0	230				
		.0	50.		60.		

MINERALISATION

FINE RARE DISSEMINATED SCHEELITE AND SCHEELITE COARSE AGGREGATES.

TRACE OF SCHEELITE AT 35.2, 35.9 and 37.1m.

RARE SPECKS OF SCHEELITE DEVELOPED THROUGHOUT SECTION.

MINOR COARSE GRAINED SCHEELITE AT 41.6m.

25.60m. GEOLOGY NO CORE

26.0m CLAY - YELLOW BROWN CLAY WITH FINE GOETHITE REPRESENTS WEATHERED SKARN.

SKARN ZONE 26.0m → 80.60m.

26.0m - 34.30m.

MAGNETITE DIOPSIDE CALCITE SKARN.

Partially weathered medium to coarse grained, felted + Fe staining

Textures very variable with slump textures, relict bedding and strongly recrystallised sections.

Coarsely crystalline magnetite at 26.5, 31.0, 34.1, 37.0, 39.2, cc crystals of 5-10mm size

Strong Fe staining around 30.5 and 33m.

Fe averages 40%.

34.30m.

34.95m. DIOPSIDE CALCITE SKARN. PALE Green fine grained diopside set in calcite with minor mag.

MAGNETITE DIOPSIDE CALCITE SKARN.

Medium to coarse grained, partially weathered magnetite diopside skarn with local discriminations and coarse calcite aggregates. Trace amounts of garnet as fine grained interstitial crystals.

Rare actinolite and tremolite as small aggregates.

Strongly weathered at 37.2, and 37.7, 40.5 to 41.1.

Local concentrations of diopside between 41.3 - 41.6 and 43.5 to 43.8

Banding of minor diopside after bedding developed locally, eg 47, 48 and around 80m.

A soft greenish brown mineral (vesuvianite?) occurs very fine disseminations.

ANGLE READ

ANGLE CORRECTED

AZIMUTH

DEPTH

SURVEY POG.

CONTRACTOR McINTYRE MINES (P.N.G.) PTY. LTD. NX.

CORE

CASING

LOGGED BY

DATE

STARTED 16 FEBRUARY 1982

FINISHED 4 MARCH 1982

047

259048

5 cm

SCALE 1 : 100

LENGTH 80.60m NORTHING 7053.2
AZIMUTH 268° 50' EASTING 7398.0
DIP AT COLLAR 60°N ELEVATION 420.7
LOCATION KARA NORTH MAGNETITE ANOMALY. PROJECT KARA.

MCINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 817 PAGE 1 OF 3/4.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm WO_3	FRACTURING	BEDDING	GEOLOGY	MINERAL
		1.0	300				
100		1.0	360				
		1.0	640				
		1.0	240				
53.44		1.0	980				
100		1.0	30		50	Tm 40	
56.09		1.0	50				
		1.0	2400		50		
93.1		1.0	120		65		
59.14		1.0	140				
100		1.0	20			Tm Bc	
		1.0	10				
62.19		1.0	10				
		1.0	25				
100		1.0	50				
62.14		1.0	15		70		
		1.0	x				
100		1.0	80			Tm 55	
		1.0	450				
68.49		1.0	35				
100		1.0	10		40		
		1.0	150				
71.24		1.0	60		75		
99.64		1.0	25		60		
74.37							

MINERALISATION

RARE SPECK OF SCHEELITE.

COARSE GRAINED SCHEELITE MINERALISATION.

Trace of scheelite as coarse grained crystals.

Trace of scheelite only.

GEOLOGY

54.5-56.0 MAGNETITE OXIDISED PARTIALLY TO GOETHITE.

60.5m.
MAGNETITE SKARN -
Fine grained to medium grained magnetite with minor calcite diopside garnet + vesuvianite. Some thin veins of coarser grained magnetite

63.15m.
MAGNETITE - DIOPSIDE CALCITE SKARN.
Magnetite 50-60% with diopside and calcite.
Brecciation of pebbles with alternate bedded sections.
Less well developed bedding around 63m, but better developed at 68-70m.
Coarsely crystalline magnetite and calcite in veins at 65.5, 69.3, 70.8, 71.1 and 71.5m. These are parallel to bedding.
Minor garnet at 68.1m
Actinolite + tremolite band at 68.8m.

74.0m
DIOPSIDE SKARN MINOR MAGNETITE (1%) AND CALCITE.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A

CONTRACTOR McINTYRE MINES (P.R. McCHANCE) Pty.
CORE
CASING

LOGGED BY DATE
STARTED 16 FEBRUARY 1982
COMPLETED 4 MARCH 1982.

048

259049

5 cm

SCALE 1:100

LENGTH 80.60m	NORTHING 7083.2
AZIMUTH 262°30'	EASTING 7398.0m
DIP AT COLLAR 50°N	ELEVATION 420.7m
LOCATION KARA NORTH MAG ANOMALY	

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT

HOLE No 317 PAGE 1 OF 4/4.

PROJECT KARA.

RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ANGLE TO CA	FRACTURING	BEDDING	GEOLOGY	MINERAL
100		1.0	45°			Tm 50	
		1.0	65°				
77.60		1.0	320				
100		1.0	330		Ec		
		1.60	20.				
80.60							

MINERALISATION

1cm SCHEELITE ZONE AT 78.0m.

RARE SPECKS OF SCHEELITE.

GEOLOGY

Medium to coarse grained ahum. with abundant ahum Breccia textures alternating with strong mineralogical banding.

Breccia at 75.6 - 76.0 contains subrounded fragments. Minor yellow brown garnets in local disseminations. Strongly Brecciated from 79.6 to E.O.H.

E.O.H. 80.60m.

ANGLE READ

ANGLE CORRECTED

AZIMUTH

DEPTH

SURVEY PDA

CONTRACTOR McINTYRE MINES (P.N.'courack).

CORE

CASING

LOGGED BY CHW DATE

TABLED 16 FEBRUARY 1982.

FINISHED 4 MARCH 1982

LIBRARY

KARA N.

317 259050

(RE) 049 RECOVERY, CONSIDER 100% EXCEPT AS NOTED MAGNETITE ANOMALY

(WX) WEATHERING, CONSIDER FRESH ROCK EXCEPT AS NOTED. WX INDICATES CLAYEY, LIMONITIC MATERIAL 1/3

SECTION:				ASSAY				AVE:			AVE:		
SAMP NO.	REC WX	INTERVAL	LGTH	ppm WO_3	% Fe	ppm Ag	ppm Sn	INVL	LGTH SM-%	WT AR AV.	INVL	LGTH SM-%	WT AR AV.
D317 1	CORE	26·0 -27·43	1·43	230	50·4	2	540						
D317 15	SLUDGE	27·43 -30·18	2·75	210.									
D317 2	CORE	30·18 - 31·0	0·82	1650	44·7	2	460						
3	"	31·0 - 32·0	1·0	55	41·4	2	420						
4	"	32·0 - 33·0	1·0	35	47·8	2	500						
5	"	33·0 - 34·0	1·0	80	44·8	2	700						
6	"	34·0 - 35·0	1·0	50	32·6	1	360						
7	"	35·0 - 36·0	1·0	300	43·0	2	560						
8	"	36·0 - 37·0	1·0	70	43·6	3	470						
9	"	37·0 - 38·0	1·0	90	51·6	2	660						
10	"	38·0 - 39·0	1·0	190	54·0	3	490						
11	"	39·0 - 40·0	1·0	130	54·3	3	460						
12	"	40·0 - 41·0	1·0	480	56·2	2	500						
13	"	41·0 - 42·0	1·0	2250	40·3	2	660						
14	"	42·0 - 43·0	1·0	110	41·8	1	1450						
15	"	43·0 - 44·0	1·0	230	43·5	3	360						
16	"	44·0 - 45·0	1·0	2450	50·0	2	440						
17	"	45·0 -46·0	1·0.	430.	50·5	1.	380.						
18	"	46·0 -47·0	1·0	90	35·6	2	300						
19	"	47·0 - 48·0	1·0	300	34·4	2	290						
20	"	48·0 -49·0	1·0	230	21·3	2	220						
21	"	49·0 - 60·0	1·0	150	24·7	1	250						
22	"	60·0 - 61·0	1·0	300	29·4	1	290						
23.	"	61·0 -62·0	1·0.	560	32·1	2	310						

INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE

COMMENT

PROJECT KARA N MAG ANOMALY

DDH 317

FILE 030 INITIAL JOB NO. 77-1004-66/82 1/2 CORE LIBRARY KARA NORTH D.D.H. 317 259051

(REC) ALL SAMPLES, CONSIDER 100% EXCEPT AS NOTED MAGNETITE ANOMALY.

(WX) WEATHER NO. CONSIDER FRESH ROCK EXCEPT AS NOTED. WX INDICATES CLAYEY, LIMONITIC MATERIAL 2/3.

SECTION:				ASSAY					AVE:			AVE:		
SAMP NO.	REC WX	INTERVAL	LGTH		ppm WO_3	% Fe	ppm Ag.	ppm Sn	INVL	LGTH SM-%	WT AR AV.	INVL	LGTH SM-%	WT AR AV.
D317 24	CORE	52.0 - 53.0	1.0		640	27.3	2	260						
25	"	53.0 - 54.0	1.0		240	32.6	2	310						
26	"	54.0 - 55.0	1.0		980	35.6	2	310						
27	"	55.0 - 56.0	1.0		50	29.5	2	250						
28	"	56.0 - 57.0	1.0		50	21.6	2	250						
29	"	57.0 - 58.0	1.0		9400	38.5	1	1400						
30	"	58.0 - 59.0	1.0		120	45.3	1	450						
31	"	59.0 - 60.0	1.0		140	40.8								
32	"	60.0 - 61.0	1.0		20	50.6								
33	"	61.0 - 62.0	1.0		10	53.5								
34	"	62.0 - 63.0	1.0		15	55.3								
35	"	63.0 - 64.0	1.0		25	43.1								
36	"	64.0 - 65.0	1.0		60	35.5								
37	"	65.0 - 66.0	1.0		15	43.9								
38	"	66.0 - 67.0	1.0		X	37.4								
39	"	67.0 - 68.0	1.0		80	44.7								
40	"	68.0 - 69.0	1.0		480	44.8								
41	"	69.0 - 70.0	1.0		35	37.5								
42	"	70.0 - 71.0	1.0		20	38.2								
43	"	71.0 - 72.0	1.0		150	29.3								
44	"	72.0 - 73.0	1.0		60	38.5								
45	"	73.0 - 74.0	1.0		25	33.6								
46	"	74.0 - 75.0	1.0		25	17.7								
47	"	75.0 - 76.0	1.0		45	42.9								
48	"	76.0 - 77.0	1.0		65	48.2								
49	"	77.0 - 78.0	1.0		390	44.6								

INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE

COMMENT PROJECT

FREE 051 [illegible] LIBRARY D.D.H. 259052

(REC) RECOVERY, CONSIDER 100% EXCEPT AS NOTED MAGNETITE ANOMALY 317

(WX) WEATHERING, CONSIDER FRESH ROCK EXCEPT AS NOTED. WX INDICATES CLAYEY, LIMONITIC MATERIAL 313

SECTION:				ASSAY			AVE:			AVE:		
SAMP NO.	REC WX	INTERVAL	LGTH	ppm WO_3	% Fe.		INVL	LGTH SM-%	WT AR AV.	INVL	LGTH SM-%	WT AR AV.
D317 50	CORE	78·0 - 79·0	1·0	330	43.1							
D317 51	"	79·0 - 80·60	1·60	20	39.3							

INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE

COMMENT PROJECT

SEC 052 LIBRARY D.D.H. 259052

817 RECHECKS

(REC) RECOVERY, CONSIDER 100% EXCEPT AS NOTED

(WX) WEATHER NO. CONSIDER FRESH ROCK EXCEPT AS NOTED. WX INDICATES CLAYEY, LIMONITIC MATERIAL

SECTION:				ASSAY					AVE:			AVE:		
SAMP NO.	REC WX	INTERVAL	LGTH	%Fe	①	②	③	Sn.	INVL	LGTH SM-%	WT AR AV.	INVL	LGTH SM-%	WT AR AV.
0317 1	0222 7			50.4	230	250	375	460						
2	15			44.7	1550	1650	1690							
3	22			41.4	55	60	63.							
4	8			47.8	35	45	62							
5	2			44.8	80	95	69							
6	16			32.6	50	55	26							
7	23			43.0	300	330	271							
8	6			43.6	70	100	149							
9	14			51.6	90	~~130~~	169 ~~164~~							
10	26			~~54.0~~ 53.0	190	200	247							
11	1			54.3	130	150	250							
12	17			66.2	480	520	729.							
13	13			40.3	2250	2400	2520.							
14	29			41.6	110	100.	93							
15	18			43.5	230	250	214.							
16	4			50.0	2450	2650	2800							
17	30			50.5	430	620	812.							
18	9			35.6	90	210.	64.							
19	27			34.9	300	330.	252							
20	3			21.3	230	200	185							
21	21			24.7	150	210	134							
22	26			21.4	300	520	335							
23	24			92.1	560.	560	433							
24	11			27.3	640.	700	642.							
25	12			32.6	240	280	195							
26	19			25.6	980	1150	1280.							

INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE

COMMENT PROJECT

FILE 053 LIBRARY D.D.H. 259054 3/7

(REC) RECOVERY, CONSIDER 95% EXCEPT AS NOTED

(WX) WEATHERING, CONSIDER FRESH ROCK EXCEPT AS NOTED. WX INDICATES CLAYEY, LIMONITIC MATERIAL

SECTION:				ASSAY					AVE:			AVE:		
SAMP NO.	REC WX	INTERVAL	LGTH	%Fe					INVL	LGTH %M-%	WT AR AV.	INVL	LGTH %M-%	WT AR AV.
D317	3122													
27	S			29.5	60	70	100							
28	20			21.6	50	60	55							
29	10			38.5	9400	9600	9710							
30	25			45.3	120	120	64							

INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE

051

259055

5 cm

SCALE 1 : 100

LENGTH 124.69m NORTHING 7052.6
AZIMUTH 287° EASTING 7392.4
DIP AT COLLAR 70°W ELEVATION 421.1
LOCATION KARA. NORTH. MAG ANOMALY.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 318 PAGE 1 OF 4
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm WO3	FRACTURING	BEDDING	GEOLOGY	MINERAL
29.87						NC.	
28.6		1.3				W Tu.	
30.78							
87.0		1.0					
31.76					50/		
100		1.0					
32.61							
41.42		1.0					
		1.0				W Tm40	
35.06							
111		4.0					
37.49							
33							
39.01							
100		1.0					
39.93							
89.5		1.0			10/	Tmd 40	
41.45				:	F		
100		1.0					
42.06							
		1.0					
43.5		1.0					
		1.0					
44.81							
100		1.0				Tm 60.	
		1.0		vvf			
47.85		1.0					
		1.0		2/			
100				1=			
		0					

MINERALISATION

29.87m – 30.78m WEATHERED SKARN. Heavy fe staining and some magnetite matty rubble

31.80m trace of scheelite.

24.10 – trace scheelite.

39.01m – 39.93m MAGNETITE-DIOPSIDE-CALCITE SKARN. Partly weathered skarn showing minor pitting and some Fe staining. 40.5m – thin fault plane showing slickensides. Magnetite and calcite of known crystals up to 5mm.

39.93m – 42.06m MAGNETITE – DIOPSIDE – CALCITE SKARN. Well crystallised and relatively fresh. Some minor areas of actinolite occur locally. Very fine calcite present. Magnetite content increases locally to 80%. Bedding poorly developed. Slump structures developed locally a brownish alteration accompanies the scheelite.

minor disseminated scheelite in interval 43-46m with good scheelite at 43.1 and 45.9m.

48-50m ~ 0.20% Some good coarse grained scheelite amongst minor disseminated scheelite

GEOLOGY

0 – 29.87m – NO CORE.

Sludge taken from 21.58m.

29.87m – 30.78m WEATHERED SKARN. Heavy fe staining and some magnetite matty rubble

30.78m – 39.01m WEATHERED MAGNETITE SKARN. Dark brown to locally black skarn with strong Fe staining and some fresh magnetite. Bedding visible locally. Some relatively fresh diopside visible. Core generally strongly pitted. Yellowish laminae developed locally.

39.01m – 42.06m MAGNETITE-DIOPSIDE-CALCITE SKARN. Partly weathered skarn showing minor pitting and some Fe staining. 40.5m – thin fault plane showing slickensides. Magnetite and calcite of known crystals up to 5mm.

42.06m – 47.85m MAGNETITE – DIOPSIDE – CALCITE SKARN. Well crystallised and relatively fresh. Some minor areas of actinolite occur locally. Very fine calcite present. Magnetite content increases locally to 80%. Bedding poorly developed. Slump structures developed locally a brownish alteration accompanies the scheelite.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES (PTY) LTD (CANADA). NO.
CORE
CASING

LOGGED BY CHN DATE 10 MARCH 1982
TABLED 1 APRIL 1982

055

259056

5 cm

SCALE 1:100

LENGTH 124.64m NORTHING 7052 6
AZIMUTH 227° EASTING 7342 N
DIP AT COLLAR 70° ELEVATION 421.1 m.
LOCATION KARA NORTH MAG. ANOMALY.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 318 PAGE 1 OF 2

PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	INTERVAL	APM NC3	FRACTURING	BEDDING	GEOLOGY	MINERAL
100		1.0					
50.50							
98.4		1.0					
		1.0					
		1.0					
53.95							
		1.0					
100		1.0					
		1.0			15/		
57.0							
		1.0				Tm d	
100		1.0				60	
		1.0					
60.05							
		1.0					
100		1.0					
		1.0					
63.10							
		1.0					
100		1.0					
		1.0					
66.15							
		1.0					
100		1.0					
		1.0			60	Td.	
69.20							
		1.0					
100		1.0					
		1.0					
72.25					45	Tmd	
100							
					60		

MINERALISATION

52-53m
Trace of scheelite.

56m - Thin band (7cms) fine scheelite.

Rare specks of scheelite.

Rare specks of scheelite.

GEOLOGY

Magnetite, diopside, calcite skarn (as above).

53.75-56.2. - magnetite content is 15% or less and is essentially a diopside-calcite cornfels.

Patches of actinolite occur irregularly throughout.

Coarse grained magnetite up to 5mm occurs in bands up to 30cm thick usually associated with crystalline calcite.

56.4-66.55 - band of pure crystalline calcite; similar bands at 66.9m (5cm) 68-68.2

Magnetite content overall 60%.

Calcite common throughout producing an optical texture with magnetite and/or diopside.

Fracture + Fe stains at 62.1-62.2

65.1

DIOPSIDE CALCITE SKARN.
with up to 10% magnetite
Brown alteration around magnetite.
Vague banding (60°) developed

70.3

MAGNETITE-DIOPSIDE SKARN.

Sequence of alternating bedded and slumped rocks with magnetite generally fine grained with only local recrystallisation.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY R.D.A.

