VOL. 1

- 1 OCT 1982

McINTYRE MINES (AUSTRALIA) PTY. LTD.

SUMMARY REPORT OF COMPLETED WORK PROGRAMME

E.L. 17/68 & C.L. 105M/77

TWELVE MONTH PERIOD

NOVEMBER 4th 1981 - NOVEMBER 3rd 1982.

KARA



82-1828
8/1
1/19

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713001

D of M | A.C. | C.C. | E.C. | D.S.M.E
Received 1 OCT 1982 | E & I.L.
Answered
DEPT. OF MINES
REF. No. 8090A/82

McINTYRE MINES (AUSTRALIA) PTY. LTD.

SUMMARY REPORT OF COMPLETED WORK PROGRAMME & EXPLORATION EXPENDITURES

EXPLORATION LICENCE 17/68

AND CONSOLIDATED LEASE 105M/77.

TWELVE MONTH PERIOD

NOVEMBER 4th 1981 TO NOVEMBER 3rd 1982.

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

1st OCTOBER 1982.

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Attachment "A" - Statement Of Expenditure (Nov 1981 - Aug 1982)

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PLANS

Plan A - E.L. 17/68 - Location of areas worked (Nov 1981 - Aug 1982)

APPENDED REPORTS

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✓ Reports - Infill Drilling Programme - Reports 1/82, 1A/82, 1B/82, 1C/82, 1D/82, 1E/82, 1F/82.

- Reserves, Resources - Reports 2A/82, 2B/82, 2C/82.
- Geological, Ground Magnetics - Reports 3A/82, 3B/82.
- Metallurgical - Reports 4A/82, 4B/82, 4C/82, 4D/82
- Environmental - Report 5/82.

McINTYRE MINES (AUSTRALIA) PTY. LTD.

APPENDED REPORTS ACCOMPANYING "YEAR REPORT - EXPLORATION LICENCE NO. 17/68"

PERIOD NOVEMBER 4th 1981 TO NOVEMBER 3rd 1982.

REPORT NO.	TITLE	PLANS
1/82	Summary Report - Infill Drill Programme E.L. 17/68	1
1A/82	Kara N. 266 Zone - Infill Drill Programme - review of reserves	8
1B/82	Kara 1 - S Ext. - Infill Drill Programme - review of reserves	3
1C/82	Kara 1 - Sec. 5820N - Infill Drill programme -review of reserves	1
1D/82	Bobs Bonanza - Infill Drill Programme	2
1E/82	Eastern Ridge - Infill Drill Programme	7
1F/82	Infill Drill Programme - Drill Logs, Assay Sheets	-
2A/82	Summary - Geological Reserves/Resources - Kara No. 1 & Kara North	-
2B/82	Kara No. 1 - Geological Reserves/Resources	8
2C/82	Kara N. 266 Zone - Geological Reserves/ Resources	7
3A/82	E.L. 17/68 - Geologic Plans & Cross Sections	7
3B/82	E.L. 17/68 - Ground Magnetic Survey Plans	3
4A/82	Metallurgical Tests - "Weathered Tungsten Material"	-
4B/82	Flotation Tests - Kara Tungsten Ore	-
4C/82	Review - Metallurgical Test Work by Warman International Ltd.	-
4D/82	Examination Of Magnetite Tailings Sample	-
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McINTYRE MINES (AUSTRALIA) PTY. LTD.

COMPLETED WORK PROGRAMME - E.L. 17/68 AND C.L. 105M/77

PERIOD NOVEMBER 4th 1981 - NOVEMBER 3rd 1982.

A - INTRODUCTION & SUMMARY

During the current twelve month period commencing November 4th 1981, McIntyre Mines (Australia) Pty. Ltd., as manager of a joint venture with Tasminex N.L., have continued to perform exploration work and investigations within Exploration Licence 17/68 and its associated mining tenement C.L. 105M/77.

In the effort of assessing the overall potential of the area embraced by E.L. 17/68, plus evaluating the economic viability of the main Kara tungsten bearing skarns, McIntyre Mines have, during the current E.L. term performed a wide variety of investigations. These have included a continuous programme of infill and exploration diamond drilling, surface geological - exploration surveys, metallurgical and environmental investigations, plus a detailed engineering - economic evaluation of the main Kara skarns. The work programme completed to date formed the basis of a Pre-Development Programme which was originally presented by McIntyre Mines to Tasminex N.L. on November 26th 1980.

Exploration activities within the E.L. are still in progress. Results of work completed during the current term are regarded as both informative and encouraging, and have, it is believed, further enhanced the economic potential of the E.L. area. The most significant results of work to date are as follows:

- Infill diamond drill programmes at the two main skarn deposits at Kara, believed to be of open pit mining potential, revealed significant increases to reserves of scheelite bearing ore and a better clarification of the potential mineable oreblocks.
- Exploration diamond drilling of suspected subsurface skarn zones has provided a clearer understanding of the genesis of tungsten bearing skarns, and gradually, specific areas of possible mineralisation are being better defined and delineated.

- A continuation of systematic geologic and exploration surveys in the outlying sections of the E.L. has both clarified the overall interpretation of the regions geology, and believed to have enhanced the Fe potential of numerous magnetite skarns in the E.L. area.
- Numerous metallurgical investigations have been performed on a variety of tungsten bearing ore types at Kara. In general, bench scale gravity - flotation tests on weathered ore were again disappointing, but indicated that with careful selective mining, certain minor oreblocks of weathered ore could be commercially treated simultaineously with the treatment of scheelite bearing ore.

During the current E.L. term, McIntyre Mines (Australia) Pty. Ltd., have incurred exploration expenditure totalling $308,145 for the ten month period to August 31st 1982.

B - Completed Exploration Programme.

The following section of the report briefly summarises the salient points of work completed to date during the initial 10 month period of the current term of E.L. 17/68 (ie. Nov. 4th 1981 to Nov. 3rd 1982). More specific details of completed programmes are presented in the form of seventeen separate appended reports. Attached Plan A indicates areas and locations where exploration activities have been performed during the period in question.

During the present 12 month term, quarterly reports, outlining exploration progress and expenditures were submitted to the Department of Mines for each of the three month periods ending February 3rd 1982, May 3rd 1982 and August 3rd 1982.

1. Diamond Drilling Programmes

Diamond drilling, utilising the Tasminex N.L. drill rig and McIntyre Mines drill personnel, has been underway continuously during the present term of the exploration licence.

Drilling took the form of two separate projects - an infill drill programme designed to more fully evaluate deposits with known tungsten mineralisation, and a programme of exploration drilling to assess the possible economic potential of subsurface geologic targets. Both programmes have been informative. Infill drilling has been completed, whereas exploration drilling is still in progress.

a) Infill Diamond Drilling

A summary report for this drill programme is given in Appended report No.1/82.

Five skarn zones on the Kara properties, known to contain associated tungsten mineralisation, were investigated.

The objectives of drilling were to test both possible up dip/down dip and strike extensions of known ore, and to increase the confidence of ore type categorisation, thereby permitting a more accurate delineation of geological reserves of scheelite bearing material of possible open pit mining potential.

The five skarns investigated were the Kara North 266 Zone*, Kara No. 1 Southern Extension, Kara No. 1 Main Zone, Bobs Bonanza and Eastern Ridge. 18 new holes totalling 1100.84 metres were completed at these areas.

Overall the programme provided encouraging and successful results, enabling ore types to be categorised more accurately and potential ore reserves to be calculated with a greater degree of confidence.

At the five areas drilled, three skarns, namely Kara North 266 Zone, Kara No. 1 S. Extension and Kara No. 1 Main Zone, showed substantial increases to tonnage figures of geological reserves and overall improvements to average WO_3 grades.

Of these three areas geological reserves of fresh and partially weathered ore were increased by 393,498 tonnes, from a September 1980 figure (Golder Associates) of 445,000 tonnes of indicated - inferred ore, to a March 1982 figure (McIntyre Mines) of 838,498 tonnes of measured ore.

* within E.L. 1, all others within C.L. 105m/77.

On completion of infill drilling, new drill cross sectional plans were drawn showing geological interpretations and ore blocks. These were used as a basis for calculating open pit geological and mining ore reserves at Kara No. 1 and Kara North during detailed mine-engineering studies undertaken by contracted engineering consultants - Golder Associates - in the period May - August 1982.

During the above infill drill programme, no new additional reserves were discovered at either the Bob's Bonanza location or the Eastern Ridge deposit.

More specific details of objectives and results of drilling, plus final drill plans and sections for each of the five skarn zones drilled are provided in the five appended reports 1A/82 to 1E/82.

Drill logs and assay sheets for all completed holes are attached in Report 1F/82.

b) Exploration Diamond Drilling

As a result of extensive surface exploration activities within outlying sections of the E.L. area, a number of prospective geologic targets of suspected subsurface skarns had been delineated. To confirm their presence, and to investigate the possibility of associated tungsten mineralisation, a programme of exploration drilling was initiated in early 1982, and this work is still in progress.

Five holes totalling 439.07 metres have been drilled at two prospective areas, namely the Kara North Magnetite Anomaly* and the Companion Skarn* area. Four additional holes, although classified as part of the infill drill programme, were drilled on the extreme margins of the Eastern Ridge and Bob's Bonanza skarns, and these holes in reality could be regarded as exploratory. A third prospective area, Location L. 5,* is at present being drilled.

As this programme is still in progress, and drill logs and assay results as yet incomplete, no detailed summary report on exploration drilling has been compiled. However, brief summaries of drilling to date are as follows:-

* within E.L. outside C.L.

- Kara North Magnetite Anomaly

This anomalous zone,as defined by ground magnetics, covers an area comparable in size to Kara No. 1, but is completely masked by either alluvium or Tertiary basalt cover. Previous limited drilling confirmed an extensive development of subsurface magnetite skarn bordered to the west by a granite intrusive.

Current drilling was initially designed to investigate the anomaly in a broader sense, and at the same time, target for a skarn horizon a specific distance from the granite front and adjacent to cupola - like structures of the intrusive.

Along drill section lines 7060N and 7160N, four holes totalling 339.08metres were completed, and these showed an unusually thick development (70 metres) of magnetite skarn. Two of the holes investigating the western margins of the skarn adjacent to granite revealed nil mineralisation. The other two holes showed narrow and inconsistent scheelite mineralisation at high levels in the skarn sequences immediately underlying Gordon Limestone.

Drilling at this area was temporarily postponed due to inaccessability during the winter months.

- Companion Skarn

This location is found midway between the Kara North and Western Limb skarns. Again ground magnetics would indicate concealed skarn, and this was confirmed by one exploration hole, DDH 319. Intersected magnetite skarn was devoid of tungsten mineralisation, but one additional hole is planned for the future farther to the west and adjacent to the granite intrusive contact.

- Bobs Bonanza - Eastern Ridge Area

DDH's 309, 310 and 322 drilled at the northern limits of the Bobs Bonanza skarn, and DDH 324 completed at the southern extremity of the Eastern Ridge deposit, proved the presence of a deep transgressive Tertiary basalt - sediment valley which had eroded the prospective "higher levels" of the potentially favourable Upper Skarn Unit. Drilling to date would indicate that any mineralisation found in skarn beneath Tertiary basalt between these two locations would be deep, and in all probability, highly oxidised.

- Location L 5

Exploration drilling is at present in progress at this area situated 1.4Kms due north of the Eastern Ridge deposit. Although the Ordovician sequences are completely masked by Tertiary basalt cover, it is expected that the favourable host horizon for skarn development extends to this area. Drill sites have been spotted over a moderately strong, but localised, ground magnetic anomaly.

2) Calculation Of Geological Ore Reserves & Resources

As a result of the recently completed infill diamond drill programme, new drill sections outlining : delineated ore blocks and grades were compiled by McIntyre Mines for the main skarn zones at the Kara properties.

These formed the basis for recalculations of geological reserves by both McIntyre Mines in March 1982 (see appended reports 1A/82, 1B/82 and 1C/82), and Golder Associates in May 1982 (see reports 2A/82, 2B/82 and 2C/82).

The Golder Associates recalculations were confined to tungsteniferous deposits of possible open pit mining potential, namely Kara No. 1 and Kara North. Oreblocks were subdivided into geological reserves, consisting of either fresh or partially weathered ore considered to be amenable to gravity recovery on a commercial scale, and geological resources consisting of weathered tungsten bearing material for which no economically viable treatment is as yet known.

At Kara No. 1 and Kara North, a total of 1,609,761 tonnes of geological reserves grading 0.84% WO_3, and 643,886 tonnes of geological resources grading 0.64% WO_3, have been calculated by Golder Associates (May 1982). Table No. 1 overleaf tabulates details of these figures, and appended reports Nos. 2A/82, 2B/82 and 2C/82 provide more specific details.

The above geological reserve tonnage figures were used by Golder Associates as a basis for evaluating open pit mining reserves at Kara No. 1 and Kara North (see section 5 of the present report).

TABLE NO. 1

SUMMARY - GEOLOGICAL ORE RESERVES & RESOURCES (GOLDER ASSOCIATES - MAY 1982)

KARA NO. 1 (EAST AND WEST ZONES) AND KARA NORTH

DEPOSIT	GEOLOGICAL RESERVES				GEOLOGICAL RESOURCES				TOTAL	
	FRESH (F) ORE		PARTIALLY WEATHERED (Y) ORE		WEATHERED MATERIAL WITH SCHEELITE(X)		WEATHERED MATERIAL NO SCHEELITE (W)			
	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$
KARA NO. 1 - WEST	458,200	0.85	397,771	0.79	308,508	0.66	290,377	0.63	1,454,856	0.75
KARA NO. 1 - EAST	210,400	0.62	20,350	0.85	14,001	0.53	10,250	0.35	255,001	0.62
KARA NORTH	466,800	1.00	56,240	0.51	20,750	0.59	-	-	543,790	0.93
TOTALS	1,135,400	0.87	474,361	0.76	343,259	0.65	300,627	0.62	2,253,647	0.78

TOTAL GEOLOGICAL RESERVES

1,609,761 Tonnes At 0.84% WO_3

TOTAL GEOLOGICAL RESOURCES

643,886 Tonnes At 0.64% WO_3

2130111

3. Geological - Exploration Work

During the current period, McIntyre Mines have continued to perform geological mapping over the entire area covered by Exploration Licence 17/68. The results of this work are shown on Plan A and B accompanying report 3A/82.
Although preliminary mapping has been completed in the south - central section of the E.L. region, it is felt additional detailed work is warranted, and that particular section of the current geological plans is left blank. Complementary to the above, Plan C shows a cross sectional interpretation of the geology across E.L. 17/68.

Additional geological mapping over the main Kara Properties has likewise resulted in the compilation of a new geological plan and cross sections at the scale of 1:2500. These are presented as Plans D and E - Report 3A/82.
Updating of geological plans at the scale of 1:1000 has also been completed (Plans F and G).

As a result of additional ground magnetic surveys completed during the year, updated plans (scale 1:500) of Location L 1, the Hampshire Silver Mine and Location L 5 are attached in Report 3B/82.

4 - Metallurgical Investigations

As part of the McIntyre Mines Pre-Development Programme, a wide range of metallurgical investigations have been completed during the year on a variety of ore types considered representative of the main Kara tungsten bearing skarns.

Separate reports summarise the objectives and results of these investigations, but in brief the nature of test work has consisted of the following:-

- An on site classification of weathered tungsten bearing material was made according to its estimated scheelite content versus total tungsten values. Representative samples of the various categories were collected and submitted for laboratory bench scale metallurgical tests. Please refer to report 4A/82.
- A programme of flotation research tests was completed on a bulk sample of fresh to partially weathered ore considered representative of the Kara No. 1 Main Zone orebody. Report No. 4B/82.

- A general review of all previous results obtained from metallurgical investigations carried out on Kara ore samples and weathered tungsten bearing material during the period 1979 - 82. Report 4C/82.
- Laboratory test work was finalised on a bulk sample of magnetite tailings. Report No. 4D/82.

Metallurgical work at present underway consists of laboratory tests on a bulk sample of concentrator table tailings, attempting to estimate the ranges of fine scheelite gravity recoveries.

5. Engineering - Economic Evaluations

In late April 1982, the engineering consultants Golder Assoicates of Sydney, were contracted by McIntyre Mines to complete a detailed geological - mining - engineering - economic evaluation of the Kara Properties.

The main requirement of the study was to evaluate in detail the economic viability of an open pit mine operation at the main Kara tungsten deposits at Kara No. 1 and Kara North.

The evaluation was to incorporate the additional ore reserve information obtained from these two tungsteniferous deposits, and to include a revised interpretation of ore limits, as well as the recent metallurgical results obtained during 1981 - 82.

To complete this study, the work required comprised the following:-

- Preparation of geological bench plans from sections prepared by McIntyre Mines.
- A calculation of both geological and mining reserves from these plans.
- Development of open pit designs.
- Development of production mining schedules.
- Preparation of equipment, manpower and cost schedules.
- Development of a revised process flow sheet.
- Basic design and relocation of an upgraded 200tpd plant.
- Addition of a further 200tpd module.
- Preparation of process plant and other costs.
- Estimation of product and revenue

The above stages of the study were completed during the period May to mid August 1982, and a draft final report has been completed by Golder Associates. They are now awaiting instructions from McIntyre Mines regarding further sensitivity evaluations before issuing a final formal report.

6. Environmental Studies

An initial programme of water sampling and analyses was completed at the Kara properties. The purpose of the study was to gather baseline information on existing water quality in and around the present Tasminex N.L. mine operation and from areas possessing undisturbed tungsteniferous skarns.

Appended report 5/82 summarises the results of this work.

C. CURRENT EXPLORATION PROJECTS

A number of investigations are at present in progress, and it is anticipated these should be completed prior to the expiry of the current term of the exploration licence (November 3rd 1982), or shortly thereafter. These projects include:-

- An evaluation of the iron potential at the main magnetite skarns at Kara. It is felt that sufficient drill information is available to complete calculations of geological reserves of estimated "plus 30% total Fe" magnetite zones, at Kara No. 1, the Western Limb, Kara North and the Eastern Ridge.
- Exploration drilling at Location L. 5
- metallurgical test work on concentrator table tailings

D. GENERAL

1. Personnel

McIntyre Mines (Australia) Pty. Ltd., personnel employed in exploration activities during the initial 10 month period of the current term of E.L. 17/68, have included:-

Full time - One Geologist (ten months)
One Prospector (ten months)
One Diamond Drill Operator (ten months)
One Diamond Drill Helper (eight months)

Part Time - One Field Assistant
One Draftsman
One Typist

McIntyre Mines have utilised the specialist expertise of the following consultants:-

- Golder Associates, Sydney - Engineering Studies
- Warman International Ltd. - Metallurgical Test Work
- S. Pullar - Metallurgical Engineer

2. Expenditures

Prior to the initiation of exploration during the current term of the E.L., McIntyre Mines (Australia) Pty. Ltd., estimated that exploration expenditures for the twelve month period to November 3rd 1982 would total $358,000.

Actual expenditures incurred by McIntyre Mines for the initial 10 month period from 4th November 1981 to 31st August 1982 totalled $308,145. Attachment "A" itemises details of these actual expenditures.

Details of expenditures incurred for the final two month period of the current term of E.L. 17/68 to November 3rd 1982, will be submitted when available.

C. H. WHITEHEAD,
McINTYRE MINES (AUSTRALIA) PTY. LTD. 1st OCTOBER, 1982.

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ATTACHMENT "A"

STATEMENT OF EXPENDITURE - E.L. 17/68 & C.L. 105M/77

TEN MONTH PERIOD - NOVEMBER 1981 TO AUGUST 1982.

McIntyre Mines (Australia) Pty. Ltd., as manager of a joint venture with Tasminex N.L., incurred the following expenditure within E.L. 17/68 and C.L. 105M/77 during the ten month period from November 3rd 1981 - August 31st 1982.

	E.L. 17/68	C.L.105M/77	TOTAL
Office, rent, services	12,253	23,426	35,679
Camp, maintenance	-	293	293
Supplies, food, hotel	-	2,104	2,104
Geology	13,550	20,265	33,815
Bulldozing	440	116	556
Ground Magnetometry	780	292	1,072
Metallurgy	-	24,351	24,351
Geochemistry	1,202	-	1,202
Assays	4,408	5,461	9,869
Transportation	7,894	13,807	21,701
Engineering Consultants	-	64,000	64,000
Environmental	-	6,891	6,891
Engineering - McIntyre Mines	-	10,429	10,429
Diamond Drilling	38,848	38,703	77,551
Assessment Work Fees	-	320	320
Legal Fees	4,254	10,687	14,941
Insurance	1,451	1,920	3,371
TOTALS	85,080	223,065	308,145

Expenditures previously reported = $1,917,320.

Total Expenditures since inception = $2,225,465.

C. H. WHITEHEAD.

McINTYRE MINES (AUSTRALIA) PTY. LTD.

1st OCTOBER, 1982.

ATTACHMENT "B"

DEPARTMENT OF MINES - TASMANIA
MINERAL INDUSTRY UNPUBLISHED REPORT
DATA SHEET

REPORT NUMBER TCR _____
☐CF ☐RF ☐OF

AUTHOR(S): WHITEHEAD C.H.

DATE: 1st OCTOBER, 1982.

TITLE: EXPLORATION LICENCE 17/68, YEARLY REPORT - COMPLETED WORK PROGRAMME NOV. 4th 1981 - NOVEMBER 3rd 1982. E.L. RENEWAL APPLICATION - PROPOSED WORK PROGRAMME

COMPANY(S): McINTYRE MINES (AUSTRALIA) PTY. LDT. (TASMINEX N.L.)

FORMAT: No. of Volumes: 2 Structure: Vol. 1 - 10 Pages, 1 Plan, 2 Attachments
Vol. 2 - 4 Pages 1 Plan, 1 Attachment. APPENDED REPORTS 17

COMPANY REF. (if any): _____

LICENCE / LEASE: E.L. 17/68 (TASMINEX N.L.)

LOCALITY: SK55- ☐1 ☐2 ☒3 ☐4 ☐5 ☐6 ☐7 ☐8

Map sheet: 8015 -I (Hellyer)

Geographic: (not in title) HAMPSHIRE

MAPPING - GEOLOGICAL
- ☒ Surface - scale: VARIOUS
- ☒ Mine/~~Underground~~

DRILLING
- ☒ Diamond
- ☐ Percussion
- ☐ Auger
- ☐
- ☒ Logs
- ☒ Analysis
- ☒ Metallic Minerals
- ☐ Non-metallic Minerals

GEOPHYSICS
GND/AIR
- ☒ ☐ Magnetic
- ☐ ☐ Electromagnetic
- ☐ ☐ Radiometric
- ☐ A.P. ☐ S.P. ☐ E.P.
- ☐ E.I.P./M.I.P ☐ Resist.
- ☐ Gravity
- ☐ Seismic - Refraction
- ☐ Seismic - Reflection
- ☐
- ☐ On - shore ☐ Off-shore
- ☐ Well-logging

GEOCHEMISTRY
- ☒ Stream Sediment
- ☐ Soil: _____
- ☐ Rock - chip
- ☐ Gossan
- ☒ Water: _____
- ☐ Biogeochemistry
- ☐
- ☐ Cu ☐ Pb ☐ Zn
- ☒ Sn ☒ WO_3 ☐ Mo
- ☒ Rock: ☐ Maj. ☐ Tr.

- ☒ PETROLOGY
- ☐ ORE GENESIS
- ☒ ORE RESERVES
- ☒ FEASIBILITY STUDY
- ☒ MINERAL PROCESSING
- ☒ MINING
- ☒ ENVIRONMENT
- ☒ ENGINEER. GEOLOGY
- ☐ INDUST. MINERALS
- ☐ CONSTRUCT. MAT.
- ☐ FUELS: _____

MINERALS: TUNGSTEN, IRON

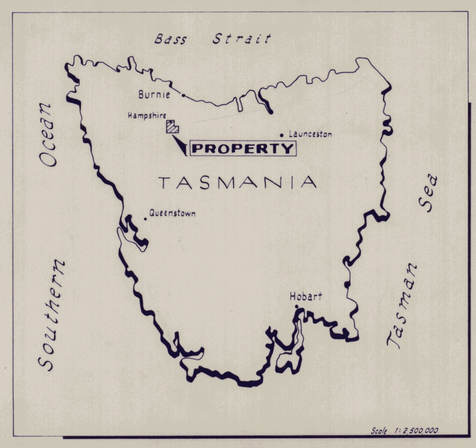
MINE / DEPOSIT NAME(S): KARA TUNGSTEN MINE.

OTHER KEY WORDS: _____

ANNOTATION: _____

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PLAN 10



McINTYRE MINES (AUST.) PTY. LTD.

E.L. 17/68 - KARA PROPERTIES



0 100 200 300 400 500 Metres

SCALE 1:10,000

5 cm

GEOLOGY

- RECENT — A — Alluvium
- TERTIARY — V V — Basalt
- TERTIARY — Δ Δ — Conglomerate, breccias etc.
- DEVONIAN — + + — Granite
- ORDOVICIAN — GORDON LIMESTONE, TRANSITION BEDS, MOINA SANDSTONE, OWEN CONGLOMERATE — Tog — Limestone
- ORDOVICIAN — GORDON LIMESTONE, TRANSITION BEDS, MOINA SANDSTONE, OWEN CONGLOMERATE — Oc — Sandstone and quartzite
- ORDOVICIAN — GORDON LIMESTONE, TRANSITION BEDS, MOINA SANDSTONE, OWEN CONGLOMERATE — Oo — Conglomerate and grits
- CAMBRIAN — HORNFELS GROUP, ACID VOLCANICS — €b — Hornfels
- CAMBRIAN — HORNFELS GROUP, ACID VOLCANICS — €v — Acid volcanics
- Skarn zones

REFERENCE

- River
- Creek
- Road
- Track
- Railway
- Trig. Beacon
- Geological Boundary
- AREAS INVESTIGATED MCINTYRE MINES (Nov. 1981 - Aug. 1982)
- AREAS FOR PROPOSED INVESTIGATIONS MCINTYRE MINES (Nov. 1982 - Oct. 1983)

Base Map enlarged from 1:100,000 Kellaur N.T.M. Sheet 8015 & Aerial Photographs

July '82

VOLUME 2

-1 OCT 1982

McINTYRE MINES (AUSTRALIA) PTY. LTD.

PROPOSED WORK PROGRAMME

E.L. 17/68 AND C.L. 105M/77

PERIOD NOVEMBER 4th 1982 - NOVEMBER 3rd 1983.

KARA.

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D of M | A.O. | C.G. | E.O. | D.G.M.E
Received 1 OCT 1982
Answered
DEPT. OF MINES
REF. No. 8090A/82

McINTYRE MINES (AUSTRALIA) PTY. LTD.

E.L. 17/68 AND C.L. 105M/77

PROPOSED WORK PROGRAMME

PERIOD - 4th NOVEMBER 1982 - 3rd NOVEMBER 1983.

SUBMITTED BY MCINTYRE MINES (AUSTRALIA) PTY. LTD.

(FOR AND BEHALF OF

McINTYRE MINES (AUSTRALIA) PTY. LTD. & TASMINEX N.L.)

C. H. WHITEHEAD.

1st OCTOBER, 1982.

PROPOSED WORK PROGRAMME

EXPLORATION LICENCE 17/68 RENEWAL

PERIOD 4th NOVEMBER 1982 - 3rd NOVEMBER 1983

McIntyre Mines (australia) Pty. Ltd., for and on behalf of Tasminex N.L., and McIntyre Mines, submit details of a proposed work programme in support of an application for the renewal of Exploration Licence 17/68 for a period of twelve months from November 4th 1982 to November 3rd 1983.

McIntyre Mines (Australia) Pty. Ltd., maintain the belief that the present 75 square kilometre area embraced by E.L. 17/68 has sound economic potential and that a continuation and extension of ongoing exploration activities and investigations are justified. Application is therefore made for a renewal of exploration rights for the entire area of 75 square kms at present covered by E.L. 17/68.

In the effort at evaluating the overall economic potential of the area embraced by E.L. 17/68, McIntyre Mines have undertaken continuous exploration work since November 1977, and to the present date have incurred expenditures totalling $2,225,465. McIntyre Mines wish to continue and extend ongoing exploration programmes, and in this respect submit for consideration an active and energetic exploration programme for the forthcoming twelve month period.

1. PROPOSED WORK PROGRAMME

Investigations at present underway will be continued during the forthcoming 12 month period commencing November 4th 1982. Efforts will be expended with two main objectives in mind:-

- Evaluating the true economic viability of known tungsten ore deposits at the main Kara skarns.
- Investigating the tungsten, and other mineral potential of additional suspected prospective areas in the outlying sections of the exploration licence area.

Proposed work consists of a variety of exploration programmes, including diamond drilling, and geological, geochemical, geophysical, metallurgical and environmental investigations. As in the past, it is envisaged the proposed work will be continuous throughout the twelve month period in question. It will be completed by McIntyre Mines in - house personnel and directed from the McIntyre Mines regional exploration office in Burnie.

The areas/regions to be investigated, and nature of work to be completed are shown on the accompanying Plan A. Specific details of the proposed work are outlined below. Contingencies are provided to be sufficiently flexible to cope with unforseen events (eg. new discoveries, disappointing results etc.), and both the programme of work and expenditures could be modified in the event of any mitigating circumstances that may arise.

A - GEOLOGICAL - EXPLORATION INVESTIGATIONS

Individual and combined geological, geochemical and geophysical surveys are proposed in a number of prospective areas, invariably located in the outlying sections of the exploration licence area. This work includes:-

i) Regional geological mapping - in the south central region of the E.L. area, which will enable a final overall geological interpretation of E.L. 17/68. This work will be supplemented by geochemical sampling of the drainage system.

ii) Localised geological mapping - routine detailed mapping of the main Kara property skarns, recording new information brought to light by ongoing mine activities, trenching etc.

iii) Combined geochemical - ground magnetic surveys at:-
- The Horizontal Creek Location (adjacent to the Eastern Ridge Skarn).
- The Loudwater Creek region, to investigate the suspected northerly strike continuation of the Kara North - Location L13 skarn zone.

iv) Detailed grid ground magnetic surveys at:-
- the area between the Eastern Ridge skarn and Location L5.
- the area between the Hampshire Silver Mine and Location L5
- at the Hampshire magnetite skarn.

v) Geochemical survey - a detailed grid soil sampling and geochemical drainage survey at and around the Location L 1 skarn.

B. EXPLORATION DRILLING

During the forthcoming year, priority will be given to exploration drilling over prospective areas in the outlying sections of the E.L. This work will be a continuation of drilling at present being undertaken, and primarily involves an evaluation of suspected subsurface skarn zones or prospective areas of strong geological potential.

A number of such areas have been outlined for exploration diamond drilling. The programme has, however, to be one of great flexibility, and one which will undoubtedly be modified and altered as results are obtained. It is proposed to complete nine months drilling at the following areas:-

- Location L 5
- the potential north and south strike extensions of L 5
- the Hampshire Silver Mine Location
- the subsurface skarn zone north of the Kara North 266 deposit
- the subsurface skarn north of the Companion skarn.

C. INFILL - EXTENSION DRILLING

Adjacent to the two main open pit deposits at Kara No. 1 and Kara North, are the Western Limb and Eastern Ridge deposits. Present knowledge of both these occurrences would indicate any future mine development be restricted to one of an underground nature. To fully evaluate their true economic viability, a limited programme of infill diamond drilling is proposed to delineate their total measured ore reservesof fresh and partially weathered ore. 1000 metres of core drilling would be anticipated.

D. EVALUATION STUDIES

i) Complete the ongoing evaluation of the iron potential of the known magnetite bearing skarns found in E.L. 17/68 . Preference will be given to near-surface skarns, and efforts will be concentrated upon the deposits at Kara No. 1, the Kara No. 2 skarns, Kara North, Location L.1, the Hampshire magnetite skarn, and Kara South.

ii) Evaluation sampling of tailings disposal areas and stockpiles at Kara No. 1.

E. - METALLURGICAL WORK

A limited programme of bench scale tests will be completed to evaluate methods of improving fine scheelite recoveries of tailings obtained from coarse gravity treatment.

F. - "ANCILLARY STUDIES"

These studies would be implemented in anticapation of converting certain sections of the exploration licence area into ones of mineral lease tenancy. They consist of:-

- A continuation of water and soil sampling base line orientation studies.
- Surveying and shallow power auger drilling of proposed new mine sites (dump areas, stockpile sites etc.).
- Establishing available water resources and requirements.

2. Expenditures

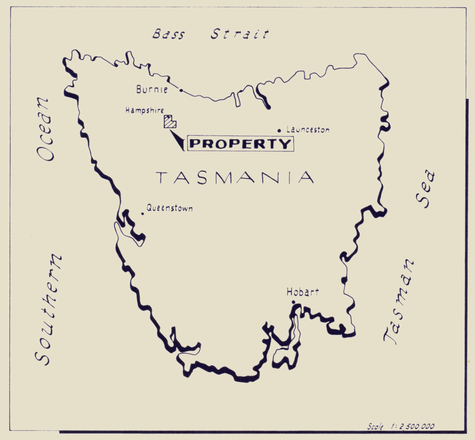
McIntyre Mines (australia) Pty. Ltd., believe that the required Department Of Mines minimum expenditure commitment of $37,500 ($500 x 75sq.kms) will be matched in completing the above programme of work during the twelve month period to November 3rd 1983.

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

1st OCTOBER, 1982.

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AREAS OF PROPOSED INVESTIGATION

(PERIOD 4th Nov. 1982 - 3rd Nov. 1983)

McINTYRE MINES (AUST.) PTY. LTD.

E.L. 17/68 - KARA PROPERTIES

NATURE OF WORK:

- = REGIONAL GEOLOGICAL MAPPING.
- = DETAILED GEOLOGICAL MAPPING.
- = GROUND MAGNETIC AND GEOCHEMICAL SURVEYS.
- = GROUND MAGNETIC GRID SURVEYS.
- = GEOCHEMICAL SOIL GRID SURVEY.
- = EXPLORATION DRILLING.
- = INFILL DRILLING.
- = Fe POTENTIAL EVALUATION.
- = "EVALUATION - METALLURGICAL STUDIES."