CONTRACTOR McINTYRE MINES (E.R. CONTRACT)
CORE
CASING

LOGGED BY C.H.W. DATE 10 MARCH 1982
STARTED 2 APRIL 1982

056

259057

5 cm

SCALE 1: 100

LENGTH 124.69m NORTHING 7052.6
AZIMUTH 287° EASTING 7892.N.
DIP AT COLLAR 70°N ELEVATION 4211
LOCATION KARA. NORTH MAG ANOMALY.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT

HOLE No 318 PAGE 7 OF 317

PROJECT KARA.

% CORE RECOVERY	CORE SIZE	FEATURE INTERVAL	Dia Mks	FRACTURING	BEDDING	GEOLOGY	MINERAL
75.30							
100							
78.35					70		
100							
81.40					60		
100							
84.45							
100							
87.50						Tmd	
100							
90.55					45		
100							
93.60							
100					70		
96.65				20/F	60		
98.75				6/1.2			
100							

MINERALISATION

81.30 - Rare scheelite.

85-90 trace scheelite.

Rare speck of scheelite.

GEOLOGY

MAGNETITE DIOPSIDE SKARN.

Similar skarn as above.

Minor mineralogical variations locally, eg at 814m. where very coarse magnetite common.

Red fluorescence - possibly hydrogarnet associated with brown alteration near shear zones, eg @ 86m.

Slump brecciation alternating with bedded sequence still dominant.

Light to red brown alteration from 90-91, associated with a reddish fluorescence under U.V. light.

From 96m core is broken and faulted and locally replaced by kaolin in amphibole or pyroxene rich sections.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY

CONTRACTOR McINTYRE MINES (P.N.G.) No.
CORE CASING

LOGGED BY CHW. DATE
STARTED 10 MARCH 1982
COMPLETED 9 APRIL 1982

057

259058

5 cm

SCALE 1: 100

LENGTH 124.69m NORTHING 7052.6
AZIMUTH 227° EASTING 7392.4
DIP AT COLLAR 70°N ELEVATION 421.1
LOCATION KARA. NORTH MAG. ANOMALY. PROJECT KARA.

WESTERN MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 318 PAGE 1 OF 4

RECOVERY %	CORE LOSS	FEATURE INTERVAL	FEATURE TYPE	FRACTURING	BEDDING	GEOLOGY	MINERAL
100				10/F			
102.13							
100				40/F			
103.32							
100						Tmd	
105.49						m-60	
100				F			
107.61							
45.05							
105.83							
100							
111.88							
100				45/F			
114.93							
100						Tdm	
117.98				05/F			
100					45		
121.03							
100					50/60	Tmd	
123.47							
87.2							

MINERALISATION

102.26 - Minor disseminated scheelite over 18 cms (0.3%).

Rare specks of scheelite.

118 - Minor disseminated scheelite adjacent to fault.

Rare speck of scheelite.

GEOLOGY

MAGNETITE DIOPSIDE SKARN (AS ABOVE).

Also patchy development of actinolite.

Large degree of fracturing and faulting.

Healed fault at 99.7 - 100.4.

Weakly developed fault with slickensides at 103 m.

Skarn weathered and kaolinised at these faults.

From 96.5m - 103.35m, approx. 50% of core is in fragments smaller than 5cm.

112.7 - Fault at 45° - Brown gauge + calcite

113.5m

BLEACHED DIOPSIDE MAGNETITE SKARN.

with patchy development of garnet for 0.5m from start of section. Section is porous and permeable with local concentration of magnetite. Overall average 3%.

Fault at 117.6m

Irregular development of actinolite in patches

Minor intervalital carbonate

119.4m

MAGNETITE DIOPSIDE SKARN.

Predominantly slump breccia skarn, alternated with bedded skarn. Bedding variable between 45°-80°.

Magnetite often well crystallised, but also in compact masses.

Brownish alteration of diopside rich areas common in first 2m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY

CONTRACTOR WESTERN MINES (P.N.G.) COMPANY
CORE No
CASING

LOGGED BY CHW DATE 10 MARCH 1982
STARTED 10 MARCH 1982 COMPLETED 2 APRIL 1982

FREP

LIBRARY

D.D.H. 259059

318

(REC) ~~ASSAY~~ 058, CONSIDER 100% EXCEPT AS NOTED

(WX) MATERIAL, CONSIDER FRESH ROCK EXCEPT AS NOTED. WX INDICATES CLAYEY, LIMONITIC MATERIAL

KARA NORTH
MAG ANOMALY.

1/2

SECTION:				ASSAY					AVE:			AVE:		
SAMP NO.	REC WX	INTERVAL	LGTH	ppm WO3					INVL	LGTH SM-%	WT AR AV.	INVL	LGTH SM-%	WT AR AV.
DDH 1	CORE	29.87-31.0	1.13	860										
2	"	31.0-32.0	1.0	780										
3	"	32.0-33.0	1.0	620										
4	"	33.0-34.0	1.0	2800										
5	"	34.0-35.0	1.0	460										
6	"	35.0-39.0	4.0	430										
7	"	39.0-40.0	1.0	110										
8	"	40.0-41.0	1.0	110										
9	"	41.0-42.0	1.0	80										
10	"	42.0-43.0	1.0	5200										
11	"	43.0-44.0	1.0	415										
12	"	44.0-45.0	1.0	620										
13	"	45.0-46.0	1.0	840										
14	"	46.0-47.0	1.0	1150										
15	"	47.0-48.0	1.0	30										
16	"	48.0-49.0	1.0	980										
17	"	49.0-50.0	1.0	1000										
18	"	50.0-51.0	1.0	95										
19	"	51.0-52.0	1.0	10										
20	"	52.0-53.0	1.0	20										
21	"	53.0-54.0	1.0	25										
22	"	54.0-55.0	1.0	30										
23	"	55.0-56.0	1.0	25										
24	"	56.0-57.0	1.0	280										
25	"	57.0-58.0	1.0	80										
26	"	58.0-59.0	1.0	190										

INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE

COMMENT

PROJECT

FREE ... CORE

LIBRARY

D.D.H. 259060

318

(REC) 059 ... CORE, CONSIDER 95% EXCEPT AS NOTED KARA. NORTH

(WX) MATERIAL, CONSIDER FRESH ROCK EXCEPT AS NOTED. WX INDICATES CLAYEY, LIMONITIC MATERIAL 2/2. MAG. ANOMALY.

SECTION:				ASSAY	AVE:			AVE:		
SAMP NO.	REC WX	INTERVAL	LGTH	PPM WO_3	INVL	LGTH SM-%	WT AR AV.	INVL	LGTH SM-%	WT AR AV.
D318 27	CORE	59.0 - 60.0	1.0	660						
28	"	60.0 - 61.0	1.0	10						
29	"	61.0 - 62.0	1.0	1450						
30	"	62.0 - 63.0	1.0	310						
31	"	63.0 - 64.0	1.0	160						
32	"	64.0 - 65.0	1.0	25						
33	"	65.0 - 66.0	1.0	L.10.						
34	"	66.0 - 67.0	1.0	150						
35	"	67.0 - 68.0	1.0	40						
36	"	68.0 - 69.0	1.0	60						
37	"	69.0 - 70.0	1.0	30						
38	"	70.0 - 71.0	1.0	25						
39	"	70.0 - 72.0	1.0	85						

INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE

COMMENT

PROJECT

060

259061

5 cm

SCALE 1:100

LENGTH 99.99m NORTHING 6521.1
AZIMUTH 90° EASTING 7326.3
DIP AT COLLAR 83°E ELEVATION 4434
LOCATION COMPANION SKARN

EXPLORATION DEPARTMENT
HOLE No 319 PAGE 1 OF 1/4
PROJECT KARA.

% CORE RECOVERY	CORE SIZE	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
NC					NC	
3.05						
23.68					AL.	
44.74						
5.49						
5.90						
6.10						
73.67						
7.01						
13.72					SL.	
14.02						
87.86						
17.07						
93.45						
17.98						
76.65						
19.31					W/Tu.	
77.65						
23.20						
79.61						
23.77						
96.13						

MINERALISATION

GEOLOGY

NOT CORED.

3.05m

RIVER GRAVEL - ALLUVIAL
CLAY + BOULDERS

Cream to yellow brown clay and waterworn pebbles and boulders. Rock types present are quartzite, microgranite + hornfels.

8.00m

LIMESTONE.

Extremely weathered limestone and skarn

Rock is buff to pale brown consisting largely of kaolin.

12.00m

12.00 to 25.30m.

WEATHERED SKARN.

Light brown, extremely weathered skarn showing remnant foliation after microscopical banding.

Dark patches assumed to represent original magnetite.

Bedding angles not clearly discernable.

22.3 - 25.0 - predominantly fine rubble, brecciated.

Continued to 25.30m

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY P.D.A.

CONTRACTOR McINTYRE MINES (P.N.G.) COMPANY
CORE NQ
CASING

LOGGED BY CHW DATE
STARTED 6 APRIL 1982
FINISHED 21 APRIL 1982

061

259062

5 cm

SCALE 1:100

LENGTH 99.99m NORTHING 6521.1
AZIMUTH 80° EASTING 7326.3
DIP AT COLLAR 83°E ELEVATION 434.4
LOCATION COMPANION SKARN.

EXPLORATION DEPARTMENT
HOLE No 319 PAGE 1 OF 2/4
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
25.30						
100						
27.13				60	Td	
100						
				46	Tgd	
30.16					Tdm	
				40		
100						
				50	Tm 70	
33.22				70		
100				40	T.	
36.27						
100				30	Tda	
39.37						
100						
42.37						
100				30	Tm 60	
45.42						
100						
				60		
48.46						
100						

MINERALISATION

NIL Mineralisation.

Nil.

One speck of scheelite at 43.3m.

25.30m — GEOLOGY —

DIOPSIDE SKARN.

PALE to mid green fine grained texture. Never patchy magnetite common. Last metre contains fine grained actinolite – tremolite and rare patches of garnet. Magnetite overall < 2%.

29.05m.

29.40m GARNET DIOPSIDE SKARN. very fine grained with thin calcite veins.

30.20m DIOPSIDE MAGNETITE SKARN Dark green, fine grained banded skarn with minor garnet + actinolite

MAGNETITE – DIOPSIDE SKARN

Medium to coarse grained skarn. being predominantly magnetite. often subspherical aggregates and coalescing into massive patches. Irregular bedding visible throughout.

34.20m

34.60m DIOPSIDE – MAGNETITE SKARN ~20°

35.20m MAGNETITE – DIOPSIDE SKARN ~70°

DIOPSIDE – ACTINOLITE – GARNET Sk

35.80m Weakly banded with thin calcite veins

36.45m MAGNETITE DIOPSIDE SKARN with banded actinolite.

DIOPSIDE – ACTINOLITE GARNET SKARN fine grained, banded with some diffuse alteration. Possible collapse breccia at 36.90m with magnetite matrix

38.40m Rare aggregates of calcite.

MAGNETITE DIOPSIDE SKARN.

fine to medium grained magnetite diopside skarn with 60% magnetite. This is a very irregular section with irregular bedding and veins (irregular) plus extensive leaching and alteration.

Small aggregates of calcite developed locally.

Patchy development of actinolite with diopside, with actinolite predominant.

46-49m – magnetite forms subordinate patches, giving spotty appearance.

Patchy alteration sections give positive carbonate test. Carb is too fine to be identified by eye.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES (P.N. CORMACK). No.
CORE CASING

LOGGED BY CHN. DATE
STARTED 6 APRIL 1982
FINISHED 21 APRIL 1982.

062

259063

5 cm

SCALE 1:100

LENGTH 99.99m NORTHING 6521.1
AZIMUTH 90° EASTING 7326.3
DIP AT COLLAR 83° ELEVATION 434.4
LOCATION COMPANION SKARN.

MT ISA MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 219 PAGE 1 OF 3/N
PROJECT KARA.

RECOVERY % | CORE LOSS | FEATURE | FRACTURING | BEDDING | GEOLOGY | MINERAL

	MINERALISATION	GEOLOGY
100		MAGNETITE SKARN CONTINUED,
51.51		Thin carbonate veins 32.0-52.5.
100		Slumpy, brecciation (soft sediment) and alteration common from 52-57.3m.
54.56		
100		Strong development of actinolite at 57.8 in rosettes up to 8mm in diameter.
57.61		
100	Disseminated scheelite in vein at 60.4m.	From approx 58m to 63.6m. magnetite content is plus 80% and locally over 95%.
60.66		Towards end of run there is an increase in actinolite content and diffuse alteration as contact with underlying granite is reached.
77.32	63.05m - trace of scheelite in vein.	A few thin carbonate veins are apparent
63.10		at 63.10m - a carbonate quartz vein (5cm wide) with minor scheelite + ? tourmaline.
100		
66.15	Rare scheelite spot.	
100		68.0m.
69.20		GRANITE.
100		Fine grained pinkish to green fractured and altered granite.
72.25		Epidote alteration developed patchily.
100		Thin carbonate and epidote veins subparallel to core axis.
73.71		alteration consists of silicification, potash alteration and introduction of epidote.
100		72-73.5m - very broken section.
		73.7-73.9 - fault breccia matrix of calcite

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY POLARIS

CONTRACTOR MT ISA MINES LTD (CONTRACT).
CORE NIL.
CASING

LOGGED BY CHW DATE
STARTED 6. APRIL 1982
FINISHED 21. APRIL 1982.

063

259064

5 cm

SCALE 1:100.

LENGTH 99.99m NORTHING 6521.1
AZIMUTH 90° EASTING 7326.3
DIP AT COLLAR 83°E ELEVATION 434.4
LOCATION COMPANION SKARN.

MINTAIL MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 319 PAGE 1 OF 4
PROJECT KARA.

RECOVERY % CORE	CORE LOSS	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL	MINERALISATION	GEOLOGY
100					Gr.			76.8 - 79.2. Completely altered, semi transitional zone between skarn and granite, although no magnetite present. Granite locally quartz rich altered 79 - 81.1m. Quartz carbonate veins occur locally with dark green amphibole.
75-90								81.90m
100								QUARTZ - EPIDOTE ROCK. Fine grained, bright green quartz epidote rock generally pitted exterior. Epidote abundant over quartz. Irregular blebs and veins consisting of calcite + fluorite (non-fluorescent) Well crystalline epidote often occurs in vicinity of carbonate veins.
78.95								
100								
82.00								
100								
85.05							86.50m Trace of disseminated scheelite.	
100					QE.			
88.10								
100					QE/T			89.05m TRANSITION ZONE - Between skarn and quartz epidote. Abundant carbonate
90								89.50m GARNET - DIOPSIDE - ACTINOLITE - MAGNETITE SKARN. A very variable section. Vague bedding. Bedding often gives way to soft sediment slump structures. 93.80 - 20mm bed of >95% magnetite Rare carbonate veins
91.15			5°					
100					Tgd			
94.20								
95								
100								
97.25			45°					96.35m GARNET DIOPSIDE SKARN. Fine grained garnet-diopside with occasional blebs of magnetite and diffuse areas of dark green amphibole.
100			60°		Tgd.			98.45
100.00					Gr.			GRANITE Red brown to pink porphyritic granite. Feldspars to 15mm. Local epidote alteration
								E.o.H 99.99m

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY POG.

CONTRACTOR Re MINTAIL MINES C.P.N. CHROMACK. n/a.
CORE
CASING

LOGGED BY CHW DATE 6 APRIL 1982
STARTED 31 APRIL 1982

064

259065

5 cm

SCALE 1:100.

LENGTH	NORTHING 7154·8
AZIMUTH 270.	EASTING 7390·8
DIP AT COLLAR 87°W	ELEVATION 4423.0.
LOCATION KARA · NORTH MAGNETITE ANOMALY	PROJECT KARA.

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT

HOLE No 321 PAGE 1 OF 1/2

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm WO₃	FRACTURING	BEDDING	GEOLOGY	MINERAL
0							
5							
						NC.	
NC.							
10							
15							
15·24							
33.66		1·76	140			CI	
17·66		1·0	240				
		1·0	70			Tg	
1737		1·73	75		20/		
20							
20·73							
NC.		NC.				NC	
22·25							
74·34		0·75	280				
23 77		1·0	160				
		1·0	260		0	Tm 60.	
45·98							

MINERALISATION

Traces of disseminated pyrrhotite up to 1mm.

GEOLOGY

15·24m.

NO CORE.

17·66m

CLAY. Pale grey and whitish clay with light brown patches. Texture appears to be after skarn

20·15m

GARNET SKARN.
Weathered and broken section of garnet skarn, with fine grained diopside. Some Fe staining possibly after magnetite. Garnet is pale to mid brown.

22·25m

NO CORE.

MAGNETITE DIOPSIDE SKARN
Partially weathered fine to medium grained skarn with minor crystalline calcite. Diopside locally bleached. Occasional coarse crystalline magnetite to 5mm

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY

CONTRACTOR McINTYRE MINES (P. N. McCUMMER)

CORE CASING

LOGGED BY CHW. DATE

STARTED 10 MAY. 1982

065

259066

5 cm

SCALE 1:100

LENGTH 45·72	NORTHING 7154·6
AZIMUTH 270	EASTING 7390·8
DIP AT COLLAR 87°	ELEVATION 423·0
LOCATION KARA NORTH MAGNETITE ANOMALY.	

M'INTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT

HOLE No 321 PAGE 2 OF 2.

PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm WO3	FRACTURING	BEDDING	GEOLOGY	MINERAL
45·40		1.0	13c				
26·21		1.0	13c				
21·52							
26·68		1.0	12C				
26·96		1.0	45C				
100		1.0	13C		5/	Tm.	
25·77							
100		1.0	18C				
		1.0	76C		15/		
32·61		1.0	60C				
31·64							
33·22		1.0	4C				
100		1.0	21C		20/	Ta	
		1.0	78C			Tmd 50	
31·27		1.0	28C				
32·64							
37·19		1.0	57C				
21·71		1.0	40			Tg.	
32·71		1.0	170		30/		
100		1.0	230				
40·54		1.0	35			Tgd.	
100		1.0	20.				
42·67		1.0	25		20/	Tgd	
97·72		1.72.	45.				
45·72							

MINERALISATION

Fine grained disseminated scheelite over interval 26-27m - estimated 0.4% WO3

A few large grains of scheelite and patchy disseminations.

34·70m

Minor disseminated scheelite 34-36 - Estimated 0·3%.

Rare speck of scheelite

Rare scheelite.

Rare scheelite.

GEOLOGY

Skarn generally partially weathered to 29 metres. Ie, minerals other than magnetite have broken down into yellowish or pale brown powdery forms.

From 29m, weathering is localised around joints where Fe staining is common.

From 30·2 - 33·4 coarsely crystalline skarn is prevalent varying in composition over 5-10cm from diopside rich to magnetite rich and calcite rich.

Grain size varies from 2-10mm.

34·40m

DIOPSIDE SKARN — Fine grained pale green skarn with minor calcite + magnetite.

MAGNETITE DIOPSIDE SKARN — Similar to above — minor garnet present.

26·27m

GARNET SKARN.

Fine grained pale pink-brown skarn with patchy development of magnetite and diopside. Occasional clusters of magnetite which are very coarse grained. Wispy alteration features evident locally. Traces of pyrolusite on joints

Hydrogarnet apparent.