N

SCALE 1:10 000

0 100 200 300 400 500 Metres

5 cm

GEOLOGY

RECENT	A	Alluvium
TERTIARY	V V	Basalt
	Δ Δ	Conglomerate, breccias etc
DEVONIAN	+ +	Granite
ORDOVICIAN — GORDON LIMESTONE TRANSITION BEDS MOINA SANDSTONE OWEN CONGLOMERATE	Oc	Limestone
	. .	Sandstone with calcareous members
	Oc	Sandstone and quartzite
	Oo	Conglomerate and grits
CAMBRIAN — MORNFELS GROUP	€b	Hornfels
ACID VOLCANICS	€v	Acid volcanics
		Skarn zones

REFERENCE

- River
- Creek
- Road
- Track
- Railway
- Trig Beacon
- Geological Boundary
- AREAS INVESTIGATED McINTYRE MINES (Nov 1981 - Aug 1982)
- AREAS FOR PROPOSED INVESTIGATIONS McINTYRE MINES (Nov 1982 - Oct 1983)

Base Map enlarged from 1:100,000 Kellgar N.T.M. Sheet 8015 & Aerial Photographs July '82

HAMPSHIRE

HAMPSHIRE MAGNETITE

Gutt River

Emu River

Emu Creek

Cowrie Creek

Companion Creek

KARA NORTH EGG ZONE

KARA NORTH MAGNETITE ZONE

COMPANION SKARN

CONSOLIDATED LEASE 1694-7T BOUNDARY

EASTERN LINE

WESTERN LINE

KARA NO 1 SOUTH EXT.

KARA NO 1 SOUTH

BOBS BOUNDARY

TASMANEX MAIN ZONE

KARA GRANITE STOCK

RINGWOOD GRANITE STOCK

SUTTONS SKARN

HOUSETOP GRANITE

KARA NO 1 MAIN ZONE

KARA NO 2 EAST

KARA NO 2 SOUTH

LOWREYS PITS

Adelaide Creek

L9 L10 L11 L12 L13

542 7000 N.

542 6000 N.

542 5000 N.

542 4000 N.

542 3000 N.

542 2000 N.

542 9000 N.

542 8000 N.

543 2000 N.

543 1000 N.

543 0000 N.

E 2000 FT

E 3000 FT

E 4000 FT

Appendix 1
Report No.
1/82

[redacted]

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of M | A.O. | C.G. | E.O. | D.S.M.E.
Registrar
Received 1 OCT 1982
Answered
E & IL
DEPT. OF MINES
REF. No: 8090A/82

McINTYRE MINES (AUSTRALIA) PTY. LTD.

SUMMARY REPORT

INFILL DIAMOND DRILL PROGRAMME

Kara Properties E.L. 17/68

(Nov. 4th 1981 - Nov. 3rd 1982).

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

SEPTEMBER, 1982.

REPORT NO. 1 - 82.

McINTYRE MINES (AUSTRALIA) PTY. LTD.

SUMMARY REPORT - INFILL DIAMOND DRILL PROGRAMME.

KARA PROPERTIES - EXPLORATION LICENCE 17/68

TABLE OF CONTENTS.

1. Introduction and Summary.

2. Drilling - Kara North 266 Zone.

3. Drilling - Kara No. 1 Southern Extension.

4. Drilling - Kara No. 1 Main Zone.

5. Drilling - Bob's Bonanza Location.

6. Drilling - Eastern Ridge.

7. Conclusions - Reassessment Of Geological Reserves.

Table No. 1 - Drilling Summary.

Table No. 2 - Reassessment of Geological Reserves.

Figure 1 - Kara Properties - Location Plan Of Main Skarn Zones.

Plan 1 - Main Ore Zones - Infill Diamond Drill Location Plan (Scale 1:2500).

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REPORT NO. 1 - 82.

SUMMARY REPORT

INFILL DIAMOND DRILL PROGRAMME - KARA PROPERTIES

EXPLORATION LICENCE 17/68 - 12 MONTH PERIOD COMMENCING NOV. 3rd 1981.

1. INTRODUCTION & SUMMARY

As part of the McIntyre Mines (Australia) Pty. Ltd., Pre - Development Work, it had been recommended that a programme of infill or extension diamond drilling be completed at a number of skarn zones on the Kara Properties.

Each of these skarn zones, totalling six in number, were known to contain associated tungsten meneralisation. However, additional drill information was considered essential to further establish the potential economics of this mineralisation. The infill drill programme was therefore designed with the following main 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 more accurately delineate the geological reserves of scheelite bearing material considered to have open pit mining potential.

The six skarn zones to be investigated were the Kara North 266 Zone, the Kara No. 1 Southern Extension Zone, the Kara No. 1 Main Zone, the Bob's Bonanza skarn, the Eastern Ridge skarn, and the Western Limb Zone. (refer Figure No. 1).

However, as the infill drill programme was designed to investigate ore reserves of possible open pit potential, the original intentions to drill the Western Limb Zone - now considered to have only underground mining potential - were postponed and not included in the present programme.

The drilling programme, utilising the Tasminex N.L., Joy Sullivan diamond drill rig, and McIntyre Mines drill personnel, was initiated in Mid August 1981 and completed in July 1982. The programme was not continuous - during the period February to June 1982, the drill rig was involved in exploratory drilling within outlying sections of E.L. 17/68.

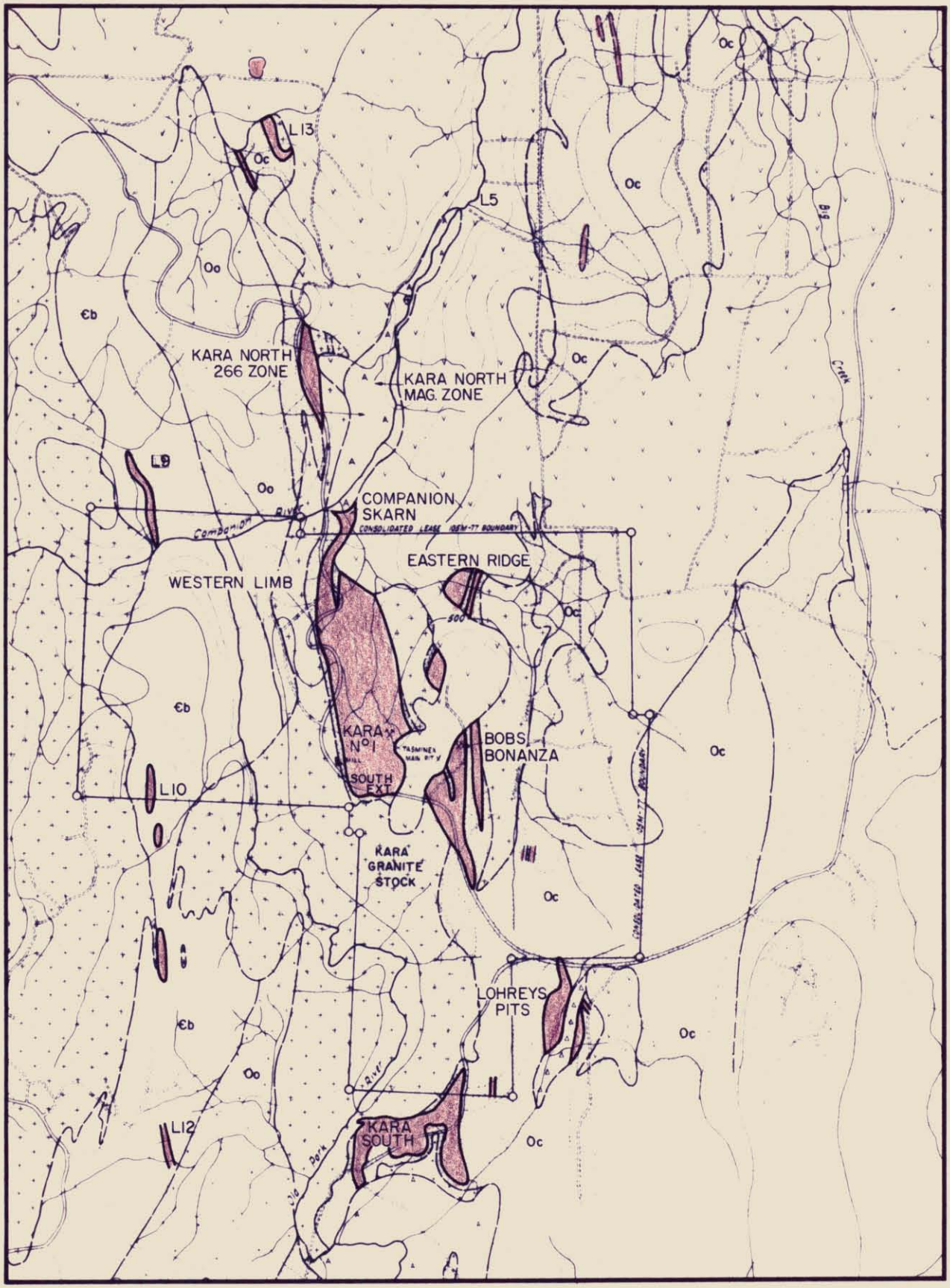
Overall, the programme provided encouraging and successful results, enabling ore types to be categorised more accurately and potential ore reserves to be calculated with a greater degreee of confidence. Of the five areas drilled, three skarns, namely Kara North 266 Zone, Kara No. 1 S. Extension and Kara No. 1 Main Zone showed both substantial increases to tonnage figures of geological reserves and improvements to average WO_3 grades. These new tonnage figures and grade calculations were used as a basis during the subsequent Golder Associates engineering - economic studies of the Kara Properties during May to August 1982.

In total, 18 new diamond drill holes totalling 1100.84 metres were completed during the infill drill programme. Details of individual holes are itemised in Table No. 1. The location of holes drilled are shown on the accompanying Plan No. 1 (scale 1:2500).

Brief resumes of the objectives and results of drilling at each of the five skarn zones are summarised below. For more detailed results, plans and sections, the reader is referred to reports on individual areas - attached reports Nos. 1A, 1B, 1C, 1D and 1E.

Drill logs for all completed holes, together with ancillary assay and recovery logs, have been compiled and attached as report No. 1F.

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McINTYRE MINES (AUST.) PTY. LTD.

5 cm

KARA PROPERTIES — E.L. 17/68

LOCATION PLAN OF MAIN SKARN ZONES

0 200 400 600 800 1000 Metres

SCALE. 1:20000

Date. August 1982

KARA PROPERTIES - INFILL DIAMOND DRILL PROGRAMME (1982)

TABLE NO. 1

HOLE NO.	LOCATION	DRILL SEC.	COORDINATES		R.L.	INCLINATION	DEPTH DRILLED
			NORTH	EAST			(METRES)
DDH 303	KARA N-266 ZONE	7160N	7161.8	7176.0	456.1	45°W	48.46
DDH 304	KARA N-266 ZONE	7060N	7073.5	7198.6	454.7	55°W	77.11
DDH 305	KARA N-266 ZONE	7120N	7111.0	7166.5	457.6	55°W	38.71
DDH 306	KARA N-266 ZONE	7020N	7024.6	7215.6	448.9	45°W	86.19
DDH 307	KARA N-266 ZONE	7220N	7220.5	7166.3	472.8	55°W	66.14
DDH 308	BOBS BONANZA	5720N	5723.0	7684.8	543.8	65°E	67.97
DDH 309	BOBS BONANZA	5820N	5821.0	7687.1	545.0	60°E	54.56
DDH 310	BOBS BONANZA	5820N	5821.0	7687.1	545.0	83°E	105.11
DDH 311	KARA 1 S.EXT.	5675N	5678.2	7328.8	535.7	70°W	51.22
DDH 312	KARA 1 S.EXT.	5675N	5681.2	7329.2	535.5	55°E	37.49
DDH 313	KARA 1 S.EXT.	5700N	5698.0	7347.8	535.5	45°W	67.65
DDH 314	KARA 1 S.EXT.	5650N	5653.0	7335.2	537.6	55°W	42.98
DDH 315	KARA 1 S.EXT.	5675N	5673.0	7390.6	537.7	60°E	24.99
DDH 316	KARA 1 MAIN ZONE	5820N	5817.0	7355.2	503.7	45°W	91.46
DDH 322	BOBS BONANZA	5820N	5823.2	7710.9	546.6	65°E	36.22
DDH 323	EASTERN RIDGE	6265N	6271.0	7676.0	479.9	54°E	81.38
DDH 324	EASTERN RIDGE	6185N	6184.1	7662.0	496.1	50°E	63.70
DDH 325	EASTERN RIDGE	6225N	6227.5	7679.6	492.3	55°E	69.50
							1100.84 METRES

71030 005

2. DRILLING - KARA NORTH - 266 ZONE

Five diamond drill holes - Nos. 303 to 307 were drilled (total metres 316.61m) between Section Lines 7020N and 7220N.

The primary objectives of drilling at this location were:-

- to investigate possible up-dip extensions of known ore, previously intersected by earlier drilling.
- To obtain a more accurate demarcation of oxidation levels.
- To investigate possible strike extensions of the ore zone to the south.

Drilling showed tungsten mineralisation to belong to a skarn which had a magnetite content in excess of 30%. It appears confined to a pod-like lens, widest at the centre, and decreasing both in width and grade towards the top and bottom. Over a total strike distance of 240 metres, the ore lens was remarkably consistent, but still showed a variation in width from 4 to 22 metres. At Section Lines 7120N and 7160N, the top of the ore lens cuts the present surface - elsewhere it is buried and not exposed.

WO_3 grades for the 266 Zone ore lens are higher than normal for Kara skarns, averaging approximately 1% WO_3. Fresh, unoxidised scheelite bearing ore was found to be nearer surface than anticipated, and there was a rapid demarcation betweeen oxidised and fresh material.

As a result of infill drilling, geological reserves of ore were extended an additional 100 metres south of drill section line 7120N. Geologic mapping and ground magnetics would also indicate a strong potential for additional strike extensions of the known delineated 266 ore zone.

On the basis of the recent drilling, it was estimated by McIntyre Mines (Burnie),that total geological reserves of fresh and partially weathered ore between drill section lines 6960N and 7280N would amount to 378,541 tonnes averaging 1.02% WO_3.

Previous calculations of reserves at this ore zone showed 151,000 tonnes of fresh ore with an average grade of 1.26% WO_3.

Appended report No. 1A/82 provides a detailed summary, plans and drill cross sections, relevant to the above infill drill programme at Kara North.

3. DRILLING - KARA NO. 1 SOUTHERN EXTENSION

The Southern Extension skarn lies immediately east and south of the present Tasminex N.L. treatment plant, ie. between Section Lines 5620N and 5750N. Geologically, it is connected to the Kara No. 1 Main Zone, but previously has been classified separately because of its high proportion of weathered resources rather than fresh scheelite bearing material.

The infill drill programme was designed with the following intentions:-

- to assess the potential of additional reserves of fresh and partially weathered ore along the western margin of the deposit.
- To delineate the southern limits of scheelite bearing ore.
- To enable a more precise categorisation of the various ore types and levels of oxidation.

Between Section Lines 5650N and 5700N, five new diamond drill holes (Nos. DDH 311 to 315) were completed with a total metreage of 224.33m.

Drill results were again encouraging, and on the basis of the completed programme, McIntyre Mines (Burnie) calculated that a total of 235,477 tonnes of fresh and partially weathered ore grading 0.84% WO_3 could be delineated as geological reserves between Section Lines 5620N and 5750N.

This compared with a total of 116,000 tonnes of similar ore types of 0.80% WO_3 grade, as calculated by Golder Associates in September 1980.

In addition, and again on the basis of the completed infill drill programme, a total of 319,000 tonnes of geological resources (ie. weathered material) grading 0.80% WO_3 were delineated at the Southern Extension skarn.

Appended report No. 18/82 provides a detailed report, plan and drill sections on this drill work at the Southern Extension.

4. DRILLING - KARA NO. 1. MAIN ZONE.

As a result of the completed infill drilling at the Kara No. 1 Southern Extension deposit, a modified and more detailed interpretation of the Kara No. 1 Main orezone was made.

In order to confirm this interpretation, and also to investigate an oreblock of inferred ore on Section Line 5820N, one hole (DDH 316) was collared along this Section Line, and drilled to a depth of 91.46m.

The inferred ore was intersected, thereby permitting a reclassification of this ore into the measured category. The hole also provided accurate information regarding the attitude of the deeper western section of the Kara No. 1 overhang structure.

On recalculating the geological reserves for drill Section Line 5820N, 224,480 tonnes of fresh and partially weathered ore grading 0.74% WO_3 were delineated. This compared with a total of 178,000 tonnes (0.71% WO_3) of indicated and inferred ore as calculated by Golder Associates in September 1980.

A revision of the geological resources (weathered material) for Section Line 5820N also showed a slight increase to 64,440 tonnes averaging 0.49% WO_3 (Golder Associates, September 1980 - 53,000 tonnes at 0.41% WO_3).

Report No. 1C/82 summarises the above drilling.

5. DRILLING - BOB'S BONANZA LOCATION

Four infill diamond drill holes, DDH'S 308, 309, 310 and 322, with a total metreage of 263.86 metres were completed at this location.

Initially the prime objective of drilling was to investigate the possible down dip extensions of a high grade ore lens associated with the Upper Skarn Unit, previously open pit mined by Tasminex N.L. DDH 308 and 309 showed no intersections of tungsten mineralisation at depth in the Upper Skarn, and no reserve figures are calculated for this location.

DDH 309, drilled along Section Line 5820N, was also collared to assess the possibility of a northerly strike extension of the mined ore lens. Again results were disappointing, drilling indicating that a deep transgressive Tertiary valley of basalt and sediments has cross cut and eroded the upper levels of the Upper Skarn Unit. This hole did however intersect low grade (0.39% WO_3) scheelite bearing mineralisation over a 10 metre run in the Lower Skarn Unit - a skarn zone not previously known to contain any significant mineralisation. Subsequent holes DDH 310 and 322 were drilled along the same Section Line 5820N to investigate both possible down dip and up dip continuations of the ore found in DDH 309. Results were unfortunately negative.

A report summarising infill drilling at Bob's Bonanza has been written, and with accompanying plans and sections is attached as Report No. 1D/82.

6. DRILLING - EASTERN RIDGE.

Three holes, DDH 323, 324 and 325, totalling 214.38 metres, were completed within the southern half of the Eastern Ridge deposit south of East Kara Creek.

On the basis of past trench work, the area between Section Lines 6185N and 6300N was considered the only portion of the Eastern Ridge deposit which had potential for reserves of fresh and partially weathered ore of a possible open pit nature.

Two of the completed holes, DDH's 323 and 325 were collared west of the deposit to investigate the possible shallow (30metre) down dip extension of surface exposed mineralisation within the Upper Skarn Unit. The additional hole, DDH 324, was collared in the extreme south of the area to assess the possible southern extensions of skarns and ore beneath basalt cover.

The results of drilling were instructive, but disappointing. The following conclusions were reached:-

- the previous reserve figure for the area south of Section Line 6300N, namely 28,000 tonnes of 0.40% WO_3 fresh ore as calculated by Golder Associates in September 1980, was confirmed but not increased.
- The mineralised ore lens exposed on surface in the Upper Skarn Unit rapidly decreased down dip in width and grade.
- The degree of weathering increased in a southerly direction. Possible open pit mining of the above limited reserves of fresh ore would be confined to the area between Section Lines 6242N and 6280N.
- Mineralisation within the Lower Skarn Unit was surprisingly continuous down dip for 70 metres, but was disseminated and low grade.
- South of Section Line 6120N, the presence of a deep cross cutting Tertiary valley restricts the southern extension of near surface mineralisation assiciated with the two skarn zones.

A more detailed report No. 1E/82 plus plans and drill sections, summarising the above drilling at the Eastern Ridge is appended.

7. - CONCLUSIONS - REASSESSMENT OF GEOLOGICAL RESERVES.

The results of the 1982 infill drill programme were considered successful. This is especially true at three of the five skarn locations drilled, namely Kara North 266 Zone, Kara No. 1 Southern Extension and Kara No. 1 Main Zone. Additional drilling at these three areas permitted:-

- a more accurate delineation of the geological reserves and better clarification of their attitude and disposition.
- A more accurate categorisation of the various ore types and differentiation of reserves (F and Y ore) and resources (X and W ore).
- An upgrading of reserves from an indicated or inferred category to one of a measured classification.
- A more sound basis for assessing true mining reserves at Kara No. 1 and Kara North.

More significantly, new reserve calculations based upon the results of the infill drill programme showed substantial tonnage increases of geological reserves at the three specific locations drilled. As shown in Table No. 2 overleaf, at the three areas in question, reserves of fresh and partially weathered ore were increased by 393,498 tonnes, from a September 1980 figure (Golder Associates) of 445,000 tonnes of indicated - inferred ore, to a March 1982 figure (McIntyre Mines) of 838,498 tonnes of measured ore. This figure is in reality greater, as no consideration has been taken into account of ore mined by Tasminex N.L. during the period between the two reserve calculations.

Although no new additional reserve tonnages were discovered at either Bob's Bonanza or Eastern Ridge Deposit, a large number of previously unanswered questions regarding down dip and strike extensions were clarified.

The new reserve calculations of geological reserves at Kara No. 1 and Kara North 266 Zone as made by McIntyre Mines, were used as basis for the Golder Associates mining - engineering studies (May - August 1982).

C. H. WHITEHEAD.

September, 1982.

TABLE NO. 2

KARA PROPERTIES - INFILL DIAMOND DRILL PROGRAMME

ALTERATIONS TO GEOLOGICAL RESERVES OF FRESH AND PARTIALLY WEATHERED ORE (MARCH 1982).

SKARN ZONE	SECTION LINES	REASSESSMENT OF GEOLOGICAL RESERVES (F & Y ORE)				ADDITIONS TO RESERVES
		RESERVES CALCULATED BY GOLDER ASSOCIATES SEPT. 1980		RECALCULATED RESERVES McINTYRE MINES MARCH 1982.		
		Tonnes	% WO_3	Tonnes	%WO_3	Tonnes
KARA NORTH - 266 ZONE	7020N-7220N	151,000	1.26	378,541	1.02	227,541
KARA 1 - S. EXTENSION	5620N-5750N	116,000	0.80	235,477	0.84	119,477
KARA NO.1 - MAIN (5820N)	5820N	178,000	0.71	224,480	0.74	46,480
		445,000	0.92	838,498	0.89	393,498

71 30 38 013

ACCOMPANYING REPORT NO. 1/82

PLAN A - Kara Properties. Infill drill site locations. Scale 1:2500

APPENDED REPORTS		PLANS	SECTIONS
No. 1A/82	- Drilling - Kara North 266 Zone	1	7
No. 1B/82	- Drilling - Kara No. 1 Southern Extension	1	2
No. 1C/82	- Drilling - Kara No. 1 Main Zone	-	1
No. 1D/82	- Drilling - Bob's Bonanza	1	1
No. 1E/82	- Drilling - Eastern Ridge	2	5
No. 1F/82	- Drill logs, recovery sheets, assay logs. Infill drill holes (1981 - 82).		

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McINTYRE MINES (AUST.) PTY. LTD.

KARA PROPERTY

MAIN ORE ZONES

INFILL AND EXPLORATORY DIAMOND DRILL PROGRAMME

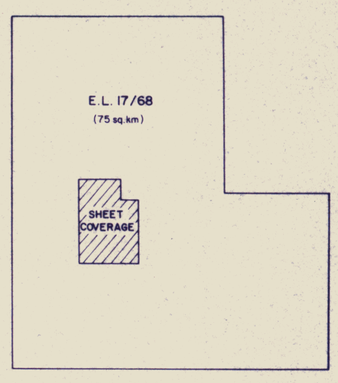
AUGUST 1981 – JULY 1982

● = INFILL D.D.H.

● = EXPLORATORY D.D.H.

SCALE: 1:2500

5 cm



KARA NORTH "266 ZONE"

KARA NORTH "MAGNETITE ANOMALY"

EASTERN RIDGE

WESTERN LIMB

KARA No 1 MAIN ZONE

KARA No 1 SOUTHERN EXT.

MAIN PIT

BOBS BONANZA

SECTION A.

SECTION B.

SECTION C.

SECTION D.

SECTION E.

LEASE BOUNDARY CL 105 M/77

KARA No 1 R.L. 539.86

Companion River

Kara Creek

East Kara Creek

Old Park River

Horizontal Creek

Tailings Dam

CORE SHED

OFFICE

WORKSHOP

PUMP HOUSE

MINE ROAD TO HAMPSHIRE

Sections

7260 N.
7220 N.
7160 N.
7120 N.
7060 N.
7020 N.
7000 N.
6980 N.
6600 N.
6540 N.
6500 N.
6460 N.
6420 N.
6380 N.
6340 N.
6300 N.
6260 N.
6220 N.
6200 N.
6180 N.
6140 N.
6100 N.
6060 N.
6020 N.
5980 N.
5940 N.
5900 N.
5860 N.
5820 N.
5800 N.
5780 N.
5740 N.
5700 N.
5660 N.
5620 N.
5400 N.

7000 E.
7400 E.
7800 E.
8200 E.

N

Scale: 1:2500

50 25 0 50 100 Metres

100 0 100 200 300 Feet

REFERENCE:

- McIntyre Diamond Drill Hole
- Anzaco Diamond Drill Hole
- Tasminex Diamond Drill Hole
- Auger Hole
- Trench

GEOLOGY LEGEND:

- ALLUVIUM
- TERTIARY BASALT
- DEVONIAN GRANITE
- SANDSTONE / QUARTZITE / CONGLOMERATE unit
- SKARN
- QUARTZ EPIDOTE unit

82-1828
4/19

Report No.
1A/82

7130

713041

D of M | A.O. | C.G. | E.O. | D.S.M.E.
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Received - 1 OCT 1982 | E & IL
Answered
DEPT. OF MINES
REF. No. 8090A/82

McINTYRE MINES (AUSTRALIA) PTY. LTD.

KARA NORTH - 266 ZONE

INFILL DRILL PROGRAMME AND REVIEW

OF RESERVES

Burnie,

23rd December, 1981.

Cliff H. Whitehead.

713042

KARA NORTH - 266 ZONE

Introduction & Summary

As part of the McIntyre Mines (Australia) Pty. Ltd., Phase 1 - Pre-Development work, an in fill drill programme has recently been completed at the Kara North 266 Zone.

Prior to the present programme, the known Kara N geologic ore reserves totalled 151,000 tonnes with an average grade of 1.26% WO_3, but these were not considered economically recoverable by either open pit or underground methods (Golder Associates - September 2980). Nevertheless, the deposit appeared a promising target for increased reserves, both laterally and updip from the known oreblock, and with those objectives in mind, a limited diamond drill programme consisting of five holes (DDH 303 to 307) totally 316.61 metres has been completed.

The results of this drilling now permits a more accurate calculation and classification of geological reserves at this deposit.

Over a total strike distance of 320 metres (between drill section lines 6960N and 7280N), it is estimated a total of 378,541 tonnes of fresh and partially weathered ore grading 1.02% WO_3 are present. In addition, 27,700 tonnes of oxidised ore are available at the deposit.

It is believed as a result of the above drill programme, combined with interpretations from geologic mapping and ground magnetics, there is strong potential for additional strike extensions of the known Kara North 266 Zone, both in a north and south direction.

1. Background Information

The Kara North 266 Zone is located outside Consolidated Mining Lease 105M/77, north of the Companion River, some 1400 metres from the Tasminex mill.

Both the Kara North and Kara No. 1 skarns are believed to belong, and be connected, to the same stratigraphic horizon along the western edge of the main Kara synclinorium.

Scheelite in magnetite skarn was first observed in trenches constructed by Anzeco. However three Anzeco core holes drilled and inclined to the east (DDH's 130 to 132) completely failed to intersect any ore bearing mineralisation. Subsequent drilling by McIntyre Mines at the same location (10 holes- total metres 1036.8m) successfully revealed the presence of a small but high grade subsurface block of mineralisation over a strike distance of 160 metres. All these holes were inclined in a westerly direction.

Based on McIntyre Mines drill data, potential ore reserve calculations have been made by two separate independent consultant groups:

- In December 1979, McKee Theiss estimated the presence of 170,000 tonnes of "demonstrated reserves" averaging 1.28% WO_3 For open pit extraction, with a 60^{o} pit slope, the ore to waste ratio was in the order of 1:6.8

- In September 1980, Golder Associates calculated 151,000 tonnes of "indicated reserves" at a grade of 1.26% WO_3. However with a flattening of the pit slope to 50^{o}, and a resultant increase of waste to ore, Golder Associates did not consider the 266 Zone to be a viable open pit possibility. In addition they stated that because of the high cost of access development through weathered material, any possible underground operation would be uneconomic.

2. Recent Drill Programme (September to November 1981)

As outlined and proposed in the McIntyre Mines Pre Development Programme (November 1081), additional drilling was justified at the Kara North 266 Zone.

The prime objectives of this programme were to investigate:

a) possible up dip extensions of known ore to the surface.

b) a more accurate interpretation of the various levels of oxidation.

c) possible strike extensions of the deposit, particularly to the south.

With these targets in mind, five additional diamond drill holes were completed. Details of these holes are as follows.

Hole No.	Section Line	Coordinates East	Coordinates North	R. L.	Inclination	Depth Drilled(m)
303	7160N	397176.0	5427161.8	456.1	45°W	48.46
304	7060N	397198.6	5427073.5	454.7	55°W	77.11
305	7120N	397166.5	5427111.0	457.6	55°W	38.71
306	7020N	397215.6	5427024.6	448.9	45°W	86.19
307	7220N	397166.3	5427220.5	472.8	55°W	66.14
						316.61m

The results (lithologies and assays) of past and recent drilling are shown on the seven accompanying drill sections. Also indicated on these sections, are interpretations of geology, the position of relevant oxidation levels and potential geological reserves.

Concurrent with the drill programme, geologic mapping and detailed ground magnetic surveys were completed in the general Kara North region. Plan A attached, shows results of geological mapping.

3. Results of Drilling

a) Geologic Interpretation

The 266 orezone belongs to a magnetite skarn which is the metamorphosed - metasomatised representative of a single stratigraphic calcereous - arenaceous unit sandwiched between lower underlying arenaceous sequences to the West and the Gordon Limestone formation to the east.

At this location, the skarn is bordered to the west by a well developed granitic mass, this intrusion forming the western margin of the main Kara synclinorium from Kara North to Kara No. 1. However at the 266 Zone, the skarn is also bordered along its eastern margin by an additional cupola of granite which separates it from a more pronounced magnetite skarn body, known as the "Kara North Magnetite Anomaly". At present it is debatable whether this eastern cupola of granite is either a discordant mass thrusting up into the Kara synclinorium or is actually warped around a minor synclinal structure affecting the Kara 266 Zone sequences.

However, the 266 Zone trends approx N 10^{o}- 15^{o}W, and regionally dips steeply to the east. There are innumerable local structural variations, and even overturning along the western flank.

From geologic and ground magnetic observations, the 266 Zone magnetite skarn can be followed southwards to the Companion skarn, through the Western Limb to Kara No. 1, and also north (although beneath Tertiary basalt cover) to Location L. 13.

b) Mineralisation

Tungsten mineralisation of ore grade category is confined to a skarn having a magnetite content in excess of 30%, and quite often it is well developed where magnetite exceeds 60%. There are nevertheless instances where good scheelite is observed in a garnet-diopside-magnetite facies.

Mineralisation could be described as belonging to a lens, or pod-like structure, widest at the centre, and narrowing both in width and grade towards the top and bottom. Along strike for an investigated distance of 240 metres, the ore lens is remarkably consistent, but still shows a variation in width from 4 to 22 metres. The central axis of the lens appears to be tilted slightly to the south, ie in a southern direction, the mineralised lens is more deeply buried. Between drill section lines 7120N and 7160N, the top of the ore lens cuts the present surface - elsewhere it is buried and not exposed.

WO_3 grades are remarkably high and consistent, in fact well above the normal for Kara skarns, averaging approx 1% WO_3. The central sections of the ore lens have the highest tungsten content, the latter decreasing towards the top and bottom of the lens where there is a narrowing and more prominent interfingering with barren skarn.

With the recent drilling a clearer picture of the various levels of oxidation is apparent. Fresh, unoxidised, scheelite bearing ore was found to be nearer the surface than originally thought. The partially weathered zone was quite narrow, there being a rapid demarcation between oxidised and fresh material. Exceptions to this are still common, and complications appear to arise along the western side of the ore zone where strike faulting with associated deep weathering is suspected.

The higher levels of the tungsten mineralised body and the overlying skarn (usually a garnet-diopside variety) are found to be constantly stanniferous, with grades in the order of 0.15% to 0.35% Sn. From mineralogical work to date, the tin content appears to be in the silicate form associated with grossularite garnet, rather than in the cassiterite form.

c) Reserves

Geological reserves of ore at the 266 Zone have been recalculated, and delineated mineralised blocks are diagramatically shown on the accompanying drill sections.

The delineation is considered conservative and the mineralised zone has been subdivided into three categories - namely, fresh, partially weathered and oxidised material.

A cut-off grade of 0.2% WO_3 was used to define the limit of reserves, and a minimum width of intersection of 3 metres was used in outlining the ore zones. Volume to ore factors used for the various ore types were - fresh ore, 1 cubic metre = 4 tonnes; partially weathered ore 1:3.7; oxidised ore 1:2 .

The table shown overleaf summarises the salient points of the new reserve calculations.

Between Sections 6980N and 7260N, the following geological ore reserves have been calculated between the mining levels 365 to 450 R.L.

Geological Reserves	Fresh Ore	- 354,028	- Grade 1.05% WO_3
	Partially Wthd Ore	- 24,513	- Grade 0.59% WO_3
Geological Resources	Oxidised Ore	- 27,700	- Grade 0.45% WO_3

Total Reserves - 406,241 tonnes - grade 0.98% WO_3

All the delineated oxidised ore contains significant proportions of scheelite mineralisation. From the vicinity of Section Line 7160N, a bulk sample of mineralised oxidised ore exposed on surface was collected, and submitted to Warman Internations Laboratories for metallurgical tests (Sample No. - Kara 19).

Until such time the proposed engineering evaluation of this deposit is completed (scheduled first quarter 1982), the above reserves can only be classified as geological reserves and resources, and not as official mineable reserves.

Cliff Whitehead.

23rd December, 1981.

TABLE NO. 1

KARA NORTH - 266 ZONE

GEOLOGICAL ORE RESERVES AND RESOURCES

Drill Sec.	Ore Type: Fresh Tonnes	Fresh %WO_3	Partially Wthed Tonnes	Partially Wthed %WO_3	Oxidised Tonnes	Oxidised %WO_3	Total Tonnes	Total %WO_3
7260N	10,080	0.28	-	-	-	-	10,080	0.28
7220N	99,600	0.87	12,950	0.63	-	-	112,550	0.84
7160N	100,000	1.31	5,550	0.25	10,900	0.81	116,450	1.21
7120N	42,500	0.87	6,013	0.69	16,800	0.22	65,313	0.69
7060N	40,248	0.62	-	-	-	-	40,248	0.62
7020N	52,000	1.60	-	-	-	-	52,000	1.60
6980N	9,600	0.49	-	-	-	-	9,600	0.49
	354,028	1.05	24,513	0.56	27,700	0.45	406,241	0.98%

Geological Reserves:-
378,541 Tonnes at 1.02% WO_3

Geological Resources:-
27,700 Tonnes at 0.45% WO_3

007 21304S

L 13 LOCATION

KARA NORTH "MAGNETITE ANOMALY"

KARA NORTH "266 ZONE"

RIVER COMPANION

To APPM Gate

To Western Limit of KNTA N°3

D.D.H.132 -60°
D.D.H.131 -60°
D.D.H.294 -54°
D.D.H.307 -55°
D.D.H.267 -55°
D.D.H.6 -90°
D.D.H.293 -60°
D.D.H.130 -55°
D.D.H.266 -45°
D.D.H.303 -55°
D.D.H.5 -55°
D.D.H.321 -60°
D.D.H.287 -45°
D.D.H.289
D.D.H.146 -90°
D.D.H.320
D.D.H.270 -45°
D.D.H.290 -45°
D.D.H.305 -55°
D.D.H.317 -45°
D.D.H.288 -45°
D.D.H.304 -55°
D.D.H.268 -45°
D.D.H.318 -70°
D.D.H.306 -45°
D.D.H.292 -45°
D.D.H.291 -45°
D.D.H.269 -45°

AH63 AH64 AH65 AH66 AH67 AH68 AH69 AH70 AH71 AH72 AH73 AH74 AH75 AH76 AH77 AH79 AH80 AH81 AH232 AH233 AH234 AH236 AH237 AH238 AH239 AH240 AH241

7600 N. 7400 N. 7260 N. 7220 N. 7200 N. 7160 N. 7120 N. 7060 N. 7020 N. 7000 N. 6980 N. 6800 N.

7200 E. 7400 E. 7600 E. 7800 E.

LEGEND

- McINTYRE MINES DIAMOND DRILL HOLE
- ANZECO DIAMOND DRILL HOLE
- TASMINEX N.L. DIAMOND DRILL HOLE
- ANZECO POWER AUGER HOLE

= ALLUVIUM
= TERTIARY BASALT
= DEVONIAN GRANITE
= SANDSTONE / QUARTZITE / CONGLOMERATE unit
= SKARN

N

5 cm

20 10 0 20 Metres

SCALE 1:1000

713049

McINTYRE MINES (AUST.) PTY. LTD.
82-1828 Vol 4 [19

KARA TUNGSTEN PROJECT TASMANIA

KARA NORTH

"266 ZONE" & "MAGNETITE ANOMALY"

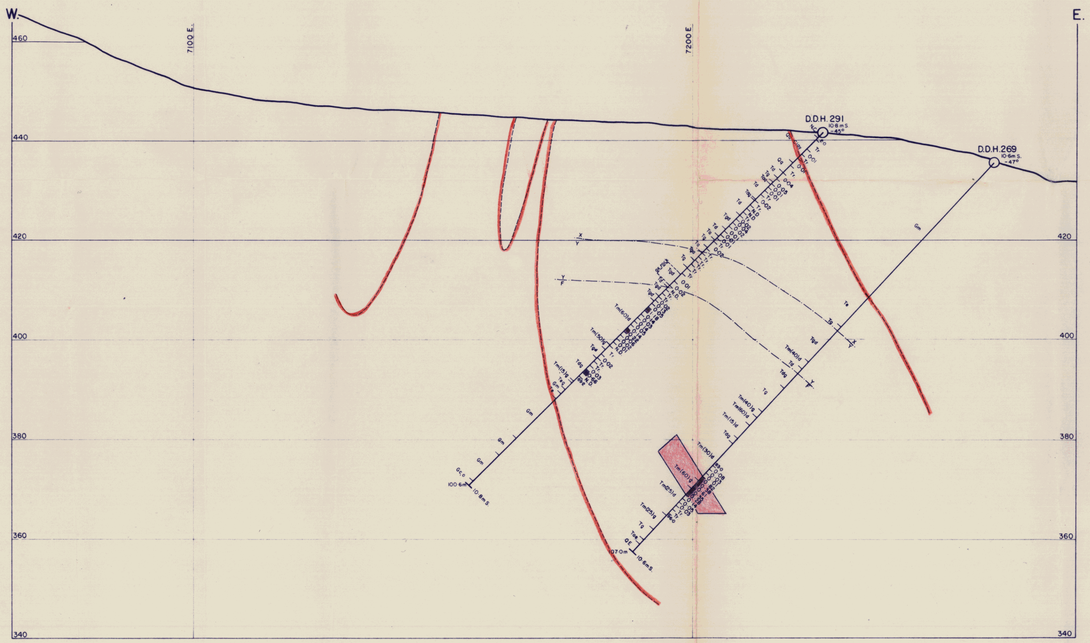
GEOLOGY AND DRILLING PLAN

DRAWN: C.H.W.	TRACED: T.G.D.S.	SCALE: 1:1000	DATE: August '82	PLAN A

008

KARA NORTH - "266 ZONE"

6980 N.



LEGEND:

- = GRANITE
- = QUARTZITE / SANDSTONE
- = SKARN ZONE / MAGNETITE RICH ZONE
- X+Y/F = WEATHERED ZONES (X = WEATHERED, Y = PARTIALLY WEATHERED, F = FRESH)
- = BLOCKED OUT POTENTIAL WO_3 RESERVES (CUT OFF 0.2% WO_3)
- D.D.H.266 — 0.12% WO_3 — INTERVAL ASSAYED FOR WO_3 — N.A. = NOT ASSAYED
- A.H.76 = AUGER HOLE (ANZECO)
- = OXIDISED ORE (with scheelite)
- = PARTIALLY WEATHERED ORE
- = FRESH ORE

10 5 0 10 20 30 METRES

SCALE 1:500 (HOR = VERT.)

5 cm

82/1828 Vol 4/19

713050

KARA NORTH — "266 ZONE"

DRILL SECTION — 6980 N.

GEOLOGY — TUNGSTEN ASSAYS

POTENTIAL RESERVES

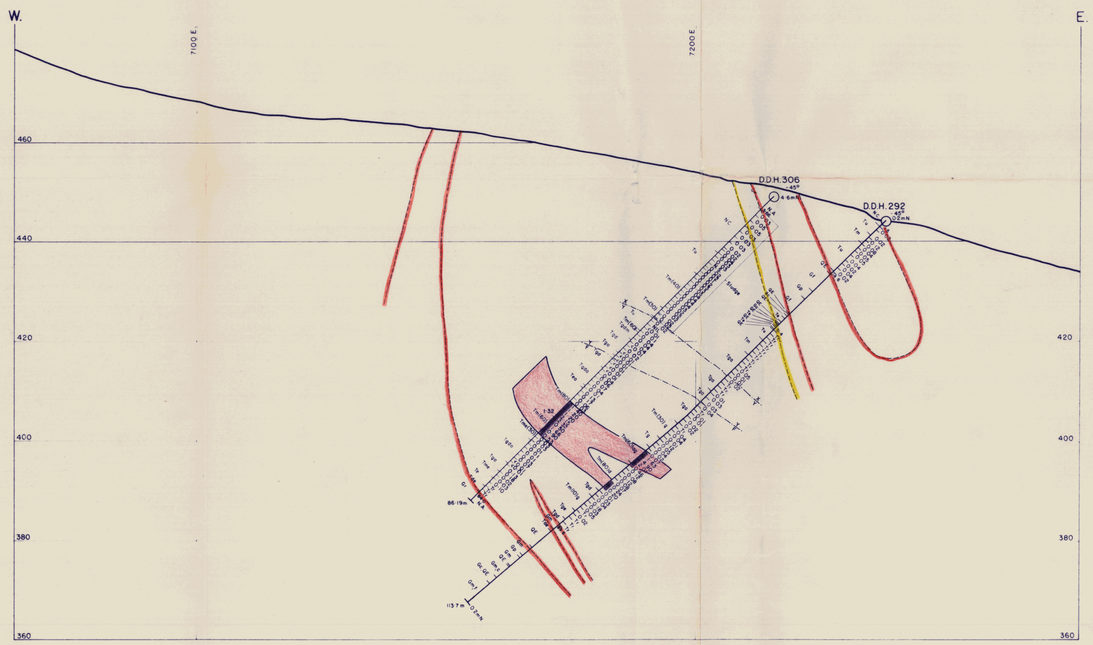
SCALE: 1:500 DATE: December 1981

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KARA NORTH - "266 ZONE"

7020 N.



LEGEND:

- = GRANITE
- = QUARTZITE / SANDSTONE
- = SKARN ZONE / MAGNETITE RICH ZONE
- X+Y/F = WEATHERED ZONES (X = WEATHERED, Y = PARTIALLY WEATHERED, F = FRESH)
- = BLOCKED OUT POTENTIAL WO_3 RESERVES (CUT OFF 0.2% WO_3)
- D.D.H.266 — 0.12% WO_3 — INTERVAL ASSAYED FOR WO_3 — N.A. = NOT ASSAYED
- A.H.76 = AUGER HOLE (ANZECO)
- = OXIDISED ORE (with scheelite)
- = PARTIALLY WEATHERED ORE
- = FRESH ORE

10 5 0 10 20 30 METRES

SCALE 1:500 (HOR = VERT.)

KARA NORTH — "266 ZONE"

DRILL SECTION — 7020 N.

GEOLOGY — TUNGSTEN ASSAYS

POTENTIAL RESERVES

SCALE: 1:500 DATE: December 1981

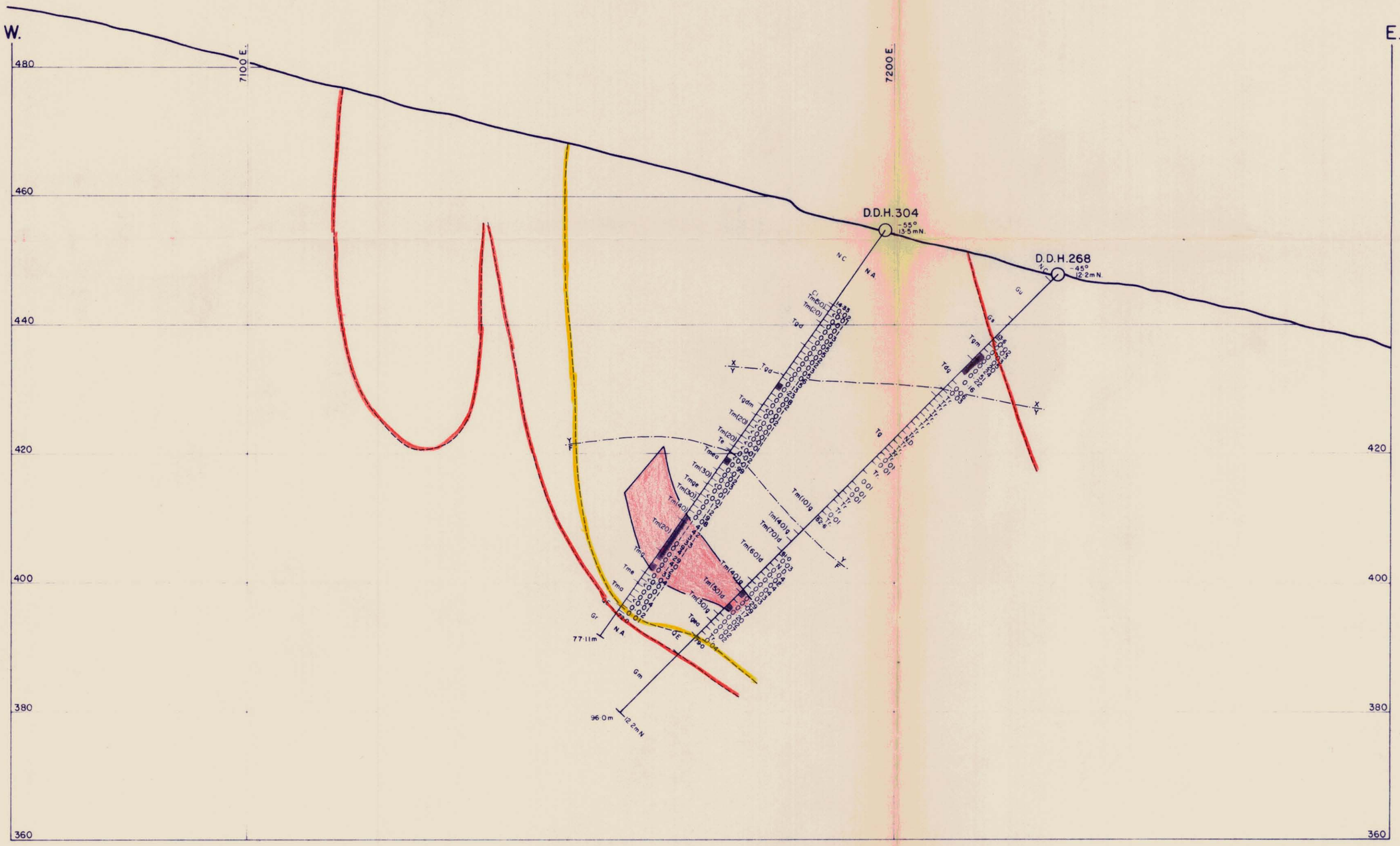
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009

KARA NORTH - "266 ZONE"

7060 N.



82-1828 Vol 4:19

LEGEND:

= GRANITE

= QUARTZITE + SANDSTONE

= SKARN ZONE
= MAGNETITE RICH ZONE

$\frac{X+Y}{F}$ = WEATHERED ZONES
X = WEATHERED
Y = PARTIALLY WEATHERED
F = FRESH

= BLOCKED OUT POTENTIAL WO_3 RESERVES (CUT OFF 0·2% WO_3)

D.D.H.266
0·12% WO_3 — INTERVAL ASSAYED FOR WO_3
N.A. : NOT ASSAYED

A.H.76 = AUGER HOLE (ANZECO)

= OXIDISED ORE (with scheelite)

= PARTIALLY WEATHERED ORE

= FRESH ORE

10 5 0 10 20 30 METRES
SCALE: 1:500 (HOR + VERT)

713051

5 cm

KARA NORTH — "266 ZONE"

DRILL SECTION — 7060 N.

GEOLOGY — TUNGSTEN ASSAYS

POTENTIAL RESERVES

SCALE: 1:500 DATE: December 1981

McINTYRE MINES (AUSTRALIA) PTY. LTD.

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010

KARA NORTH - "266 ZONE"

7120 N.

W. E.

7100 E. 7200 E.

460 440 420 400 380 360 340

D.D.H.305 -55° 9·0m S.
A.H.236
D.D.H.290 -45° 8·8m S.
A.H.235
A.H.234
D.D.H.270 -45° 2·7m S.
A.H.233
A.H.232

713052

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LEGEND:

- = GRANITE
- = QUARTZITE + SANDSTONE
- = SKARN ZONE
- = MAGNETITE RICH ZONE
- X+Y / F = WEATHERED ZONES
  - X = WEATHERED
  - Y = PARTIALLY WEATHERED
  - F = FRESH
- = BLOCKED OUT POTENTIAL WO_3 RESERVES (CUT OFF 0·2% WO_3)
- D.D.H.266 — 0·12 % WO_3 — INTERVAL ASSAYED FOR WO_3 — N.A. = NOT ASSAYED
- A.H.76 = AUGER HOLE (ANZECO)
- = OXIDISED ORE (with scheelite)
- = PARTIALLY WEATHERED ORE
- = FRESH ORE

10 5 0 10 20 30 METRES

SCALE: 1:500 (HOR + VERT)

5 cm

KARA NORTH — "266 ZONE"

DRILL SECTION — 7120 N.

GEOLOGY — TUNGSTEN ASSAYS

POTENTIAL RESERVES

SCALE: 1:500 DATE: December 1981

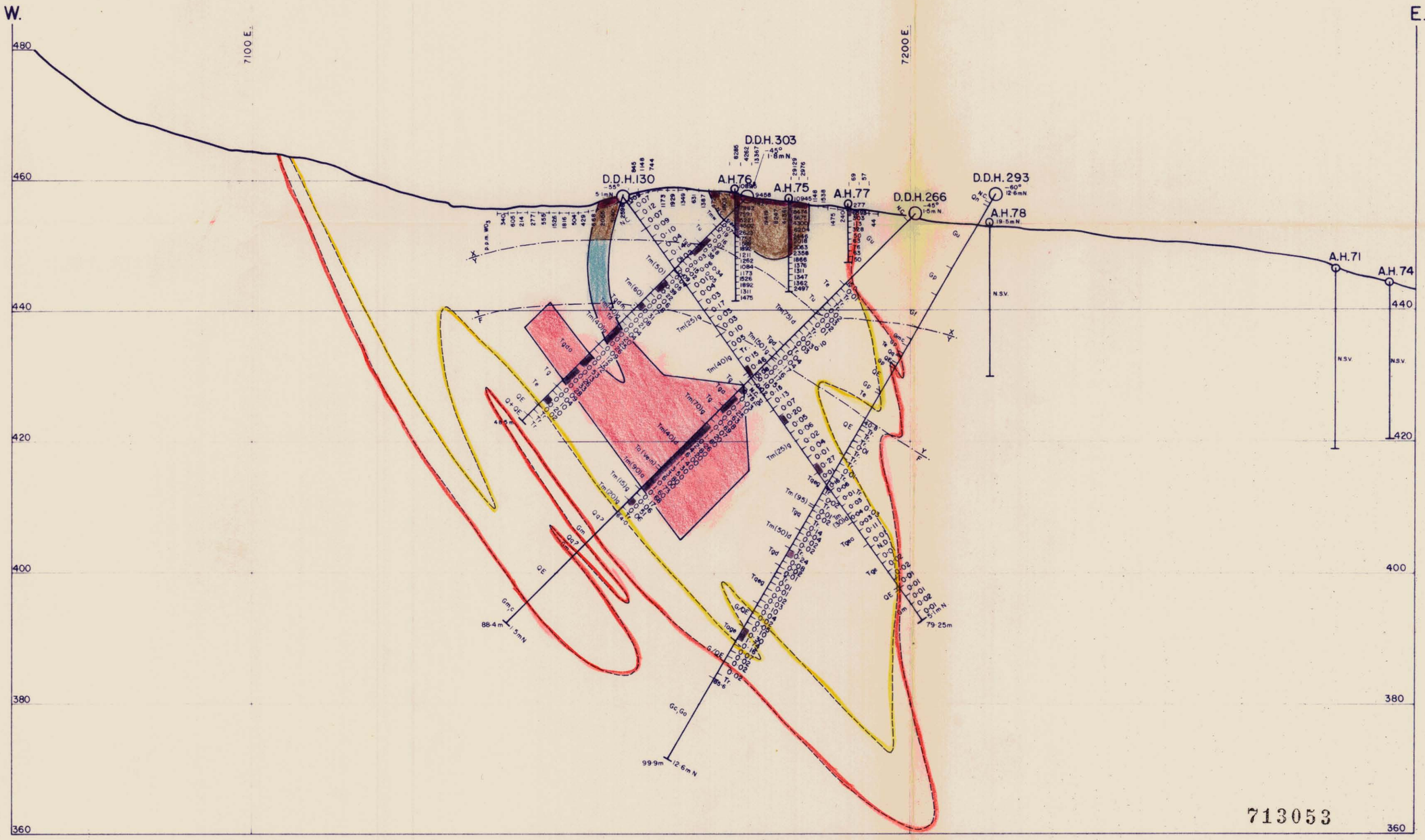
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011

KARA NORTH - "266 ZONE"

7160 N.



LEGEND:

- = GRANITE
- = QUARTZITE + SANDSTONE
- = SKARN ZONE
- = MAGNETITE RICH ZONE
- = BLOCKED OUT POTENTIAL WO_3 RESERVES (CUT OFF 0·2% WO_3)
- D.D.H.266 — 0·12 % WO_3 — INTERVAL ASSAYED FOR WO_3; N.A = NOT ASSAYED
- A.H.76 = AUGER HOLE (ANZECO)
- = OXIDISED ORE (with scheelite)
- = PARTIALLY WEATHERED ORE
- = FRESH ORE
- $\frac{X+Y}{F}$ = WEATHERED ZONES; X = WEATHERED, Y = PARTIALLY WEATHERED, F = FRESH

10 5 0 10 20 30 METRES

SCALE: 1:500 (HOR. + VERT.)

5 cm

82-1828 Vol 4/19

KARA NORTH — "266 ZONE"

DRILL SECTION — 7160 N.

GEOLOGY — TUNGSTEN ASSAYS

POTENTIAL RESERVES

SCALE: 1:500 DATE: December 1981

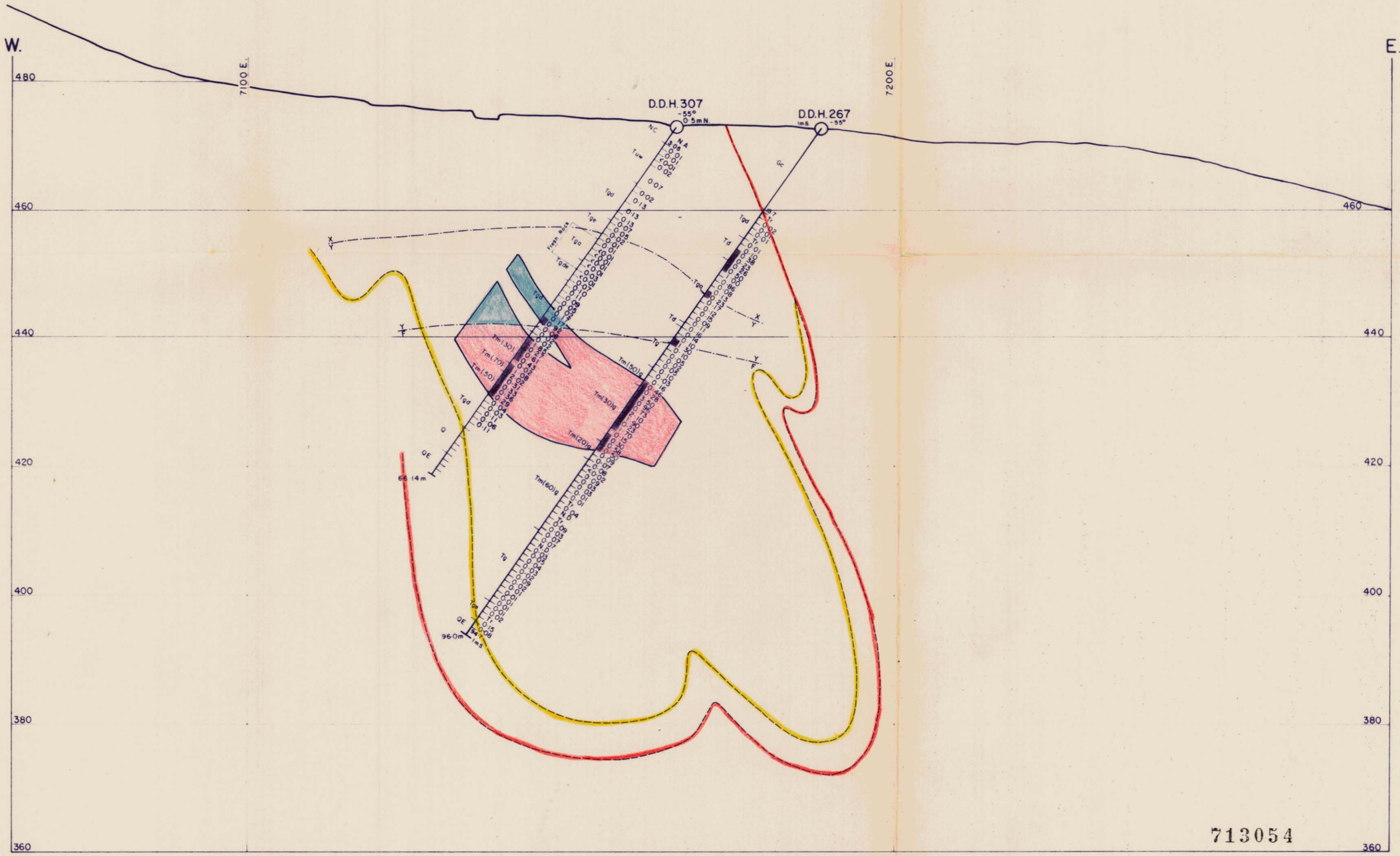
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012

KARA NORTH - "266 ZONE"

7220 N.



82-1828 Vol 4 19

LEGEND:

= GRANITE

= QUARTZITE + SANDSTONE

= SKARN ZONE
= MAGNETITE RICH ZONE

$\frac{X+Y}{F}$ = WEATHERED ZONES
X = WEATHERED
Y = PARTIALLY WEATHERED
F = FRESH

= BLOCKED OUT POTENTIAL WO_3 RESERVES (CUT OFF 0·2% WO_3)

D.D.H.266
0·12% WO_3 — INTERVAL ASSAYED FOR WO_3
N.A. = NOT ASSAYED

A.H.76 = AUGER HOLE (ANZECO)

= OXIDISED ORE (with scheelite)

= PARTIALLY WEATHERED ORE

= FRESH ORE

10 5 0 10 20 30 METRES
SCALE: 1:500 (HOR + VERT.)

5 cm

KARA NORTH — "266 ZONE"

DRILL SECTION — 7220 N.

GEOLOGY — TUNGSTEN ASSAYS

POTENTIAL RESERVES

013

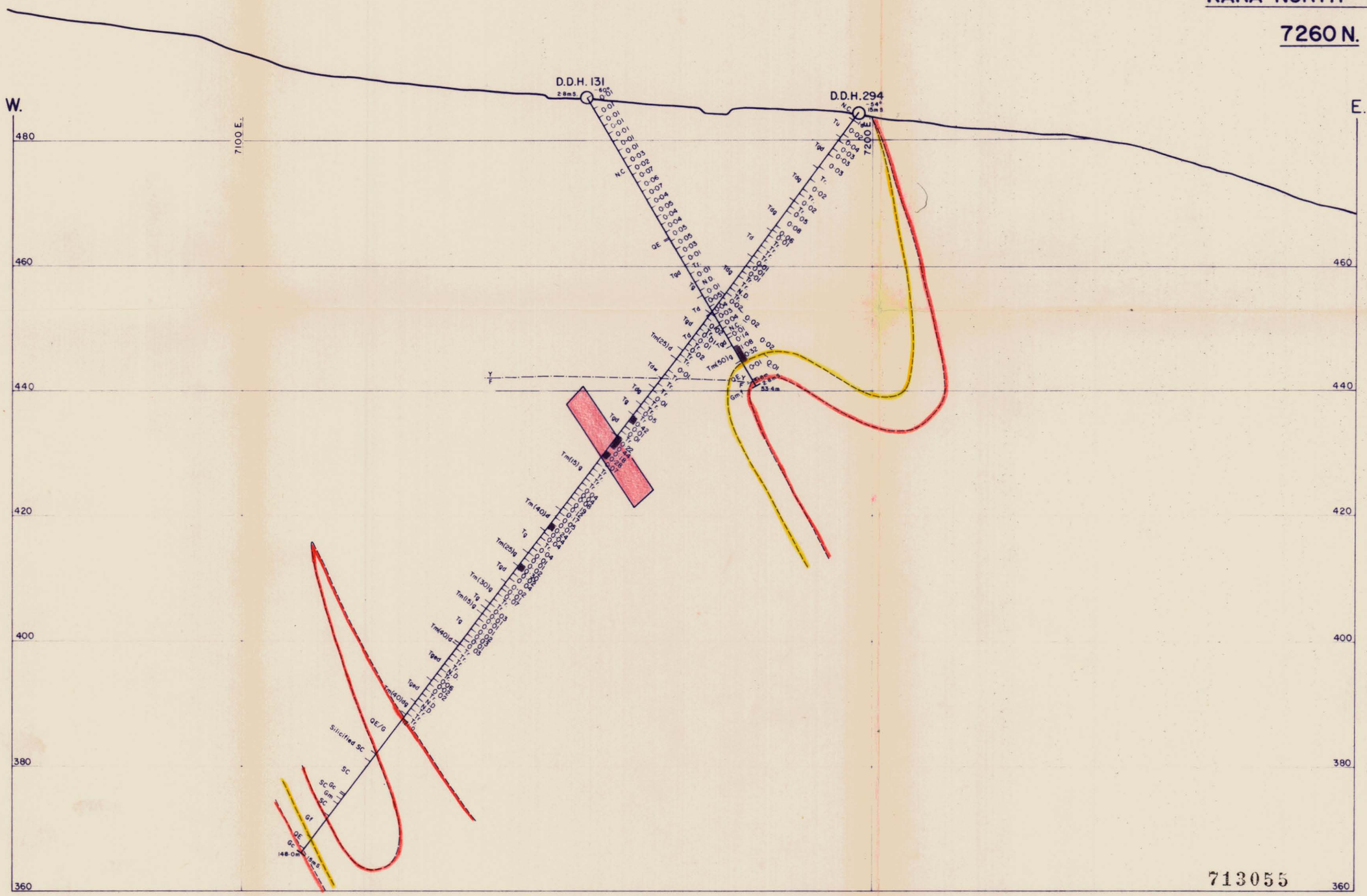
SCALE: 1:500 DATE: December 1981

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KARA NORTH - "266 ZONE"

7260 N.



82-1828 Vol 4 19

LEGEND:

- = GRANITE
- = QUARTZITE + SANDSTONE
- = SKARN ZONE
- = MAGNETITE RICH ZONE
- $\frac{X+Y}{F}$ = WEATHERED ZONES
  - X = WEATHERED
  - Y = PARTIALLY WEATHERED
  - F = FRESH
- = BLOCKED OUT POTENTIAL WO_3 RESERVES (CUT OFF 0·2% WO_3)
- D.D.H.266 — 0·12% WO_3 — INTERVAL ASSAYED FOR WO_3 — N.A. : NOT ASSAYED
- A.H.76 = AUGER HOLE (ANZECO)
- = OXIDISED ORE (with scheelite)
- = PARTIALLY WEATHERED ORE
- = FRESH ORE

10 5 0 10 20 30 METRES

SCALE: 1:500 (HOR. + VERT.)

5 cm

KARA NORTH — "266 ZONE"

DRILL SECTION — 7260 N.

GEOLOGY — TUNGSTEN ASSAYS

POTENTIAL RESERVES

SCALE: 1:500 DATE: December 1981

McINTYRE MINES (AUSTRALIA) PTY. LTD.

COMPILED: C.H.W. DRAWN: T.G.D.S.

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Report No.
1B/82

82-1828
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7130,

713056

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Registrar
Received
Answered - 1 OCT 1982
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DEPT. OF MINES
REF. No. 80909/82

McINTYRE MINES (AUSTRALIA) PTY. LTD.

KARA 1 - SOUTHERN EXTENSION

INFILL DRILL PROGRAMME

AND REVIEW OF RESERVES

C. H. WHITEHEAD.
BURNIE.

9th MARCH, 1982.

713057

KARA 1 - SOUTHERN EXTENSION

Introduction and Summary

As part of the McIntyre Mines (Australia) Pty. Ltd., Phase 1 - Pre Development work, an infill drill programme has been completed (December 1981 - January 1982) at the Kara 1 - Southern Extension orezone.

The programme was designed to investigate the potential of additional reserves of fresh and partially weathered ore along the western margin of the orezone and to enable a more precise delineation of the various ore types and levels of oxidation.

Over a strike distance of 130 metres (drill sections 5620N to 5750N), the indicated geological reserves of fresh and partially weathered ore as calculated by Golder Associates in September 1980, totalled 116,000 tonnes grading 0.80% WO_3.

On the basis of the recently completed drill programme, it is now calculated that geologic reserves of fresh and partially weathered ore would total 235,477 tonnes averaging 0.84% WO_3. In addition it is estimated a total of 319,000 tonnes of geologic resources (weathered ore) grading 0.80% WO_3, are present within the same area.

1. Background Information

The Kara No.1 Southern Extension skarn is located between Section Lines 5620N and 5750N, that is, adjacent and south of the Tasminex N.L. treatment plant.

Although it is geologically connected to the main Kara No. 1 skarn to the north, the Southern Extension deposit has, over the years, been classified separately - primarily because of its high proportion of weathered ore, rather than scheelite bearing material.

Of historic interest, the Southern Extension deposit was the first area to be seriously investigated at the Kara properties. These examinations were initially undertaken by Tasminex N.L. (trenching, percussion and diamond drilling), followed by a series of Anzeco exploratory diamond drill and auger holes, and finally a limited amount of infill diamond drilling by McIntyre Mines.

All these investigations showed a near or on-surface deposit of high grade tungsteniferous material, but unfortunately, one of a highly weathered nature with little scheelite content and not amenable to treatment by conventional gravity and flotation methods.

In September 1980, Golder Associates calculated the following reserves at the Southern Extension deposit between Section Lines 5620N and 5750N.

GEOLOGIC RESERVES:-

	Tonnes	$\%WO_3$
Fresh Ore	19,000	0.76%
Partially Weathered Ore	97,000	0.81%
Total =	116,000	0.80%

GEOLOGIC RESOURCES:-

Weathered Ore-Some scheelite	130,000	0.75%
Weathered Ore-No Scheelite	242,000	0.75%
Total =	372,000	0.75%

2. Recent Drill Programme

As proposed in the McIntyre Mines Pre Development Programme (November 1980), additional infill drilling was justified at the Southern Extension deposit. The following objectives were to be investigated:-

- geologically along the western margin of the deposit, there appeared to be potential for additional reserves of fresh or partially weathered scheelite bearing ore.
- If the latter could be proved they would be mined as part of the future proposed open pit operation for Kara No. 1, and consequently a more accurate delineation of their western and southern extent was required.
- The core library of past drilling at the Southern Extension deposit is very limited and certainly insufficient to permit a present day classification of the various ore types. It was hoped additional drilling would help clarify this situation and in addition provide suitable samples for any further metallurgical studies.