39-40.85m.

40·85

GARNET-DIOPSIDE SKARN

Fine to medium grained skarn with bands of coarse grained magnetite

42·10m Hydrogarnet at 41·2m.

GARNET DIOPSIDE-MAGNETITE SKARN with coarse grained calcite. Section becomes well crystalline and coarse grained towards bottom of hole.

Magnetite 20%.

Diffuse alteration in diopside rich sections.

45·72m

E.O.H 45·72m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY

M'INTYRE MINES / PYCUMBRIDGE

CONTRACTOR
CORE
CASING

DATE

LOGGED BY GWW 18 MAY 1982.
STARTED
FINISHED

FILE 066 G145/82. G289/82.

LIBRARY

D.D.H. 259067

(REC) RECOVERY, CONSIDER 100% EXCEPT AS NOTED

(WX) WEATHERING, CONSIDER FRESH ROCK EXCEPT AS NOTED. WX INDICATES CLAYEY, LIMONITIC MATERIAL

AMAX NORTH MAGNETITE PROSPECT

321

1/2

SECTION :

ASSAY

AVE:

AVE:

SAMP NO.	REC WX	INTERVAL	LGTH	ppm Wo3	INVL	LGTH SM-%	WT AR AV.	INVL	LGTH SM-%	WT AR AV.
D521 1	CORE	15.24 - 17.0	1.76	140						
2	"	17.0 - 18.0	1.0	240						
3	"	18.0 - 19.0	1.0	70						
4	"	19.0 - 20.73	1.73	75						
5	"	22.25 - 23.0	0.75	280						
6	"	23.0 - 24.0	1.0	160						
7	"	24.0 - 25.0	1.0	260						
8	"	25.0 - 26.0	1.0	130						
9	"	26.0 - 27.0	1.0	230						
10	"	27.0 - 28.0	1.0	120						
11	"	28.0 - 29.0	1.0	450						
12	"	29.0 - 30.0	1.0	130						
13	"	30.0 - 31.0	1.0	180						
14	"	31.0 - 32.0	1.0	760						
15	"	32.0 - 33.0	1.0	600						
16	"	33.0 - 34.0	1.0	40						
17	"	34.0 - 35.0	1.0	210						
18	"	35.0 - 36.0	1.0	780						
19	"	36.0 - 37.0	1.0	280						
20	"	37.0 - 38.0	1.0	50						
21	"	38.0 - 39.0	1.0	40						
22	"	39.0 - 40.0	1.0	170						
23	"	40.0 - 41.0	1.0	250						
24	"	41.0 - 42.0	1.0	35						
25	"	42.0 - 43.0	1.0	20						
26	"	43.0 - 44.0	1.0	25						

INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE

COMMENT

PROJECT

DDH 321

259068

(REC) 067 6154/82
(WX) WEATHERING, CONSIDER [illegible]

[illegible] MAGNETITE ANOMALY
AS NOTED. WX INDICATES CLAYEY, LIMONITIC MATERIAL 2/2

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SECTION :

ASSAY

AVE :

AVE :

SAMP NO.	REC WX	INTERVAL	LGTH	PPM WC	INVL	LGTH SM-%	WT AR AV.	INVL	LGTH SM-%	WT AR AV.
D321 27	CORE	44.6 45.72	1.72	45.						
D321 19	SL WDG	15.24-17.68	2.44	200						
25		17.68-20.73	3.05	150						
35		20.73-23.77	3.04	1450						
45		23.77-25.60	1.83	900.						

INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE

COMMENT

PROJECT [illegible] MAGNETIC ANOMALY

DDH 321

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APPENDIX NO. 2

McINTYRE MINES (AUSTRALIA) PTY. LTD.

PRE - DEVELOPMENT PROGRAMME

KARA TUNGSTEN PROJECT

C. H. WHITEHEAD.

31st DECEMBER, 1983.

McINTYRE MINES (AUSTRALIA) PTY. LTD.

PRE - DEVELOPMENT PROGRAMME

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INTRODUCTION & SUMMARY

The Pre-Development Programme was initiated by McIntyre Mines (Australia) Pty. Ltd. ("McIntyre") in 1981 and completed by December 1983.

The prime objective of the 'Programme' was to complete detailed investigations of the Kara Properties, collecting sufficient data to assess the economic viability of the main tungsten deposits, thereby providing a basis for a decision as to whether to proceed to Development of the Kara Properties.

As foreshadowed in the concluding statement of the 'Programme' itself, the nature of work completed during the 'Programme' varied slightly from that proposed, but it is believed modifications provided a more extensive and diversified review of the technical and economic aspects of the Properties and fulfilled the objective of the 'Programme'.

The Pre-Development Work consisted of a combination of investigations, primarily exploration work, infill and exploratory drilling, metallurgical investigations, ore reserve studies, mine planning, production studies and economic evaluations. The work was performed by McIntyre, its affiliated companies, or contracted specialists in the mining field. Total project expenditures during the 1981-83 period amounted to $814,000.

The evaluation of the possible open pit mine development of the Kara No. 1 and Kara N deposits was successful in the following respects:

- Geological ore reserves of scheelite bearing ore were increased from 813,000 tonnes at 0.74% WO_3 to 1,446,096 tonnes at 0.78% WO_3.

- Mineable ore reserves of scheelite bearing ore were increased from 900,000 tonnes at 0.66% WO_3 to 1,049,000 tonnes at 0.84% WO_3. (Thereby contained mtu's WO_3 increased from 594,000mtu to 881,160mtu).

Using the above base data, two independent mine planning - production - economic studies of these deposits have been undertaken during the Pre-Development Programme. The initial study by Golder Associates was completed in August 1982, evaluating the economic viability of the Kara No. 1 and Kara North deposits utilising an initial production rate of 200 tpd with an early expansion to 400 tpd. In an effort to reduce capital/operating costs and determine the best operating plan, a second alternative scenario using a production rate of 500 tpd was commenced by Superior Oil, Minerals Division in June 1983. This study is currently being reviewed by McIntyre Mines Ltd., and will constitute the basis for the detailed production plan and financing schedule for the Development to be presented on or before July 31st 1984.

In addition it is believed Pre-Development work has further enhanced the economic potential of the Kara Properties - E.L. 17/68 area.

Significant results within the region were as follows:

- Total geological ore reserves at the Kara Properties were increased 36.73% and now estimated at 1,994,936 tonnes grading 0.78% WO_3. (Geological resources provide an additional 621,930 tonnes).

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- A new zone of high grade scheelite mineralisation was outlined at Location L.5, and additional targets of potential WO_3 mineralisation were delineated.

- Preliminary studies on magnetite concentrates showed a potential application in the coal washery industry.

This report briefly reviews the Pre-Development Programme, namely its proposals, nature of work completed and significant results. For detailed results of individual investigations completed during the Programme, the reader should refer to Volumes 1 to 7 accompanying this report.

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SECTION A - PRE-DEVELOPMENT PROGRAMME - REVIEW

1. DEFINITION - PROPOSALS

1A - Legal

Clause 2 of the Heads of Agreement signed 20th June, 1980 stated that by the 31st December, 1980, McIntyre will present Tasminex with a Pre-Development Programme.

In the McIntyre - Tasminex Deed dated 6th May, 1983, Recitals E and F acknowledge that the Programme was delivered to Tasminex before 31st December, 1980, and that McIntyre was implementing the Programme to be completed by 31st December, 1983.

Clause 6.1 of the above Deed, states that McIntyre shall no later than 31st January, 1984 advise Tasminex in writing whether or not it elects to proceed to Development, and if McIntyre so elects to proceed to Development, McIntyre shall contemporaneously present Tasminex with a full report on the results of the Pre-Development Programme.

1B - Objectives and Proposals

The proposals outlined in the Pre-Development Programme were originally drafted on behalf of McIntyre in October - November 1980, by Canadian Superior Exploration (Vancouver). The proposals were delivered to Tasminex N.L. on 26th November, 1980.

The proposals were based upon the results of engineering studies completed by Golder Associates in October 1980 (report - "Evaluation of the Kara Tungsten Property"),

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and also on the results of previous work by various parties.

The basic premise of the whole programme was that in October 1980, indicated tungsten reserves were insufficient to justify a 600 tonne per day operation, but might suffice for a 200 tpd or perhaps 400 tpd mine, provided start-up capital costs were low. The corollary to this was that more ore had to be found before McIntyre could consider a medium or large scale operation to be viable.

The original work proposals constituting the Pre-Development Programme were divided into a number of categories. These were:-

- Expansion of Reserves
  - (i) Metallurgical
  - (ii) Infill Drilling
  - (iii) Exploration
  - (iv) Underground Mining Studies
- Production Studies
- Marketing Studies
- Legal Work
- Environmental Studies

1C - Timetable - Expenditures

To complete the above work programmes, a three phased timetable covering an initial two year period was proposed:-

- Phase 1 - 6 months duration, Jan. to June 1981
- Phase 2 - 6 months duration, July to Dec. 1981
- Phase 3 - 12 months duration, Jan. to Dec. 1982.

In addition, McIntyre had the option of a further one year period, from 31st December, 1982 in which to complete the programme.

The implementation, and all costs incurred during the Programme, were to be borne by McIntyre.

Total estimated expenditures for the Programme amounted to $880,000 (Phase 1 - $215,000, Phase 2 - $280,000, Phase 3 - $385,000).

It was acknowledged in the original work programme schedule, that "unexpected delays, changes in the programme and other happenings could alter the schedule".

It was also stated "the Programme must be flexible enough to cope with unforseen events" and the Programme "should be continuously monitored and if necessary modified to cope with any mitigating circumstances that have arisen".

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2. COMPLETED PRE-DEVELOPMENT PROGRAMME - STATUS

2A - Nature of Work

The Pre-Development Programme was completed as proposed by McIntyre and/or its affiliated Companies.

Investigations and studies completed during the Pre-Development Programme were essentially two fold:-

- To assess the economic viability of the open pit development of the two main tungsten bearing deposits at Kara (i.e. Kara No. 1 and Kara North).

- To evaluate the overall economic potential of the Kara Properties and E.L. 17/68 area.

The first of these has received priority attention. The initial aim was to assess if known reserves of scheelite bearing ore could be increased, and this was undertaken by exploration work, drilling programmes and metallurgical investigations. Once additional reserves were blocked out, their economic viability was studied by mine planning - production - economic appraisals.

Although the individual Pre-Development work programmes did not follow a strict sequential pattern, for descriptive purposes the Pre-Development Programme has been subdivided into the following seven categories:-

1. Exploration Work
2. Infill - Extension Drilling Programmes
3. Exploration Drilling Programmes
4. Metallurgical Investigations
5. Ore Reserve Studies
6. Mine Planning - Production Economic Studies

7. Miscellaneous Studies - Marketing & Environmental

2B - Timetable

The programme was originally initiated as planned in January 1981, and completed in December 1983.

Progress however was severely hampered during the first half of 1981, when in April 1981, Tasminex N.L. informed McIntyre "that it requires that company to cease its exploration programme within E.L. 17/68 when that licence expires on the 4th May, 1981". On 19th May 1981, the Tasmanian Supreme Court awarded McIntyre an interim injunction, enabling it to continue investigations on the Kara Properties, and although the equity rights of the Properties could not be resolved until after litigation proceedings in May 1983, McIntyre Mines did however reactivate and continue with the execution of the Pre-Development Programme.

In light of the above situation, and changes to the timing of the individual investigations for practical purposes, the original chronological timetable of the Pre-Development Programme was not adhered to. Table No. 1 tabulates the progressive timing of the various studies completed during the Programme.

2C - Personnel

The bulk of the Programme was co-ordinated and completed by McIntyre from its Regional Exploration Offices at Burnie. Direction was maintained from both Canadian Superior Exploration and McIntyre Mines Ltd., Canada, and during the 2nd half of 1983, Superior Oil Minerals Division, Tucson, played a major role in completing the final phases of the Programme.

The various "specialist fields" of the Programme necessiated the acquisition of the services and expertise of a number of individuals and "outside companies". In summary the following were involved in completing the various studies and investigations:-

- Exploration - McIntyre
  Canadian Superior Exploration
- Infill Drilling - McIntyre
- Exploration Work - McIntyre
- Metallurgical - Warmans International Ltd., AMDEL Ltd., Australian Coal Industry Laboratories, Bartles Ltd., S. Pullar, Tasmanian Mines Department, McIntyre
- Ore Reserve Studies - Golder Associates, Pincock, Allen & Holt Inc., McIntyre
- Mine Planning, Production - Golder Associates, Superior Oil, McIntyre
- Environmental - TIAFEC, McIntyre
- Marketing - McIntyre Mines Ltd., Calgary

2D - Expenditures

Due to current accounting procedures, it is difficult to itemise expenditures solely applicable to the Pre-Development Programme.

McIntyre's 100% total Project expenditures for the Kara Tungsten Project during the period 1st January 1981 to 30th November 1983 total $814,363. (Please see Table No. 2). This figure includes Regional Exploration Office overhead and infrastructure costs, but does not include Superior Oil expenditures incurred in 1983.

Approximate expenditures assigned to the seven programmes of work would be estimated to be as follows:-

	A$
Exploration	210,000
Infill Drilling	89,000
Exploration Drilling	103,000
Metallurgical	43,000
Ore Reserves, Mine Planning, Production	119,000
Environmental	7,000
Marketing	In house study

2E - Reporting

Interim reports summarising progress of Pre-Development Programme work have been systematically recorded within quarterly, biannual and annual reports compiled by McIntyre and submitted to the Director of Mines and Tasminex N.L.

Attached Volumes Nos. 1-7 provide detailed accounts of the various studies and results.

3. PERFORMANCE ANALYSIS OF THE PROGRAMME

The nature of investigations completed by McIntyre during the period 1981 - 1983 have been such to fulfill the basic objective of the Pre-Development Programme, and McIntyre now has sufficient data available "to enable a decision to be made whether or not to place the Kara Properties into Production".

As stated earlier, the format of the original proposed Pre-Development Programme, in particular the timing of work, has been changed radically. However, although the individual programmes were modified, their actual nature was more varied and diversified, and in addition, supplementary work programmes were completed.

Table No. 3 itemises details of additional work programmes - not originally proposed - completed during the execution of the Pre-Development work.

Some work programmes have been omitted from the completed Pre-Development Programme because such programmes would have no direct or significant bearing on the basic objectives of the Programme.

As preference and priority was given to the economic assessment of tungsten ore zones with open-pit mining potential, the decision not to pursue the original studies entitled "underground mining studies" was made at an early stage during the Programme.

Other studies not included were "bulk sample treatment of ore types" utilising the Tasminex treatment plant. This was initially considered impractical because of litigation proceedings between Tasminex and McIntyre. After resolving the latter, it was ascertained that

Tasminex N.L. had commissioned Aberfoyle Central Metallurgical Services to complete identical investigations, and the justification for McIntyre repeating this work was not warranted.

Major additions to Pre-Development work during the Programme were:-

- Exploration work
- Exploration drilling programmes
- Metallurgical investigations (flotation, slimes, non-magnetics, fresh ore tests)
- Appraisal of magnetite concentrate potential
- Additional mine planning studies

4. SIGNIFICANT RESULTS OF THE 'PROGRAMME'

Brief summary reports on the objectives, nature of work and results of the seven individual programmes are compiled in Section B of the current report.

Significant results of these programmes are as follows:-

1. Exploration Work

- Regional and detailed geologic/surface exploration work provided a more comprehensive geological interpretation of the E.L., area, a clearer understanding of tungsten ore genesis, and better delineation of favourable host horizons for tungsten mineralisation in this metallogenic district. It is believed the tungsten potential in outlying sections of the E.L. area have been further enhanced.

- Regional ground magnetic surveys, combined with geological interpretations permitted a better definition of additional prospective subsurface magnetite skarn zones.

- Detailed surface exploration evaluations of known skarn zones and prospects revealed that six of the areas had sufficient potential for associated tungsten mineralisation and warranted further investigation by exploration drilling. (This was initiated during the Pre-Development Programme).

2. Infill Drilling

- Permitted a better delineation of the main ore

zones and more accurate delineation of scheelite bearing ore (F & Y types) from weathered tungsten material (X and W types). This provided a basis for geological ore reserve/resource calculations and future mine planning studies.

- Geological ore reserves of F and Y ore were increased substantially at three of the five specific areas drilled. At Kara North, Kara No. 1 Southern Extension, and Section Line 5820N - Kara No. 1, geological reserves of scheelite bearing ore were increased by 393,498 tonnes, from 445,000 tonnes at 0.92% WO_3 to 838,498 tonnes at 0.89% WO_3.

- No additional ore reserves of open pit potential were discovered at either the Eastern Ridge or at Bobs Bonanza.

3. Exploration Drilling

- New zones of high grade scheelite bearing mineralisation were discovered at Location L.5 in the central sections of E.L. 17/68. Delineated mineralisation over a 130 metre strike distance was estimated to total 97,840 tonnes of possible ore grading 1.50% WO_3. The new deposit is open ended both along strike and down dip.

- Scheelite mineralisation was shown to be apparent in the skarn "plumbing system" at the Kara N. Magnetite Anomaly.

- At Kara South, down dip extension of a surface exposed mineralised zone were proved to be limited and possible N strike extension downgraded.

4. Metallurgical Investigations

- On site classification at Kara No. 1 and Kara N permitterd a better definition and delineation of weathered tungsten material.

- Bench tests on X and W ore types showed low and variable gravity and scheelite recoveries. For future mine plan studies it was decided to classify this material as "stockpiled resource".

- No analytical laboratory techniques of a reliable nature were defined for estimating the scheelite content of weathered ore.

- A review of past coarse scheelite gravity recovery tests, and new bench scale fine scheelite recovery tests on bulk samples of F and Y ore, proved a better level of confidence for predicting commercial gravity recoveries for these ore types. Estimated metal recoveries were increased from 53% to 74.25%.

- Metallurgical tests permitted a better definition of mineral processing techniques and flow sheet design.

- Preliminary metallurgical work on beneficiated unoxidised magnetite concentrates from Kara No. 1 show a potential application of this material as dense heavy medium in the coal washery field.

5. Ore Reserve Studies

- Total geological ore reserves (F and Y ore) of the Kara Properties are now estimated to total

1,994,936 tonnes at 0.78% WO_3, i.e. an increase of 36.73% from the tonnage of October, 1980.

- Geologicial ore reserves at Kara No. 1 and Kara North were increased from 964,000 tonnes at 0.82% WO_3 to 1,446,096 tonnes at 0.78% WO_3.

- Reserves were upgraded from an inferred - indicated classification to the measured - probable ore categories.

- Geological resources (X and W material) of the Kara Properties were decreased from a total of 746,500 tonnes at 0.67% WO_3 to 621,930 tonnes at 0.62% WO_3.

6. Mine Planning Studies

- At Kara No. 1 and Kara N, mineable ore reserves of F and Y ore increased from 813,000 tonnes at 0.74% WO_3, to 1,049,000 tonnes grading 0.84% WO_3.

- Mineable ore resources (X and W material) at Kara No. 1 and Kara N are estimated to total 381,452 tonnes at 0.63% WO_3.

- Open pit designs for the two above deposits were completed, and at a production rate of 130,000 tpy, an eight year mine life could be sustained. Waste to ore stripping ratios for Kara No. 1 and Kara N were estimated at 2.56 : 1 and 9.3 : 1 respectively.

- Kara North was regarded as a feasible open pit deposit but additional pre development work may

show underground development to be more economically attractive.

7. Production - Economic Studies

- Golder Associates, during May - August, 1982, considered the open pit mine development and economic viability of the Kara No. 1 and Kara N deposits. The study revolved around an initial production rate of 200 tpd, with an early expansion to 400 tpd.

- Operating cost schedules showed an overall cost per tonne of ore ranging from approx. $26 during the life of the Kara No. 1 open pit, rising to the $38/39 range during the pre-production of the Kara N open pit, reducing to around $33 for the balance of the Kara N life.

- Financial analyses used a mid July 1982 WO_3 price, namely A$112.21 mtu Wo_3. Cashflows resulting from the study indicated a 12.9% DCFROR for a cashflow in July 1982 Australian dollars which increased to 19.2% DCFROR with an equivalent escalation of 9% per annum.

- During the 2nd half of 1983, McIntyre Mines proceeded with an alternative production scenario in an effort to reduce capital and operating costs, and to determine the best operating plan. These studies, not originally proposed in the Pre-Development Programme, were completed and are being reviewed by McIntyre Mines Ltd.

Base parameters used in their evaluation are:

- Open pit development at a production rate of 500 tpd (130,000 tonnes per annum)
- Mineral processing by gravity concentration
- Utilisation of a mining contractor in order to maintain initial capital costs at a minimum

5. CONCLUSIONS

The Pre - Development Programme work has been successful in increasing known and potential recoverable metal units at the Kara No. 1 and Kara North deposits, and further substantiating the additional exploration potential of the Kara Properties - E.L. 17/68 area. "Sufficient data" is now available to enable McIntyre to proceed to Development of the Kara Properties.

With regard to potential open pit mineable deposits of Kara No. 1 and Kara North, the overall results of the Pre - Development Programme have shown:

- An increase of measured geological ore reserves of fresh and partially weathered ore
- Substantial improvements to mineable ore reserves
- Improvements to estimated % WO_3 content of mineable reserves
- Superior estimated metallurgical recoveries of treated ore
- The possible economic potential of magnetite concentrates

Established tonnage/grade statistics for the Kara No. 1 and Kara North deposits before and after Pre - Development Programme can be defined as follows:

	October 1980 Golders (Case C)	December 1983 Pincock, Allen & Holt Inc.
Geological Reserves (F and Y Ore)	813,000 tonnes 0.74% WO_3	1,446,096 tonnes 0.78% WO_3
Mine Reserves	900,000 tonnes	1,049,000 tonnes

(F and Y Ore)	0.66% WO_3	0.84% WO_3
Contained Metal Units	594,000 mtu	881,160 mtu
Est. Metallurgical Recoveries	53%	74.25%
Metal Units Recoverable	314,820 mtu	654,261 mtu

Economic - production studies on the two deposits show that in terms of cost per mtu WO_3 produced, Kara could be a low cost producer and competitive in the world market.

The overall tungsten potential of the entire E.L. area would be regarded as strong.

The current status of known and potential tungsten bearing deposits within the mineral tenements would now be classified as follows:

Open Pit Deposits	Kara No. 1, Kara N. 266 Zone
Potential Underground Deposits	Eastern Ridge, Western Limb, Location L. 5
Potential WO_3 Target Zones	Kara N. Magnetite Anomaly, Kara South, Location L.13, Hampshire Magnetite, Companion Skarn, Hampshire Silver Mine.
Prospective WO_3 Regions	Subsurface zones along the east and west limbs of the Kara synclinorium. Around the Hampshire granite Stock.

1. EXPLORATION PROGRAMMES

Report References: Volume 1, Reports 1, 1A, 1B, 1C, 1D.

Objectives

Exploration work had been recommended over a number of prospects or skarn zones which had tungsten mineralisation potential, but had previously only received preliminary investigations.

During the course of the Pre - Development work, it was decided to diversify exploration work attempting to complete a more extensive geologic - economic appraisal of the entire E.L. area. In addition to the tungsten mineralisation potential, consideration also included the commodities tin and magnetite.

Nature of Work

- Nine of the twelve prospects originally recommended for examination were investigated by a variety and combination of surface exploration techniques (namely, geologice mapping, ground geophysics, trenching, geochemical surveys, etc.). Three additional prospects, originaly unlisted, were likewise examined in detail, and a further three areas covered by reconnaissance examinations.

- Geologic Surveys:

  i) detailed surveys over the four main known Kara skarns at Kara No. 1, Kara N, Western Limb and Estern Ridge. These were completed in conjunction with infill drill programmes, the aim being to finalise geological

interpretations of the deposits and ore zones, thereby forming a basis for follow-up reserve/resource calculations and mine planning studies.

ii) Regional geological surveys aimed at evaluating the overall interpretation and appraisal of the entire E.L. area, and delineation of additional prospective ground.

- Ground Magnetic Surveys:

There were three fold in nature:- detailed grid surveys over prospects; regional surveys over delineated prospective ground; or reconnaissance surveys. Detailed grid surveys were aimed at evaluating specific mineralised targets of known skarns. Regional and reconnaissance work was aimed at investigating potential targets of magnetite skarn buried beneath basalt along the east and west limbs of the Kara synclinorium.

"Other mineral" studies of the E.L. area were initiated. These involved an appraisal of the possible tin content of known skarns, and a preliminary evaluation of the magnetite resources of the Kara No. 1 - Western Limb deposit.

Results of Work

Detailed surface exploration work at twelve examined skarn zones or prospects showed that:

i) Six of the areas had sufficient potential for associated tungsten mineralisation to warrant subsurface investigations by

exploratory drilling. These six prospects were Location L.5, Hampshire Silver Mine, Kara North Magnetite Anomaly, Companion Skarn, Kara South and Location L.13. (N.B.: Preliminary exploratory drilling was initiated at four of these areas. New Zones of high grade scheelite mineralisation were discovered at Location L.5 - see Volume 3).

ii) Two of the prospects, Hampshire Magnetite and Location L.1, require further investigations on surface, and could have associated WO_3 mineralisation potential. (This work is currently underway.).

- Regional ground magnetic surveys, combined with geological interpretations delineated new buried targets of potential meqnetic skarn along the east and west limb of the Kara synclinorium.

- Detailed geological mapping, and evaluation of existing dril data, permitted a realistic interpretation of the Kara No. 1 and Kara N deposits and assisted in delineation of contained tungsten reserves and resources. A clearer understanding of tungsten ore genesis and recognition of favourable host horizons became more apparent during Pre-Development work.

- The tin content or anomalism of all surface exposed and drilled magnetic skarns of E.L. 17/68 was ascertained. They were classified according to ranges of tin content. The skarn zones at Eastern Ridge, Western Limb, Kara N. 266 Zone and the Kara No. 2 Main skarn all showed tin values ranging up to 1% Sn.

On the basis of Pre - Development Programme exploration work, the tungsten mineralisation potential of E.L. 17/68 is regarded as strong and further enhanced. This statement would apply to both known magnetite skarn zones, and delineated prospective geological regions.

The current status of known magnetite skarn zones within E.L. 17/68 would be classified as follows:

- Skarns with economic WO_3 mineralisation of open pit mining potential.

  i) Kara No. 1
  ii) Kara North 266 Zone

- Skarn with economic WO_3 mineralisation of underground mine potential.

  i) Eastern Ridge
  ii) Western Limb
  iii) Location L.5

- Skarns with potential for associated tungsten mineralisation.

  i) Kara North Magnetite Anomaly
  ii) Location L.13
  iii) Kara South
  iv) Hampshire Magnetite Skarn
  v) Companion Skarn
  vi) Hampshire Silver Mine.

In addition, the following regions would be classified as prospective for possessing buried skarn zones which could contain associated WO_3 mineralisation:

East Limb of the Kara Synclinorium.

i) Between E. Ridge and location L.5 (specific targets delineated)

ii) Between Location L.5 and Loudwater Creek (specific targets delineated).

West Limb of the Kara Synclinorium.

i) Between Companion Skarn and Kara N. 266 Zone

ii) North of Location L.13.

The W and S.W. margins of the Hampshire Granite Stock.

2. INFILL DRILLING PROGRAMMES

Report References: Volume 2, Reports 2, 2A, 2B, 2C and 2D.

Objectives

Infill drilling had been recommended at six skarn zones known to contain associated tungsten mineralisation. However, additional drill information was considered essential to further establish the true limits and extent of mineralisation. The programmes were designed with the following specific objectives in mind:-

- to test both possible up/down dip and strike extensions of known ore.
- to increase the confidence of ore - type categorisation.
- to accurately delineate geological reserves of scheelite bearing mineralisation (F and Y ores) considered to have open pit mining potential.

Nature of Work

Five skarn zones were investigated by infill drilling, namely, Kara N. 266 Zones, the Kara No. 1 S. Ext. zones, the Kara No. 1 Main Zone, Bob's Bonanza skarn and the Eastern Ridge skarns.

During the Pre - Development Programme, the strategy became one of solely investigating reserves of possible open pit potential, and therefore, the intentions to drill the Western Limb zone were shelved.

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The programme were completed by in-house personnel, and although not continuous, was undertaken during the period mid August 1981 to July 1982. 18 diamond drill holes, totalling 1100.84m. were completed.

Results of Work

The drilling programmes were successful (three skarns showed increased reserves) and instructive. The drill data provided:

- A better clarification of the attitudes and dispositions of individual ore zones.
- A more accurate delineation of geological ore reserves and better categorisation of the four ore types (F, Y, X and W ores).
- An upgrading of reserves/resources from an indicated or inferred cateogry, to one of a measured or probable classification.
- A sound basis for assessing true mineable reserves at Kara No. 1 and Kara N.

As shown in the table below, from infill drill results at three of the five skarn zones, geological reserves of fresh and partially weathered ore were increased significantly.

	BEFORE INFILL DRILLING GEOLOGIC RESERVES		AFTER INFILL DRILLING GEOLOGIC RESERVES	
	m.t.	% WO_3	m.t.	% WO_3
Kara N. 266 Zone	151,000	1.26	378,541	1.02
Kara No. 1 Sthn. Extn.	116,000	0.80	235,477	0.84
Kara No. 1 Sec. Line 5820N	178,000	0.71	224,480	0.74
Totals =	445,000	0.92	838,498	0.89

Geological reserves of F and Y ore at the three specific locations therefore showed an increase of 393,498 tonnes. In reality this figure would be greater, as no consideration was made for reserve depletion by Tasminex mining during the period between the two reserve calculations (Sept. 1980 - March 1982).

Also as a result of infill drilling (and geologic interpretation) the delineation of the entire Kara No. 1 and Kara N. oreblocks could be made with a greater degree of confidence. Recalculations of geological reserves and resources of these two deposits by Golder Associates (August 1982) showed the following increases.

	BEFORE DRILLING (Sept. 1980)		AFTER DRILLING (AUG. 1982)	
	m.t.	$\%WO_3$	m.t.	$\%WO_3$
Kara 1 and Kara N. Geol. Reserves	964,000	0.83	1,609,761	0.84
Kara 1 and Kara N. Geol. Resources	576,000	0.67	643,886	0.64

3. EXPLORATION DRILLING PROGRAMMES

Report References: Volume 3, Reports 3, 3A, 3B and 3C.

Objectives

As a result of surface exploration activities in the E.L. area, a number of prospective geologic targets of potential buried magnetite skarn were outlined. In order to confirm the presence of these skarns, and to investigate the possibility of associated tungsten mineralisation, a programme of exploratory drilling was proposed.

Nature of Work

A total of 25 holes, totalling 1591.72m., was drilled at four prospective areas, namely:

- Kara South, 8 holes - 225.55m.
- Kara North Magnetite Anomaly, 4 holes - 339.08m.
- Companion Skarn, 1 hole - 99.99m.
- Location L.5, 12 holes 927.10m.

Results of Work

Considering the overall preliminary nature of exploration drilling, the results were remarkably informative and successful. Highlights of the programme were:

- New zones of high grade scheelite mineralisation were discovered and delineated at Location L.5.

- Scheelite mineralisation was proved to be present in the "plumbing system" at the Kara North Magnetite Anomaly.

- Down dip subsurface extensions of the Kara South mineralised skarn were proved to be limited, and possible strike extensions to the north were downgraded.

- One hole at the Companion Skarn was unsuccessful in proving tungsten bearing magnetite skarn.

Drilling at Location L.5 was extremely rewarding, and the results are ones which could enhance the overall economic potential of the Kara Properties. Results were encouraging by:

- Proving geologic interpretations, and identifying the continuation of magnetite skarn zones along the eastern limb of the Kara Synclinorium.

- Identifying the presence of associated scheelite mineralisation in the skarns. Recognitiion of scheelite so distant from other known occurrences, is in the regional sense, considered quite significant.

- Showing scheelite mineralisation of fresh quality and a very high grade nature (0.20% to 10.% WO_3 over 1 metre runs).

- Showing continuity over 130 metres strike length, with the ore lens and host horizons showing little complexity or variation.

- Mineralisation still being open ended both in a N and S direction. The ground magnetic anomaly at L.5 has a 400 metres strike length, of which only the central 130 metres has been drilled. Over this distance, ore zones of "possible ore" totalling

97,840 tonnes grading 1.50% WO_3 have been calculated.

Additional success, and discoveries of mineralisation on the Kara Properties by future exploration drilling, would be regarded as strong. New discoveries would however probably be of underground mine potential.

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4. METALLURGICAL INVESTIGATIONS

Report References: Volume 4, 4A, 4B, 4C, 4D, 4E, 4F, 4G.

Objectives

To perform analytical, laboratory bench scale tests and bulk sample treatment of both "weathered tungsten material" and "scheelite bearing ore" with the ultimate aim of:

- Improving the level of confidence for evaluating tonnages of scheelite bearing material which would be economically amenable to commercial gravity treatment methds.

- Perfecting and assessing methods of improving recoverable scheelite values.

Investigations Performed

Slight modifications were made to the original metallurgical test work proposals. Although no bulk sample treatment tests were undertaken by McIntyre, overall there was a greater diversification of test work completed on both scheelite bearing and weathered tungsten material. In addition, other investigations were completed, aimed at both perfecting mineral processing techniques and assessing the potential of the processed magnetite bi-product.

Results of Work

A Weathered Tungsten Material:

i) An on-site classification provided a better differentiation of weathered material into X and W

types, and delineation from reserves of scheelite bearing ore.

ii) The above delineations were used by Golder Associates (August 1982) in their resource calculations for X and W ore types at Kara 1 and Kara N. Geological resources totalled 643,886 tonnes at 0.64% WO_3 (compared to 516,000 tonnes at 0.67% WO_3).

iii) Bulk samples of X type ore were collected in whcih the estimated scheelite content ranged from 15% to 40% of the total WO_3 contention. Bench scale tests on these samples showed only low qravity/ flotation scheelite recoveries from 10% to 37%. These recovery figures correlated resonably with estimated U.V. visual scheelite values.

iv) In view of the above, and previous, low variable scheelite recovery values for X type samples, it was decided that in future mine planning - evaluation studies, both X and W ore types should be regarded as a geological resource, but in any future mine operation they should be mined and stockpiled separately.

v) No definitive analytical technique was outlined for estimating the scheelite content of weathered ore. With practise, U.V. light estimates can become an accurate guide, but are of course subjective. Soluble tungsten tests on weathered material showed little correlation with bench scale test estimates of recoverable scheelite by qravity and flotation.

B. Fresh and Partially Weathered Tungsten Ore

i) A more detailed classification of these ore types was effected. One the basis of this, Golder Associates calculated (Aug. 1982) that geological reserves of F and Y ore totalled 1,609,761 tonnes at 0.85% WO_3 at the Kara No. 1 and Kara N deposits. (This compared with 964,000 toness at 0.82% WO_3.)

ii) An overall review of coarse gravity bench scale tests on these ore types, assisted in evaluating that estimated scheelite recoveries on a commercial scale would be 65% for fresh ore and 55% for Y ore (Golder Associates, Aug. 1982).

iii) Additional fine gravity scheelite recovery test work by Bartles Ltd., assisted in upgrading estimated metallurgical recoveries. Superior Oil Minerals Division estimate that coarse and fine scheelite recoveries for combined F and Y ore would be 74.25%.

iv) Flotation research test work, although somewhat preliminary was rather inconclusive. Incorporation of flotation techniques into a future mineral processing system was not considered technically or economically justified.

C. Limited slimes and non magnetic tailings testwork indicated more sophisticated processing techniques should lower their present WO_3 content, and that the possible retreatment of existing slimes material was potentially feasible.

D. Preliminary studies and test work on the potential of Kara magnetite concentrates as a marketable product as a

heavy medium in the coal washery field have proved encouraging. Specifications were determined. Initial test work on magnetite tailings samples currently produced by Tasminex N.L. proved they were of inferior quality and unlikely to be upgraded. Extensive tests on fresh magnetite skarn samples from the Kara No. 1 West Limb proved satisfactory. The studies should be continued, and beneficiation test work is justified on samples of the magnetite bi-product representative of material produced in the proposed future tungsten mill operation.

5. GEOLOGICAL ORE RESERVE STUDIES

Report References: Volume 5, Reports 5, 5A, 5B, 5C, 5D and 5E.

Preamble

The basic premise of the Pre - Development Programme was that additional reserves of tungsten had to be found before a medium (400 tpd) or a larger scale (600 tpd or more) operation could be considered a viable operation by McIntyre.

With this prime objective in mind a number of specific programmes were completed with the aim of increasing the geological ore reserve situation on the Kara Properties. These programmes consisted of infill drilling of known ore bearing skarns, exploration drilling of suspected skarn zones, geological mapping and ore zone interpretations of the deposits.

On completion of this work, a number of reassessments and recalculations of the geological reserves/resources have been made. Two of these calculations were made by outside consultants who were involved in either mine production/ economic evaluations or feasibility studies of the Kara Properties - namely, Golder Associates, Sydney, August, 1982, and Pincock, Allen and Holt Inc., Tuscon, October 1983.

Results of Studies

With regard to geological ore reserve calculations during the Pre - Development Programme, the following significant changes were made:

i) The greater proportion of geological reserves, especially at Kara No. 1 and Kara N can now be classified as measured reserves, rather than indicated or inferred reserves.

ii) Total geological reserves of the Kara Properties were increased by 36.75% during the Pre - Development Programme and now stand at 1,994,936 tonnes at 0.78% WO_3 (Table 5 - 1).

iii) Total geological reserves of the potential open pit deposits at Kara No. 1 and Kara North were increased 50% and stand at 1,446,096 tonnes at 0.78% WO_3 (Pincoch, Allen & Holt).

iv) Total geological resources of the Kara Properties decreased 16.7% and now stand at 621,930 tonnes grading 0.62% WO_3.