With the above intentions in mind, five new diamond drill holes were planned, and completed during the period December 1981 - January 1982. Details of these holes are as follows:-

HOLE NO.	SECTION LINE	COORDINATES NORTH	COORDINATES EAST	R.L.	INCLINATION	DEPTH DRILLED(m)
311	5675N	5678.2	7328.8	535.7	70°W	51.22
312	5675N	5681.2	7329.2	535.5	55°E	37.49
313	5700N	5698.0	7347.8	535.3	45°W	67.65
314	5650N	5653.0	7335.2	537.6	55°W	42.98
315	5675N	5673.0	7355.2	537.7	60°E	24.99
					Total Metres =	224.33m

The attached plan A shows the above drill sites, plus past drilling data, trenches, and an interpretation of surface geology.

In conformity with other Kara property drill section lines, new section lines covering the Southern Extension deposit have been drawn in an east-west direction.

These are shown on Plan B, and indicate drill lithologies and assays, an interpretation of the tungsten bearing ore zone, plus a breakdown into various ore types and their potential reserve blocks.

3. Results Of Drilling

a) Geological Interpretation

The deposit in question is the southern continuation of the main Kara No.1 skarn. At both these locations, skarn type rocks are bordered to the east and west, and underlain at subsurface by a granitic body. The latter occurs in a saucer form, with its western border steeply inclined, and slightly overturned to the west,and its eastern margin gently dipping. In a N - S direction, the central axis of the "saucer" is tilted or plunges north at approx 15 - 20^{o}, ie. the overlying thickness of skarn becomes thinner in a southerly direction.

Whether the overlying skarnified Ordovician rocks are warped conformably with the granite, is still debatable. Arenaceous rocks (sandstones and conglomerates) border the granite to the west, but are not evident to the east. A straight-forward synclinal structure affecting metamorphosed Ordovician sediments now appears less likely.

b) Mineralisation

Regardless of doubts to the local geological interpretation, a clearer understanding of the form of tungsten mineralisation within the skarn is now believed to be more apparent.

Mineralisation occurs in a well defined body of skarn some 10 to 18 metres distant from the granite front; ie it conformably overlies and follows the underlying granite. The lower margin of the mineralised body is clear cut and well defined and separated from granite by a zone of skarns barren of tungsten mineralisation, plus a unit of inconsistent quartz epidote at the granite contact. The upper limit of mineralisation is not clearly defined, unless one uses a cut-off of approx 0.40% WO_3.

The thickness of mineralisation would be estimated at between 10 and 12 metres, but narrows considerably east of grid coordinate 7400E. Along the western edge of the Southern Extension deposit, the thickness of ore grade material

increases, in some cases twofold, due to the effect of warping by granite, and the obvious influence of mineralisation from both an east and west direction.

The central 2 - 3 metres of the warped body show WO_3 grades between 1% and 4%, but overall the Southern Extension deposit averages approx 0.80% WO_3.

A better understanding of the various oxidation levels can now be made. Reserves of fresh and partially weathered ore containing scheelite bearing mineralisation are found along the western half of the deposit, but are not found south of section line 5675N due to the steadily rising granite contact towards the present surface.

c) Reserves

Geological reserves and resources of ore at the Southern Extension deposit have been recalculated, and the delineated mineralised blocks are shown on the new E - W drill sections (Plan B and C) and itemised in Table 1.

The mineralised zone is subdivided into four ore types - namely, fresh, partially weathered, weathered with some scheelite, and weathered with no scheelite. The latter two ore types are classified as resources, as no scheelite content is considered economically recoverable by conventional treatment. Reserves of fresh and partially weathered ore are considered as geological reserves and not offical mineable reserves.

A cut-off grade of 0.2% WO_3 was used to define the limit of reserves. Volume to ore factors used for the various ore types were - fresh ore, 1 cubic metre = 4 tonnes; partially weathered ore 1:3.7; weathered ore 1:2.0.

Geological reserves of fresh and partially weathered ore are now increased from those calculated by Golder Associates (September 1980). This increase is primarilya result of fresh ore being found slightly further to the west and an extension of partially weathered ore as far south as 5675N.

Additional minor tonnages of geological resources could probably be proved along the eastern margin of the Southern Extension deposit. Because of the anticipated weathered nature of this material this area was not investigated during the present study, except for drilling hole DDH 315.

C. H. Whitehead.

9th March, 1982.

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TABLE NO. 1

KARA NO. 1 - SOUTHERN EXTENSION - RESERVES SECTIONS 5620N - 5750N

SECTION	GEOLOGICAL RESERVES				GEOLOGICAL RESOURCES			
	FRESH ORE		PARTIALLY WEATHERED ORE		WEATHERED ORE + 20% SCHEELITE		WEATHERED ORE NO SCHEELITE	
LINE	Tonnes	%WO_3	Tonnes	%WO_3	Tonnes	%WO_3	Tonnes	%WO_3
5620N	Nil		Nil		Nil		18,950	0.76
5650N	Nil		Nil		20,020	0.66	27,748	1.21
5675N	30,400	0.81	30,155	1.30	14,176	1.22	33,800	0.79
5700N	63,088	0.69	20,350	0.47	37,702	0.69	39,330	0.54
5730N	22,200	0.56	34,503	1.12	58,876	0.83	31,388	1.00
5750N	24,180	0.91	10,601	0.85	25,785	0.58	11,325	0.55
Totals	139,868	0.73	95,609	1.01	156,559	0.77	162,541	0.82

GEOLOGICAL RESERVES - 235,477 0.84%

GEOLOGICAL RESOURCES 319,100 0.80%

Golder Assoc.

Reserves (Sept. 1980) 116,000 0.80% And 372,000 0.75%

7200 E. 7300 E. 7400 E. 7500 E.

5740 N. 5700 N. 5660 N. 5620 N. 5600 N. 5580 N.

SECTION 5750 N. SECTION 5730 N. SECTION 5700 N. SECTION 5675 N. SECTION 5650 N. SECTION 5620 N.

OFFICE WORKSHOP MILL

D.D.H.209 -45° D.D.H.134 -90° D.D.H. 112 -50° D.D.H.121 -45° D.D.H.109 -90° D.D.H.111 -50°

D.D.H.243 -75° D.D.H.244 -45° D.D.H.133 -90° D.D.H.261 -45° D.D.H.262 -45° D.D.H.263 -45° D.D.H.264 -45°

D.D.H. 115 -45° D.D.H.120 -45° D.D.H.313 -45° D.D.H.116 -45° D.D.H.118 -90° D.D.H.2 -45° D.D.H.3 -45° D.D.H. 149 -60°

D.D.H.312 -55° D.D.H.311 -75° D.D.H.136 -90° D.D.H.315 -60° D.D.H.103 -45° D.D.H.237 -45°

D.D.H.314 -55° D.D.H.1 -60° R.D.H.1 -75° D.D.H. 101 -90° D.D.H.102

D.D.H.236 -40° D.D.H.105 -45° D.D.H. 104 -45° D.D.H. 106 -45°

Tr.1 Tr.2 Tr.3 Tr.6 Tr.7 Tr.8 Tr.9 Tr.14 Tr.16 Tr.18 Tr.19 Tr.20 Tr.21 Tr.22 Tr.39 Tr.46

A.H.86 A.H.87 A.H.88 A.H.89 A.H.90 A.H.91 A.H.224 A.H.225 A.H.226 A.H.227 A.H.222 A.H.221 A.H.223

525 530 535 540

GEOLOGY LEGEND

- Tertiary Basalt
- Granite
- Sandstone / Quartzite
- Barren Skarn
- WO_3 Ore Zone

REFERENCE:

- McIntyre diamond drill hole
- Anzeco diamond drill hole
- Tasminex diamond drill hole
- Anzeco auger hole
- Anzeco trench
  WO_3 Assays

N

10 5 0 10 20 Metres

SCALE: 1:500

5 cm

713063

82-1928 Vol 5/19

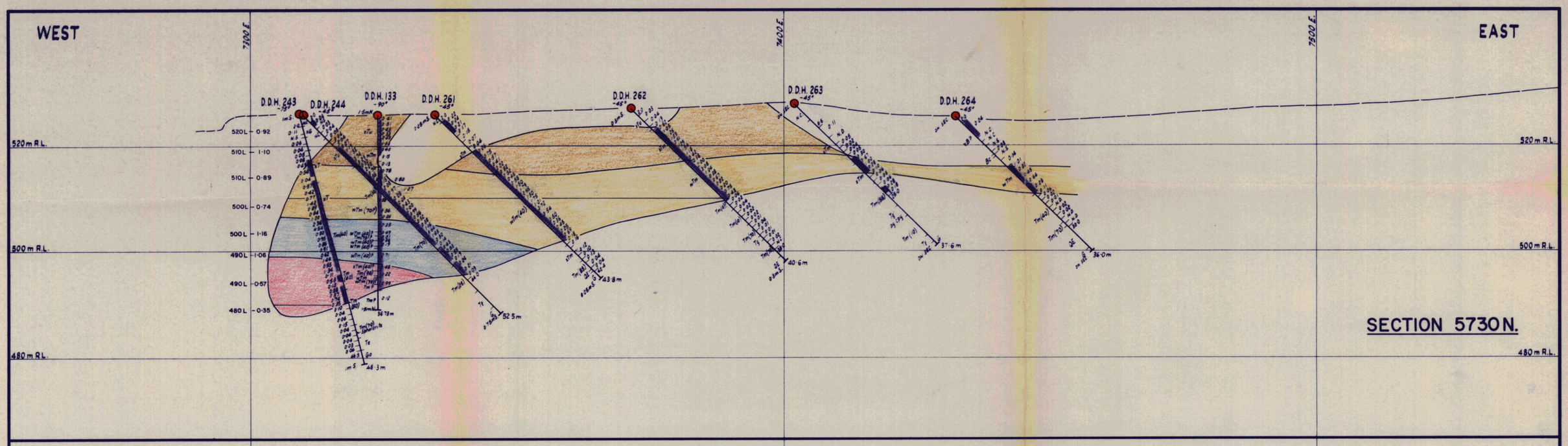
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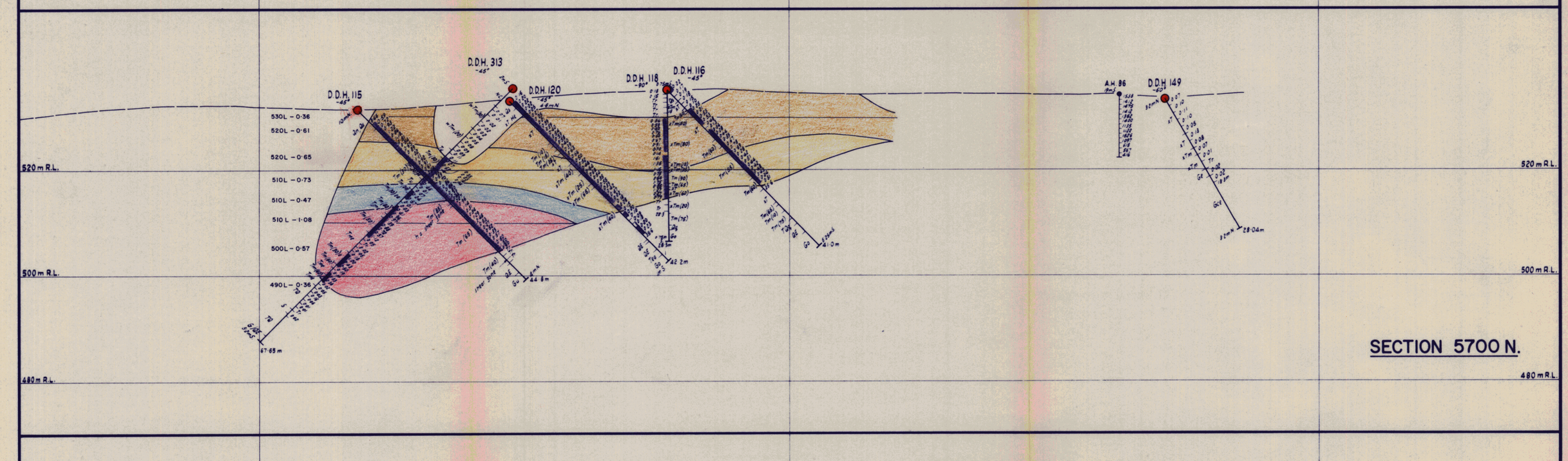
KARA N°1 SOUTHERN EXTENSION GEOLOGY PLAN

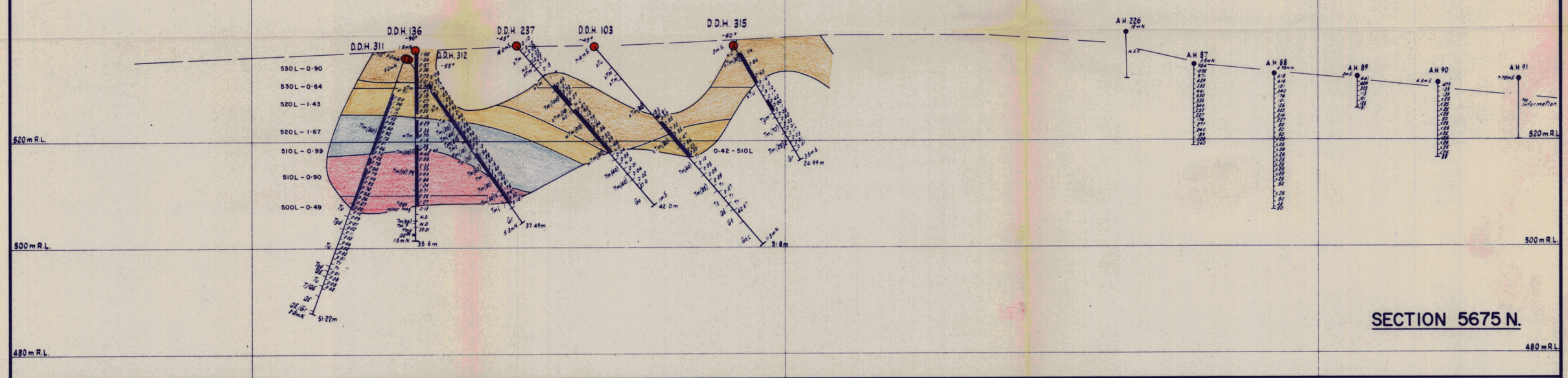
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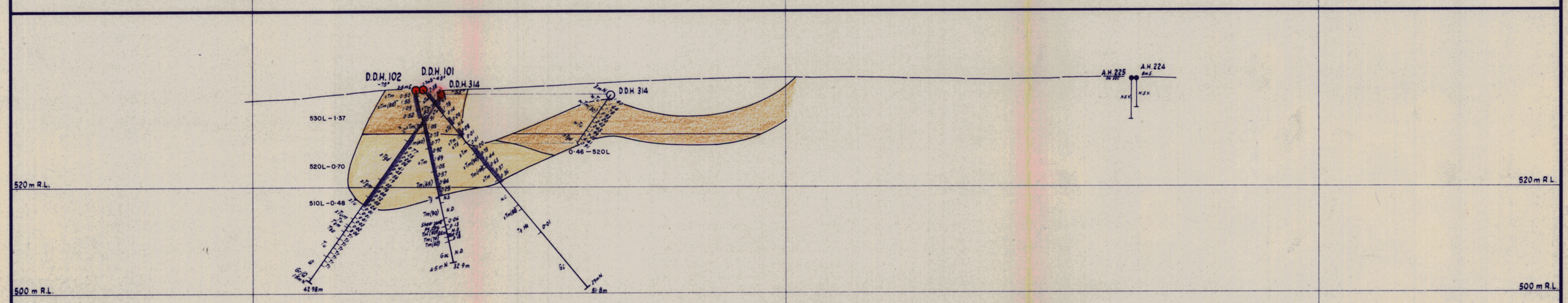
PLAN. A.

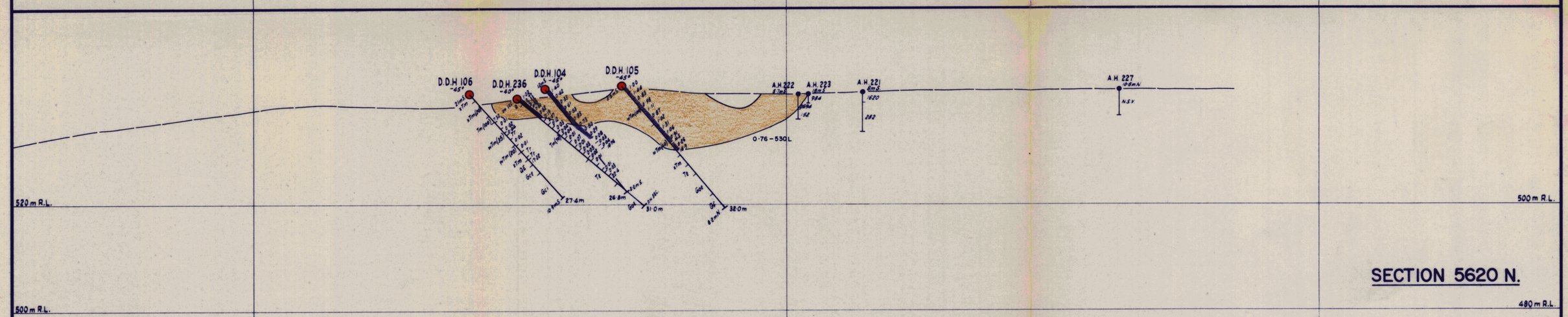
008











7300 E. 7400 E. 7500 E.

ROCK TYPE

Q ALLUVIUM SERIES
n - clay, s - sand, c - gravel

B BASALT SERIES
b - basalt, s - fine-grained siliciclastic
c - conglomerate, t - tuff, tuffaceous
v - fossil alluvium

S SEDIMENTARY SERIES
Rock units readily distinguished
N - siltstone, C - conglomerate,
S - sandstone, L - limestone

(h) chloritic, (d) diopsidic, (v) vesuvionite,
(r) brecciated, (y) stylolitic, (z) massive,
(b) bedded

T SKARN SERIES
Mineralogy

u - undivided	h - chlorite
g - garnet	l - calcite
d - diopside	q - quartz
e - epidote	m(zz) - magnetite, percent indicated
a - amphibole	

TR - Marble

TQ - Quartzose rock, uncertain derivation
s - siliceous sandstone; sedimentary texture
q - quartzite; no remnant texture
(e) epidote, (a) amphibole, (i) biotite
k - hornfels

QE QUARTZ - EPIDOTE ROCK
Quartz mosaic with interstitial epidote, associated with granite/skarn contact zone. Probably late-stage feature of intrusion history.

G GRANITE

a - porphyritic	q - quartz rich
p - pegmatite	e - epidote altered
u - undivided	j - aplite

NOTE: Rock type, dominant mineralogy and related features of rock unit shown by suffix; e.g. Tgd - garnet diopside skarn, TQq - quartzite, SLr - brecciated limestone

GRAIN SIZE
(f) fine (m) medium (c) coarse; shown by subscript e.g. S_{sc} - fine-grained sandstone, T_{gm} - medium-grained garnet skarn, G_c - coarse-grained granite.

MINERALS
FL - fluorite, PY - pyrite, MO - molybdenite, HE - hematite, CPY - chalcopyrite, MA - malachite, - CH - chrysocolla.

ORE TYPES
F = FRESH
Y = PARTIALLY WEATHERED
X = WEATHERED (some scheelite)
W = WEATHERED (no scheelite)

REFERENCE:
McIntyre diamond drill hole
Anzeco diamond drill hole
Tasminex diamond drill hole
Anzeco auger hole
500L-1-01 = Mine level with average $\%WO_3$

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10 5 0 10 20 Metres
SCALE: 1:500

5 cm

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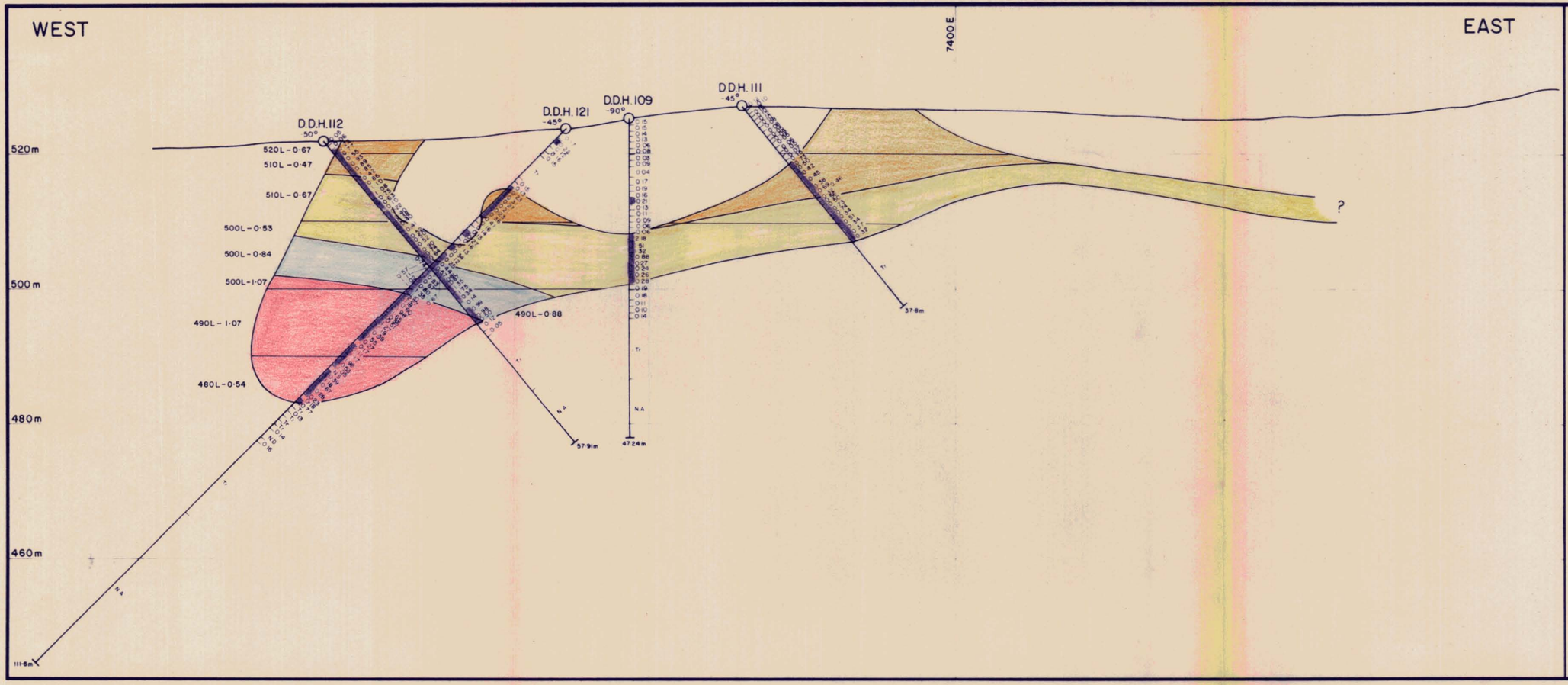
KARA N°1 SOUTHERN EXTENSION

CROSS SECTIONS WITH ORE BLOCKS

DRAWN: C.H.W.	SCALE: 1:500
TRACED: T.G.D.S.	DATE: February 1982

PLAN. B.

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SECTION 5750 N.

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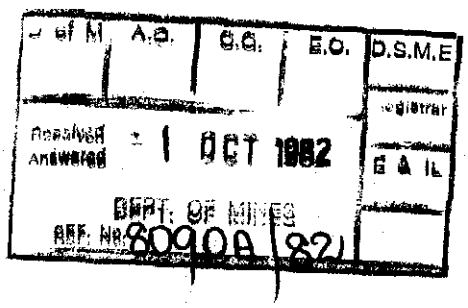
PLAN. C.

Report No.
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82-1828
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McINTYRE MINES (AUSTRALIA) PTY. LTD.

KARA NO. 1 - SECTION LINE 5820N

INFILL DRILL PROGRAMME

AND REVISION OF RESERVES

C. H. Whitehead.

15th March, 1982.

KARA NO. 1 ORE ZONE - INFILL DRILL PROGRAMME

As part of the infill diamond drill programme - Phase 1, Pre-Development work - one hole (DDH 316) was drilled on Section Line 5820N at the Kara No. 1 orezone.

During the September 1980 Golder Associate ore reserve review, it was considered by "lack of drill information" to classify a certain portion (21,000 tonnes) of the section line ore block in the inferred category. To upgrade this ore to the indicated category, one additional hole was required and recommended.

With this in mind, DDH 316 was collared, inclined 45^{o} W and drilled to a depth of 91.46 metres. The main intentions were to intersect and prove the inferred ore and also to obtain more accurate information of ore in the deeper sections of the western synclinal structure.

The accompanying plan of Section Line 5820N shows the results of DDH 316 and interpretation of ore types and blocks. The ore zone was proved, and it is now felt all previous inferred ore can now be reclassified as indicated. It should also be noted that although the extent of weathered ore was slightly deeper than previously interpretated, the grades of fresh ore were remarkably high.

On recalculation of geologic reserves for this section line, (Table No. 1) indicated reserves of fresh and partially weathered ore are now estimated to total 224,480 tonnes grading 0.74% WO_3. This compares with a total of 178,000 tonnes (0.71%) of indicated and inferred ore calculated by Golder Associates in September, 1980.

A revision of geologic resources (weathered ore) also shows a slight increase to 64,440 tonnes averaging 0.49% WO_3 (Golders - 53,000 tonnes 0.41% WO_3).

The western portion of the Section Line 5820N profile shows the effect of Tasminex mining since September, 1980, and the depletion of reserves.

C. H. Whitehead.

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TABLE NO. 1

KARA NO. 1 - SECTION LINE 582ON

A. GEOLOGIC RESERVES

	INDICATED FRESH ORE		INFERRED FRESH ORE		INDICATED PART WTHED		TOTAL	
	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$
GOLDERS -	92,000	0.67	21,000	0.69	65,000	0.76	178,000	0.71
REVISED -	120,960	0.73	Nil	Nil	103,520	0.76	224,480	0.74

B. GEOLOGIC RESOURCES

	WEATHERED ORE (SOME SCHEELITE)		WEATHERED ORE (NO SCHEELITE)		TOTAL	
	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$
GOLDERS -	34,000	0.48	19,000	0.28	53,000	0.41
REVISED -	30,960	0.67	33,480	0.32	64,440	0.49

WEST

EAST

7200E

7300E

7400E

7500E

540

520

500

480

460

440

420

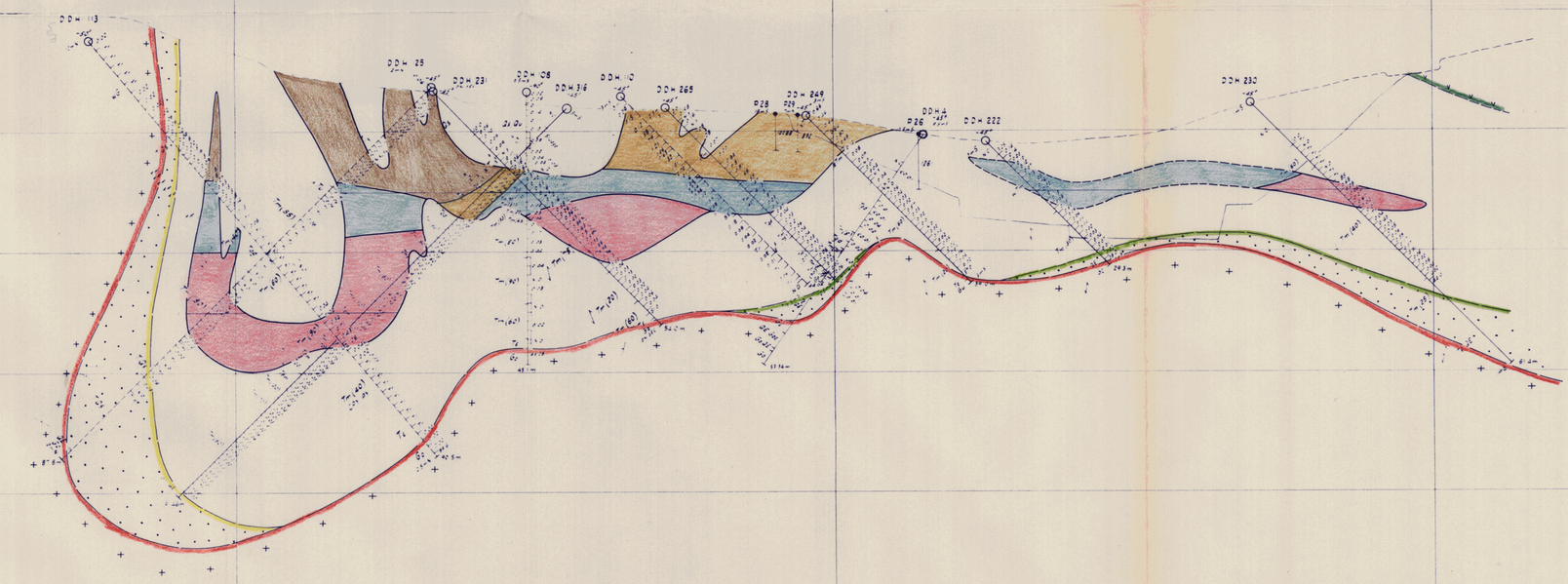
400

380

360

340

320



5820 N

SAMPLING

DDH	WIDTH SLUDGE OR RECOVERY (SOIL)
108	0 - 12.2
113	0 - 36.3
125	0 - 26.5

GEOLOGY LEGEND:

- = Tertiary Basalt
- = Sandstone / Quartzite, Quartz Epidote
- = Granite
- = Barren Skarn
- = ORE ZONE: Completely Oxidised (no scheelite); Oxidised (some scheelite); Partially Weathered; Fresh

PETROGRAPHY DESCRIPTION

South of Section

North of Section

T.S, R 180m

T.S. - Thin section
R. - Rock slice

GRADE CLASSIFICATION

% WO_3

< 0.05	
≥ 0.05 - < 0.10	
≥ 0.10 - < 0.20	
≥ 0.20 - < 0.40	
≥ 0.40	

N.C. No core
N.S. No sample
N.D. Not detected
N.S.V. No significant values
Tr. Trace

ROCK WEATHERING

[X] EXTREMELY WEATHERED;
Fully decomposed; rock substance can be remoulded, original texture still evident. Cuts readily with knife

[W] WEATHERED;
Mainly decomposed, staining extends throughout rock substance, original colour of fresh rock not recognisable. Resistant to knife.

[Y] SLIGHTLY WEATHERED;
Minor decomposition, usually in local patches; partial staining, colour and texture of rock recognisable. Rock condition generally sound impenetrable by knife.

[F] FRESH;
Rock substance unaffected by weathering.

ROCK TYPE

[Q] ALLUVIUM SERIES
n - clay, s - sand, c - gravel

[B] BASALT SERIES
b - basalt, a - fine-grained siliceous
c - conglomerate, t - tuff, tuffaceous
V - fossil alluvium

[S] SEDIMENTARY SERIES
Rock units readily distinguished
N - siltstone, C - conglomerate,
S - sandstone, L - limestone

(h) chloritic, (d) diopsidic (v) vesuvianite,
(r) brecciated, (q) stylolitic, (z) massive,
(b) bedded

[T] SKARN SERIES
Mineralogy
u - undivided
g - garnet
d - diopside
e - epidote
a - amphibole
h - chlorite
l - calcite
q - quartz
m(sh) - magnetite; percent indicated

TR - Marble

TQ - Quartzose rock, uncertain derivation
s - siliceous sandstone; sedimentary texture
q - quartzite; no remnant texture
(e) epidote, (a) amphibole, (i) biotite
h - hornfels

[QE] QUARTZ - EPIDOTE ROCK;
Quartz mosaic with interstitial epidote, associated with granite/skarn contact zone. Probably late stage feature of intrusion history.

[G] GRANITE;
o - porphyritic
p - pegmatite
u - undivided
q - quartz rich
e - epidote altered
j - aplite

NOTE: Rock type, dominant mineralogy and related features of rock unit shown by suffix; e.g. Tgd - garnet diopside skarn, TQq - quartzite, SLr - brecciated limestone.

SYMBOLS

- Vein
- Joint, cleavage, structural foliation
- Banding bedding, compositional foliation
- X / W / F — Boundary of weathering
- Established / Inferred / Concealed — Geological boundary

GRAIN SIZE

(f) fine (m) medium (c) coarse; shown by subscript e.g. S_{mg} - fine-grained sandstone, T_{Sm} - medium-grained garnet skarn, G_c - coarse-grained granite.

MINERALS

FL - fluorite, PY - pyrite, MO - molybdenite, HE - hematite, CPY - chalcopyrite, MA - malachite, - CH - chrysocolla.

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5 cm

Mc INTYRE MINES (AUST.) PTY. LTD.

KARA TUNGSTEN PROJECT, TASMANIA

KARA Nº 1 82-1828 Vol 6(19

ASSAY & GEOLOGY SECTION 5820 N.

WO_3 DISTRIBUTION

REVISIONS	NO.	BY	DATE	DESCRIPTION
	1	R.G.G	Feb '80	Compile all data
	2	C.H.W	March '82	D.D.H 316 addition

DESIGNED: R.G.G.
DRAWN: T.G.D.S.
CHECKED:
DATE: July 1979
SCALE 1:500 Metres 10 0 10
PROJECT No: 21081
PLAN No.
REVISION 2

003

Report No.
1D/82

82-1828
7/19

713070

of M | A.G. | G.G. | E.O. | D.S.M.E
Registrar
Received 1 OCT 1982
Answered
E & IL
DEPT. OF MINES
REF. No. 80908/82

McINTYRE MINES (AUSTRALIA) PTY. LTD.

BOBS BONANZA LOCATION

INFILL DRILL PROGRAMME

C. H. WHITEHEAD.

AUGUST, 1982.

BOB'S BONANZA. SKARN LOCATION

1. - BACKGROUND INFORMATION.

A - Location

The Bob's Bonanza skarn location is situated approx. 400 metres ENE of the Tasminex N.L. Mill and some 380 metres due south of the Eastern Ridge deposit. Although the skarn itself is known to extend to the south, the Bob's Bonanza location could be described as embraced by drill sections 5680N and 5840N, (160 metres strike length).

At the centre of the location is the Bonanza open pit area. This results from past mining by Tasminex N.L., and is approximately 90 metres by 30 metres in size, and between 20 - 30metres deep.

B - Previous Work

i) Exploration

Anzeco initially examined the area, excavating four surface trenches, drilling four diamond drill holes (Nos. 114, 117, 119 and 123) and a series of shallow power-auger holes. Surface sampling, mapping and a ground magnetic survey had been completed by McIntyre Mines in 1980.

ii) Mining

Tasminex N.L. have mined 31,470 tonnes of mill feed from this location during the period August 1979 to June 1980. Production ceased when it became essential to strip overburden along the western hanging wall contact.

C - Geology

i) Regional

The Bob's Bonanza skarns form the eastern margin of the main Kara synclinorium structure. The geological succession strikes N-S, and dips west at the angles between 40^{o} and 55^{o}. The Ordovician sequences disappear to the north beneath Tertiary basalt cover, eventually reappearing at the Eastern Ridge location some 380 metres to the north.

ii) Local

The geology at both Bob's Bonanza and the Eastern Ridge are quite comparable, there being two westerly dipping skarns (known as the Upper and Lower Skarn Units) separated by a "sandstone unit" and these are underlain by an additional narrow arenaceous member and finally granite. The latter is somewhat discordant, although not strongly, cutting out various members of the Ordovician succession at depth to the west. The succession is masked by Tertiary basalt and sediments to the north and east.

D - Mineralisation

At this location, tungsten mineralisation appears to be associated and restricted to the basal portions of the Upper Skarn Unit. The mineralised zone varies in width from 3 to 20 metres, being lenticular along strike, but generally narrowing to the south. The mineralised section is predominantly of the garnet-diopside variety, with associated magnetite content generally less than 30% (i.e. much lower than average for the Kara skarns). Fresh scheelite mineralisation was exposed on surface near DDH 123, but the depth of weathering increases southwards. Scheelite occurs as very coarse crystals, in addition to fine disseminations. The average grade of the main mineralised zone mined to date probably averaged 1% WO_3.

The Lower Skarn Unit shows little or no tungsten mineralisation, but investigations of this Unit have been somewhat limited. This Lower Unit gives a much more pronounced ground magnetic expression, especially in the northern sections of the location.

E - General

A good width of scheelite bearing bearing skarn was originally exposed in the trench adjacent to DDH 123 - namely 22 metres averaging 1.45% WO_3. On evaluation, the results of the Anzeco diamond drilling were extremely disappointing, but only sludge samples were obtained until well into fresh unweathered material.

The ore zone definetly appears to be pod-like in form, but mining proved better ore widths and grades than would have been expected from drilling.

The location has a few significant advantages, in particular, the fact that fresh ore is near surface, grades are high, and the structural disposition of the skarn would lead to a reasonably easy open pit operation with low waste to ore stripping ratio.

2. INFILL DIAMOND DRILL PROGRAMME

i) Objectives

The principal objectives of the infill drill programme at Bob's Bonanza were:-

- to investigate the potential of any down dip extensions of the mined mineralised zone in the Upper Skarn Unit as exposed in the pit.
- to investigate the potential of a northerly strike extension of mineralisation in the Upper Skarn Unit beneath Tertiary Basalt cover.
- to investigate the Lower Skarn Unit to the north of the location, in the vicinity of a strong ground magnetic anomaly.

ii) Holes Drilled

With the above intentions in mind, four new diamond drill holes were planned and drilled by McIntyre Mines.

Details of the holes completed are as follows. Locations are shown on the accompanying Plan 'A'.

Hole No.	Section Line	Coordinates North	East	R.L.	Inclination	Depth Drilled(m)
308	5720N	5723.0	7684.8	543.8	65°E	67.97
309	5820N	5821.0	7687.1	545.0	60°E	54.56
310	5820N	5821.0	7687.1	545.0	83°E	105.11
322	5820N	5823.2	7710.9	546.6	65°E	36.22
					Total Metres	= 263.86

iii) Drill Results

The results of the above drill holes are shown on drill section plans 5720N and 5820N - Plan A and B.

DDH 308 was drilled along Section Line 5720N to investigate the possible down dip extension of mineralisation in the Upper Skarn Unit in the vicinity of the southern end of the Tasminex N.L. mined area. No associated mineralisation was found in this skarn, confirming the pinching out of the ore lens. The Upper Sandstone Unit and a thin portion of the Lower Skarn Unit were intersected, before the underlying discordant granite intrusion was penetrated. The Lower Skarn Unit likewise showed negative mineralisation.

Because of the disappointing results of DDH 308, tentative plans for additional holes to be drilled along the western margin of the Bob's Bonanza Pit between Section Lines 5720N and 5780N were shelved.

DDH 309 was sited to explore the possibility of Upper Skarn mineralisation continuing north beneath Tertiary basalt cover. The hole proved a deep transgressive Tertiary valley of basalt and sediments which cross-cut and eroded the Upper Skarn Zone at a level where mineralisation was projected. The hole was continued towards the down dip extension of the surface exposed Lower Skarn Unit beneath the ground magnetic anomaly. This skarn was seen to be stongly magnetiferous and possess associated low grade scheelite mineralisation - 10 metres averaging 0.39% WO_3.

DDH 310 and DDH 322 were sited along the same section line (5820N) to investigate the downdip and updip potential of the low grade mineralisation intersected in DDH 309. Both holes gave disappointing results and no mineralisation was found in the Lower Skarn Unit.

iv) Conclusions

The above infill drill programme provided useful information but of a disappointing nature.

- mineralisation in the Upper Skarn Unit appears to have only limited potential for extending downdip from the present mined levels.
- any northern extension of mineralisation in the Upper Skarn Unit are limited by a cross cutting Tertiary valley.
- mineralisaltion, was found in the Lower Skarn Unit, but its extent and low grade nature prohibit the justification for additional drilling.

C. H. WHITEHEAD. AUGUST, 1982.

Plan A - Bobs Bonanza - Geology, Ground Magnetics and Sections

Plan B - Drill Section 5820N

Attachments A - DDH 308 Lithological log

" B - DDH 309 Lithological log and assay sheet

" C - DDH 310 Lithological log

" D - DDH 322 Lithological log

ATTACHMENT A

DDH 308 LITHOLOGICAL LOG

713077 007

SCALE 1:100.

LENGTH 67.97m NORTHING 2425723.0
AZIMUTH 98° EASTING 397684.8
DIP AT COLLAR 65°E ELEVATION 548.6
LOCATION BOBS BONANZA.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 308 PAGE 1 OF 1/3
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE: INTERVAL	FEATURE: ANGLE	FRACTURING	BEDDING	GEOLOGY	MINERAL
N.C						NC (Tu)	
52.28		1.43	160			W Tu	
100		1.0	45				
97.91		1.0	15				
92		1.0	130				
82.75		1.0	140				
98.1		1.0	170			X Tge	
77.06		1.0	140				
65.08		1.0	200				
43.21		1.0	150				
65.15		1.0	220				
96.5		1.0	140			Tgd	
78.21		1.0	230			X Tgd.	
100		1.0	25				
96.4			190			Tgd.	
82.2						Tad.	
82.6							

MINERALISATION
ZONES OF OXIDATION:-
X : Y = 9.15m
Y : F = 20.60m.

NO SCHEELITE MINERALISATION IN ANY SECTION OF HOLE.

GEOLOGY

X

4.57m. NO CORE - CASED TO 4.57m.
OVERBURDEN + WEATHERED SKARN AND CLAYS.

8.08m. SKARN.
SOFT WEATHERED LIMONITIC CLAYS AND SKARNS.
FRIABLE, RUBBLY, ONLY A LITTLE REMNANT MAGNETITE.
YELLOWISH-BROWN COLOR.

9.15m

SKARN.
WEATHERED SKARN, PROBABLY REPRESENTING GARNET-EPIDOTE FACIES.
MEDIUM GRAINED, BROWNISH WITH SLIGHT GREENISH DISCOLORATION.

Y

14.94m. SKARN.
FRESH GARNET DIOPSIDE SKARN.
GREENISH BROWN.

15.60m. SKARN.
GARNET DIOPSIDE SKARN.
MEDIUM GRAINED TEXTURE.
WEATHERED, BROKEN, RUBBLY CORE.

19.38m. SKARN.
COARSE EQUIGRANULAR.
GARNET DIOPSIDE SKARN.
LIGHT GREY TO BROWN.

20.60m. 20.75m.

F

SKARN.
FINE GRAINED EPIDOTE-DIOPSIDE SKARN.
GREYISH-GREEN COLOR.
FRESH.
LITTLE (5-10%) MAGNETITE CONTENT.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY POG.

CONTRACTOR McINTYRE MINES (P.N.G.) PTY. LTD. (NX)
CORE NX (41.9mm)
CASING

LOGGED BY CHW. DATE 12 DEC 1981.
RECD 2 JAN 1981
SUBM 17 JAN 1981

713078 008

SCALE 1:100

LENGTH 67.97m NORTHING 6425723.0
AZIMUTH 90° EASTING 397684.8
DIP AT COLLAR 65°E ELEVATION 543.8
LOCATION BOBS BONANZA.

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 308 PAGE 1 OF 2/3
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
100					T_{ed}.	
27.18						
100					T_{gd}.	
30.18						
100					$T_{m_{\alpha}}$.	
32.00						
83.8						
33.53						
100						
36.58						
61.8						
38.10						
38.40	100				T_{gd}.	
47.7						
39.93						
91.13						
42.37						
100					T_{gd}.	
45.92						
100						
48.40					$T_{m_{qp}}$.	

MINERALISATION

NIL SCHEELITE MINERALISATION.

F

Y

F

GEOLOGY

AS ABOVE.

26.60m.

SKARN.

DIOPSIDE GARNET SKARN.
COARSE GRAINED + VUGGY.
LIGHT BROWN COLOUR.

30.18m.

SKARN.

MAGNETITE AMPHIBOLE SKARN.
GENERALLY FINE GRAINED TEXTURE
BUT COARSE BETWEEN 32.0-33.0m.
WEATHERED ALONG FRACTURES.
DARK GREY TO GREEN COLOUR.

35.58m.

SKARN.

PARTIALLY WEATHERED
GARNET DIOPSIDE SKARN.
LIGHT BROWN + COARSE GRAINED
BUT FRACTURED + RUBBY.

37.50m.

41.50m.

SKARN.

AS ABOVE BUT - GARNET DIOPSIDE
SKARN ; BUT NOT
FRACTURED + OXIDISED.
FINE TO MEDIUM GRAINED TEXTURE.
LIGHT BROWN.

41.50m.

46.60m.

SKARN.

BANDED MAGNETITE SKARN.
FINE GRAINED TEXTURE - HOMOBLASTIC
40% MAGNETITE CONTENT

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR D'ENTRECASTEAUX (P.N.G.) PTY. LTD.
CORE NX
CASING NX (46.57m)

DATE 12 DEC 1981.

BY CHW. 9 NOV. 1981.
17 NOV. 1981.

713079 009

SCALE 1:100

LENGTH 67.97m NORTHING 6425728.0
AZIMUTH 90° EASTING 297684.8
DIP AT COLLAR 65°E ELEVATION 543.8
LOCATION BOBS BONANZA.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 308 PAGE 1 OF 3
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
91.6						
94.2					Q.	
89.4					Ta	
100					Ta	
56.36						
100					Q	
100						
42.46					T_{m40} S	
100						
45.53						
100					Gr.	
67.97						

MINERALISATION

NIL

SCHEELITE

MINERALISATION.

GEOLOGY

SKARN (AS ABOVE) BUT GRADATIONAL CONTACT TO:-
51.40m.

QUARTZITE.
FINE GRAINED GREYISH GREEN QTZ.
52.40m.

SKARN.
AMPHIBOLE SKARN.
GREENISH - SOFT, SLIGHTLY WEATHERED.
54.20m. GREENISH ROADSTONE ACTINOLITE.

AS. ABOVE BUT WITH INCREASING ARENACEOUS CONTENT.
55.50m.

ARENACEOUS UNIT.
FINE GRAINED METAMORPHOSED SANDSTONES & QUARTZITES
SLIGHTLY SKARNIFIED - LITTLE Fe.
LIGHT GREY TO BROWN.
JOINTED.
LITTLE REMINISCENT BANDING.
SKARN BANDS INCREASING TO END OF RUN.
11.0m.

SKARN.
MAGNETITE GARNET SKARN.
MAGNETITE CONTENT - 40%.
SLIGHTLY WITHED ALONG FRACTURES.
LITTLE MINOR GRANITE VEINING.
65.0m.

GRANITE.
MEDIUM TO COARSE GRAINED
PINKISH COLOUR
LITTLE EPIDOTISATION.
67.97m

E.O.H. 67.97m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES C/P. NT CONTRACTS
CORE NX
CASING NX 46.97m

LOGGED CHIN DATE 12 DEC. 1987
2. NOV. 1987
17. NOV. 1987.

RECOVERY SHEET

713080 HOLE No. 307 | PAGE 1 OF 1 1/1

CORE RECOVERY (CR) & 91% EXCEPT AS NOTED

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0 00	4.57	4.57	NIL	——					
4 57	6.10	1 53	0 80	52.28%					
6 10	7.01	0 91	0 91	100%					
7 01	7 92	0.91	0 80	87 91.					
7 92	9 19	1 27	0 70	55 12%.					
9.19	10.06	0 87	0 72	82.75%.					
10 06	10 67	0.61	0 58	95.1%					
10 76	11 85	1.09	0 84	77 06%.					
11 85	13.11	1.26	0 82	65.08%.					
13.11	14.00	0 81	0 35	43.21%.					
14.00	14.94	0.94	0 30	68.18%.					
14.94	15.24	0 30	0 30	100%.					
15 24	16.50	1.26	1.22	96.8%.					
16.50	18.29	1 79	1 40	78.21%					
18.29	19.51	1.22	1.22	100%.					
19 51	20 73	1 22	1 20	98.4%					
20 73	22.72	2.13	1 75	82.2%					
22.86	24.69	1.83	1.53	83.6%					
24.69	27 13	2.44	2.44	100%					
27.13	30.18	3.05	3.05	100%					
30 18	32.00	1.82	1.82	100%					
32.00	33 53	1 53	1.36	88.8%.					
33 53	36 58	3.05	3.05	100%.					
36.58	38.10	1.52	0 94	61.8%.					
38.10	38.41	0.30	0.30	100%					
38.40	39 93	1 53	0 73	47 7%.					
39 93	42.37	2.44	2.37	97.13%.					
42.37	45.42	3.05	3.05	100%					
45 42	48.48	3.06	3.06	100%					
48.40	51.61	3.11	2.85	91.6%.					
51 51	52 46	0.95	0 80	84.2%.					
52 46	54.25	1.79	1.60	89.4%.					
54.25	56.38	2.13	2.13	100%.					
56.38	59 43	3.05	3.05	100%.					
59.43	62.48	3.05	3.05	100%.					
62.48	65.53	3.05	3.05	100%.					
65 53	67 97	2.44	2.44	100%.					
67.97									

HOLE 266N° 28/12/82.

18 DEC. 1981.

308 011

BOBS BONANZA. 713081

CTION:

	Tool	Metres Interval	Lgth	%WO3	ASSAY				AVE: INVL	LGTH %WO3	WT AV	AVE: INVL	LGTH %WO3	WT AV
		0·0 - 4·57	4·57	N/C.										
88	CORE	4·57 - 6·0	1·43	160										
		6·0 - 7·0	1·0	45										
		7·0 - 8·0	1·0	15										
		8·0 - 9·0	1·0	130										
		9·0 - 10·0	1·0	140										
		10·0 - 11·0	1·0	170										
		11·0 - 12·0	1·0	140										
		12·0 - 13·0	1·0	240										
		13·0 - 14·0	1·0	150										
		14·0 - 15·0	1·0	220										
		15·0 - 16·0	1·0	140										
		16·0 - 17·0	1·0	230										
		17·0 - 18·0	1·0	25										
		18·0 - 19·0	1·0.	190										

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

ATTACHMENT B

DDH 309 LITHOLOGICAL LOG AND ASSAY SHEET

713083 013

SCALE 1:100

LENGTH 64.86m NORTHING 6425826.1
AZIMUTH 90° EASTING 397687.1
DIP AT COLLAR 60°E ELEVATION 645.0
LOCATION BOBS BONANZA.

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 309 PAGE 1 OF 1/3
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ZONE WIDTH	FRACTURING	BEDDING	GEOLOGY	MINERAL	GEOLOGY
N.C.						NC.		NO CORE - CASED TO 3.09m (LARGELY OVERBURDEN BULLDOZED FILL).
3.09								3.09m
100								BASALT.
3.96								TERTIARY BASALT.
82						B.	NIL.	HARD UNWEATHERED MASSIVE FINE TO MEDIUM GRAINED OLIVINE BASALT.
5.16								5.20m.
57.9								BASALT.
7.01						wB.	NIL.	SOFT WEATHERED CREAMISH BROWN CLAYS EX BASALT.
84.2								VESICLES (1/8") OF CREAM SOFT MATERIAL.
8.53								8.50m.
66.0								BASALT.
9.73						wB.	NIL	SOFT WEATHERED VERY FINE MEDIUM BROWN COLOURED CLAYS EX BASALT.
62.25								RELICT VESICLES LESS OBSERVABLE.
11.28								11.60m.
72.8								BASALT/CLAYS.
12.50								CREAMISH BROWN - LIGHT BROWN CLAYS
91.0								LIGHT WEIGHT, WEATHERED WITH
13.72								RETINANT VESICULAR STRUCTURES - EX
90.2						wB.	NIL.	BASALT.
14.94								INCLUDES SOME NON-DESCRIPT
67.0						↓		CLAY AND SANDY HORIZONS.
16.76								VESICULAR BETWEEN 17.50 - 18.50m.
93.4								18.50m.
17.87								AS ABOVE.
97.7								
17.68								
100								18.50m.
								TERTIARY SEDIMENTS.
								NON DESCRIPT CLAYS, SILTS, SANDS
20.73								VARIOUS COLOURS, LIGHT IN WEIGHT.
100							NIL.	WEATHERED.
								TRANSITION ZONE TO UNDERLYING RUN.
22.56						Bs.		
100								
22.16								
95.7								
24.65								

MINERALISATION
X/Y. = 26.0m
Y/F = 33.50m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.

CONTRACTOR McINTYRE MINES (C.P. D'CAMMET).
CORE N.X. 3.09m.
CASING

LOGGED BY CHW. DATE 3 DEC. 1981
ARTCO OS 25 NOV 1981

713084 014

SCALE 1:100.

LENGTH 64.86m NORTHING 5425828.6
AZIMUTH 90° EASTING 397687.1
DIP AT COLLAR 60°E ELEVATION 645.0
LOCATION BOB BONANZA.

M'INTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 309 PAGE 1 OF 2/3
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE: INTERVAL	FEATURE: 100m WO3	FRACTURING	BEDDING	GEOLOGY	MINERAL
25·3c						Bs	
46·7						Tu.	
27.13							
70·5							
27·74							
8667							
28·34							
100							
29·87							
100							
31·70							
100							
32·81						a/s.	
100							
34·14							
100							
34·75							
100							
35·44							
100							
35·36							
37·4							
36·27							
65·57							
37·49		1.0	4410				
100							
38·71		1.0	2160			Ted.	
82·7		1.0	3650				
		1.0	4450				
46·84							
		1.0	1750			Tle	
77·5							
		1.0	1950			Te.	
43·28							
		1.0	75				
100							
		1.0	4600				
45·42							
		1.0	3200			Tgd	
100							
		1.0	2250				
47·85							
		1.0	4950				
		1.0	1·04%			Tm 60.	
100							
		1.0	1000.				

MINERALISATION

NIL.
WO3 MINERALISATION.

NIL.

YELLOW SCHEELITE CRYSTALS 38·60 - 38·60m.

STRONG CONC YLW. SCH. CRYSTALS. 39·40 - 39·60.

40·80 - 42·30m - GOOD WELL DISTRIBUTED CONCENTRATION OF COARSE SCHEELITE 0·48 - 0·50%.

EXCELLENT COARSE FREEN SCHEELITE ZONES.
44·75 - 45·20m
& 45·70 - 46·0m.

DISSEMINATED SPECKS AND COARSE BLEBS OF SCHEELITE.
46·0 - 48·50m
AVERAGE = 0·6% WO3

48·0 - 61·60 ONLY FEW ISOLATED SPECKS OF SCHEELITE

25·40m. GEOLOGY

SKARN (UPPER UNIT)
WEATHERED SKARN, SLIGHTLY IMPREGNATED WITH IRON, & NOW WITH A LARGE ADMIXTURE OF SKARNIFIED ARENACEOUS MEMBERS.
HEAVIER IN WEIGHT.
FRACTURED, JOINTED.

25·80m.

UPPER ARENACEOUS UNIT.
28·0 - 29·0m. - SLIGHTLY SKARNIFIED FINE GRAINED SANDSTONE, SLIGHTLY FRACTURED AND JOINTED WITH A LITTLE IRON IMPREGNATION.
29·0 - 30·20m - GREY SANDSTONE, HIGHER DEGREE OF SILICIFICATION.
30·20 - 31·80. - SANDSTONE-GRIT - RUBBLY, COARSE, CREAM GREY, SLIGHTLY WEATHERED, FRACTURED.
31·80 - 33·50 - LIGHT BROWN SANDSTONE/ QUARTZITES. SLIGHT IRON IMPREGNATION.
33·50 - 36·0 - SILICIFIED SANDS AND GRITS.
36·0 - 37·30 - HARD SILICIFIED QUARTZITE.

37·30m.

SKARN (LOWER UNIT?)
QUARTZ, EPIDOTE, DIOPSIDE SKARN.
FRESH - UNWEATHERED.
MAGNETITE BECOMING MORE PROMINENT WITH DEPTH.

40·84m

DIOPSIDE, EPIDOTE SKARN.
COARSELY CRYSTALLINE.

41·50m

LIGHT TO MEDIUM GREEN EPIDOTE SKARN
FINE GRAINED
LITTLE OR NO MAGNETITE.

44·40m.

GARNET, EPIDOTE, DIOPSIDE SKARN.
COARSELY CRYSTALLINE.
IRON BECOMING MORE PROMINENT.

46·60m.

MAGNETITE SKARN
WITH DIOPSIDE, GARNET, LITTLE EPIDOTE.
FRESH
MAGNETITE CONTENT - 60%.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES C.P. McCARRICK.
CORE NY
CASING 3.09m

LOGGED BY CHW. DATE 3 DEC. 1951
STARTED 15 NOV 1951
FINISHED 26 NOV. 1951.

SCALE 1:100

LENGTH 54.86m NORTHING 6425723.4
AZIMUTH 90° EASTING 397687.1
DIP AT COLLAR 60°E ELEVATION 645.0
LOCATION BOBS BONANZA.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 309 PAGE 3 OF 3
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE: INTERVAL	FEATURE: ppm Ni	FRACTURING	BEDDING	GEOLOGY	MINERAL	MINERALISATION	GEOLOGY
100									BIARN (CONTIN) GEOLOGY
83.96		1.0	650			Fm_{50}		SEE ABOVE	MAGNETITE BIARN
93.4		1.0	90						67.50m.
52.12									GRANITE
						Gr		NIL.	FINE TO MEDIUM GRAINED PINK GRANITE, SHARP CONTACT, BUT EPIDOTISATION FOR 60cm at CONTACT ZONE
93.4									
64.86									54.86m
									E.O.H - 54.86m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES Co. (CANADA) LTD.
CORE NX
CASING 3.02m.

ED BY CAH DATE 3 DEC. 1987.
TED 15 NOVEMBER
HED 25 NOV 1987.

JOB. N°. Ac. 5093/82 SPLIT. LIBRARY
24 DEC 1981.
(REC) MATERIAL, CONSIDER SAMPLE ACCEPT AS NOTED
(WX) MATERIAL, CONSIDER SAMPLE ROCK ACCEPT AS NOTED. WX INDICATES CLAYEY, SMECTITIC MATERIAL

BOBS BONANZA

D.D.H. 309

016

1/1

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.
D309														
1		37.0 - 38.0	1.0		440									
2		38.0 - 39.0	1.0		260							7	13	86
3		39.0 - 40.0	1.0		3660									
4		40.0 - 41.0	1.0		1450									
5		41.0 - 42.0	1.0		1750									
6		42.0 - 43.0	1.0		1950									
7		43.0 - 44.0	1.0		75									
8		44.0 - 45.0	1.0		9600									
9		45.0 - 46.0	1.0		3200									
10		46.0 - 47.0	1.0		2250									
11		47.0 - 48.0	1.0		4950									
12		48.0 - 49.0	1.0		1.00%									
13		49.0 - 50.0	1.0		1000									
14		50.0 - 51.0	1.0		680									
15		51.0 - 52.0.	1.0.		90.									

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

EXPLORATION DEPARTMENT. 017

RECOVERY SHEET 713087

HOLE No. 309 | PAGE 1 OF 1

CORE RECOVERY (%) & RQD % ENTERED AT METER

BOBS BONANZA.

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0 00	3 09	3.09	NO CORE	—					
3.09	3 96	0 87	0 87	100%					
3.96	5.18	1.22	1.00	82%					
5.18	7.01	1 83	1 06	57.4%					
7.01	8 53	1 52	1 28	84.2%					
8 53	9 75	1.22	0 73	60%					
9.75	11 28	1 53	0 80	52.2%					
11.28	12 50	1 22	0 90	73.8%					
12 50	13.72	1.22	1.11	91%					
13.72	14.94	1.22	1 10	90.2%					
14 94	16 76	1.82	1 22	67.0%					
16 76	17.37	0 61	0 57	93.4%					
17.37	17 68	0 31	0 24	45.7%					
17 68	20 73	3 05	3 05	100%					
20 73	22 56	1 83	1 83	100%					
22 56	23 16	0 60	0 60	100%					
23 16	24 08	0 92	0 88	95 7%					
24 08	25 30	1 22	0 72	59 0%					
25 30	27 13	1 83	1 22	66 7%					
27 13	27 74	0 61	0 43	70 5%					
27 74	28 34	0 60	0 52	86 67					
28 34	29 87	1 53	1 53	100%					
29 87	31 70	1 83	1 83	100%					
31 70	32 31	0 61	0 61	100%					
32 31	34 14	1 83	1 83	100%					
34 14	34 75	0 61	0 61	100%					
34 75	35 06	0 31	0 31	100%					
35 06	35 36	0 30	0 30	100%					
35 36	36 27	0 91	0 34	37 4%					
36 27	37 49	1 22	0 80	65 57%					
37 49	38 71	1 22	1 22	100%					
38 71	40 84	2 13	1 89	88 7%					
40 84	43 28	2 44	2 38	97 5%					
43 28	45 42	2 14	2 14	100%					
45 42	47 85	2 43	2 43	100%					
47 85	50 90	3 05	3 05	100%					
50 90	52 12	1 22	1 14	93 4%					
52 12	54 66	2 74	2 56	93 4%					
EOH	54 86								

ATTACHMENT C

DDH 310 LITHOLOGICAL LOG

713089 019

SCALE 1:100

LENGTH 105.11. NORTHING 6425823.6
AZIMUTH 90° EASTING 397687.1
DIP AT COLLAR 83°E ELEVATION 645.0
LOCATION BOBS BONANZA.

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 310 PAGE 1 OF 1/5.
PROJECT KARA.

% CORE RECOVERY | CORE SPLIT | FEATURE: INTERVAL, ppm WO_3 | FRACTURING | BEDDING | GEOLOGY | MINERAL

NO CORE
ROLLER BIT.
10.0
NOT SAMPLED.
20.42
24.6
27.85
28.46
30.0

Td.
Tbs.
Tbs.

MINERALISATION

LEVELS OF OXIDATION.
X/Y - 35.50m.
Y/F - 40.86m.

X.

GEOLOGY

TERTIARY BASALT AND SEDIMENTS.
GROUND TO 20.42m - ROLLER BIT.
1.0m - OVERBURDEN.
1.0 - 7.50m - BASALT + CLAY.
7.50m - 20.42 - TERTIARY SEDIMENTS CLAYS + SANDS.
SOFT - EASY PENETRATION.

20.42m.
TERTIARY SEDIMENTS. SEE BELOW.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.O.A.

CONTRACTOR McINTYRE MINES. P. McCORMACK
CORE NX
CASING NX.

BY CHW. DATE 17 DEC 1981
26 NOV 1981
9 DEC. 1981.

713090 020

SCALE 1:100

LENGTH 105·11m. NORTHING 5K 2572 N
AZIMUTH 90° EASTING 397687·1
DIP AT COLLAR 83°E ELEVATION 545·0
LOCATION BOBS. BONANZA.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 210 PAGE 2/6 OF
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE: INTERVAL	FEATURE: ppm Mo₂	FRACTURING	BEDDING	GEOLOGY	MINERAL
81·0							
27·43							
79·4							
39·26							
100							
29·57							Tds
79·3							
20·75							
100							
32·61							
91·9							
34·58							
62·7							Ss
39·01							
18·1							
40·56							Tgd.
89·7							Q
42·63							
96·7							
45·11							
83·6							
44·32							Tgd
100							
45·77							
93·1							

MINERALISATION

X

3560.

Y.

NIL MINERALISATION.

F.

NO MINERALISATION.

GEOLOGY

TERTIARY SEDIMENTS.

SOFT, WEATHERED CLAYS, SILTS AND SANDSTONES.

VARIEGATED COLOURS - OVERALL BROWNISH-ORANGE.

GRADATIONAL CONTACT TO SKARN? AT 36·00m.

36·05m.

ARENACEOUS UNIT.

SANDSTONE - QUARTZITE.

YELLOWISH BROWN - FINE GRAINED, LITTLE Fe IMPREGNATION.

RUBBLY + FRIABLE.

39·06m.

SKARN.

GARNET DIOPSIDE SKARN.

COARSE GRAINED.

40·60m.

40·75m.

QUARTZITE.

VERY FINE GRAINED GREYISH GREEN QUARTZITE.

43·10m.

SKARN.

LIGHT GREY-BROWN, MEDIUM TEXTURED GARNET DIOPSIDE SKARN.

RUBBLY, DISJOINTED.

SLIGHTLY WEATHERED IN RUNS.
44·80 - 46·00m.
49·00 - 58·60m.

87·55m.

AS ABOVE - GARNET DIOPSIDE SKARN.
BUT BANDED APPEARANCE

ANGLE READ
ANGLE CORRECTE
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES. P. McCONNACHIE. N.Y. N.Y.
CORE

DATE 17. DEC. 1981.

LOGGED BY C.H.W. 26 NOV 1981
STARTED 9 DEC 1981

713091 021

SCALE 1:100

LENGTH 105·11m.	NORTHING 5425928·6
AZIMUTH 90°	EASTING 397687·1
DIP AT COLLAR 83°E	ELEVATION 645·0
LOCATION BOBS. BONANZA.	

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

HOLE No 310 PAGE 3/5

PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
84·1						
88·40						
80·1						
52·61						
100						
53·95						
92·9						
56·05						
46·7						
57·60					Tgd.	
75·8						
58·51						
85·2						
62·34						
75·4						
68·39						
100						
65·22						
100						
66·13						
100						
56·13						
100					Qc.	
67·65						
77·0						
69·17						
100						
71·91					Tgl.	
100						
76·61						

MINERALISATION

NIL MINERALISATION.

F.

GEOLOGY

GARNET DIOPSIDE SKARN. (CONTINUED).

COARSE GRAINED - VUGGY.

BROWNISH GREY GREENY BROWN.

WOULD CLASSIFY AS FRESH TO PARTIALLY WEATHERED.

NOT COMPETENT.

ARENACEOUS MEMBERS., WHICH ARE SLIGHTLY SILICIFIED BETWEEN. 54·50 - 55·35m AND 57·20 - 60·10m.

65·00m.

ARENACEOUS MEMBERS.

SANDSTONE.

FINE GRAINED, MOTTLED GREYISH BROWN.

FRESH.

FE IMPREGNATIONS ALONG FRACTURES.

69·90m.

SKARN.

GARNET DIOPSIDE (EPIDOTE) SKARN.

NIL MINERALISATION.

MEDIUM GRAINED, VUGGY.

LITTLE WEATHERING ALONG FRACTURES.

77·30m.

ANGLE READ

ANGLE CORRECTED

AZIMUTH

DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES (P. McCORMACK)

CORE N.X.

CASING N.X.

LOGGED BY C.H.W. DATE 17 DEC 1981

STARTED 26 NOV 1981

FINISHED 9 DEC 1981

713092 022

SCALE 1:100

LENGTH 105.11m NORTHING 5425923.0
AZIMUTH 90° EASTING 397687.1
DIP AT COLLAR 83°E ELEVATION 545.0.
LOCATION BOBS BONANZA.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 310 PAGE 1 OF 116.
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
100					Tgdc.	
74.48						
100						
77.70						
95.1					Qs (T)	
80.75						
73.8						
81.97						
85.5						
83.49						
61.5					F Cl	
85.93						
94.0					Qz+ Tgd	
87.76						
84.5						
89.89					Tm.	
82.2						
92.63					Tma	
76.2						
94.15						
100					Qs.	
95.62						
93.4						
97.19						
100						
99.32						

MINERALISATION

NO MINERALISATION EXCEPT 93.50 - 94.15m.
FINE DISSEMINATED SCHEELITE.

GEOLOGY

AS ABOVE.
77.30m

ARENACEOUS UNIT.
FINE GRAINED "SKARNIFIED" SANDSTONE AND GRITS.
BANDED - Fe IMPREGNATED LAYERS
SKARN MEMBER - 81.56 - 82.60m.
F
83.60m.

CONTACT - FAULT? ZONE.
YELLOWISH ORANGE SOFT ROCK RUBBLE + CLAYS.
86.00m.

ARENACEOUS UNIT/SKARN
"SKARNIFIED" SANDSTONE + QUARTZITE.
WITH GARNET DIOPSIDE SKARN.
89.40m.

F.
SKARN.
MAGNETITE WITH SPECULARITE SKARN.
HOMOGENEOUSLY FINE GRAINED.
91.60m.

SKARN.
MAGNETITE - AMPHIBOLE SKARN.
VUGGY, COULD ALMOST BE CLASSIFIED AS PARTIALLY WITHER.
92.00 - 94.15 - RUBBLY FRACTURED ZONE?
94.75m.

ARENACEOUS MEMBER.
Fe IMPREGNATED SANDSTONE.
YELLOWISH ORANGE
JOINTED.
97.20m.

FINE GRAINED GREYISH GREEN FRESH SANDSTONES + QUARTZITES.
LITTLE EPIDOTE.
V 103.00m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES (P. McCONNOCHIE).
CORE NX
CASING NX.

LOGGED BY C.H.W. DATE 17. DEC. 1981.
STARTED 26 NOV 1981
FINISHED 9 DEC. 1981.