None of the above increases in reserves take into account depletion of reserves by Tasminex N.L. mine operations during the Pre - Development Programme period.

GEOLOGICAL RESERVES - KARA PROPERTIES.

A - BEGINNING OF PRE-DEVELOPMENT PROGRAMME.

DEPOSIT.	GEOLOGICAL RESERVES.					
	MEASURED.		INDICATED/INFERRED		TOTAL.	
	M. TONNES	% WO_3	M. TONNES	% WO_3	m. TONNES	% WO_3.
KARA. Nº 1.	NIL	—	813,000	0·74	813,000	0·74
KARA NORTH.	NIL	—	151,000	1·26	161,000	1·26
WEST LIMB.	NIL	—	198,000	0·47	198,000	0·47
EASTERN RIDGE.	NIL.	—	297,000	0·68	297,000	0·68
TOTALS.	NIL	—	1,459,000	0·74	1,459,000	0·74.

B - ON COMPLETION OF PRE-DEVELOPMENT PROGRAMME.

DEPOSIT.	GEOLOGICAL RESERVES.					
	MEASURED		INDICATED/INFERRED		TOTAL.	
	m. TONNES.	% WO_3	m. TONNES	% WO_3	m. TONNES	% WO_3.
KARA. Nº 1.	1,019,565	0·75	NIL	—	1,019,565	0·75
KARA NORTH.	426,531	0·85	NIL	—	426,531	0·85
WEST. LIMB.	NIL	—	164,000	0·47	154,000	0·47
EASTERN RIDGE.	NIL	—	297,000	0·68	297,000	0·68
LOCATION 15.	NIL	—	97,840	1·50	97,840	1·50
TOTALS.	1,446,096	0·78	548,840	0·77	1,994,936	0·78.

GEOLOGICAL RESOURCES - KARA PROPERTIES.

A - AT BEGINNING OF PRE-DEVELOPMENT PROGRAMME.

DEPOSIT.	GEOLOGICAL RESOURCES				TOTAL GEOLOGICAL RESOURCES	
	F + Y MATERIAL.		X + W MATERIAL.			
	m TONNES	% WO_3	m TONNES	% WO_3	m TONNES	% WO_3.
KARA. N° 1.	NIL	–	576,000	0·69	576,000	0·69
KARA NORTH	50,000	0·80	NIL	–	50,000	0·80.
WEST LIMB.	27,000	0·43	47,000	0·59.	74,000.	0·53.
EASTERN RIDGE.	22,500	0·52	24,000	0·75.	46,500.	0·64.
TOTALS.	99,500	0·64	647,000	0·67.	746,500	0·67.

B - ON COMPLETION OF PRE-DEVELOPMENT PROGRAMME.

DEPOSIT.	GEOLOGICAL RESOURCES				TOTAL GEOLOGICAL RESOURCES.	
	F+Y MATERIAL.		X + W MATERIAL.			
	m. TONNES	% WO_3	m. TONNES	% WO_3.	m. TONNES	% WO_3.
KARA. N° 1.	NIL	–	538,276	0·63	538,276	0·63
KARA. NORTH.	NIL	–	12,654	0·29	12,654	0·29
WEST LIMB.	NIL	–	47,000	0·59	47,000	0·59
EASTERN RIDGE	NIL	–	24,000	0·75.	24,000	0·75
TOTAL.	NIL	–	621,930	0·62.	621,930	0·62.

6. MINE PLANNING - PRODUCTION STUDIES

Report References:- Volume 6, Reports 6, 6A and 6B.

Preamble

Under the heading "Production Studies" a number of proposals were originally outlined for completion. These included the formulation of a development plan, generation of production schedules, analyses of capital - operating costs and overall financial evaluations of possible operations at Kara.

Nature of Work

During the course of the Pre - Development work, McIntyre, or one of its affiliated Companies, have commissioned two independent mining engineering groups to review the mine planning aspects of developing the two main tungsten deposits at Kara No. 1 and Kara North.

In August 1982, Golder Associates completed a study entitled "Evaluation of the Kara Tungsten Deposits". Summary details of the results of this work are outlined below.

In October 1983, Superior Oil Minerals Division commissioned Pincock, Allen & Holt Inc., Tucson, to complete a "mine planning study of the Kara Mine". Details of their mineable reserve calculations are presented below.

Results of Work

A Mineable Reserves - Kara 1 and Kara N.

Results of mineable ore reserve calculations by both the above mining engineering groups are as follows:-

	Kara No. 1		Kara N		Total	
	m.t.	% WO_3	m.t.	%WO_3	m.t.	%WO_3
Golder Associates	812,000	0.63	326,000	0.71	1,138,000	0.65
Pincock, Allen & Holt Inc.	819,000	0.81	230,000	0.91	1,049,000	0.83

B - Summary Review - "Evaluation Of The Kara Tungsten Deposits" Golder Associates 1982

- The scope of the Golder study was to consider the open pit mine development and economic viability of the Kara No. 1 and Kara N deposits. Production rates were to be initially 200 tonnes per day, with an early expansion to 400tpd.

- Initial compilation of the geological reserves and resources, utilising McIntyre Mines data, showed the following tonnages and grade estimates by Golders:-

  i) Kara No. 1 comprised of 1,087,000 tonnes of F and Y ore at 0.78% WO_3, and 625,000 tonnes of weathered resource at 0.64% WO_3.

  ii) Kara N calculated to consist of 523,000 tonnes of F and Y ore at 0.95% WO_3, and 20,000 tonnes of weathered material at 0.59% WO_3.

- The McIntyre geological interpretation was evaluated as satisfactory by Golders, who stated geological reserves to fall within the "probable reserve" category.

- After determination of economical pit limits and calculation of diluted ore, the mineable reserves and resource tonnages were calculated to be:-

  i) Kara No. 1 open pit to contain 812,000 tonnes of F and Y ore at 0.69% WO_3, and 325,947 tonnes of weathered resource at 0.55% WO_3.

  ii) Kara N open pit to contain 326,000 tonnes of F and Y ore at 0.71% WO_3 and 6000 tonnes of weathered resource at 0.31% WO_3.

- A mining schedule was drawn up, initially at 50,000 tp year increased to 100,000 tpy. The project assumed depletion of the Kara No. 1 East Zone reserves by Tasminex prior to start up date.

- Ore to waste stripping ratios were calculated to be:-

  Kara No. 1 West Zone 1:3.80, Waste = 2,387,693 tonnes
  Kara N 1:11.46,Waste = 4,065,500 tonnes.

- Open pit operations were based on the logic of maintaining the existing fleet of mobile (Tasminex) equipment during the life of the Kara No. 1 pit, and a new fleet of larger equipment acquired to accomplish pre - stripping at Kara North, allowing sufficient waste removal to maintain a product at 400 tpd thereafter.
- Mineral processing studies considered utilising gravity concentration to recover coarse scheelite down to 75 microns size, with finer scheelite recovery by gravity concentration on vanners.
- The overall indicated metallurgical recoveries were 62% (65% for fresh ore, and 55% for partially weathered ore).
- Capital cost schedule analysis by Golders showed three major influxes of capital during a 11 year mine life, namely associated with the relocation of the existing plant, expansion of the mill, and purchase of a larger mining fleet prior to the development of the Kara N deposit. Total capital costs, estimated in 1982 Aus. $, approximated $8.5 million.
- Operating cost schedules showed an overall cost per tonne of ore ranging from approx. $26 during the life of the Kara No. 1 open pit, rising to the $38/39 range during the pre-production phase of the Kara N open pit, reducing to around $33 for the balance of the Kara N life.
- Financial analyses used a mid July 1982 WO_3 price, namely A$112.21mtu WO_3.
- Cashflows resulting from the study indicated a 12.9% DCFROR for a cashflow in July 1982 Australian dollars which increased to 19.2% DCFROR with an equivalent escalation of 9% per annum. No examinations of tungsten price variables on cashflows were made.

7. MISCELLANEOUS STUDIES

Report References - Volume 7, Report 7A, 7B and 7C.

A Marketing Aspects

McIntyre Mines Ltd., Calgary, completed (October 1983) a general review on the "marketing aspects of tungsten concentrates".

This study reviewed:-

- Demand
- Supply
- Prices
- Technical Considerations
- Marketing of Concentrates

B - Environmental Studies

During the course of the Pre - Development Programme, McIntyre assessed and monitored the environmental aspects involved for developing and operating a new mining venture at Kara. These aspects included:-

- Study of Environmental Protection Act
- Review of environmental procedures
- Current environmental status - Kara
- Implementation of base line orientation studies.

APPENDIX NO. 3

PINCOCK, ALLEN & HOLT INC.

KARA MINE PLANNING UPDATE STUDY - JUNE 1984

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Pincock, Allen & Holt, Inc.
1750 E. BENSON HIGHWAY • TUCSON, ARIZ. 85714 - 1798
Telephone (602) 746-1451 • Cable KAYPIN • Telex 66-6457 (WUI)

June 26, 1984

Mr. Cliff Whitehead
McIntyre Mines
30 Marine Terrace
Burnie, Tasmania
AUSTRALIA 7320

Dear Cliff:

Please find enclosed one (1) copy of the Kara Mine Planning Update Study. Also included are the following:

- Yearly Mine Advance Maps
- New Topography Extracted from Model
- Topographic Difference Map Comparing Old and New Topographic Elevation
- Detailed Reserve Breakouts by Rock Type and Oxidation Level

If you have any questions, please do not hesitate to call.

Sincerely,

Sam Christo

Sam Christo
Senior Geological Engineer

w/encls

SC:kd

1.0 SUMMARY

Superior Oil Company (Superior) requested Pincock, Allen & Holt, Inc. (PAH) to update the Kara No. 1 minable reserves estimate with new surface topography in May 1984. Upon completion of the updated reserve extractions, it became apparent that significant problems would exist if the 1983 mine plan were followed. In response to this realization, Superior requested PAH, in June 1984, to revise the mine plan in order to obtain a balanced production schedule. The results of the Kara update are presented herein as an addendum to the "Kara Mine Planning Study", October 1983.

The scope of work included digitizing for computer entry two base topography plan maps containing, in combined form, topography updated to May 15, 1984. The new topography combined with the October 1983 ore reserve model provided the base for minable reserve estimates.

The digitized shapes of the October 1983 Kara No. 1 mine plan were applied against the new topo model to produce an updated set of minable reserve statements. Reserve model

block grades and tonnage factors were held constant as was the pit development scheme. Table 1-1 summarizes the updated minable reserves using the 1983 mining schedule. By comparing the 1983 model with the 1984 model, a set of reserve differences was compiled. Table 1-2 summarizes the differences, which approximate materials mined by Tasminex between June 1983 and May 15, 1984.

TABLE 1-1

KARA NO. 1

Preliminary Minable Reserves
May 15, 1984

Year	Ore +0.20% WO3 Tonnes	% WO3	%Mag	Stockpile Resource +0.20% WO3 Tonnes	% WO3	%Mag	Waste Tonnes	Total Tonnes
PP	32,518	1.024	51.9	146,132	0.784	53.0	172,085	350,735
1	129,880	0.904	53.9	91,948	0.661	43.4	197,919	419,747
2	118,080	0.721	49.0	52,970	0.395	28.9	217,144	388,194
3	76,707	0.550	44.7	16,183	0.273	26.4	295,874	388,764
4	129,994	0.786	59.4	507	0.255	57.0	316,984	447,485
5	129,812	0.897	63.3	826	0.253	47.6	320,003	450,641
6	130,856	0.969	75.5	0	---	--	133,254	264,110
7	6,209	0.791	78.1	0	---	--	406	6,615
Total	754,056	0.833	58.6	308,566	0.651	44.6	1,653,669	2,716,291

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TABLE 1-2

KARA NO. 1

Reserve Differences
Oct 1983 - May 1984

Year	Ore +0.20% WO3 Tonnes	% WO3	%Mag	Stockpile Resource +0.20% WO3 Tonnes	% WO3	%Mag	Waste Tonnes	Total Tonnes
PP	0	---	--	5,383	0.671	33.3	448	5,831
1	0	---	--	15,232	0.471	30.0	9,243	24,475
2	10,909	0.414	40.7	37,727	0.599	36.1	55,263	103,899
3	53,631	0.625	53.9	3,046	0.342	23.9	4,722	61,399
4	88	0.786	59.4	250	0.261	00.1	1,765	2,103
5	0	---	--	0	---	--	19	19
6	0	---	--	0	---	--	0	0
7	0	---	--	0	---	--	0	0
Total	64,628	0.590	51.7	61,638	0.560	33.6	71,460	197,726

Inspection of the current topography and the 1983 mine plan revealed that Tasminex mining will alter the Preproduction-Year 2 haulage ramp. Significant ore depletion in the Year 3 reserves left the production schedule unbalanced. To maintain the 130,000 tonnes per year target, existing reserves were rescheduled and a new mine plan was developed.

The 1984 mine plan is based on the assumptions that:

1) Tasminex will not mine further into the reserve area.
2) The ultimate pit limits will not change.
3) Waste dump configurations and external haulage access routes will not significantly change.

Table 1-3 presents the benched reserve summary based on the revised mine plan. Yearly reserve statements are presented in Section 3.0 of this report. Plan maps depicting the pit advancement on a yearly basis are located in the Map Appendix.

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TABLE 1-3

KARA PROJECT
SUPERIOR OIL COMPANY

TOTAL MINABLE RESERVES
KARA NO. 1
(UPDATED 15 JUNE/84)

	WO3 ORE			STOCKPILE RESOURCE				
BENCH	±0.200 % WO3 CUTOFF ORE TONNES	% WO3	% FE3O4	±0.200 % WO3 CUTOFF ORE TONNES	% WO3	% FE3O4	WASTE TONNES	TOTAL TONNES
537	0	0.000	0.000	1383	1.195	0.670	4952	6335
535	0	0.000	0.000	3688	1.253	0.607	14046	17734
532	0	0.000	0.000	4660	0.989	0.557	23621	28281
530	0	0.000	0.000	11855	0.903	0.586	18463	30318
527	0	0.000	0.000	16503	0.792	0.568	22555	39058
525	0	0.000	0.000	24658	0.779	0.536	16537	41195
522	2280	1.970	0.511	24848	0.743	0.523	18582	45710
520	12615	1.021	0.526	19637	0.723	0.511	18780	51032
517	12780	0.912	0.532	19494	0.687	0.515	31753	64027
515	18823	1.013	0.547	19409	0.739	0.438	30054	68286
512	19237	1.023	0.559	20352	0.735	0.439	39181	78770
510	21847	0.869	0.542	19871	0.720	0.437	48011	89729
507	20241	0.752	0.551	23068	0.653	0.432	58950	102259
505	23007	0.976	0.507	19252	0.589	0.414	63117	105376
502	25878	0.858	0.516	17298	0.534	0.382	74154	117430
500	30592	0.226	0.456	10847	0.416	0.281	63553	104892
497	31132	0.780	0.494	11442	0.391	0.289	68271	110845
495	25745	0.645	0.476	8787	0.304	0.264	69389	103921
492	25546	0.614	0.491	9745	0.326	0.265	77436	112727
490	23421	0.548	0.465	5433	0.271	0.218	80058	108912
487	26020	0.521	0.449	5415	0.269	0.255	84757	116192
485	22986	0.520	0.439	4033	0.273	0.306	81173	108242
482	25657	0.572	0.525	3951	0.278	0.400	82613	111821
480	22959	0.698	0.576	150	0.244	0.325	86410	109549
477	21975	0.821	0.581	0	0.000	0.000	81058	103033
475	27922	0.787	0.563	0	0.000	0.000	63298	91220
472	27947	0.795	0.573	0	0.000	0.000	61764	89711
470	32540	0.806	0.582	0	0.000	0.000	48684	81224
467	33934	0.845	0.569	0	0.000	0.000	43120	77054
465	36317	0.904	0.649	0	0.000	0.000	30257	68574
462	36101	0.947	0.705	0	0.000	0.000	27539	63640
460	27792	0.963	0.733	0	0.000	0.000	28573	56365
457	27456	1.013	0.736	0	0.000	0.000	23168	50624
455	22487	1.026	0.762	0	0.000	0.000	20234	42721
452	21935	1.148	0.767	0	0.000	0.000	13514	35450
450	15076	1.077	0.775	0	0.000	0.000	8665	23743
447	11835	0.910	0.735	0	0.000	0.000	5221	17056
445	8414	0.793	0.785	0	0.000	0.000	1423	9837
442	6226	0.784	0.776	0	0.000	0.000	583	6809
440	4118	0.909	0.771	0	0.000	0.000	130	4248
TOTAL	754974	0.833	0.586	305339	0.652	0.444	1633647	2693950

2.0 RESERVE MODEL MODIFICATIONS

Two topographic contour maps were received from McIntyre:

- Kara No. 1 - Base Plan, 1:500 scale surface topography dated 15-3-84, and
- A modification on this plan, "Kara No. 1 - Modified Contours - May 15, 1984 Update", 1:500 scale surface topography.

These maps were combined and digitized for computer interpolation. A surface topography kriging program was used to assign surface elevations to a grid coincident with the 1983 reserve model. The differences between the 1983 and 1984 gridded topographies is presented in contoured form in the Map Appendix.

The new topography was combined with the 1983 model to form the current model. The only difference between the two models are the topographic codes. Topographic codes for each reserve block were adjusted to reflect the new surface estimate, carried as a three-decimal place fraction. Where a block was mined, the fraction was reduced to zero. If a block was partially mined, the fraction contains the portion of block remaining. Added blocks used a 2.48 density as a default value for reserve estimations.

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Digitized mining shapes from the 1983 Kara No. 1 mine plan were applied against the model to extract yearly reserve estimates. Individual rock type breakouts for each year are contained in Appendix A under separate cover. Table 1-1 summarizes these reserves. Table 4-4 of the 1983 PAH report was used as the standard from which 1983-1984 reserve differences were calculated. Table 1-2 presents the calculated differences. These differences represent approximate tonnages mined between June 1983 and May 1984 by Tasminex.

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3.0 MINE PLAN MODIFICATIONS

Revised Mine Plan - Kara No. 1

Since June 1983, Tasminex operations have resulted in decreasing the minable reserves, as determined in the PAH October 1983 study, by the following:

	Ore		Stkpl Resource		Waste	Total
	Tonnes	% WO_3	Tonnes	% WO_3	Tonnes	Tonnes
Oct 83	818,684	0.814	370,204	0.636	1,725,129	2,914,017
May 84	754,974	0.833	305,329	0.652	1,633,647	2,693,950
Diff	63,710	0.589	64,875	0.561	91,482	220,067

The May 1984 reserves have been extracted from the revised 1984 mine schedule. The above material mined by Tasminex has been removed from areas contained in Preproduction, Year 1, and Year 2 of the October 1983 study. Other than requiring a re-scheduling to meet the 130,000 tonnes per year target, the most significant effects of the Tasminex operations as of mid-May are minor operational access revisions.

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Should Tasminex continue mining into the high grade zone in the south end of the PAH pit, project economics could be significantly altered due to loss of higher grade material in early years. Some of the lower grade ore adjacent to the final southeast pit wall may not be accessible should Tasminex operations continue southwards.