713093 023

SCALE 1:100.

LENGTH 105·11m. NORTHING 5425928·0
AZIMUTH 90° EASTING 397687·1
DIP AT COLLAR 83°E ELEVATION 545·0
LOCATION BOBS BONANZA.

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

HOLE No 210 PAGE 6/6

PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL	MINERALISATION	GEOLOGY
100								
67·5					Qs.			AS ABOVE (ARENACEOUS MEMBER).
102·66								102·90m.
100					Gr			GRANITE. FINE GRAINED - PINK. LITTLE EPIDOTE ALONG FRACTURES.
105·11								105·11m. E.O.H. 105·11m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY A.D.D.

CONTRACTOR M'INTYRE MINES. (P. O'CONNOR)
CORE NX
CASING NX

LOGGED BY C.H.W. DATE 12 DEC. 1981.
STARTED 26 NOV 1981.
FINISHED 9 DEC. 1981.

713094 024

RECOVERY SHEET

BOBS BONANZA. HOLE No. 310 PAGE 1 OF 1/1

CORE RECOVERY (ca) 2 91% EXCEPT AS NOTED

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0·00	20·42	20·42	N/C	ROLLER BIT.	94·15	95·67	1·52	1·52	100.
					95·67	97·19	1·52	1·42	93·4
20·42	22·25	1·83	0·45	24·6.	97·19	99·32	2·13	2·13	100
22·25	22·86	0·61	0·22	36·1	99·32	102·06	2·74	1·85	67·5
22·86	27·43	4·57	3·70	81·0	102·06	105·11	3·05	3·05	100
27·43	29·26	1·83	1·46	79·8					
29·26	29·57	0·31	0·31	100.					
29·57	30·78	1·21	0·96	79·3.					
30·78	32·61	1·83	1·83	100.					
32·61	36·58	3·97	3·65	91·9					
36·58	39·01	2·43	1·28	52·7					
39·01	40·54	1·53	0·20	13·1					
40·54	42·67	2·13	1·91	89·7					
42·67	45·11	2·44	2·36	96·7					
45·11	46·33	1·22	1·02	83·6					
46·33	48·77	2·44	2·44	100.					
48·77	50·60	1·83	1·52	83·1					
50·60	52·66	2·06	1·65	80·1					
62·66	53·95	1·29	1·29	100					
53·95	56·08	2·13	2·00	93·9					
56·08	57·60	1·52	0·71	46·7					
57·60	58·51	0·91	0·69	75·8					
58·51	60·34	1·83	1·56	85·2.					
60·34	63·39	3·05	2·30	75·4.					
63·39	65·22	1·83	1·83	100					
65·22	66·13	0·91	0·91	100.					
66·13	66·43	0·30	0·30	100					
66·43	67·65	1·22	1·22	100.					
67·65	69·17	1·52	1·17	77·0					
69·17	71·91	2·74	2·74	100.					
71·91	74·65	2·74	2·74	100.					
74·65	76·48	1·83	1·83	100					
76·48	77·70	1·22	1·22	100.					
77·70	80·75	3·05	2·90	95·1					
80·75	81·97	1·22	0·90	73·8					
81·97	83·49	1·52	1·30	85·5					
83·49	85·93	2·44	1·50	61·5					
85·93	87·76	1·83	1·72	94·0					
87·76	89·89	2·13	1·80	84·5					

ATTACHMENT D

DDH 322 LITHOLOGICAL LOG

SCALE 1:100.

LENGTH 36.27m. NORTHING 6828·2
AZIMUTH 62°40' EASTING 7710·9
DIP AT COLLAR 65° ELEVATION 346·6
LOCATION BOBS BONANZA.

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 312 PAGE 1 OF 1/2.
PROJECT KARA

% CORE RECOVERY	CORE SIZE	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
NC.		NO SAMPLES SUBMITTED FOR ASSAY.			Gr	
4·57					Tb.	
5·0						
34·59					WTb Tbs	
8·53						
31·47					Qa	
10·0						
11·58						
100						
12·50						
100						
13·41						
90·16						
12·63						
15·0						
63·18						
16·15						
79·08					Qs.	
17·65						
100						
18·29						
45·49						
20·0						
20·73					Qw	
27·00						
23·47						
9·5						
34·98						
50·2.					Qs	

MINERALISATION
X/Y - 10·50m
Y/F - 26·40m.

No Mineralisation.

No Mineralisation.

	GEOLOGY
1·20m.	OVERBURDEN + BULLDOZED RUBBLE.
3·40m.	TERTIARY BASALT. BUILDERS/PEBBLES FRESH OLIVINE BASALT + WEATHERED CLAY.
X	TERTIARY BASALT AND CLAYS/SEDIMENTS. WEATHERED SOFT BASALTIC MATERIAL. SANDS AND CLAYS.
8·58m.	GRADATIONAL CONTACT, EXTREMELY WEATHERED.
	ARENACEOUS UNIT. SANDSTONE, CREAMISH-WHITE. FINE TO MEDIUM GRAINED. PARTIALLY WEATHERED. JOINTED - LITTLE Fe IMPREGNATION ALONG JOINTS.
15·20m.	
Y	ARENACEOUS UNIT. FINE GRAINED ORANGE-BROWN SANDSTONE. SOFT, PARTIALLY WEATHERED. BLOTCHY IMPREGNATIONS OF IRON.
18·68m.	
	ARENACEOUS UNIT. SOFT WHITISH-CREAM SILTSTONE. PARTIALLY WEATHERED TO WEATHERED. EXTREMELY FRACTURED - BLOCKY CORE. POOR CORE RECOVERY.
23·47m.	
	Fe IMPREGNATED SANDSTONE. MAGNETITE.

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

CONTRACTOR McINTYRE MINES (P. McGRANAEL)
CORE NX
CASING NX (4·5-7m)

DATE JUNE 16. 1982
LOGD BY GMW.
APPD JUNE 11. 1982

713097 027

SCALE 1:100

LENGTH 36.27m. NORTHING 5823.2
AZIMUTH 68°40' EASTING 7710.9
DIP AT COLLAR 65° ELEVATION 546.6.
LOCATION BOBS BONANZA.

M'INTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 322 PAGE 1 OF 2/2.
PROJECT KARA

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL	MINERALISATION	GEOLOGY
100					Q SN			ARENACEOUS UNIT. GREY SILTSTONE/QUARTZITE. BANDED WITH MAGNETITE – Fe CONTENT INCREASING ALONG RUN – GRADATIONAL CONTACT
27.13								26.40m. 26.48m.
100.					Tm 40		NIL FLUORESCENCE.	SKARN. MAGNETITE SKARN. MAGNETITE CONTENT APPROX 40% FRESH + BANDED MAGNETITE – MEDIUM TEXTURED.
20.15								
72.52								
31.09								F. 31.30m.
90.14.					Q6			ARENACEOUS UNIT. SILTSTONE – QUARTZITE. PARTIALLY WEATHERED – SLIGHTLY SPILITISED. 32.15m.
33.22								GRANITE.
100.					Gr.		NIL MINERALISATION.	FINE TO MEDIUM GRAINED. SHARP CONTACT WITH ABOVE. FEW MAFIC MINERALS.
36.27.								36.27m.
								E.O.H. 36.27m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDG.
CONTRACTOR McINTYRE MINES LTD. (NEE BARNES)
CORE NX NX (WL 57m)
CASING

LOGGED BY C.H.W. DATE 16. JUNE 1982
PLOTTED Z. JUNE 1982
CHECKED 11. JUNE 1982

MOUNT ISA MINES (A.S.T.) PTY. LTD.
EXPLORATION DEPARTMENT.

713098

028

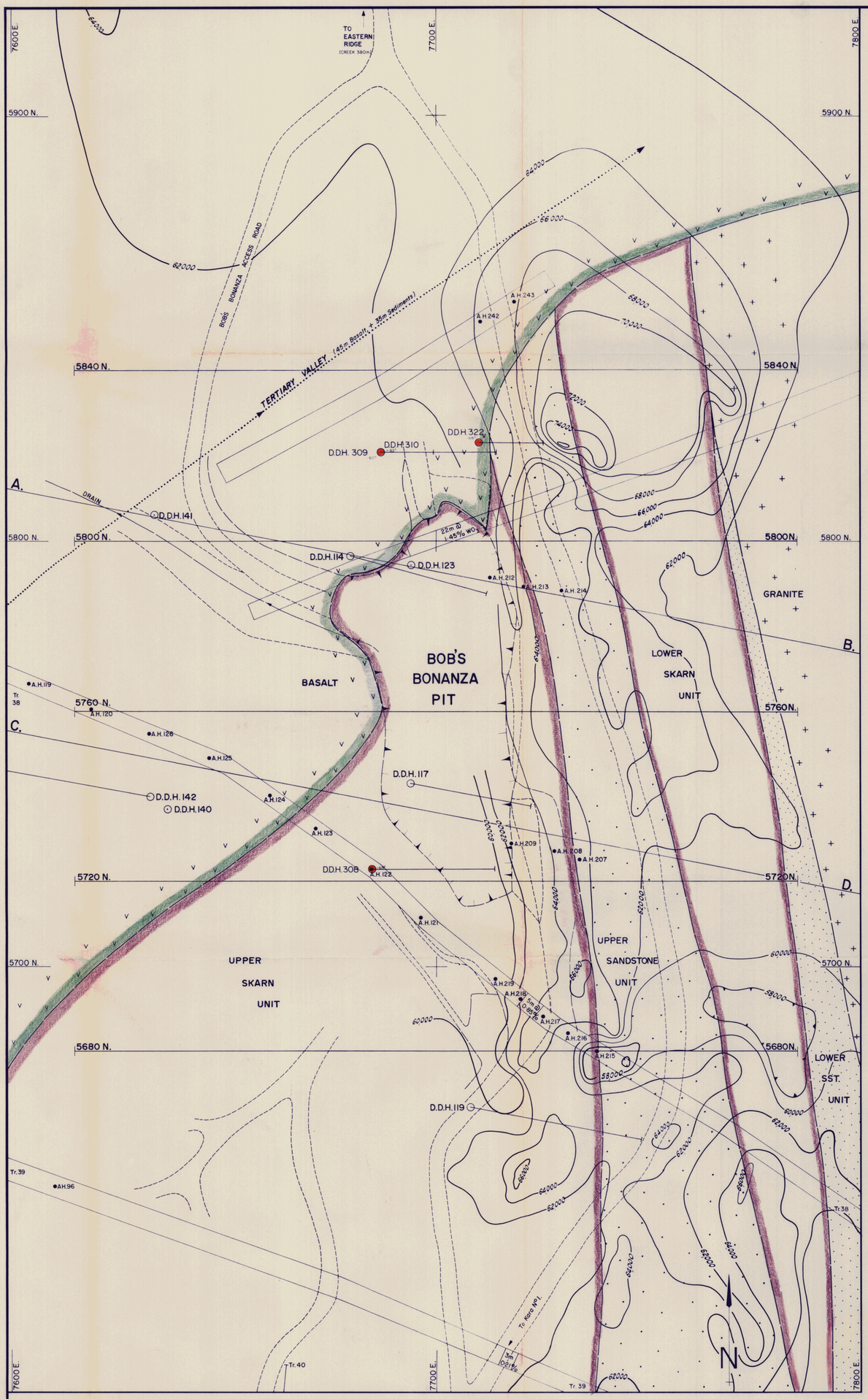
RECOVERY SHEET

HOLE No. 322. PAGE 1 OF 111.

"BOBS BONANZA"

CORE RECOVERY (IN) > 98% EXCEPT AS NOTED

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0.00	4.57	4.57	—	CASING.					
4.57	8.53	3.96	1.58	39.89					
8.63	11.68	3.05	0.96	31.47.					
11.58	12.50	0.92	0.92	100%.					
12.50	13.41	0.91	0.91	100%.					
13.41	14.63	1.22	1.10	90.16%.					
14.63	16.15	1.52	1.00	65.78%.					
16.15	17.68	1.53	1.21	79.08%					
17.68	18.29	0.61	0.61	100%.					
18.29	20.73	2.44	1.11	45.49%.					
20.73	23.47	2.74	0.74	27.00%.					
23.47	24.08	0.61	0.06	9.8%.					
24.08	24.99	0.91	0.73	80.2%					
24.99	27.13	2.14	2.14	100%					
27.13	30.18	3.05	2.05	100%.					
30.18	31.09	0.91	0.66	72.52.					
31.09	33.22	2.13	1.92	90.14%					
33.22	36.27	3.05	3.05	100%.					
	36.27	E.O.H.							



MAGNETICS:

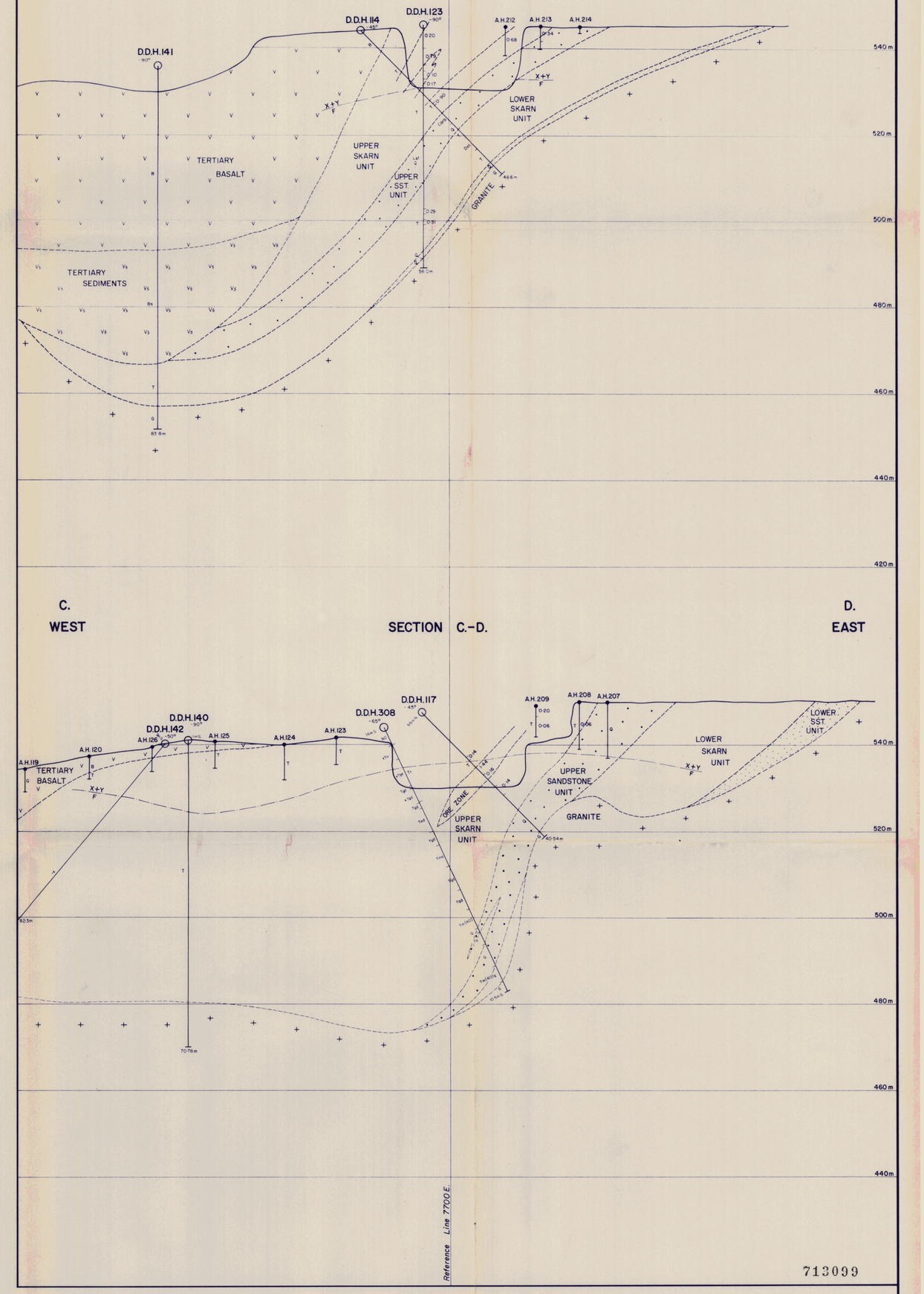
- < 60,000 Gammas
- 60,000 – 62,000
- 62,000 – 64,000
- 64,000 – 66,000
- 66,000 – 68,000
- 68,000 – 70,000
- 70,000 – 72,000
- > 72000

10 5 0 10 20 Metres

SCALE 1:500

SECTION A.–B.

A. WEST — B. EAST



SECTION C.–D.

C. WEST — D. EAST

713099

GEOLOGY LEGEND:

- BASALT SEDIMENTS — TERTIARY
- UPPER SKARN UNIT (ORE ZONE)
- UPPER SANDSTONE UNIT
- LOWER SKARN UNIT
- LOWER SANDSTONE UNIT
- GRANITE

5 cm

82-182.8 Vol 7/19

McINTYRE MINES (AUST.) PTY. LTD.

BOB'S BONANZA
GEOLOGY, GROUND MAGNETICS AND SECTIONS

DRAWN: C.H.W.	SCALE: 1:500
TRACED: T.G.D.S.	DATE: August 1982

PLAN A.

WEST

EAST

7600 E

7700 E

7800 E

D.D.H. 141 -90°

D.D.H. 310 -83°

D.D.H. 309 -60°

D.D.H. 322 -65°

530 m

520 m

500 m

480 m

460 m

440 m

420 m

Tb

Tbs

Tgd

Tgde

Tm

Tma

Q

Qs

Qn

Qsn

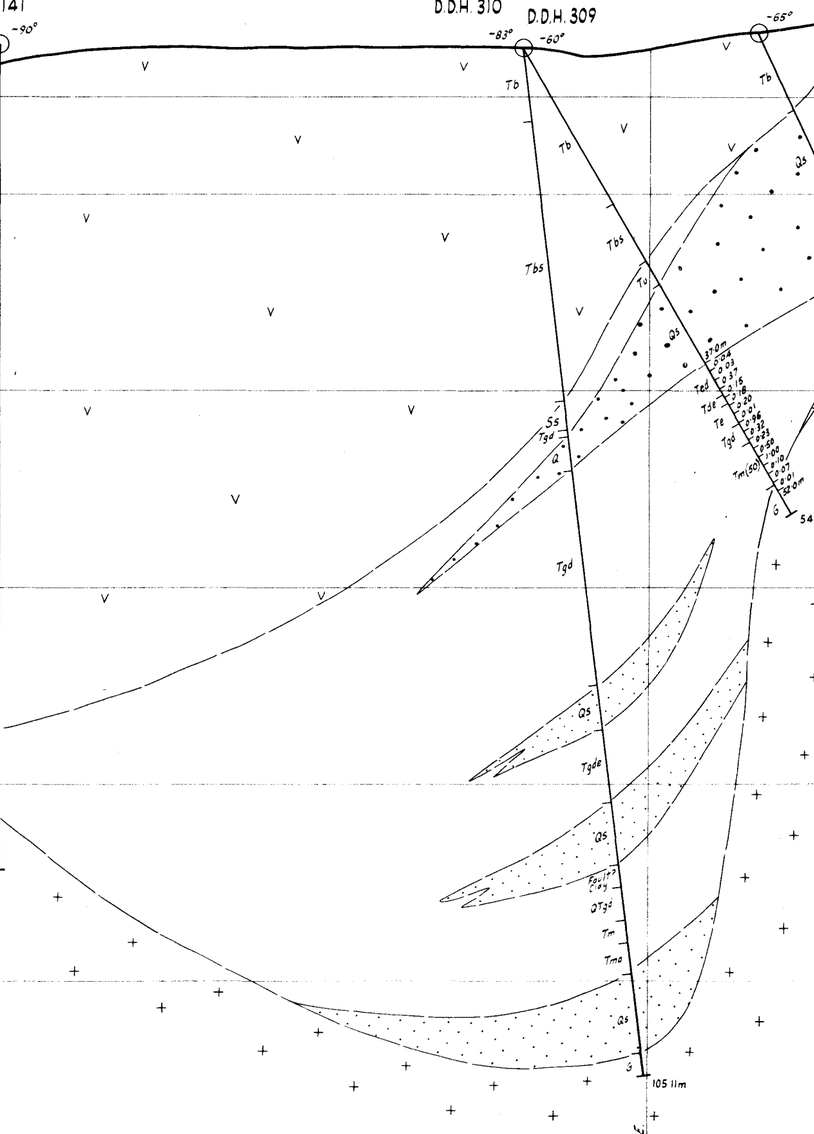
Tm(40)

Tm(50)

36.27m

54.86m

105.11m



10 5 0 10 20 Metres

SCALE 1:500

BASALT

UNDIFFERENTIATED SKARN

UPPER SKARN UNIT

UPPER SANDSTONE

LOWER SKARN UNIT

LOWER SANDSTONE

GRANITE

5 cm

713100

McINTYRE MINES (AUST.) PTY. LTD.

82-1828 Vol 7/19

BOB'S BONANZA

SECTION LINE 5820 N.

DRAWN: C.H.W.	SCALE: 1:500
TRACED: T.G.D.S.	DATE: September 1982

PLAN. B.

030

Report No.
1E/82



82-1828
8/14

713C1

713101 000

D of M | A.G. | O.G. | E.O. | D.S.M.E
Received Answered 1 OCT 1982 | B & IL
DEPT. OF MINES
Ref. No. 8090A 82

McINTYRE MINES (AUSTRALIA) PTY. LTD.

EASTERN RIDGE DEPOSIT

INFILL DRILL PROGRAMME

C. H. WHITEHEAD.

8th SEPTEMBER, 1982.

INFILL DRILL PROGRAMME - EASTERN RIDGE DEPOSIT.

INTRODUCTION AND SUMMARY

A limited programme of diamond drilling was recently completed over the southern half of the Eastern Ridge deposit, south of East Kara creek.

At this location over a strike distance of approximately 75m, mineralisation of a partially weathered ore type had been exposed by surface trenching across the Upper Skarn Unit. Drilling was proposed to investigate the possible down dip subsurface extensions of this ore - at least to depths not in excess of those considered prohibitive to any future open pit mining. At the same time, it was reccommended that drilling be undertaken to evaluate the effect of a Tertiary valley cross cutting the surface exposed skarns in the extreme south of the area.

With the above in mind, three diamond drill holes - DDH's 323, 324 and 325 were completed, with a total drilled metreage of 214.58 metres.

Overall the results of drilling were informative, but disappointing:

- The surface exposed mineralised ore lens of the Upper Skarn Unit was found to rapidly decrease in a down dip direction, both in width and grade.
- Although the ore lens had a greater strike extension than previously known, the original geological reserves of fresh and partially weathered ore (as calculated in September 1980) could not be increased.
- Mineralisation in the Lower Skarn Unit was found to have a good downdip extension, but was disseminated and low grade.
- Depth of weathering increased significantly in a southerly direction.
- The Tertiary valley, of basalt and sediments, was proved to be deeper than expected, and had eroded any high level near surface mineralised zones of possible open pit potential.

1. BACKGROUND INFORMATION

a) Location And Size.

The Eastern Ridge area is approximately 750m N.E. of the Kara No. 1 orezone, and 1.25km by road from the present Tasminex treatment plant. The Bobs Bonanza location is situated 450m to the south.

As known, the Eastern Ridge deposit is small in size, covering an area of 260metres by 150 metres (Section Lines 6240N to 6500N). Most of the area is covered by Tertiary basalt and sediments, but past trenching in the vicinity of East Kara Creek has revealed a "window" exposing skarns and other enclosing Ordovician sequences (please see Plan A).

b) Geology

Regionally, the Eastern Ridge area forms part of the eastern limb of the main northerly plunging synclinorium structure which affects the main Kara area. Locally, the area consists of a series of N - S striking skarns and sandstones, flanked on the east by a fairly conformable granite. This succession shows predominant dips to the west at angles between 55^{o} - 70^{o}.

c) Mineralisation

Tungsten mineralisation is associated with two separate stratigraphical skarn horizons, known as the Upper and Lower Skarn Units. These skarns show good continuity along strike for a distance of 260 metres, and extensions in both a north and south direction are open - ended. Over a strike distance of 260m, diamond drill holes totalling 2257m have in the past been completed to investigate the possible associated tungsten mineralisation of these skarns.

At first glance, drilling to date would indicate mineralisation to be somewhat discontinious and pod-like in form, the individual lenses being confined to narrow widths and being steeply dipping in attitude. Except in the south-central portion of the deposit, the ore lenses are masked by varying amounts (up to 70m) of Tertiary cover, and the degree of weathering within the mineralised skarns is both extensive and variable.

Mineralisation does however appear to be confined to two specific statigraphic levels within the skarns which lie constant distances away from the adjacent granite front.

The Eastern Ridge deposit and that at Kara North 266 Zone are geologically and genetically considered to be very comparable. It is believed, as was the case with the Kara North orezone, that additional drilling would substantiate a better continuity of individual ore lenses and delineate additional ore reserves. However.the previously mentioned Tertiary cover and extensive weathering downgrades this deposits future economic potential.

Of the two skarn zones, mineralisation is best developed in the Upper Skarn Unit, and between Section Lines 6363N and 6460N, a single ore lens attains a maximum thickness of 12 metres. In the Lower Skarn Unit, WO_3 grades are much lower (0.25 to 0.35% WO_3), and the ore occurs in a series of inconsistent lenses commonly less than 1.0m in thickness.

d) Reserves

Geological reserves of ore at the Eastern Ridge deposit were calculated by Golder Associates in September 1980.

Table No. 1 overleaf summarises details of these calculations of reserves and resources, but a total of 297,000 tonnes at 0.67% WO_3 of indicated and inferred geological reserves of fresh and partially weathered ore have been delineated at the Eastern Ridge deposit.

2. INFILL DRILL PROGRAMME

The area studied by the recent programme of infill drilling was confined to that portion of the Eastern Ridge south of the East Kara Creek. This is an area of 115 metres strike length, between Section Lines 6185N and 6300N. (Please refer to Plan B).

This specific location was considered to be the portion of the Eastern Ridge area which had unexplored potential for additional reserves of fresh or partially weathered ore which could possibly be extracted by open pit methods.

713105

TABLE NO. 1

EASTERN RIDGE - GEOLOGICAL RESERVES AND RESOURCES.

A. GEOLOGICAL RESERVES.

UPPER SKARN UNIT

	INDICATED		INFERRED		TOTAL	
	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$
FRESH ORE	15,000	0.79	65,000	0.73	80,000	0.74
PARTIALLY WTHED ORE	20,000	0.90	83,000	1.09	103,000	1.05
				TOTAL	183,000	0.91

LOWER SKARN UNIT

	INDICATED		INFERRED		TOTAL	
	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$
FRESH ORE	19,000	0.31	72,000	0.30	91,000	0.30
PARTIALLY WTHED ORE	2,000	0.27	21,000	0.25	23,000	0.25
				TOTAL	114,000	0.29

OVERALL GEOLOGICAL RESERVES = 297,000 TONNES AT 0.67%WO_3

B. GEOLOGICAL RESOURCES

(Essentially "possible" tonnages of weathered mineralisation and narrow lenses of fresh and partially weathered mineralisation which are between 1.0 and 2.0m true thickness).

UPPER SKARN UNIT

	TONNES	$\%WO_3$
FRESH ORE	9,000	0.62
PARTIALLY WTHED ORE	1,000	0.31
WEATHERED MATERIAL	24,000	0.75
TOTAL	34,000	0.70% WO_3

LOWER SKARN UNIT

FRESH ORE	2,500	0.41
PARTIALLY WTHED ORE	10,000	0.47
TOTAL	12,500	0.46% WO_3

OVERALL GEOLOGICAL RESOURCES = 46,500 TONNES AT 0.67% WO_3

Over the area in question, and prior to the proposed drilling, McIntyre Mines has previously carried out detailed geologic mapping, a ground magnetic survey and detailed sampling along constructed E - W trending trenches. In addition, Tasminex N.L. had through mining operations exposed a number of mine faces across the Upper Skarn Zone - this permitted valuable delineation of ore lenses on surface between Section Lines 6280N and 6242N. One ore lens in the Upper Skarn Zone revealed partially weathered scheelite bearing ore which showed a grade of 0.84% WO_3 over a maximum width of 13 metres. Trenching indicated that this mineralisation continued as far south as Section Line 6210N before deep Tertiary basalt cover prohibited further evaluation.

It was the intention of infill drilling to investigate the possible down dip extension of this mineralisation in the Upper Skarn Unit exposed on surface between 6210N and 6300N, and in addition to evaluate the strike extensions of the skarn beneath Tertiary cover south of 6210N.

Over this particular area, Golder Associates had in September 1980 calculated geological reserves of indicated and inferred fresh ore in the order of 28,000 tonnes with an average grade of 0.40% WO_3.

a) Drilling Completed:-

Three holes, DDH 323 to 325 were completed, with a total of 214.58 metres being drilled.

HOLE NO	SECTION LINE	COORDINATES North	East	R.L.	INCLINATION	DEPTH DRILLED (Metres)
323	6265N	6271.0	7676.0	479.9	54°E	81.38
324	6185N	6184.1	7662.9	496.1	50°E	63.70
325	6225N	6227.5	7679.6	492.3	55°E	69.50
				TOTAL	METRES	214.58

The attached Plan B (Scale 1:250) shows the above drill hole locations, details of past drilling, trench work and assays, plus an interpretation of surface geology.

New drill section plans, 6185N, 6225N and 6265N have been drawn showing lithological logs and assay runs for the new holes. Section Line drill plans 6280N and 6242N, are also attached with the report.

b) Drilling Results

DDH 323

This hole was drilled along Section Line 6265N, west of the surface exposed mineralised skarn within the Upper Skarn Unit. The drill hole objective was to investigate the possible continuity of mineralisation to a depth of approx. 35 metres down dip.

Drilling showed no alterations to interpretated geology, and fresh scheelite bearing mineralisation was intersected at 32m depth down dip. However the ore lens showed a rapid decrease in both true width and grade from 12 metres averaging 0.94% WO_3 on surface to 3.5 metres of 0.45% WO_3 at drill depth.

The hole was continued through the normal Eastern Ridge succession into underlying granite. The Lower Skarn Unit showed dispersed scheelite mineralisation, but this was intermittent, low grade (0.30% WO_3) and too deep for open pit consideration.

DDH 325

Drilled along Section Line 6225N with similar objectives to DDH 323.

The two surface exposed ore lens within the Upper Skarn Unit were again intersected down dip at 30 - 34 metres depth. One ore lens increased in width from 2 metres at 0.29% WO_3 on surface, to 5 metres at 0.34% WO_3 at depth. The second zone decreased to a 1.0m width from a surface width of 8.0 metres averaging 0.83% WO_3. Moreover these mineralised lenses were markedly affected by a lowering of the depth of weathering.

This hole was also continued into the Lower Skarn Unit, and again, very low grade mineralisation (0.30 - 0.35% WO_3) of a dispersed nature was intersected.

DDH 324

This hole was sited along Section Line 6185N to determine the depth and nature of a cross cutting Tertiary valley. Hole inclination was 50^{o}, planned to intersect a projection of the Upper Skarn Unit 40 metres down dip beneath Tertiary cover.

At this inclination, the hole showed a greater development of Tertiary sediments

than anticipated to a vertical depth of 44.0 metres. It is calculated a hole at 70 - 75° inclination would be required to investigate any mineralisation in the Upper Skarn Unit beneath Tertiary sediments along Section Line 6185N. However, indications are that any mineralisation would be extremely weathered, and too deep for any open pit extraction, and consequently additional drilling was postponed.

c) Conclusions

The overall results of the above limited infill drill programme were instructive, but disappointing. Results can be summarised as follows:-

- the mineralised ore lens exposed on surface in the Upper Skarn Unit rapidly decreased both in width and grade down dip.
- The tonnage figure for this specific location, as calculated by Golder Associates, was proved but not increased.
- The degree of weathering rapidly increases in depth in a southerly direction. Possible open pit mining of fresh and partially weathered ore could only be considered between Section Lines 6242N and 6280N.
- Mineralisation within the Lower Skarn Unit was surprisingly continuous down dip for 70 metres but was very disseminated and low grade. The immediate justification for drilling this skarn unit at higher near surface levels does not appear warranted.
- South of Section Line 6120N the presence of a deep cross cutting Tertiary valley severely restricts the southern extension of near surface mineralisation associated with the skarn zones. Deep mineralisation could be proved, but extensive weathering would be expected.

Cliff H. Whitehead.

8th September, 1982.

PLANS		SCALE
Plan A	- Eastern Ridge, Geological Plan	1:500
Plan B	- Southern Sections - Eastern Ridge. Geology and Trench Assay Values	1:250
Plan C	- Drill Section Line No. 6280N	1:500
Plan D	- Drill Section Line No. 6265N	1:500
Plan E	- Drill Section Line No. 6242N	1:500
Plan F	- Drill Section Line No. 6225N	1:500
Plan G	- Drill Section Line No. 6185N	1:500

APPENDICES

Appendix A - DDH 323 - Drill log, recovery sheet, assay log.

Appendix B - DDH 324 - Drill log, recovery sheet, assay log.

Appendix C - DDH 325 - Drill log, recovery sheet, assay log.

APPENDIX A

DDH 323 - Drill Log, Recovery Sheet, Assay Log.

713111 010

SCALE 1:100

LENGTH 81.35m NORTHING 6271.0
AZIMUTH 101°10' EASTING 7676.0
DIP AT COLLAR 64° ELEVATION 479.9
LOCATION EASTERN RIDGE.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 323 PAGE 1 OF 4.
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE (mm)	FRACTURING	BEDDING	GEOLOGY	MINERAL
NC.						W T_u	
4.57							
30.71							
6.10							
77.12						X T_u	
7.92							
29.45							
9.14							
75.62							
10.06							
52.52							
10.97							
100							
12.19							
79.27							
13.11							
79.81		1.0	80				
15.24		1.0	30				
95.06		1.0	180				
15.29		1.0	100				
36.76		1.0	83				
19.20		1.0	132			T_{gd}	
100		1.0	120				
21.13		1.0	260				
100		1.0	210				
22.25		1.0	150				
100		1.0	100				
24.08		1.0	130				
100							

MINERALISATION

LEVELS OF CAPTION.

W - 0.00 - 4.57.
X - 4.57 - 12.00.
Y - 12.00 - 23.50
F - 23.50 - 81.35m.