In re-scheduling the reserves remaining as of mid-May, it was assumed that:

- Tasminex would not mine further than the current position.
- Final pit limits are not affected by Tasminex mining.
- Waste dump configurations and external haulage access will not change significantly.

The revised Kara No. 1 production schedule is summarized in Table 3-1. Individual mining years (Preproduction through Year 6) are summarized in Tables 3-2 through 3-8.

During Preproduction, the south end of the final pit is mined out to the 515 bench. As noted in the October 1983 report, nearly all the 173,000 waste tonnes are required to

TABLE 3-1

SUPERIOR OIL COMPANY
KARA PROJECT

Revised Production Schedule
Kara No. 1

	Ore (+0.20% WO3 COG)			Stockpile Resource (+0.20% WO3 COG)					
Year	Ore Tonnes	% WO3	%Mag	Ore Tonnes	% WO3	%Mag	Waste Tonnes	Total Tonnes	* Ratio
PP	46,498	1.034	53.5	146,135	0.782	52.6	184,067	376,700	7.10
1	130,317	0.899	52.5	106,223	0.641	41.9	218,147	454,687	2.49
2	130,264	0.638	47.5	44,486	0.322	24.9	325,692	500,442	2.84
3	129,846	0.676	55.1	7,303	0.277	33.8	364,082	501,231	2.86
4	130,244	0.839	59.3	1,182	0.254	48.8	368,436	499,862	2.84
5	129,926	0.974	71.6	--	--	--	151,226	281,152	1.16
6	57,879	0.980	78.3	--	--	--	21,997	79,876	0.38
Total	754,974	0.833	58.6	305,329	0.652	44.4	1,633,647	2,693,950	2.57

*Waste/Ore Ratio = (Total Tonnes - Ore Tonnes)/Ore Tonnes

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TABLE 3-2.

KARA PROJECT
SUPERIOR OIL COMPANY

MINABLE RESERVES
KARA NO. 1
PREPRODUCTION
(UPDATED 15 JUNE/84)

	WO3 ORE ±0.200 % WO3 CUTOFF			STOCKPILE RESOURCE ±0.200 % WO3 CUTOFF				
BENCH	ORE TONNES	% WO3	% EE304	ORE TONNES	% WO3	% EE304	WASTE TONNES	TOTAL TONNES
537	0	0.000	0.000	1393	1.195	0.670	4932	6335
535	0	0.000	0.000	3688	1.253	0.607	14046	17734
532	0	0.000	0.000	4660	0.984	0.557	23621	28281
530	0	0.000	0.000	11855	0.903	0.586	18463	30318
527	0	0.000	0.000	16503	0.762	0.568	22555	39058
525	0	0.000	0.000	24659	0.779	0.538	16537	41195
522	2280	1.970	0.511	24848	0.743	0.523	18582	45710
520	12615	1.021	0.526	19637	0.723	0.511	18612	50864
517	12780	0.912	0.532	19494	0.687	0.515	24418	56692
515	18823	1.013	0.547	19409	0.739	0.438	22281	60513
TOTAL	46493	1.034	0.535	146135	0.782	0.526	184067	376700

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TABLE 3-3

KARA PROJECT
SUPERIOR OIL COMPANY

MINABLE RESERVES
KARA NO. 1
YEAR 1
(UPDATED 15 JUNE/84)

	WO3 ORE			STOCKPILE RESOURCE				
BENCH	±0.200 % WO3 CUTOFF ORE TONNES	% WO3	% FE3O4	±0.200 % WO3 CUTOFF ORE TONNES	% WO3	% FE3O4	WASTE TONNES	TOTAL TONNES
520	0	0.000	0.000	0	0.000	0.000	168	168
517	0	0.000	0.000	0	0.000	0.000	7335	7335
515	0	0.000	0.000	0	0.000	0.000	7773	7773
512	19237	1.023	0.559	20352	0.735	0.439	38770	78359
510	21847	0.889	0.542	19871	0.720	0.437	40790	82508
507	20241	0.752	0.551	23068	0.653	0.432	48004	91313
505	23007	0.976	0.507	19252	0.589	0.414	48862	91121
502	25878	0.858	0.516	15696	0.556	0.400	22160	63734
500	20107	0.906	0.477	7647	0.471	0.345	4285	32039
497	0	0.000	0.000	337	0.312	0.273	0	337
TOTAL	130317	0.899	0.525	106223	0.641	0.419	218147	454687

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TABLE 3-4

KARA PROJECT
SUPERIOR OIL COMPANY

MINABLE RESERVES
KARA NO. 1
YEAR 2
(UPDATED 15 JUNE/84)

BENCH	WOB ORE ±0.200 % WO3 CUTOFF ORE TONNES	% WO3	% FE3O4	STOCKPILE RESOURCE ±0.200 % WO3 CUTOFF ORE TONNES	% WO3	% FE3O4	WASTE TONNES	TOTAL TONNES
512	0	0.000	0.000	0	0.000	0.000	411	411
510	0	0.000	0.000	0	0.000	0.000	7221	7221
507	0	0.000	0.000	0	0.000	0.000	10946	10946
505	0	0.000	0.000	0	0.000	0.000	14255	14255
502	0	0.000	0.000	1702	0.325	0.220	51994	53696
500	10585	0.674	0.530	3000	0.275	0.118	59268	72853
497	31132	0.780	0.494	11109	0.393	0.290	39816	82053
495	25745	0.645	0.476	3737	0.304	0.264	35510	70042
492	25546	0.614	0.491	9651	0.327	0.268	39663	74860
490	23421	0.545	0.465	5145	0.271	0.200	40877	69443
487	13835	0.482	0.373	5096	0.270	0.238	25731	44662
TOTAL	130264	0.638	0.475	44486	0.322	0.249	325692	500442

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TABLE 3-5

KARA PROJECT
SUPERIOR OIL COMPANY

MINABLE RESERVES
KARA NO. 1
YEAR 3
(UPDATED 15 JUNE/84)

	WO3 ORE			STOCKPILE RESOURCE				
BENCH	+0.200 % WO3 CUTOFF ORE TONNES	% WO3	% EE3O4	+0.200 % WO3 CUTOFF ORE TONNES	% WO3	% EE3O4	WASTE TONNES	TOTAL TONNES
497	0	0.000	0.000	0	0.000	0.000	28455	28455
495	0	0.000	0.000	0	0.000	0.000	33879	33879
492	0	0.000	0.000	94	0.255	0.000	37773	37867
490	0	0.000	0.000	288	0.258	0.539	26793	27081
487	12185	0.585	0.529	0	0.000	0.000	14035	26220
485	22769	0.520	0.439	3670	0.275	0.238	41268	67907
482	25565	0.571	0.527	3251	0.280	0.386	41971	70787
480	21129	0.717	0.585	0	0.000	0.000	48438	69567
477	19549	0.857	0.596	0	0.000	0.000	42183	61732
475	21267	0.830	0.587	0	0.000	0.000	31737	53004
472	7182	0.671	0.595	0	0.000	0.000	17550	24732
TOTAL	129846	0.676	0.551	7303	0.277	0.338	364082	501231

TABLE 3-6

KARA PROJECT
SUPERIOR OIL COMPANY

MINABLE RESERVES
KARA NO. 1
YEAR 4
(UPDATED 15 JUNE/84)

	WO3 ORE			STOCKPILE RESOURCE				
BENCH	±0.200 % WO3 CUTOFF ORE TONNES	% WO3	% Fe2O4	±0.200 % WO3 CUTOFF ORE TONNES	% WO3	% Fe2O4	WASTE TONNES	TOTAL TONNES
490	0	0.000	0.000	0	0.000	0.000	12388	12388
487	0	0.000	0.000	319	0.253	0.541	44991	45310
485	17	0.386	0.000	413	0.356	0.460	39905	40335
482	92	0.703	0.000	300	0.254	0.553	40642	41034
480	1360	0.479	0.479	150	0.249	0.325	37972	39932
477	2426	0.530	0.460	0	0.000	0.000	38875	41301
475	6655	0.651	0.488	0	0.000	0.000	31561	38216
472	20028	0.635	0.543	0	0.000	0.000	41582	61610
470	31755	0.805	0.565	0	0.000	0.000	43226	74981
467	25546	0.879	0.576	0	0.000	0.000	18796	44342
465	17541	0.865	0.661	0	0.000	0.000	7905	25446
462	16837	0.909	0.694	0	0.000	0.000	3865	20702
460	7487	0.994	0.624	0	0.000	0.000	6728	14215
TOTAL	130244	0.839	0.593	1182	0.254	0.488	368436	499862

TABLE 3-7

KARA PROJECT
SUPERIOR OIL COMPANY

MINABLE RESERVES
KARA NO. 1
YEAR 5
(UPDATED 15 JUNE/84)

BENCH	WC3 ORE ±0.200 % WDB CUTOFF ORE TONNES	% WC3	% FE2O4	STOCKPILE RESOURCE ±0.200 % WDB CUTOFF ORE TONNES	% WDB	% FE2O4	WASTE TONNES	TOTAL TONNES
472	737	0.938	0.366	0	0.000	0.000	2632	3369
470	785	0.843	0.373	0	0.000	0.000	5458	6243
467	8388	0.742	0.568	0	0.000	0.000	24324	32712
465	20776	0.936	0.640	0	0.000	0.000	22352	43128
462	19264	0.980	0.715	0	0.000	0.000	23674	42938
460	20305	0.951	0.751	0	0.000	0.000	21845	42150
457	27456	1.013	0.738	0	0.000	0.000	23168	50624
455	22487	1.026	0.762	0	0.000	0.000	20234	42721
452	9723	1.068	0.730	0	0.000	0.000	7539	17267
TOTAL	129926	0.974	0.716	0	0.000	0.000	151226	281152

TABLE 3-8

KARA PROJECT
SUPERIOR OIL COMPANY

MINABLE RESERVES
KARA NO. 1
YEAR 6
(UPDATED 15 JUNE/84)

BENCH	WCB ORE +0.200 % WO3 OUTCEE ORE TONNES	% WO3	% FE2O4	STOCKPILE RESOURCE +0.200 % WO3 OUTCEE ORE TONNES	% WO3	% FE2O4	WASTE TONNES	TOTAL TONNES
452	12208	1.211	0.797	0	0.000	0.000	5975	18183
450	15078	1.077	0.775	0	0.000	0.000	8665	23743
447	11835	0.910	0.785	0	0.000	0.000	5221	17056
445	8414	0.798	0.785	0	0.000	0.000	1423	9837
442	6226	0.734	0.776	0	0.000	0.000	583	6809
440	4118	0.806	0.771	0	0.000	0.000	130	4248
TOTAL	57879	0.980	0.783	0	0.000	0.000	21997	79876

TABLE 3-8

[illegible]

BENCH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	WASTE TONNES	TOTAL TONNES
456	12306	1.211	0.767	1	0.000	0.000	5975	18193
450	15074	1.077	0.773	0	0.000	0.000	8665	23743
447	11833	0.910	0.762	0	0.000	0.000	5221	17056
445	2414	0.716	0.762	0	0.000	0.000	1423	3837
442	2226	0.734	0.772	0	0.000	0.000	583	2809
440	4210	0.830	0.771	0	0.000	0.000	139	4249
TOTAL	57879	1.040	0.783	0	0.000	0.000	21497	79876

develop the stockpile pad. To develop a similar waste tonnage in the revised plan requires completion of the 515 bench, which results in an additional 13,000 tonnes of ore in the stockpile.

In Year 1, ore access is revised by eliminating the ramp system originally left on the east wall and joining the Tasminex access directly to the north. As in the original plan, stripping is initiated in the middle of the deposit, with haulage along surface contours north to the initial access road.

During Year 2, ore has been developed in the middle of the deposit and stripping has been initiated at the north end. Ore access is maintained along the western limit of the Tasminex excavation. Haulage access for waste stripping is again along surface contours to the initial access road.

During Year 3, ore is mined from the middle of the deposit, with stripping continuing at the north end. Ore access conforms to that in the October 1983 study with the aid of minor fill material at the bottom of the Tasminex excavation.

In Year 4, the primary ore source continues to be the central pit area. By the end of the year, stripping of the final phase in the north end is essentially completed, with the exposure of ore grade material. Note that temporary access must be maintained on the northeast wall into Year 5.

During Year 5, the temporary ramp developed in Year 4 is mined out after continuity with the 460 bench. Also by Year 5, stripping requirements have been eliminatee and total material movement has dropped from 500,000 mtpy to 280,000 mtpy.

The Kara No. 1 deposit is completely mined out during the first six months of Year 6.

Pit composites at a scale of 1:500 have been developed for each mining period and are included in a Map Appendix.

APPENDIX NO. 4

KARA PROJECT

DETAILED PRODUCTION PLAN

AND FINANCING SCHEDULE

KARA PROJECT

DETAILED PRODUCTION PLAN

AND FINANCING SCHEDULE

2.0 REPORT SUMMARY

2.1 Overview

Pursuant to the terms of the Kara deed of May 6, 1983, not later than July 31, 1984, McIntyre must provide Tasminex with a detailed production plan and financing schedule, and call upon Tasminex to form a joint venture. Within 90 days of presenting this report, Tasminex must elect to maintain its 50% of the project or dilute its interest.

As proscribed in the deed, this report constitutes the detailed production plan and financing schedule.

2.2 Reserves

The two orebodies described in this report are known as Kara No. 1 and Kara North. At Kara No. 1, 93 cored holes were drilled to an average depth of 53 meters - 4,900 meters total and at Kara North, 17 holes were drilled to an average depth of 83 meters - 1,500 meters total. At Kara No. 1 mineable reserves are 755,000 tonnes grading 0.833 percent

WO_3 and at Kara North 230,000 tonnes grading 0.91 percent WO_3. Combined reserves total 985,000 tonnes grading 0.851 percent WO_3.

2.3 Mining

The mining method will be conventional open pit using loaders and trucks. The mine is scheduled to produce 500 tonnes ore per day. Operating 260 days per year 130,000 tonnes of ore will be produced each year.

This would result in an eight year mine life at current reserve estimates. The two deposits will be mined sequentially - Kara No. 1 followed by Kara North. Inter-ramp pit slope angles vary from 35 degrees to 65 degrees depending on ground competency. Pit configurations and the relatively small scale of the operation dictate a loader/truck mining method. Ramps are designed to allow two way traffic and are maintained at 10 percent maximum grade. Bench heights are 2.5 meters for grade control purposes. In order to reduce initial capital, a mining contractor will be hired to carry out mining operations.

2.0 cont'd.....3

2.4 Processing

The processing plant is designed to treat 130,000 tonnes ore per year on a 5 day per week basis. The treatment scheme will be gravity separation for both coarse and fine scheelite. The plant will consist of a crushing and grinding section, a magnetic separation section for rejection of magnetite, 3 gravity circuits and a concentrate handling and packaging section. Saleable product will be +65% WO_3 concentrate. The plant will be modular and semi-mobile to minimize construction time and facilitate relocation when new ore zones are found.

2.5 Manpower

A total of 36 employees will be required, 20 in the plant, 9 in the pit and 8 G & A. In addition a mining contractor, hired for mining operations will employ 9 - 11 operators.

2.6 Capital and Operating Costs

The capital cost of the project is estimated at approximately Aus. $5.7 million, with Aus.$1.1 million for mining, Aus.$3.5

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million for processing and Aus.$1.1 million for additional infrastructure and pre-production capitalized costs. At the start of production, Aus. $0.6 million will also be required for working capital.

Cash operating costs on a per MTU basis are estimated to be Aus. $41.58 with Aus.$13.48 for mining, Aus.$10.80 for processing and Aus.$17.30 for G & A and freight. Non cash depreciation would add Aus.$14.62 per MTU to the unit cost.

2.7 Economics

Under the most probable scenario, economic measures for the project are as follows:

2.0 cont'd.....5

	Constant Dollars	Escalated Dollars
NPV @ 12% (Aus.$ Millions)	5.3	
NPV @ 18% (Aus.$ Millions)		3.2
ROR (%)	34.0	34.0
Payback (years from start of production)	2.9	3.0

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APPENDIX NO. 5

GOVERNMENT CHEMICAL LABORATORIES

Western Australia

LEACHING OF TUNGSTEN ORES

FOR

McINTYRE MINES (AUSTRALIA) PTY LTD

December 1983
Laboratory Nos 83E304-7

ENGINEERING CHEMISTRY LABORATORY
19 CATHERINE STREET, BENTLEY
WESTERN AUSTRALIA 6102

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1. INTRODUCTION
2. HEAD SAMPLES
3. EXPERIMENTAL PROCEDURE
4. DISCUSSION OF RESULTS
5. ACKNOWLEDGEMENT

SUMMARY

Alkaline/EDTA leaches on three of the ores submitted have shown that 45-60 percent of the tungsten is extractable within acceptable time spans.

All of the ores contained minerals known to interfere with the process by limiting the tungsten extraction. It is recommended that leach trials be conducted on samples from which these deleterious minerals have been removed, before the process is deemed unsuitable because of the low tungsten extraction.

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1. INTRODUCTION

Telephone discussions were held with Mr G. Widelski of Superior Minerals, Tucson, Arizona on the possible application of the alkaline leach process developed in this laboratory for the extraction of tungsten from scheelite ($CaWO_4$) bearing ores. Subsequently four samples were forwarded with a request (letter dated 19 October 1983) from McIntyre Mines (Australia) Pty Ltd for ethylenediaminetetra-acetic acid (EDTA) leach trials.

Only one leach trial was to be conducted on each ore. It was acknowledged that many factors influence the scheelite dissolution and therefore optimum leaching conditions were unlikely to be selected first time. However, it was considered expedient to examine the ores in this manner to ascertain whether they were at all amenable to the process.

2. HEAD SAMPLES

Four samples, each of approximately one kilogram, were submitted for testwork. Mr C. Whitehead, Project Manager, McIntyre Mines, supplied the following information.

Sample	Comments
TD/2, TD/22	Tailings dump samples containing 0.4-0.6 percent WO_3.
WO/1	Weathered ore containing about 2 percent WO_3 in the form of anthoinite, $Al_2O_3 \cdot 2WO_3 \cdot 3H_2O$; no scheelite.
XO/1	Ore containing 1.2-1.3 percent WO_3; up to forty percent of the tungsten present as scheelite.

All four samples contained varying percentages of the iron oxides magnetite, hematite, limonite, and goethite. Calcite was also identified in samples TD/2 and TD/22.

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Each of the four samples was lightly crushed to destroy any aggregates, and representatively subsampled into a 200-300g working fraction. The subsamples were subsequently analysed and the results are shown in Table 1.

TABLE 1

Head Sample Analysis

Sample	Calcium Ca	Tungsten WO_3	Total Iron Fe	Ferrous Iron FeO
	..... percent as received			
TD/2	8.25	0.38	8.46	3.82
TD/22	4.46	0.51	23.7	2.16
WO/1	0.10	2.10	52.5	4.24
XO/1	6.45	1.24	31.5	4.88

The mineralogical form of the ferrous iron is important since Fe^{2+} can be extracted by the EDTA anion. Economic constraints prevented any detailed mineralogical assessment but one sample (XO/1) contained at least 27 percent of highly magnetic material, presumably magnetite (Fe_3O_4). The other three samples also contained a highly magnetic fraction but the percentages were not determined.

3. EXPERIMENTAL PROCEDURE

The dissolution of scheelite in alkaline/EDTA solution is dependent on pH, ore particle size, temperature, level of soluble cations in ore, calcium:EDTA ratio, and retention time. Experience with other scheelite bearing ores pointed to the last three variables as having the major influences on the economics of the process. Without a complete analysis of the level of co-extractable cations (e.g. Cu, Ni, Mg, etc.) it was decided to ignore them for this preliminary assessment.

The samples (200-300g) were stage ground in a motorised mortar and pestle to 95 percent minus 150 micrometre.

60g subsamples were leached in 300ml of leachant at 100°C and at pH 11. The leachant was prepared by dissolving the required quantity of the disodium salt of EDTA in water and adjusting the pH with caustic soda. A Ca:EDTA anion ratio of 1.5:1 was used for three trials and an Al:EDTA anion ratio of 9:1 was used for WO/1. For this latter ore sufficient EDTA was added to complex all the ferrous iron and still allow an Al:EDTA anion ratio of 2.5:1.

The leach trials were run for varying lengths of time depending on the level of tungsten in the ore and the results are shown in Table 2.

TABLE 2

Results of Leaching Trials

Ore	Retention Time hours	Tungsten Extraction percent
TD/2	8	61
TD/22	8	45
XO/1	24	47
WO/1	16	22

4. DISCUSSION OF RESULTS

The degree of tungsten extraction was low in all leach trials. The results obtained on the two tailings dump samples (TD/2, TD/22) were particularly disappointing as past experience with low grade tungsten ores would suggest that ores in the range 0.3-0.5 percent WO_3 should be leachable in 6-10 hours.

An increase in the retention time from eight to twelve hours should lead to an improvement in the extraction of tungsten. However, an examination of all of the leach liquors generated in the current trials showed a significant concentration of iron. The iron concentration was not quantified for all liquors but in the TD/22 liquor it was

sufficient to complex fifteen percent of the added EDTA anion. This reduced significantly the concentration of anion free to complex the calcium in the scheelite.

The preliminary nature of the testwork requested precluded a thorough analysis of the head samples for extractable cations. It can therefore only be speculated that their presence is responsible for the low tungsten recoveries. Similarly one trial on each ore is insufficient to examine all parameters controlling the tungsten dissolution kinetics. Whether co-extracted cations or the process conditions selected were responsible for the low tungsten recoveries can only be determined by further testwork.

The magnetite fraction in the ores can be removed simply by magnetic separation and the calcite levels reduced by a dilute acid wash. Both these techniques would reduce the EDTA anion requirement and should lead to enhanced tungsten extractions.

5. ACKNOWLEDGEMENT

The experimental testwork reported was performed by Mr P. Chandler.

R.E. MARSHALL
CHEMIST AND RESEARCH OFFICER

M.J. WORT
CHIEF
ENGINEERING CHEMISTRY LABORATORY

APPENDIX NO. 6

KARA NO. 1 -

PRE PRODUCTION DRILLING - ASSAY RECORDS

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259153 HOLE. N° PP. 1.

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5733·1 LENGTH. 22·86m LOCATION.

EASTING. 7377·3 AZIMUTH. — KARA N° 1.

ELEVATION. 519·0 DIP. 90°

SURVEYED. PDA. SURVEY DATE. 6 SEPT. 1984. DRILL DATE. 15 AUG 84

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) AMDEL - AC/954/86 WO3.	Bi	Mo	Pb.	
PP 1/1	3·05	4·57		1·15%	88	420	690	
1/2	4·57	6·10		1·03%	76	520	355	
1/3	6·10	7·62		7300	22	120	275	
1/4	7·62	9·14		1·25%	32	155	375	
1/5	9·14	10·67		6900	58	125	255	
1/6	10·67	12·19		8750	4	150	105	
1/7	12·19	13·72		1·27%	20	145	64	
1/8	13·72	15·24		8100	66	125	70	
1/9	15·24	16·76		1·01%	155	385	290	
1/10	16·76	18·29		2140	350	215	400	
1/11	18·29	19·81		1000	30	34	160	
1/12	19·81	21·34		1120	54	32	150	
1/13.	21·34	22·86.		610	18.	22	500.	

AVERAGE GRADES.	FROM (m)	To (m)	METRES DRILLED.	AVERAGE GRADES.				

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HOLE. N° PP2.

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5733·7 LENGTH. 21·34m. LOCATION.

EASTING. 7386·9. AZIMUTH. — KARA N° 1.

ELEVATION. 519·2 DIP. 90°

SURVEYED. PDA. SURVEY DATE. 6 SEPT 1984 DRILL DATE. 17 AUG 1984

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) AMDEL - AC. 934/85 WO3.	Bi	Mo	Pb.	
PP2/1	0·00	3·05		1·00%	14	105	185	
2/2	3·05	4·57		4620	22	76	140	
2/3	4·57	6·10		3740	14	125	140	
2/4	6·10	7·62		2860	26	76	120	
2/5	7·62	9·14		4700	40	74	610	
2/6	9·14	10·67		6560	32	44	640	
2/7	10·67	12·19		1420	14	34	335	
2/8	12·19	13·72		510	<4	16	770	
2/9	13·72	15·26		320	8	14	540	
2/10	15·24	16·76		430	10	32	960	
2/11	16·76	18·29		410	10	20	490	
2/12	18·29	19·81		1960	10	36	145	
2/13.	19·81.	21·34.		2840.	34.	58.	430.	

AVERAGE GRADES.	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				

HOLE N° PP 2.

154

259155 HOLE. N°. PP 2A.

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5733·6 LENGTH. 28·34m LOCATION.

EASTING. 7386·3 AZIMUTH. 270° KARA N° 1.

ELEVATION. 519·2. DIP. 65°W.

SURVEYED. PDA. SURVEY DATE. 6 SEP 84 DRILL DATE. 20-21 AUG 84

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) AMDEL - AC. 954/85 WO3.	Bi	Mo	Pb.	
PP 2A|1	0·00	3·05		7500	20	96	190	
2A|2	3·05	4·57		1·10%	18	125	540	
2A|3	4·57	6·10		1·20%	18	155	430	
2A|4	6·10	7·62		5050	8	90	300	
2A|5	7·62	9·14		6500	<4	72	190	
2A|6	9·14	10·67		3660	4	60	225	
2A|7	10·67	12·19		1800	16	40	130	
2A|8	12·19	13·72		3800	14	72	375	
2A|9	13·72	15·24		5200	64	42	410	
2A|10	15·24	16·76		6250	235	105	830	
2A|11	16·76	18·29		1200	48	64	330	
2A|12	18·29	19·81		890	32	48	1140	
2A|13	19·81	21·34		630	14	24	175	
2A|14	21·34	22·86		620.	14	12	150	
2A|15	22·86	24·38		740	10	18	305	
2A|16.	24·38.	25·91		660	20	22	495.	
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE N° PP. 2A.

155

259156

HOLE. N°. PP2A (CONTINUED)

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 6733.6 LENGTH. 28.34m LOCATION.

EASTING. 7386.3 AZIMUTH. 270° KARA N° 1.

ELEVATION. 519.2 DIP. 65°W.

SURVEYED. PDA. SURVEY DATE. 6 SEP 84 DRILL DATE. 20-21 AUG '84

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) AMDEL - AC. 954/85 WO3.	Bi	Mo	Pb.	
2A/17.	25.91	27.43		270	10	18	305	
2A/18	27.43	28.34.		350	30	22	495	
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE N°PP2A (CONTIN)

156

259157

HOLE. N° PP 2B.

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5733.6 LENGTH. 13.72 m LOCATION.

EASTING. 7385.7 AZIMUTH. 270° KARA N° 1.

ELEVATION. 519.2 DIP. 45°

SURVEYED. PDA SURVEY DATE. 6 SEPT 1984 DRILL DATE. 22 AUG 84.

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) AMDEL - AC. 954/85 WO3.	Bi	Mo	Pb.	
PP 2B/1	0.00	3.05		4100	4	76	200	
2B/2	3.05	4.57		5200	4	84	250	
2B/3	4.57	6.10		8100	14	130	420	
2B/4	6.10	7.62		3360	20	96	445	
2B/5	7.62	9.14		7000	14	140	520	
2B/6	9.14	10.67		8400	16	96	460	
2B/7	10.67	12.19		1.01%	18	205	230	
2B/8.	12.19	13.72.		5050.	14	100	215	

AVERAGE GRADES.	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				

HOLE N° PP 2B.

157

259158

HOLE. N° PP3.

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5736-7 LENGTH. 16·76m LOCATION.

EASTING. 7397·0 AZIMUTH. — KARA N° 1.

ELEVATION. 519·6 DIP. 90°

SURVEYED. PDA. SURVEY DATE. 6th SEPT '84 DRILL DATE 23-24 AUG '84

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) AMDEL - AC. 954/85 WO3.	Bi	Mo	Pb.	
PP3/1	3·05	4·57		1·10%	34	335	380	
3/2	4·57	6·10		4560	14	150	145	
3/3	6·10	7·62		6250	28	62	76	
3/4	7·62	9·14		1·62%	78	250	220	
3/5	9·14	10·67		6150	64	94	160	
3/6	10·67	12·19		2·16%	< 4	430	145	
3/7	12·19	13·72		4780	64	92	155	
3/8	13·72	15·24		790	34	28	130	
3/9	15·24.	16·76.		180.	12	8	80.	
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE N° PP3.

158

259159

HOLE. N°. PP4.

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5738·8 LENGTH. 11·58m. LOCATION.

EASTING. 7406·2 AZIMUTH. – KARA N°1.

ELEVATION. 519·9 DIP. 90°

SURVEYED. PDA. SURVEY DATE. 6 SEPT 84 DRILL DATE. 28 AUG 84

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) AMDEL – AC. 1108/85 WO3.	Bi	Mo	Pb.	
PP 4/1	3·05	4·57		930	48	210	265	
4/2	4·57	6·10		680	12	130	45	
4/3	6·10	7·62		1040	10	275	150	
4/4	7·62	9·14		1700	18	66	155	
4/5	9·14	10·67		220	50	16	160	
4/6.	10·67	11·58		580	190	16	190	

AVERAGE GRADES.	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				

HOLE N° PP4

159

259160

HOLE. N°. PP 5.

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5680·9 LENGTH. 11·28m LOCATION.

EASTING. 7360·3 AZIMUTH. – KARA N° 1.

ELEVATION. 536·4 DIP. 90°

SURVEYED. PDA. SURVEY DATE. 11 OCT 1984 DRILL DATE. 29-30 AUG 84.

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	DEPTH DRILLED TO (m)		ASSAY. (ppm) WO3.	Bi	Mo	Pb.	AMDEL – AC. 1105/85
PP 5/1	0·00	3·05		1580	110	34	9450	
5/2	3·05	4·57		5400	280	72	8800	
5/3	4·57	6·10		1·00%	315	420	4780	
5/4	6·10	7·62		1·39%	335	295	3520	
5/5	7·62	9·14		6200	36	74	2460.	
5/6	9·14	10·67		5800	62	150	1860	
5/7	10·67	11·28.		4880	76	140	2180.	

AVERAGE GRADES.	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				

HOLE N° PP/5.

160

259161

HOLE N° PP6.

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5683·0 LENGTH. 27·43m LOCATION.

EASTING. 7370·4 AZIMUTH. — KARA N° 1.

ELEVATION. 836·2 DIP. 90°

SURVEYED. PDA. SURVEY DATE. 11 OCT 1986 DRILL DATE: 31 AUG 1986 – 4 SEP 1986

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	DEPTH DRILLED TO (m)		ASSAY. (ppm) AMDEL – AC/108/86. WO3.	Bi	Mo	Pb	
PP 6/1	0·00	3·05		2700	320	38	7650	
6/2	3·05	4·57		3640	1200	20	8180	
6/3	4·57	6·10		2780	150	22	950	
6/4	6·10	7·62		1200	135	18	1340	
6/5	7·62	9·14		420	68	48	520	
6/6	9·14	10·67		620	44	94	395	
6/7	10·67	12·19		880	68	110	320	
6/8	12·19	13·72		1220	48	72	170	
6/9	13·72	15·24		3480	92	105	260	
6/10	15·24	16·76		5050	26	74	210	
6/11	16·76	18·29		6800	40	62	225	
6/12	18·29	19·81		6150	12	84	165	
6/13	19·81	21·34		1940	46	700	420	
6/14	21·34	22·86		690	92	58	690	
6/15	22·86	24·38		1060	70	24	730	
6/16.	24·38	25·91		910	38	28	400	
6/17	25·91	27·43		1020	98	34	820	
AVERAGE GRADES.	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				

HOLE N° PP6

HOLE. N° PP 7.

161

259162

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5685·3 LENGTH. 26·52m LOCATION.

EASTING. 7380·6 AZIMUTH. — KARA N° 1.

ELEVATION. 536·0 DIP. 90°.

SURVEYED. PDA. SURVEY DATE. 11th OCT 1984 DRILL DATE. 4-6 SEPT '84

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) ANDEL - AC. WO3.	Bi	Mo	Pb	
PP 7/1	0·00	3·05		1600	62	22	7300	
7/2	3·05	4·57		3380	160	36	1720	
7/3	4·57	6·10		8600	145	180	720	
7/4	6·10	7·62		1·90%	90	285	630	
7/5	7·62	9·14		1·12%	86	175	440	
7/6	9·14	10·67		6900	22	195	125	
7/7	10·67	12·19		1260	24	42	94	
7/8	12·19	13·72		7250	18	205	160	
7/9	13·72	15·24		6900	22	360	52	
7/10	15·24	16·76		9450	34	170	100	
7/11	16·76	18·29		890	26	30	325	
7/12	18·29	19·81		330	14	14	190	
7/13	19·81	21·34		550	4	18	255	
7/14	21·34	22·86		320	8	18	140	
7/15	22·86.	24·38		320	4	20	360	
7/16.	24·38	25·91.		260	14	26	600	
7/17.	25·91	26·52.		240	8	18	390	
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE N° PP7

162

259163

HOLE. N° PP 8.

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING _____ LENGTH. 25·30m LOCATION.

EASTING. _____ AZIMUTH. - KARA N° 1.

ELEVATION. _____ DIP. 90°

SURVEYED. SURVEY DATE. DRILL DATE. 6-7 SEPT 84.

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) WO3.	Bi	Mo	Pb.	AMDEL - AC. 1144/85 1274/85
PP8/1	0·00	3·05		5000	48	105	950	
8/2	3·05	4·57		7000	66	94	900	
8/3	4·57	6·10		4280	26	40	295	
8/4	6·10	7·62		2300	125	40	205	
8/5	7·62	9·14		2320	125	44	195	
8/6	9·14	10·67		1420	82	295	180	
8/7	10·67	12·19		1400	74	290	180	
8/8	12·19	13·72		1640	10	32	68	
8/9	13·72	15·24		1420	12	22	76	
8/10	15·24	16·76		990	6	22	100	
8/11	16·76	18·29		3440	12	120	485	
8/12	18·29	19·81		490	44	42	155	
8/13	19·81	21·34		610	16	135	935	
8/14	21·34	22·86		250	<4	64	245	
8/15	22·86	24·38.		240	12	46	990	
8/16.	24·38	25·30		230	24	36	1360.	
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE N°. PP 8

163

259164 HOLE N° PP 9

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5697.6. LENGTH. 27.13m LOCATION.

EASTING. 7361.4 AZIMUTH. — KARA N° 1.

ELEVATION. 533.3 DIP. 90°

SURVEYED. PDA SURVEY DATE. 22 OCT. 1984 DRILL DATE. 10 SEPT 84

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) AMDEL - AC. 1274/EG. WO3.	Bi	Mo	Pb.	
PP. 9/1	0.00	3.05		4380	115	60	3320	
9/2	3.05	4.57		6750	120	96	1600	
9/3	4.57	6.10		6450	32	165	460	
9/4	6.10	7.62		8150	24	130	470	
9/5	7.62	9.14		8200	18	135	440	
9/6	9.14	10.67		6250	26	125	325	
9/7	10.67	12.19		5400	42	150	325	
9/8	12.19	13.72		1.20%	58	315	295	
9/9	13.72	15.24		9300	24	175	175	
9/10	15.24	16.76		6700	54	98	145	
9/11	16.76	18.29		6950	42	130	180	
9/12	18.29	19.81		6450	56	94	98	
9/13	19.81	21.34		4420	38	64	105	
9/14	21.34	22.86		2740	62	66	84	
9/15	22.86	24.38		1200	34	36	94	
9/16	24.38	25.91		1160	34	32	74	
9/17.	25.91	27.13.		770.	24	34	130.	
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE N° PP. 9.

259165 HOLE. N° PP 10

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5700·5 LENGTH. 28·0Hm LOCATION.

EASTING. 7371·0 AZIMUTH. – KARA N° 1.

ELEVATION. 532·8 DIP. 90°

SURVEYED. POA. SURVEY DATE. 22 OCT 1984 DRILL DATE. 12-13 SEPT 84

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY (ppm) AMDEL – AC. 1274/85 WO3.	Bi.	Mo	Pb.	
PP. 10/1	0·00	3·05		2560	480	84	1·80%	
10/2	3·05	4·57		4460	115	46	7100	
10/3	4·57	6·10		1·13%	36	320	1200	
10/4	6·10	7·62		1·45%	20	290	495	
10/5	7·62	9·14		8150	26	140	510	
10/6	9·14	10·36		7900	32.	215	390	
10/7	10·36.	12·19		1·24%	32	450	560	
10/8	12·19	13·72		1·29%	<4	345	315	
10/9	13·72	15·24		1·48%	14	280	355	
10/10	15·24	16·76		1·11%	<4	365	420	
10/11	16·76.	18·29		7900	72	205	375	
10/12	18·29	1981		6300	32	215	225	
10/13	19·81	21·34		1800	98	84	285	
10/14	21·34	22·86		630	60	34	170	
10/15	22·86	24·38		570	16	24	255	
10/16.	24·38.	25·91		190	4	14	86	
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE N°. PP 10.

259166 HOLE. N°. PP 10 (CONTINUED)

16

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5700.5 LENGTH. 28.04m LOCATION.

EASTING. 7371.0 AZIMUTH. - KARA N° 1.

ELEVATION. 532.8 DIP. 90°

SURVEYED. PDA. SURVEY DATE. 22 OCT. 1984 DRILL DATE. 12-13 SEPT 1984

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) AMDEL - AC. 1274/84 WO3.	Bi	Mo	Pb	
PP 10/17	25.91	27.43		160	4	20	275	
10/18	27.43	28.04.		200	14	36	320	
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE N°. PP 10 (CONT

166

259167

HOLE. N° PP 11

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5702.5 LENGTH. 26.52m LOCATION.

EASTING. 7380.9 AZIMUTH. — KARA N° 1.