W

4.57

NIL MINERALISATION.

X

9.80m.

12.00.

13.00 - 15.36m
NIL SCHEELITE.

15.86 - 15.45m.
LITTLE DISSEMINATED WHITISH-YELLOW FINE SCHEELITE ALONG FRACTURES

Y.

NIL SCHEELITE OR VERY, VERY ISOLATED SPECKS. NO GRADE ESTIMATED.

23.50

F.

GEOLOGY

MAIN LITHOLOGICAL UNITS.

UPPER SKARN ZONE - 0.00 - 45.95m.
UPPER SST UNIT - 45.95 - 59.40m
LOWER SKARN ZONE - 59.40m - 74.90m.
LOWER SST UNIT - 74.90m - 80.45m.
GRANITE - 80.45m - 81.35m.

UPPER SKARN UNIT:-
NC CORE - CASED TO 4.57m.
CRYSTALLINE Fe SILICATE REPRESENTING SKARN

4.57.

SKARN

UNDIFFERENTIATED UNIT.
WEATHERED (u)
PROBABLY MAGNETITE (ORIGINAL) SKARN.

LIMONITIC

7.25 - 9.80m - CALCITE AND FRIABLE

9.80m.

GARNET DIOPSIDE SKARN.
WEATHERED TO 12.00m, PARTIALLY WITHED THEREAFTER.

EPIDOTE RICH ZONE 14.0 - 15.40m.

WEATHERED ZONE 17.25 - 18.35.

RUBBLY, AND MEDIUM TO COARSE GRAINED TEXTURE.

23.50 - 25.15.

GOOD CLEAN UNCONTAMINATED FRESH GARNET DIOPSIDE SKARN.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY POG.

CONTRACTOR McINTYRE MINES P/L BROWNBACK.
CORE NX NX
CASING

LOGGED BY CHW DATE 30 AUG 1982.
STARTED 16 JUNE 1982
... 1 JULY 1982

713112 011

SCALE 1:100

LENGTH 51.35m | NORTHING 6271.0 | McINTYRE MINES (AUST.) PTY. LTD. EXPLORATION DEPARTMENT
AZIMUTH 105°10' | EASTING 7676.0
DIP AT COLLAR -64° | ELEVATION 479.9 | HOLE No. 323 | PAGE 1 OF 2
LOCATION EASTERN RIDGE. | PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE: MINERAL	FEATURE: AMOUNT	FRACTURING	BEDDING	GEOLOGY	MINERAL
25.7		1 C	35C				
100		10	30C				
27.13		10	25C			Te	
100		10	40C				
29.83		10	50C				
100		10	50C			TJg	
32.92		10	35C				
100		10	30C			Tgdm	
35.97		10	45C				
100		10	14C			Tm4c	
39.01		10	20C				
100		10	12C				
42.06		10	25C			Tdg	
43.0		10	22C				
44.20		10	12C				
45.96		10	12C			Tc	
47.42		10	3C				
100						Q.	
48.96							
98.36							

MINERALISATION

- 25.70 - 26.70m. PATCHY DISSEMINATED SCHEELITE & PYRRH. STRONG BROWN CUT OFF GRADE.
- 30.20 - 31.40m. CRYSTALS (0.5mm) OF SCHEELITE AND FINE DISSEMINATIONS WITHIN YELLOW FLUORESCENCE EST @ 0.6-0.8%
- 31.40 - 33.0m - SCHEELITE, BUT WELL DISPERSED. EST GRADE 0.1-0.2%
- 33.0 - 44.0m. FEW ISOLATED SPECKS EST NOT TO REACH CUT OFF GRADE.
- 44.0 - 45.0m. NIL SCHEELITE OR THE ISOLATED SPECK. NO GRADE.
- NIL MINERALISATION.

GEOLOGY

-2.13 — CHLORITIC SKARN. FINE GRAINED - MEDIUM TO DARK GREEN COLOUR. SLIGHTLY BANDED - NO MAGNETITE.

25.20 m. DIOPSIDE-GARNET SKARN. BROWNISH GREEN. MEDIUM TEXTURE, FRESH & BRITTLE.

31.60 m. GARNET, DIOPSIDE, MAGNETITE SKARN. FRESH, ROUGH FRACTURE, HARD. OVERALL Fe CONTENT, ESTIMATED AT 25%.

35.60 m. MAGNETITE SKARN. HASS AMPHIBOLE, GARNET, DIOPSIDE. MAGNETIC 40% WELL DISTRIBUTED - FINE GRAINED.

39.14 m. DIOPSIDE GARNET SKARN. COARSE-MEDIUM GRAINED TEXTURE. SLIGHTLY WEATHERED.

42.2 m. TRANSITIONAL ZONE FROM SKARN TO QUARTZITE. HARD FINE GRAINED. EPIDOTE CONTENT.

43.43 m. UPPER SANDSTONE UNIT - 43.43 - 51.40. QUARTZITE UNIT. MASSIVE, VERY HARD & MICROCRYSTALLINE. FINE GRAINED. LIGHT GREY. EXTREMELY SLOW DRILLING RATES.

ANGLE READ | ANGLE CORRECTED | AZIMUTH | DEPTH

SURVEY POA.

CONTRACTOR McINTYRE MINES (AUST.) LTD. CORE NX. CASING NX.

LOGGED BY CWM DATE 30 AUG. 1972.

STARTED 26 JUNE 1972

713113 012

SCALE 1:100

LENGTH 81.35m NORTHING 6271.0
AZIMUTH 102°10' EASTING 7476.0
DIP AT COLLAR 61° ELEVATION 479.9
LOCATION EASTERN RIDGE

MINTARE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 323 PAGE 1 OF 3/4
PROJECT KARA

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE (cm into c.a.)	FRACTURING	BEDDING	GEOLOGY	MINERAL
100							
57.51							
100						C	
74.76							
100							
75.47							
100							
74.56		10	600				
100		10	2950				
77.91		10	1700				
100		10	1650			TTG	
60.65		10	2700				
100		10	3000			Tgd	
63.76		10	500				
100		10	1752			Tgb	
66.75		10	720			Tgd	
100		10	1000				
69.75		10	760				
100		10	4400			Tc	
73.76		10	3500				
100		10	400				
77.85		10	210				
100		10	75			Tmss	
		10	100				
		10	45				

MINERALISATION

57.45 - 57.45m
ISOLATED SPECKS AND CRYSTALS OF FRESH WHITE FLUORESCENT SCHEELITE (0.15-0.20)

57.45 - 60.50m.
WELL DISTRIBUTED SPECKS OF SCHEELITE ESTIMATED 0.4%.
60.50 - 63.20m
AS ABOVE BUT LOWER GRADE. EST AV 0.2%.

63.20 - 66.75m.
WELL DISPERSED SPECKS OF SCHEELITE (FINE) WITH NARROW (2cm) ZONES OF VERY FINE DISSEMINATION.

66.75 - 73.5%.
ISOLATED SPECKS ONLY
EST 0.05 - 0.1%.

GEOLOGY

QUARTZITE UNIT AS ABOVE
WELL CRYSTALLINE

MINERALISED FROM 57.00m.
TRANSITIONAL TO UNDERLYING UNIT VERT HARD DRILLING
57.50

TRANSITIONAL ZONE
QUARTZITE TO SKARN
57.90

LOWER SKARN UNIT
57.90 - 74.95m.
SKARN - CHIEFLY GARNET DIOPSIDE FACIES
BUT NARROW INTERVENING ZONE OF AMPHIBOLE RICH SKARN.

63.00
63.50
MAGNETITE SKARN
APPROX 60% MAG.
GARNET DIOPSIDE SKARN.
FINE, MEDIUM GRAINED TEXTURE.

66.90

EPIDOTE RICH SKARN
FINE GRAINED TEXTURE.
DARK GREENISH BROWN COLOUR.

76.50

MAGNETITE SKARN
MAGNETITE WELL DISTRIBUTED THROUGHOUT
60-70% CONTENT

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY PDA

CONTRACTOR KENTICE MINES (PTY) LTD
CORE NX
CASING NX

LOGGED BY C.H.W. DATE 30 AUG 1982.
STARTED 16 JUNE 1982.

713114 013

SCALE 1:100

LENGTH 51.36m NORTHING 6271.0
AZIMUTH 101°10' EASTING 7676.0
DIP AT COLLAR 64° ELEVATION 4749
LOCATION EASTERN RIDGE.

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 323. PAGE 1 OF 4/4
PROJECT KARA

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
75						
96.5%						
100					a	
100						
100					Gr	

MINERALISATION

GEOLOGY

UPPER SST UNIT 74.90 - EC 45m

QUARTZITE.

LIGHT GREY, HARD, BRITTLE FINE GRAINED TEXTURE

MORE JOINTED THAN LOWER SANDSTONE UNIT.

FEW QUARTZ STRINGERS IN LOWEST SECTION.

EC 45
GRANITE - SHARP CONTACT, FINE GRAINED INEQUIGRANULAR, LIGHT PINK.

E.O.H. 51.36

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES (P. McCORMACK)
CORE NX
CASING NX

LOGGED BY C.H.W. DATE 30 AUG. 1982.
STARTED 16 JUNE 1982 FINISHED 1 JULY 1982.

AK 176/82
AC 126/83
AC 127/83

713115

DDH. 014
323.

EASTERN RIDGE 1/3

SECTION:					ASSAY				AVE:			AVE:		
Hole No.	Feet	Metres Interval	Lgth.	% WO3	ppm WO3				INVL	LGTH SM-%	WT AR Av.	INVL	LGTH SM-%	WT AR Av.
223/1	CORE	13.0 - 14.0	1.0		80									
2	"	14.0 - 15.0	1.0		30									
3	"	15.0 - 16.0	1.0		180									
4	"	16.0 - 17.0	1.0		160									
5	"	17.0 - 18.0	1.0		85									
6	"	18.0 - 19.0	1.0		130									
7	"	19.0 - 20.0	1.0		120									
8	"	20.0 - 21.0	1.0		260									
9	"	21.0 - 22.0	1.0		210									
10	"	22.0 - 23.0	1.0		150									
11	"	23.0 - 24.0	1.0		100									
12	"	24.0 - 25.0	1.0		130									
13	"	25.0 - 26.0	1.0		350									
14	"	26.0 - 27.0	1.0		200									
15	"	27.0 - 28.0	1.0		25									
16	"	28.0 - 29.0	1.0		400									
17	"	29.0 - 30.0	1.0		3900									
18	"	30.0 - 31.0	1.0		7500									
19	"	31.0 - 32.0	1.0		3900									
20	"	32.0 - 33.0	1.0		2550									
21	"	33.0 - 34.0	1.0		310									
22	"	34.0 - 35.0	1.0		290									
23	"	35.0 - 36.0	1.0		450									
24	"	36.0 - 37.0	1.0		140									
25.	"	37.0 - 38.0	1.0.		190									

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

AC 126183
AC. 127183.

323

713116

EASTERN RIDGE 2/2

SECTION: Hole No.	Face	Metres Interval	Lgth	ASSAY % WO_3	ppm WO_3	AVE: INVL	LGTH $gm \cdot \%$	WT AV	AVE: INVL	LGTH $gm \cdot \%$	WT AV
D3231 26	CORE	38.0 - 39.0	1.0		260						
27	"	39.0 - 40.0	1.0		120						
28	"	40.0 - 41.0	1.0		250						
29	"	41.0 - 42.0	1.0		220						
30	"	42.0 - 43.0	1.0		220						
31	"	43.0 - 44.0	1.0		130						
32	"	44.0 - 45.0	1.0		10						
33	"	45.0 - 46.0	1.0.		20.						
D3231 34	CORE	56.0 - 57.0	1.0		640						
35	"	57.0 - 58.0	1.0		2950						
36	"	58.0 - 59.0	1.0		780						
37	"	59.0 - 60.0	1.0		1650						
38	"	60.0 - 61.0	1.0		2900						
39	"	61.0 - 62.0	1.0		3000						
40	"	62.0 - 63.0	1.0		500						
41	"	63.0 - 64.0	1.0		1750						
42	"	64.0 - 65.0	1.0		720						
43.	"	65.0 - 66.0	1.0		1000						
44	"	66.0 - 67.0	1.0		760						
45		67.0 - 68.0	1.0		1140						
46		68.0 - 69.0	1.0		5500						
47		69.0 - 70.0	1.0		400						
D3231 48	CORE	70.6 - 71.0	1.0		210						
49	"	71.0 - 72.0	1.0.		75						

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

COMMENT

PROJECT 6008

AC-0760/82
AC 126/83
AC 127/83

323 016

713117 3/3

SECTION:

Sludge No.	Feet	Metres Interval	Lgth.	% WO_3	ppm WO_3										
323										INVL	LGTH $gm\text{-}m^{-3}$	WT AR AV	INVL	LGTH $gm\text{-}m^{-3}$	WT AR AV
BL	C-C=	72.0 - 73.0	1.0		100										
BI	"	73.0 - 74.0	1.0		45										
BD	"	74.0 - 75.0	1.0		45										

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

ASSAY

AVE:

AVE:

COMMENT

PROJECT LARA

EXPLORATION DEPARTMENT

RECOVERY SHEET 713118

017

HOLE No. 323 | PAGE / OF 1/1

EASTERN RIDGE

CORE RECOVERY (CR) = 99% EXCEPT AS NOTED

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0.00	4.57	4.57	-	CASED					
4.57	6.10	1.53	0.47	30.71%					
6.10	7.98	1.88	1.45	77.12%					
7.98	9.14	1.16	1.04	89.65%					
9.14	10.06	0.92	0.80	86.96%					
10.06	10.97	0.91	0.71	78.02%					
10.97	12.19	1.22	1.08	88.52%					
12.19	13.11	0.92	0.92	100%					
13.11	15.24	2.13	1.70	79.81%					
15.24	18.29	3.05	2.90	95.08%					
18.29	19.20	0.91	0.28	30.76%					
19.20	20.12	0.92	0.92	100%					
20.12	22.25	2.13	2.13	100%					
22.25	24.08	1.83	1.83	100%					
24.08	25.30	1.22	1.22	100%					
25.30	27.13	1.83	1.83	100%					
27.13	29.87	2.74	2.74	100%					
29.87	32.92	3.05	3.05	100%					
32.92	35.97	3.05	3.05	100%					
35.97	39.01	3.04	3.04	100%					
39.01	42.06	3.05	3.05	100%					
42.06	44.20	2.14	0.92	43.07%					
44.20	45.42	1.22	1.00	81.96%					
45.42	48.46	3.04	3.04	100%					
48.46	51.51	3.05	3.00	98.36%					
51.51	54.56	3.05	3.05	100%					
54.56	55.47	0.91	0.91	100%					
55.47	56.38	0.91	0.91	100%					
56.38	57.91	1.53	1.53	100%					
57.91	60.65	2.74	2.74	100%					
60.65	63.70	3.05	3.05	100%					
63.70	66.75	3.05	3.05	100%					
66.75	69.80	3.05	3.05	100%					
69.80	72.85	3.05	3.12	100%					
72.85	75.59	2.74	2.74	100%					
75.59	76.81	1.22	1.18	96.86%					
76.81	78.64	1.83	1.83	100%					
78.64	81.38	2.74	2.74	100%					

APPENDIX B

DDH 324 Drill Log, Recovery Sheet, Assay Log.

713120 019

SCALE 1:100

LENGTH 63.70m NORTHING 6184.1
AZIMUTH 89°50' EASTING 7662.9
DIP AT COLLAR 50°E ELEVATION 496.1
LOCATION EASTERN RIDGE.

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 324 PAGE 1 OF 1/3.
PROJECT KARA

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
					B.	
12.20						
14.94						
15.24						
16.15						
17.03						
17.98						
18.45						
21.03					Bs	
100						
23.49						
24.05						

MINERALISATION

LEVELS OF OXIDATION:-

W = 0.00 - 16.60m.
X = 16.60 - 25.50m.
W = 25.50 - 29.10m.
X = 29.10 - 63.20m.
Y = 63.20 - 63.70m.

Nil MINERALISATION.

GEOLOGY

12TH SUMMARY.

TERTIARY BASALT - 0.00 - 12.20m.
TERTIARY SEDS - 12.20 - 53.20m.
SST
LOWER SHARN UNIT - 53.20 - 58.00m.
LOWER SHARN UNIT - 58.00 - 63.70m.
HOLE ABANDONED.

NO CORE REQUESTED.
0.00 - 12.20m.
RESIDUAL TERTIARY BASALT.
SLUDGE COLLECTED.

12.20m.

DARK BROWN TERTIARY.
MUDS REPRESENTING TUFFS?
GRADES INTO UNDERLYING UNIT.

14.70m.

FAWN COLOURED MUDS
REPRESENTING TUFFS.
COMPLETELY OXIDISED.

16.60m.

TERTIARY SEDIMENTS
16.60m - 63.20m.

LIGHT FAWN TO GREY TERTIARY SILTS AND SANDS.

SLIGHTLY BANDED/CROSS BEDDED.

SLIGHTLY INDURATED.

W
X.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.
CONTRACTOR McINTYRE MINES (P. McCONNICK) N.V.
CORE N.X.
CASING

DATE 31 AUG. 1982.
LOGGED BY CHW
STARTED 6 JULY 1982
FINISHED 16 JULY 1982

SCALE 1" = 100'

LENGTH 63.70m	NORTHING 6784.1
AZIMUTH 89°50'	EASTING 7662.9
DIP AT COLLAR 50°	ELEVATION 496.1
LOCATION EASTERN RIDGE.	

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

HOLE No 324 PAGE 1 OF 2 & 3.

PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
52.45						
26.58						
46.6						
29.57						
100						
31.72						
20.09						
33.53						
88.89						
35.36						
32.80					BS.	
36.40						
41.64						
41.65						
54.72						
44.30						
22.53						
46.98						
0						
38.46						
82.64						
49.87						

MINERALISATION

25.50 x

W

29.10

X

Nil MINERALISATION

GEOLOGY

25.50 TERTIARY SEDS.
CLAYS + MUDSTONE.
LIGHT GREY.
CARBONACEOUS CONTENT.

29.40.
TERTIARY FAWN AND YELLOW LIGHTLY INDURATED SANDS AND CONGLOMERATE BANDS.
SUB ROUNDED CONGLOMERATE FRAGMENTS.
HARD SAND UNITS.

33.53.
TERTIARY. FAWN AND GREY ALTERNATING BANDS OF SANDS AND GRITS.
GENERALLY OXIDISED AND SOFT.

44.40
LIGHT FAWN TERTIARY FINE GRAINED SILTS.

▼ 53.20m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.

CONTRACTOR LEVITTE LINES / R.C.'S (CARDWELL)
CORE NIL
CASING NIL

LOGGED BY CHN DATE 31 AUG. 1962.
STARTED 6 JULY 1962
FINISHED 16 FEBRUARY 1962

713122 021

SCALE 1" = 100'

LENGTH 63.70m NORTHING 6184.1
AZIMUTH 89°50' EASTING 7662.9
DIP AT COLLAR 60° ELEVATION 494.1
LOCATION EASTERN RIDGE.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 324 PAGE 1 OF 3
PROJECT KARA

% CORE RECOVERY	CORE ABLT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
77.10						
51.81					B_S	
55.30						
53.84						
100						
54.56						
100					Q.	
57.60						
100						
59.13						
54.60						
58.90					T_u	
100						
61.57						
100						
63.70						

MINERALISATION

x

NIL. 53.30

MINERALISATION.

y

62.00 - 63.20m.
FINE DISSEMINATED SCHEELITE
0.8 - 0.4% EST GRADE
NOT ASSAYED

GEOLOGY

AS ABOVE - TERTIARY SILTS.

53.20m.

"LOWER SANDSTONE UNIT"

QUARTZITE / SANDSTONES.
(SLIGHTLY ALTERED AND SKARNIFIED FROM 58.10 TO 62.00m).

LIGHT GREY TO BROWN
FINE GRAINED
JOINTED + FRACTURED
INTERPRETATED AS LOWER SST UNIT.

62.00m.

"LOWER SKARN UNIT.

SKARN, ALTHOUGH COULD BE CLASSIFED AS SKARNIFIED ARENACEOUS UNIT.

FAULTED ZONE OF FINE-MEDIUM SAND - UNCONSOLIDATED BETWEEN 59.15 - 60.90m.

LITTLE OR NO MAGNETITE CONTENT.

E.O.H. 63.70m.

HOLE ABANDONED.

(ON WITHDRAWING RODS AT 63.70m TO CHANGE CORE BIT., CORE BARREL STUCK AT 60.90m. RODS BROKEN AT BARREL CONNECTION).

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.

CONTRACTOR McINTYRE MINES (P. McCORMACK)
CORE N/X
CASING N/X

LOGGED BY MMS DATE 31 JUNE 1982.
STARTED 28 JULY 1982.
FINISHED 4th AUGUST 1982.

MOUNT ISA MINES (AUST) PTY. LTD.
EXPLORATION DEPARTMENT. 022

713123

RECOVERY SHEET

HOLE No. 324 | PAGE 1 OF 1.

CORE RECOVERY (CR) 3 98% EXCEPT AS NOTED

EASTERN RIDGE.

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
000	12·20	12 20	–	ROLLER BIT					
12·20	14·94	2 74.	1·10	40·14.					
14·94	16 15	1 21.	1·00	82·6.					
16 15	17·98	1·83.	1·30	71·03.					
17 98	21 03	3·05.	2·71	88·85.					
21·03	23·47	2·44.	2·44	100.					
23·47	26·52	3·05.	1·60	52·45.					
26 52	29·57	3·05.	1·22	40·0%					
29·57	31 72	2 15.	2·15	100%.					
31·72	33·83	2 11.	1·69	80·09.					
33·83	35·36	1·53.	1 36	88·89.					
35·36	38·40	3·04.	1·00	32·80.					
38·40	41·45	2·95.	1·23	41·69.					
41·45	44·30	2·85.	1 56	54·74.					
44·30	46 94	2 64.	0·86	32·58.					
46 94	48·16	1·22.	NIL	0%					
48·16	49·37	1·21	0 00	82·64.					
49·37	51·51	2·14.	1·65	77·10.					
51·51	53·84	2·33	1·29	55·36.					
53 84.	54 56	1·22.	1·22	100%.					
54 56	57·60	3·04.	3·04	100%					
57·60	59·13	1·53.	1·53	100%					
59·13	60 96	1·83.	0 00	54·64.					
60·96	61·57.	0·61.	0 61	100%					
61·57.	63·70.	2·13.	2·13	100%.					
		EOH		63·70m.					

APPENDIX C

DDH 325 Drill Log, Recovery Sheet, Assay Log.

713125 024

SCALE 1:100.

LENGTH 69.50m. NORTHING 6227.5
AZIMUTH 87°30' EASTING 7674.6
DIP AT COLLAR 55°E ELEVATION 492.3
LOCATION EASTERN RIDGE.

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 325 PAGE 1 OF 1 / 3.
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE SAMPLE	FRACTURING	BEDDING	GEOLOGY	MINERAL
NC CASED							
4.57							
94.26							
5.79							
100							
7.32							
95.76		1.0	780			W	
8.84		1.0	1550			Tu	
70		1.0	720				
11.58		1.0	1400				
100		1.0	600				
14.63		1.0	760				
100		1.0	1111%				
17.65		1.0	1600				
98.50		1.0	1300				
20.42		1.0	450				
100		1.0	150				
23.44		1.0	470				
23.95		1.0	190				
96.58		1.0	230			X	
23.47		1.0	1170			Tu.	
81.97		1.0	1550				
24.69		1.0	4.5%			Te.	

MINERALISATION

MAIN LITH. LOG SUMMARY:-
"UPPER SKARN UNIT" 0.0 - 40.25
UPPER EST UNIT" 40.25 - 62.60
LOWER SKARN 62.60 - 66.50
LOWER EST - 66.56 - EOH.

LEVELS OF OXIDATION.
W = 0.00 - 20.40m
X = 20.40 - 24.90m
Y = 24.90 - 60.30m.
F = 60.30 - E.O.H.

NIL SCHEELITE MINERALISATION.

14.30m - 14.60m.
EXCELLENT ACCUMULATION OF WHITE 'OXIDISED' SOFT SCHEELITE.
EST. 1.0 - 1.2% WO3

24.20 - 24.7 - EXCELLENT SOFT WELL DISSEMINATED WHITE - YELLOW SCHEELITE MINERALISATION + 3.0% WO3

GEOLOGY

NO CORE
NX CASED TO 4.57m.

OVERBURDEN, CLAYS AND COMPLETELY WEATHERED SKARN SLUDGE.
HOLE COLLARED ON SKARN.

4.57m.

4.57 - 20.40m.
UNDIFFERENTIATED SKARNS.
COMPLETELY OXIDISED.
GOETHITE / LIMONITE ABUNDANT.
CLAY ZONES COMMON.
SOFT, RUBBLY, LIGHT, VERY LITTLE REMNANT MAGNETITE.

W.

20.40m. J 20.40m.

20.40 - 24.40m.
UNDIFFERENTIATED SKARN.
AS ABOVE UNIT, BUT LESS OXIDISED
BLEBBY, JOINTED
GOETHITE, LIMONITE STILL ABUNDANT

X

24.40m.

↓ 27.80m SEE BELOW.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR NYMAGEE MINES (P.D. LYSAGHT) NX
CORE NX (41.57m)
CASING

LOGGED BY CHIV. DATE 31 AUG 1982.
STARTED 26 JULY 1982.
FINISHED 5 AUG 1982.

713126 025

SCALE 1" = 10'

LENGTH 695m. NORTHING 6227·6
AZIMUTH 27°30' EASTING 76796
DIP AT COLLAR 55° ELEVATION 492·3.
LOCATION EASTERN RIDGE.

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 325 PAGE 1 OF 2/3.
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE mm/M3	FRACTURING	BEDDING	GEOLOGY	MINERAL	MINERALISATION	GEOLOGY
35·6c		1·0	1350						EPIDOTE SKARN.
44·26		1·0	680			Tc			STILL OXIDISED.
36·82									ANTHONIANITE COMMON TO 25·30m.
100		1·0	640						26·40
27·34		1·0	1150					27·30 - 27·75m. GOOD ACCUM FINE WHITE SPECKS OF SCHEELITE 0·2% WO3 EST.	27·80m.
100		1·0	680			Tm 3c			MAGNETITE SKARN. MAG APPROX 30%. STILL OXIDISED.
30·76		1·0	480			Tgd.		30·75 - 31·30m MEDIUM TO COARSE WHITE FLUORESCENCE 0·25% WO3 EST	30·10m. GARNET DIOPSIDE SKARN. LIGHT BROWN TO FAWN. WELL CRYSTALLINE - HARD.
42·5		1·0	2100						31·80m.
32·61		1·0	420					31·30 - 39·15 FINE SPECKS OF SCHEELITE DISTRIBUTED THROUGHOUT, BUT WELL DISPERSED. CUB CUT OFF GRADE. 0·1 - 0·15%.	MAGNETITE, AMPHIBOLE SKARN. AMPHIBOLE, FINE SOFT AND DISSEMINATED. MAGNETITE CONTENT ESTIMATED AT 20 - 25%. ALMOST FRESH AND UNOXIDISED BRITTLE. FINE TO MEDIUM GRAINED TEXTURE. LITTLE DIOPSIDE CONTENT.
100		1·0	1750						
100		1·0	430			T_{gd}			
35·66		1·0	340						
100		1·0	640						
100		1·0	1200						
28·71		1·0	350					39·15 - 39·85 - VERY FINE. BUT WELL DISSEMINATED SCHEELITE. EST 1·2% WO3.	38·00m. GARNET DIOPSIDE (MAGNETITE 10%) SKARN. ALMOST UNOXIDISED, EXCEPT AT END OF RUN.
100		1·0	6100			Tgd (m)			42·26m.
100		1·0	390						STRONGLY EPIDOTISED ARENACEOUS SEQUENCE. VERY SOFT DECOMPOSED, SOAPY. POOR CORE RECOVERY.
44·75						Q (e)			
44·60									44·21m.
45·81								NIL OR VERY FEW ISOLATED FINE SPECKS SCHEELITE.	QUARTZITE. FINE GRAINED, HARD, LIGHT GREY QUARTZITE. BLOCKY, JOINTED.
45·11									
45·76									
46·90									
46·43									
46·96						Q.			
47·47									
47·96									
100									
49·45									

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA

CONTRACTOR McINTYRE MINES (AUST.) LTD. (N'CORBACK).
CORE SIZING NX NX (46·57m).

LOGGED BY CHW. DATE 31 AUG 1982
STARTED 26 JULY 1982
FINISHED 5 AUG 1982

713127 026

SCALE 1:100.

LENGTH 69.50m. NORTHING 6227.6
AZIMUTH 87°30' EASTING 7679.6
DIP AT COLLAR 55° ELEVATION 492.3
LOCATION EASTERN RIDGE.

M'INTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 325. PAGE 1 OF 2/3.
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTENSITY	FEATURE gm/m³	FRACTURING	BEDDING	GEOLOGY	MINERAL
85.19							
51.81		1.0	490				
100		1.0	40				
		1.0	410			$Q_{(c)}$	
54.56		1.0	340				
100		1.0	110				
		1.0	160				
57.61		1.0	80				
		1.0	420				
100		1.0	3100			Tc	
60.66		1.0	3500				
		1.0	860				
100		1.0	1560				
63.71		1.0	360				
		1.0	270			Tm (sz)	
100		1.0	65				
64.4		1.0	120			Tm.	
100						Qs.	
69.50							

MINERALISATION 50.3m

50.80m
QUARTZITIC UNIT.
HIGHLY INDURATED.
FINE TO MEDIUM GRAINED TEXTURE.
VERY TRANSITIONAL TO BEING CLASSIFIED AS SKARN.
MINOR UNITS ARE SKARNIFIED AND EPIDOTISED.
CONTACT WITH UNDERLYING SKARN UNIT IS VERY GRADATIONAL.

56.50m.
LOWER SKARN UNIT.
FINE GRAINED TEXTURE.
HARD FRESH UNWEATHERED
EPIDOTE COMMON.
MAGNETITE, OF FINE GRAINED DISSEM VARIETY INCREASES WITH DEPTH OF RUN.
61.00 - 63.70 - BLEBBY PATCHES OF MAGNETITE.

56.50 - 58.50 VERY FEW ISOLATED SCHEELITE SPECKS.

58.50 - 61.00 - WELL DISSEMINATED FINE YELLOW SCHEELITE EST ON 0.55% WO3.

61.00 - 62.50m - AS ABOVE BUT NOT AS DISSEMINATED 0.20% EST WO3

63.70m.
MAGNETITE SKARN.
MAGNETITE CONTENT ~60%.
FINE + WELL DISSEMINATED HARD + BRITTLE UNIT.

66.00m.
66.50m. TRANSITIONAL SKARN (HBG) + QZT.

LOWER SANDSTONE UNIT.
FINE GRAINED SST/QZT.
MEDIUM SOFT.
LIGHT GREY.
JOINTING NOT TOO COMMON.
HOLE STOPPED BEFORE GRANITE.
69.50m THIS UNIT (SST) COMPARABLE TO THAT IN DDH 323.

E.O.H. 69.50m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY POD.

CASING NQ (4.57m).
CORE NX
CONTRACTOR MCELHANNEY MINES. C.P.U. CORMANN.

DATE 31 AUG 1982

LOGGED BY CMH 26 JULY 1982.
CHECKED BY [illegible] 5 AUG 1982

AC · 82218
AC. 1058153.

713128 | 229 | 1/2. | 027

EASTERN RIDGE.

SECTION:

Sample or Core	Soil	Metres Interval Metres	Lgth. recovered	% WO_3	ppm WO_3										
325	CORE														
1		8.0 - 9.0	1.0		760										
2	"	9.0 - 10.0	1.0		560										
3	"	10.0 - 11.0	1.0		760										
4	"	11.0 - 12.0	1.0		1400										
5	"	12.0 - 13.0	1.0		500										
6	"	13.0 - 14.0	1.0		760										
7	"	14.0 - 15.0	1.0		1.11%										
8	"	15.0 - 16.0	1.0		1600										
9	"	16.0 - 17.0	1.0		1300										
10	"	17.0 - 18.0	1.0		450										
11	"	18.0 - 19.0	1.0		150										
12	"	19.0 - 20.0	1.0		470										
13	"	20.0 - 21.0	1.0		190										
14	"	21.0 - 22.0	1.0		330										
15	"	22.0 - 23.0	1.0		140										
16	"	23.0 - 24.0	1.0		1550										
17	"	24.0 - 25.0	1.0		4.50%										
18	"	25.0 - 26.0	1.0		1350										
19	"	26.0 - 27.0	1.0		580										
20	"	27.0 - 28.0	1.0		640										
21	"	28.0 - 29.0	1.0		1150										
22	"	29.0 - 30.0	1.0		580										
23	"	30.0 - 31.0	1.0		1480										
24	"	31.0 - 32.0	1.0		2100										
25	"	32.0 - 33.0	1.0		420										
26.	"	33.0 - 34.0	1.0.		1750										

ASSAY

AVE:

INVL	LGTH gm-%	WT AR	INVL	LGTH gm-%	WT AR

AVE:

INVL	LGTH gm-%	WT AR	INVL	LGTH gm-%	WT AR

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

COMMENT

PROJECT [illegible] EASTERN RIDGE

DDH 225

AC-E 22/E3
AC 1033/83

713129

325 2/2 028

KARA - EASTERN RIDGE.

SECTION:

Sample No.	Feet	Metres Interval METRES	Lgth.	ASSAY % WO_3	ppm WO_3	AVE: INVL	LGTH SM-%	WT AR AV.	AVE: INVL	LGTH SM-%	WT AR AV.
325 27	CORE	34·0 - 35·0	1·0		430						
28	"	35·0 - 36·0	1·0		340						
29	"	36·0 - 37·0	1·0		640						
30	"	37·0 - 38·0	1·0		1200						
31	"	38·0 - 39·0	1·0		350						
32	"	39·0 - 40·0	1·0		6100						
33	"	40·0 - 41·0	1·0		390						
325 34	CORE	51·0 - 52·0	1·0		490						
35	"	52·0 - 53·0	1·0		40						
36	"	53·0 - 54·0	1·0		440						
37	"	54·0 - 55·0	1·0		340						
38	"	55·0 - 56·0	1·0		110						
39	"	56·0 - 57·0	1·0		160						
40	"	57·0 - 58·0	1·0		80						
41	"	58·0 - 59·0	1·0		420						
42	"	59·0 - 60·0	1·0		3100						
43		60·0 - 61·0	1·0		3500						
44		61·0 - 62·0	1·0		860						
45		62·0 - 63·0	1·0		1550						
46		63·0 - 64·0	1·0		360						
47		64·0 - 65·0	1·0		270						
48		65·0 - 66·0	1·0		55						
49		66·0 - 67·0	1·0		130.						