ELEVATION. 532.8 DIP. 90°

SURVEYED. PDA. SURVEY DATE. 22 OCT. 1964 DRILL DATE. 13-17 SEPT. 1964.

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) WO3.	AMDEL – AC. 1360/85			
PP. 11/1	0.00	3.05		2460				
11/2	3.05	4.57		5900				
11/3	4.57	6.10		7000				
11/4	6.10	7.62		1.16%				
11/5	7.62	9.14		3.04%				
11/6	9.14	10.67		1.32%				
11/7	10.67	12.19		7100				
11/8	12.19	13.72		3600				
11/9	13.72	15.24		8550				
11/10	15.24	16.76		4940				
11/11	16.76	18.29		4100				
11/12	18.29	19.81		3240				
11/13	19.81	21.34		760				
11/14	21.34	22.86		320				
11/15	22.86	24.38		330				
11/16	24.38	25.91		300				
11/17.	25.91	26.62.		450.				
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE N° PP. 11

167

259168 HOLE N° PP12.

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5704.1 LENGTH. 26.21m LOCATION.

EASTING. 73896 AZIMUTH. 270° KARA N°1.

ELEVATION. 533.1 DIP. 85°

SURVEYED. PDA SURVEY DATE. 22 OCT 1982 DRILL DATE.

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) AMDEL - AC. 1360/ES WO3.				
PP.12/1	0.00	3.05		3240				
12/2	3.05	4.57		3160				
12/3	4.57	6.10		2880				
12/4	6.10	7.62		6600				
12/5	7.62	9.14		7400				
12/6	9.14	10.67		1.45%				
12/7	10.67	12.19		2.32%				
12/8	12.19	13.72		1.31%				
12/9	13.72	15.24		2620				
12/10	15.24	16.76		1520				
12/11	16.76	18.29		1380				
12/12	18.29	19.81		2460				
12/13	19.81	21.34		680				
12/14	21.34	22.86		410				
12/15	22.86	24.38		380				
12/16	24.38	25.91		510				
12/17	25.91	26.21		670				
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE N° PP12.

259169 HOLE. N°. PP13

168

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5705.6 LENGTH. 28.34m LOCATION.

EASTING. 73946 AZIMUTH. 270° KARA N° 1.

ELEVATION. 533.1 DIP. 86°

SURVEYED. PDA SURVEY DATE. 22 OCT. 1984. DRILL DATE. 19-21 SEPT 84

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) WO3. 13160/86 AMDEL - AC. 1469/85				
PP13/1	0.00	3.05		115%				
13/2	3.05	4.57		1.06%				
13/3	4.57	6.10		1.48%				
13/4	6.10	7.62		1.42%				
13/5	7.62	9.14		1.51%				
13/6	9.14	10.67		2.72%				
13/7	10.67	12.19		1.91%				
13/8	12.19	13.72		8200				
13/9	13.72	15.24		2380				
13/10	15.24	16.76		3320.				
13/11	16.76	18.29		3820				
13/12	18.29	19.81		1500				
13/13	19.81	21.34		910				
13/14	21.34	22.86		620				
13/15	22.86	24.38		650				
13/16.	24.38	25.91		640.				
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE N°

169

259170

HOLE N° PP13 (CONTIN)

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 6705·6 LENGTH. 28·34m LOCATION.

EASTING. 7399·6 AZIMUTH. 270° KARA N° 1.

ELEVATION. 533.1 DIP. 85°

SURVEYED. P.D.A. SURVEY DATE. 22.OCT 1984 DRILL DATE. 19-21 SEPT 84

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) AMDEL - AC. WO3.				
PP.13/17	25·91	27·43		630				
13/18	27·43	28·34.		530.				
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE N° P.P.13/CONTIN

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259171

HOLE N° PP. 14

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5680·1 LENGTH. 8·53m LOCATION.

EASTING. 7350·7 AZIMUTH. - KARA N° 1.

ELEVATION. 536·0 DIP. 90°

SURVEYED. P.D.A. SURVEY DATE. 11. OCT. 1984 DRILL DATE. 24 SEPT. 1984

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) WO3.					ANDEL - AC. 1464/ES
PP. 14/1	0·00	3·05		2370					
14/2	3·05	4·57		3620					
14/3	4·57	6·10		1740					
14/4	6·10	7·62		1780					
14/5.	7·62	8·53.		1780.					
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.					
AVERAGE GRADES.									

HOLE N° PP. 14

171

259172

HOLE N° PP 14 A.

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5680·3 LENGTH. 7·01m LOCATION.

EASTING. 7349·7 AZIMUTH. KARA N° 1.

ELEVATION. 536·1 DIP. 90°

SURVEYED. POA. SURVEY DATE. 11 OCT 1984 DRILL DATE. 25 SEPT 84

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) WO3.	AMDEL - AC. 1469/85			
PP14A/1	0·00	3·05		W020				
14A/2	3·05	4·57		1680				
14A/3	4·57	6·10		1640				
14A/4	6·10	7·01		1100				

	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE N° PP 14 A

259173 HOLE N° PP 15

172

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5676·7 LENGTH. 6·10m LOCATION.

EASTING. 7340·6. AZIMUTH. — KARA N° 1.

ELEVATION. 536·4 DIP. 90°.

SURVEYED. PDA. SURVEY DATE. 11-OCT 1984 DRILL DATE. 25-26 SEPT 84

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)	ASSAY. (ppm) AMDEL - AC. WO3.					
PP. 15/1	0·00	6·10	NO SAMPLE					

AVERAGE GRADES.	FROM (m)	TO (m)	METRES DRILLED	AVERAGE GRADES.				

HOLE NO PP 15

173

259174

HOLE N° PP 16

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 6654·4. LENGTH. 16·76m LOCATION.

EASTING. 7341·0 AZIMUTH. 270 KARA N° 1.

ELEVATION. 5373 DIP. 85°

SURVEYED. PDA. SURVEY DATE. 11 OCT 1984 DRILL DATE. 26-27 SEPT 84

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) AMDEL - AC. 1469/85 WO3.				
PP 16/1	0·00	3·05		1520				
16/2	3·05	4·57		810				
16/3	4·57	6·10		520				
16/4	6·10	7·62		630				
16/5	7·62	9·14		280				
16/6	9·14	10·67		310				
16/7	10·67	12·19		7800				
16/8	12·19	13·72		8000				
16/9	13·72	15·24		4520				
16/10	15·24	16·76.		4·10%				
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE N° PP 16

259175 HOLE N° PP.17

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5659.7 LENGTH. 27.43m. LOCATION.

EASTING. 7238.6 AZIMUTH. 270° KARA N° 1.

ELEVATION. 536.7 DIP. 85°

SURVEYED. PDA. SURVEY DATE. 11 OCT. 1984 DRILL DATE. 28th SEPT 1984 TO 4 OCT. 1984.

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) WO3. AMDEL - AC. 1744/85.				
PP. 17/1	0.00	3.05		3740.				
17/2	3.05	4.57		2980				
17/3	4.57	6.10		1420				
17/4	6.10	7.62		2100				
17/5	7.62	9.14		710				
17/6	9.14	10.67		1140				
17/7	10.67	12.19		660				
17/8	12.19	13.72		1180				
17/9	13.72	15.24		2260				
17/10	15.24	16.76		8100				
17/11	16.76	18.29		6850				
17/12	18.29	19.81		4640				
17/13	19.81	21.34		1740				
17/14	21.34	22.86		950				
17/15	22.86	24.38		650				
17/16	24.38	25.91		1060				
17/17.	25.91	27.43		690.				
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE N° PP 17

175

259176

HOLE N° PPRC.

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5660·7 LENGTH. 7·62m LOCATION.

EASTING. 7347·3 AZIMUTH. – KARA N°1.

ELEVATION. 536·9 DIP. 90°

SURVEYED. POA. SURVEY DATE. 11·OCT.1984 DRILL DATE. 9-10 OCT 1984

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	DEPTH DRILLED TO (m)		ASSAY. (ppm) AMDEL – AC. WO3.				
PP. 18/1	0·00	1·52		440				
18/2	3·05	4·57		1·15%				
18/3	4·57	6·10		1·26%				
18/4	6.10	7·62.		2700.				
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE N° DD 18

176

HOLE N° PP 19

259177

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 6663·1 LENGTH. 12·19m LOCATION.

EASTING. 7357·3 AZIMUTH. - KARA N° 1.

ELEVATION. 538·1 DIP. 90°

SURVEYED. POA. SURVEY DATE. 11 OCT 1984 DRILL DATE. 10-11 OCT. 84

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	TO (m)		ASSAY. (ppm) ANDEL - AC. WO3.				
PP19/1	0·00	1·52		4280				
19/2	1·52	3·05		7650				
19/3	3·05	4·27		1.04%				
19/4	4·27	6·10		1.08%				
19/5	9·14	10·67		3160				
19/6	10·67	12·19m.		1900.				
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

LINE N° PP 19

177

259178 HOLE. N° PP20

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5668·4 LENGTH. 32·00m LOCATION.

EASTING. 7333·9. AZIMUTH. — KARA N° 1.

ELEVATION. 536·2 DIP. 90°

SURVEYED. PDA. SURVEY DATE. 22 OCT 1984. DRILL DATE. 10-11 OCT 1984

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	DEPTH DRILLED TO (m)		ASSAY. (ppm) AMDEL - AC. WO3.				
PP20/1	0·00	1·52		870				
20/2	1·52	3·05		890				
20/3	3·05	4·57		870				
20/4	4·57	6·10		1720				
20/5	6·10	7·62		980				
20/6	7·62	9·14		460				
20/7	9·14	10·67		6050				
20/8	10·67	12·19		1·17%				
20/9	12·19	13·72		1·23%				
20/10	13·72	15·24		8350				
20/11	15·24	16·76		2340				
20/12	16·76	18·29		1560				
20/13	18·29	19·81		1·10%				
20/14	19·81	21·34		1·18%				
20/15	21·34	22·86		2920				
20/16.	22·86	24·30		2420				
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE NO PP20

178

259179

HOLE. N° PP20 (CONTINUED)

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 568·4 LENGTH. 32·00m LOCATION.

EASTING. 7333·9 AZIMUTH. - KARA N°1.

ELEVATION. 536·2 DIP. 90°

SURVEYED. PDA. SURVEY DATE. 22 OCT. 1984 DRILL DATE. 11 OCT 1984

SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	DEPTH DRILLED TO (m)		ASSAY. (ppm) ANDEL - AC. WO3.				
PP20/17	24·30	25·91		530				
20/18	25·91	27·43		450				
20/19	27·43	28·96		270				
20/20	28·96	30·48		500				
20/21	30·48	32·00		600.				
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE NO PP/20 (CONTIN)

179

259180

HOLE. N° PP20A.

McINTYRE MINES (AUSTRALIA) PTY LTD. KARA TUNGSTEN PROJECT.

NORTHING 5668·8 LENGTH. 4·57m. LOCATION.

EASTING. 7333·2 AZIMUTH. 270°. KARA N° 1.

ELEVATION. 536·2 DIP. 60°

SURVEYED. PDA. SURVEY DATE. 22 OCT 1984 DRILL DATE. 16 OCT 1984

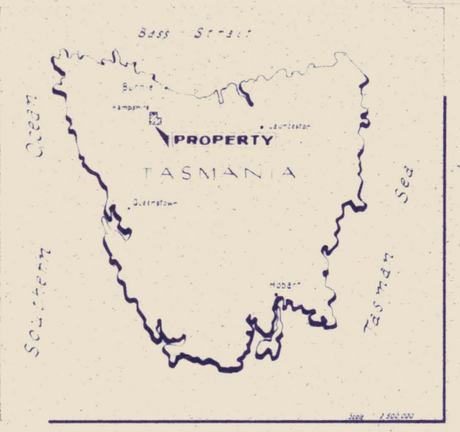
SAMPLE NUMBER.	DEPTH DRILLED FROM (m)	DEPTH DRILLED TO (m)		ASSAY. (ppm) AMDEL - AC. WO3.				
PP20A/1	0·00	3·05		5650				
20A/2.	3·05	4·57		4800.				
	FROM (m)	TO (m)	METRES DRILLED.	AVERAGE GRADES.				
AVERAGE GRADES.								

HOLE N° PP20A

84-2305

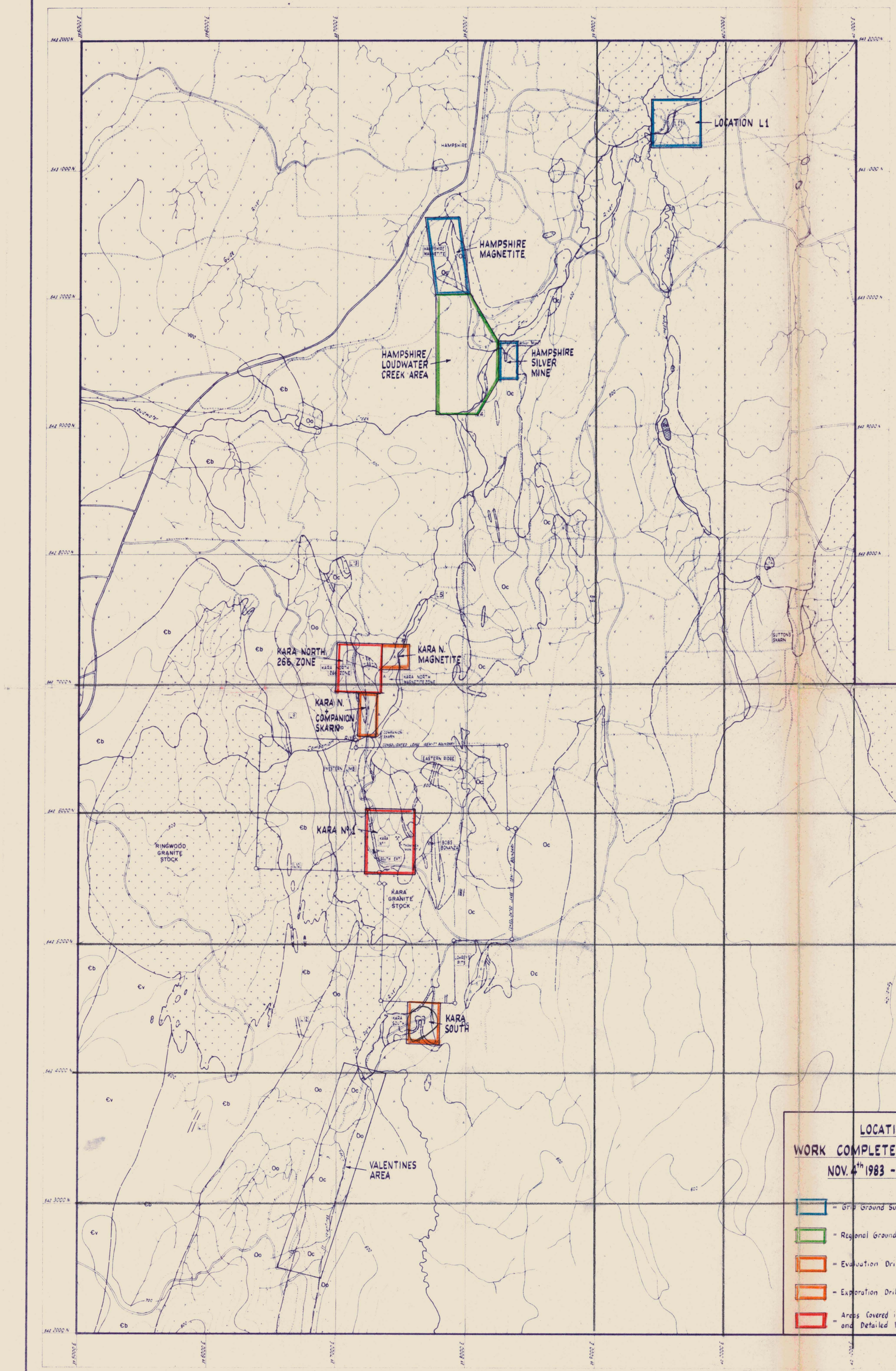
PLAN. N°1.

259181



McINTYRE MINES (AUST) PTY. LTD.

E.L. 17/68 - KARA PROPERTIES



N

SCALE 1:20,000

GEOLOGY

REFERENCE

Nov. '83

LOCATION OF WORK COMPLETED & IN PROGRESS NOV. 4th 1983 - SEPT. 15th 1984

- = Grid Ground Surveys
- = Regional Ground Geophysics
- = Evaluation Drilling
- = Exploration Drilling
- = Areas Covered in Production Plan and Detailed Investigations

6570

84-2305

6571

9800

9600

9400

9200

8800

8600

8400

HAMPSHIRE SILVER
MINE LOCATION
850mS of B3560 on 80-1435, Plan no. 1.

EMU RIVER

LOUDWATER CREEK

COMPANION RIVER

Cannot reconcile this position for the Companion/Loudwater river junction with either the aigid or the position given for the Hampshire silver mine

LEGEND:

- >66000 Gammas
- 65 - 66
- 64 - 65
- 63 - 64
- 62 - 63
- 61 - 62
- 60 - 61
- <60

N

259182

6571

5 cm

McINTYRE MINES (AUST.) PTY. LTD.

84-2305

KARA TUNGSTEN PROJECT, TASMANIA

LOUDWATER CK./HAMPSHIRE MAG. ANOM.
GROUND MAGNETICS

DRAWN: C.H.W.	TRACED: T.G.D.S.	SCALE: 1:1000	DATE: Aug	PLAN No 2.

DRAWN: C.H.W | TRACED T.G.D.S | SC

KARA TUNGSTE

McINTYRE M

KARA N

KL-2305

259183

7500 E
7400 E
7300 E
7200 E
5500 N
5700 N
5800 N
5900 N
6000 N
6100 N
6200 N
MAIN ACCESS ROAD
CONCENTRATOR SHED
MILL FEED STOCKPILE
MAGNETITE TAILINGS STOCKPILE
H.E.C Compound
MILL
WORKSHOP
MESS ROOM
Old Incinerator Site
SLIME POND
TAILINGS
DUMP - "WASTE"
To Kara North
5 cm

6572

7200 E.
7300 E.
7400 E.
7500 E.
6200 N.
6100 N.
6000 N.
5900 N.
5800 N.
5700 N.
5600 N.

TAILINGS
DUMP - "WASTE"
TAILINGS
TAILINGS
TAILINGS
SLIME POND
SLIME POND
POND
MAGNETITE TAILINGS STOCKPILE
MAGNETITE TAILINGS STOCKPILE
MAGNETITE TAILINGS STOCKPILE
MAGNETITE TAILINGS STOCKPILE
Old Core Shed Site
MESS ROOM
WORKSHOP
MILL
H.E.C Compound
MILLFEED STOCKPILE
CONCENTRATOR SHED
MAIN ACCESS ROAD

5 cm

McINTYRE MINES (AUST.) PTY. LTD.

KARA TUNGSTEN PROJECT, TASMANIA

KARA N°1 - BASE PLAN

259183

84-2305.

6572

DRAWN: C.H.W. | TRACED: T.G.D.S. | SCALE: 1:500 | DATE: 15-

PLAN N°3.