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

COMMENT

PROJECT 1000 EASTERN RIDGE

DDH 325

EXPLORATION DEPARTMENT.

029

RECOVERY SHEET 713130

HOLE No. 325 | PAGE 1 OF 1/1

CORE RECOVERY (CR) > 90% EXCEPT AS NOTED

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0.00	4.57	4.57	NIL	CASED					
4.57	5.79	1.22	1.15	94.26%					
5.79	7.32	1.53	1.53	100%					
7.32	8.84	1.52	1.00	65.78%					
8.84	11.58	2.74	1.95	71.16%					
11.58	14.63	3.05	3.05	100%					
14.63	17.68	3.05	3.05	100%					
17.68	20.42	2.74	2.70	98.50%					
20.42	21.64	1.22	1.22	100%					
21.64	21.95	0.31	0.31	100%.					
21.95	23.47	1.52	0.86	56.58%					
23.47	24.69	1.22	1.00	81.97%					
24.69	25.60	0.91	0.29	31.87%					
25.60	26.82	1.22	0.54	44.26%					
26.82	28.34	1.52	1.52	100%					
28.34	30.78	2.44	2.44	100%					
30.78	32.61	1.87	1.73	92.51%					
32.61	35.66	3.05	3.05	100%					
35.66	38.71	3.05	3.05	100%					
38.71	41.75	3.04	3.04	100%.					
41.75	44.81	3.05	1.24	40.65%					
44.81	45.11	0.30	0.28	93.33%					
45.11	45.72	0.61	0.36	59.01%					
45.72	46.00	0.28	0.28	100%					
46.00	46.63	0.63	0.63	100%					
46.63	46.94	0.31	0.31	100%					
46.94	48.46	1.52	1.36	89.47%					
48.46	49.68	1.22	1.22	100					
49.68	51.51	1.83	1.57	85.79%					
51.51	54.56	3.05	3.05	100%					
54.56	57.61	3.05	3.05	100%					
57.61	60.66	3.05	3.05	100%					
60.66	63.71	3.05	3.05	100%					
63.71	66.45	2.74	2.75	100%					
66.45	69.50	3.05	3.05	100%					
			E.OH	69.50m.					

GEOLOGICAL LEGEND

Overburden (bulldozed rubble)

VOLCANIC SEQUENCE

B - Basalt, Bs - Subbasalt

SEDIMENTARY ROCKS

N - Siltstone
C - Conglomerate
S - Sandstone
L - Limestone
T - Skarn
Q - Quartzose rock

IGNEOUS ROCKS

Granite

Qz Quartz epidote facies

KARA SEQUENCE

Limestone unit
Thick bedded

Thin bedded sequence siltstone, sandstone, local conglomerate

Conglomerate unit
Massive

EASTERN RIDGE SEQUENCE

Upper skarn unit

Upper sandstone unit

Lower skarn unit

Lower sandstone unit

Sandstone - undifferentiated

Outcrop Float

Geological boundaries: definite; inferred; concealed

Bedding (strike and dip): normal; overturned

Fault: approximate; inferred

Axis of magnetic anomaly

Weathering characteristics of skarn

W - weathered
P - partially weathered
F - fresh
Sch - visible schistite

GENERAL LEGEND

Drainage

Surveyed track

Unsurveyed track

Trench N°, ppm or % WO3

Survey station

Surveyed spot height

Diamond drill hole number, inclination and depth drilled

Contours (metres indicated)

6242N——6242N. Drill line section

D.D.H. 277 -55°
D.D.H 151 -55°
D.D.H. 274 -55°
D.D.H. 203 -55°
D.D.H. 150 -50°
D.D.H. 272 -50°
D.D.H. 202 -55°
D.D.H. 273 -50°
D.D.H. 201 -50°
D.D.H. 145 -50°
D.D.H. 144 -50°
D.D.H. 271 -45°
D.D.H. 139 -70°
D.D.H. 138 -50°
D.D.H. 275 -55°
D.D.H. 323 -50°
D.D.H. 276 -55°
D.D.H. 325 -55°
D.D.H. 324 -50°
D.D.H. 143 -50°

Tr. Er. 1.
Tr. Er. 2.
Tr. Er. 3.
Tr. Er. 4.
Tr. Er. 5.

EAST KARA CREEK
SULLY CREEK
BULLDOZED RUBBLE AND OVERBURDEN
GLORY-HOLE
Bulk Sample
BS 3 0.24%

713131

5 cm

McINTYRE MINES (AUST.) PTY. LTD.

KARA TUNGSTEN PROJECT, TASMANIA

82-1828 Vol. 8/19

EASTERN RIDGE

GEOLOGICAL PLAN

REVISIONS	NO	BY	DATE	DESCRIPTION

DESIGNED: C.W.
DRAWN: T.G.D.S.
CHECKED:
DATE: Aug '82

SCALE 1:500
Metres 10 0 10

PROJECT No: 21081

PLAN No
PLAN A.

7600 E.
7650 E.
7700 E.
7750 E.
7800 E.
6300 N.
6250 N.
6200 N.
D.D.H. 271 -55°
D.D.H. 275 -55°
D.D.H. 276 -55°
D.D.H. 323 -54°
D.D.H. 138 -50°
D.D.H. 139 -70°
D.D.H. 325 -55°
D.D.H. 324 -50°
D.D.H. 143 -90°
A211
A212
A223
475m Level
385m Level
295m Level
East Kara Creek
Gully Creek
470
480
490
500
510

GEOLOGY

- BASALT
- UNDIFFERENTIATED SKARN
- UPPER SKARN UNIT
- UPPER SANDSTONE
- LOWER SKARN
- LOWER SANDSTONE
- GRANITE

LEGEND

- McINTYRE MINES DIAMOND DRILL HOLE
- ANZECO DIAMOND DRILL HOLE
- TRENCH ASSAY VALUES (Expressed in ppm or %)

5 cm

713132

McINTYRE MINES (AUST.) PTY. LTD.

KARA TUNGSTEN PROJECT, TASMANIA

EASTERN RIDGE (SOUTHERN EXTENSION)

82-1828
Vol 3119

GEOLOGY AND TRENCH ASSAY VALUES

REVISIONS	NO.	BY	DATE	DESCRIPTION

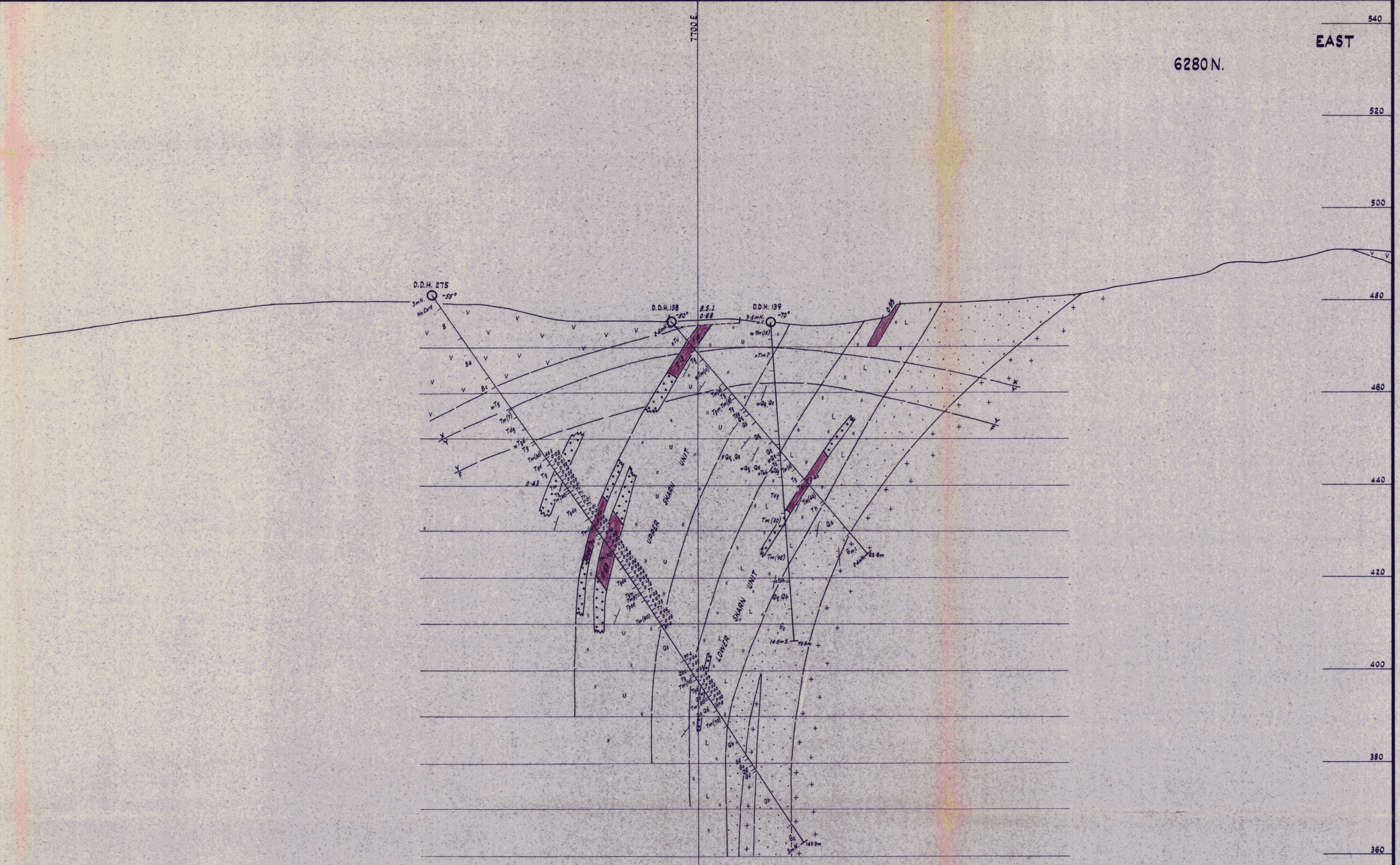
DESIGNED: C.H.W.
DRAWN: T.B.D.
CHECKED:
DATE: Aug '82
SCALE 1:250
Metres 5 2.5 0 5
PROJECT No. 21081
PLAN No. PLAN B
REVISION

WEST

EAST

6280 N.

7700 E



GEOLOGY

- BASALT
- UNDIFFERENTIATED SKARN
- UPPER SKARN UNIT
- UPPER SANDSTONE
- LOWER SKARN UNIT
- LOWER SANDSTONE
- GRANITE
- INFERRED RESERVES
- POSSIBLE RESERVES
- WEIGHTED GRADE % WO_3 > 0·20% WO_3
- TRENCH + ASSAY % WO_3
- ZONES OF WEATHERING
  - X - WEATHERED / OXIDISED
  - Y - PARTIALLY WEATHERED
  - F - FRESH

713133

5 cm

Mc INTYRE MINES (AUST.) PTY. LTD.

KARA TUNGSTEN PROJECT, TASMANIA

EASTERN RIDGE

ASSAY & GEOLOGY SECTION 6280 N.

WO_3 DISTRICTION

82-1828 Vol 8 19

REVISIONS	NO.	BY	DATE	DESCRIPTION

DESIGNED: C.W.
DRAWN: T.G.D.S.
CHECKED:
DATE: Aug. '82

Metres SCALE 1:500 10 5 0 10

PROJECT No. 21081

PLAN No. PLAN C.

REVISION

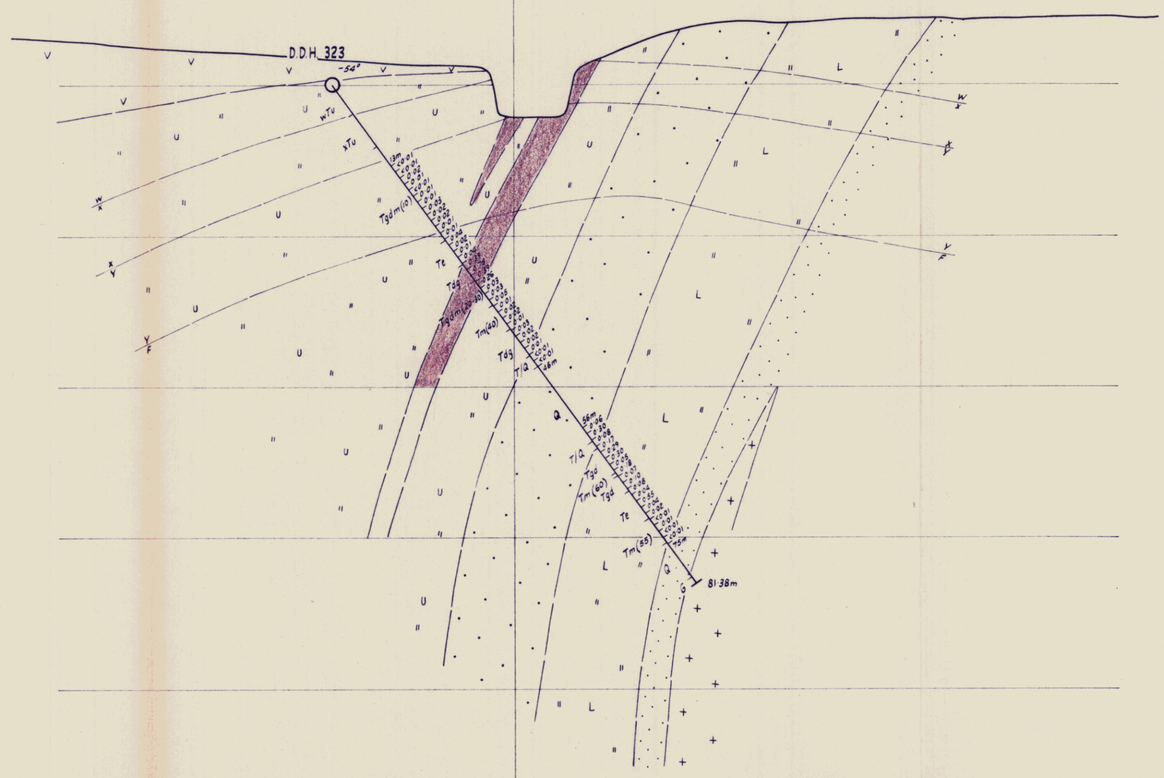
032

WEST

EAST

7700 E

540
520
500
480
460
440
420
400
380
360
340
320
300
280



GEOLOGY

- BASALT
- UNDIFFERENTIATED SKARN
- U — UPPER SKARN UNIT
- UPPER SANDSTONE
- L — LOWER SKARN UNIT
- LOWER SANDSTONE
- + + — GRANITE

INFERRED RESERVES — POSSIBLE RESERVES

WEIGHTED GRADE % WO_3 >0.20% WO_3

E-T-1 — TRENCH + ASSAY % WO_3

— X/Y — ZONES OF WEATHERING

X - WEATHERED / OXIDISED
Y - PARTIALLY WEATHERED
F - FRESH

713134

5 cm

McINTYRE MINES (AUST.) PTY. LTD.

KARA TUNGSTEN PROJECT, TASMANIA

EASTERN RIDGE

ASSAY & GEOLOGY SECTION 6265 N.

WO_3 DISTRIBUTION 82-1828 Vol 8/19

REVISIONS	NO.	BY	DATE	DESCRIPTION

DESIGNED: C.W.
DRAWN: T.G.D.S.
CHECKED:
DATE: Aug. '82

Metres SCALE 1:500 10 5 0 10

PROJECT No. 21081

PLAN No. PLAN D

REVISION

033

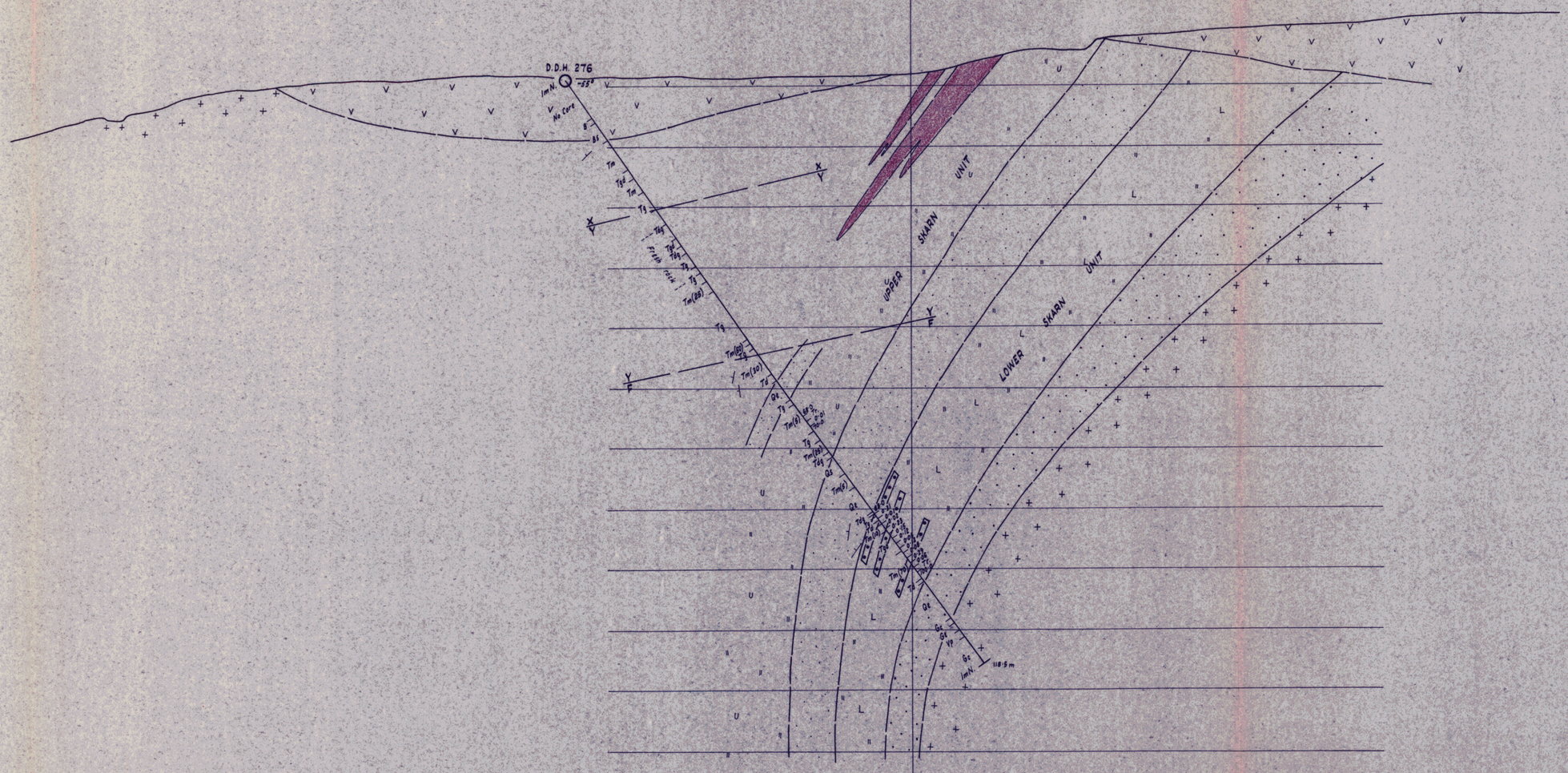
WEST

EAST

7700 E.

6242 N.

540
520
500
480
460
440
420
400
380
360
340
320
300
280



GEOLOGY

- BASALT
- UNDIFFERENTIATED SKARN
- UPPER SKARN UNIT
- UPPER SANDSTONE
- LOWER SKARN UNIT
- LOWER SANDSTONE
- GRANITE

INFERRED RESERVES — POSSIBLE RESERVES

WEIGHTED GRADE % WO_3 >0·20% WO_3

TRENCH + ASSAY % WO_3

ZONES OF WEATHERING

X – WEATHERED / OXIDISED
V – PARTIALLY WEATHERED
F – FRESH

713135

5 cm

McINTYRE MINES (AUST.) PTY. LTD.

KARA TUNGSTEN PROJECT, TASMANIA

EASTERN RIDGE

82-1828 Vol 8/9

ASSAY & GEOLOGY SECTION 6242 N.

WO_3 DISTRIBUTION

REVISIONS	NO.	BY	DATE	DESCRIPTION

DESIGNED: C.W.
DRAWN: T.G.D.S.
CHECKED:
DATE: Aug. '82
SCALE 1:500 (Metres 10 5 0 10)
PROJECT No. 21081

PLAN E.

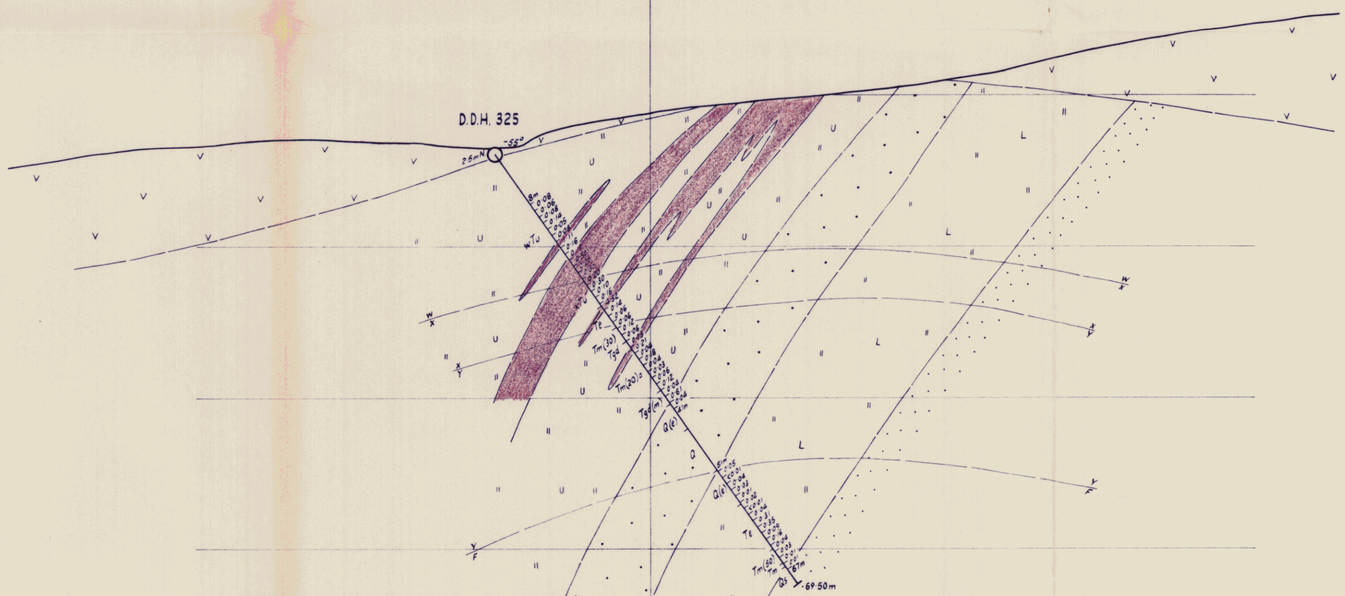
REVISION

WEST

EAST

7700 E

540
520
500
480
460
440
420
400
380
360
340
320
300
280



GEOLOGY

- BASALT
- UNDIFFERENTIATED SKARN
- U — UPPER SKARN UNIT
- UPPER SANDSTONE
- L — LOWER SKARN UNIT
- LOWER SANDSTONE
- GRANITE

INFERRED RESERVES — POSSIBLE RESERVES

WEIGHTED GRADE % WO_3 >0.20% WO_3

Er Tr 1 — TRENCH + ASSAY % WO_3

X/Y — ZONES OF WEATHERING

X - WEATHERED / OXIDISED
Y - PARTIALLY WEATHERED
F - FRESH

713136

5 cm

McINTYRE MINES (AUST.) PTY. LTD.

KARA TUNGSTEN PROJECT, TASMANIA

EASTERN RIDGE

82-1828 Vol. 8/19

ASSAY & GEOLOGY SECTION 6225 N.

WO_3 DISTRIBUTION

REVISIONS	NO.	BY	DATE	DESCRIPTION

DESIGNED: C.W.
DRAWN: T.G.D.S.
CHECKED:
DATE: Aug '82

Metres SCALE 1:500 0 5 0 10

PROJECT No. 21081

PLAN No. PLAN F.

REVISION

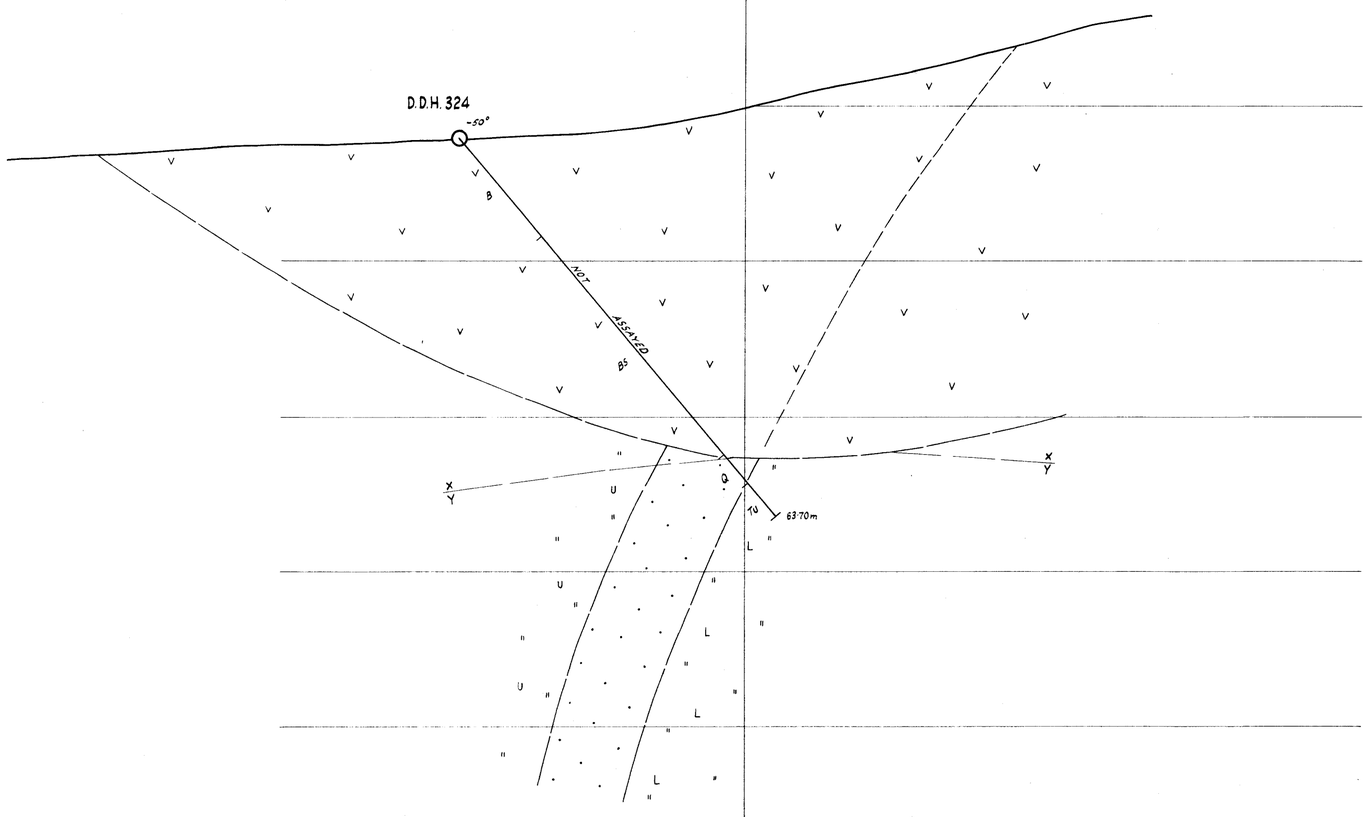
035

WEST

EAST

7700 E

540
520
500
480
460
440
420
400
380
360
340
320
300
280



GEOLOGY

- BASALT
- UNDIFFERENTIATED SKARN
- UPPER SKARN UNIT
- UPPER SANDSTONE
- LOWER SKARN UNIT
- LOWER SANDSTONE
- GRANITE

INFERRED RESERVES — POSSIBLE RESERVES

0·20% — WEIGHTED GRADE % WO_3 > 0·20% WO_3

E.T. 1 — 0·22% / 1·45% — TRENCH + ASSAY % WO_3

X / Y — ZONES OF WEATHERING

X - WEATHERED / OXIDISED
Y - PARTIALLY WEATHERED
F - FRESH

713137

5 cm

Mc INTYRE MINES (AUST.) PTY. LTD.

KARA TUNGSTEN PROJECT, TASMANIA

EASTERN RIDGE 82-1828 Vol 8/19

ASSAY & GEOLOGY SECTION 6185 N.

WO_3 DISTRIBUTION

REVISIONS	NO.	BY	DATE	DESCRIPTION

DESIGNED: C.W.
DRAWN: T.G.D.S.
CHECKED:
DATE Aug '82

Metres SCALE 1:500
10 5 0 10

PROJECT No. 21081

PLAN G.
REVISION

Report No.
1F/82

82-1828
9/16

713138

000

of M	A.O.	C.G.	E.O.	D.S.M.E
				Registrar
Received / Answered	– 1 OCT 1982			E & IL
DEPT. OF MINES REF. No. 8090R 82				

McINTYRE MINES (AUSTRALIA) PTY. LTD.

INFILL DIAMOND DRILL PROGRAMME (1982)

DRILL LOGS, ASSAY SHEETS,

RECOVERY SHEETS

C. H. WHITEHEAD.

SEPTEMBER, 1982.

TABLE NO. 1.

McINTYRE MINES (AUSTRALIA) PTY. LTD.

E.L. 17/68 - KARA PROPERTIES

INFILL DIAMOND DRILL PROGRAMME (1982)

HOLE NO.	LOCATION	DRILL LOG SHEETS	ASSAY SHEETS	RECOVERY LOG SHEETS
DDH 303	Kara N. 266 Zone	2	2	1
DDH 304	" " " "	4	3	1
DDH 305	" " " "	2	1	1
DDH 306	" " " "	4	4	2
DDH 307	" " " "	3	3	2
DDH 308	Bob's Bonanza	3	1	1
DDH 309	" "	3	1	1
DDH 310	" "	5	N.A.	1
DDH 311	Kara 1 S. Ext.	3	2	1
DDH 312	" " " "	2	2	1
DDH 313	" " " "	3	3	1
DDH 314	" " " "	2	2	1
DDH 315	" " " "	1	1	1
DDH 316	Kara 1 Main	4	4	1
DDH 322	Bob's Bonanza	2	N.A.	1
DDH 323	Eastern Ridge	4	3	1
DDH 324	" "	3	N.A.	1
DDH 325	" "	3	2	1

N.A. = Core Not Assayed.

KARA PROPERTIES - INFILL DIAMOND DRILL PROGRAMME (1982)

TABLE NO. 2

HOLE NO.	LOCATION	DRILL SEC.	COORDINATES NORTH	COORDINATES EAST	R.L.	INCLINATION	DEPTH DRILLED (METRES)
DDH 303	KARA N-266 ZONE	7160N	7161.8	7176.0	456.1	45°W	48.46
DDH 304	KARA N-266 ZONE	7060N	7073.5	7198.6	454.7	55°W	77.11
DDH 305	KARA N-266 ZONE	7120N	7111.0	7166.5	457.6	55°W	38.71
DDH 306	KARA N-266 ZONE	7020N	7024.6	7215.6	448.9	45°W	86.19
DDH 307	KARA N-266 ZONE	7220N	7220.5	7166.3	472.8	55°W	66.14
DDH 308	BOBS BONANZA	5720N	5723.0	7684.8	543.8	65°E	67.97
DDH 309	BOBS BONANZA	5820N	5821.0	7687.1	545.0	60°E	54.56
DDH 310	BOBS BONANZA	5820N	5821.0	7687.1	545.0	83°E	105.11
DDH 311	KARA 1 S.EXT.	5675N	5678.2	7328.8	535.7	70°W	51.22
DDH 312	KARA 1 S.EXT.	5675N	5681.2	7329.2	535.5	55°E	37.49
DDH 313	KARA 1 S.EXT.	5700N	5698.0	7347.8	535.5	45°W	67.65
DDH 314	KARA 1 S.EXT.	5650N	5653.0	7335.2	537.6	55°W	42.98
DDH 315	KARA 1 S.EXT.	5675N	5673.0	7390.6	537.7	60°E	24.99
DDH 316	KARA 1 MAIN ZONE	5820N	5817.0	7355.2	503.7	45°W	91.46
DDH 322	BOBS BONANZA	5820N	5823.2	7710.9	546.6	65°E	36.22
DDH 323	EASTERN RIDGE	6265N	6271.0	7676.0	479.9	54°E	81.38
DDH 324	EASTERN RIDGE	6185N	6184.1	7662.0	496.1	50°E	63.70
DDH 325	EASTERN RIDGE	6225N	6227.5	7679.6	492.3	55°E	69.50
							1100.84 METRES

21140 002

SCALE 1:100

LENGTH 118.46m NORTHING 6427161·8
AZIMUTH 270° EASTING 397176·0
DIP AT COLLAR 45°N ELEVATION 456·1
LOCATION KARA. NORTH - 266 ZONE.

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 303. PAGE 1 OF 1/2.
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	SAMPLE INTERVAL	SAMPLE ppm NO_3	FRACTURING	BEDDING	GEOLOGY	MINERAL
NO CORE		SLUDGE 5·18	2300			NO REC	
5·18							
44·4		0·82	720			T_{m_W}	
6·71		1·0	1900				
94·1		1·0	1600				
		1·0	700			T_u	
9·75		1·0	2750				
10·0		1·0	3500				
11·28		1·0	3400				
10·0		1·0	500			T_{gd}	
12·28		1·0	1450				
10·0		1·0	260				
14·02		1·0	940			$T_{m_{SC}}$	
10·0		1·0	430				
17·07		1·0	540				
10·0		1·0	3650				
20·00		1·0	2150				
93·20		1·0	640				
21·03		1·0	820			$T_{m_{60}}$	
95·90		1·0	1700				
22·25		1·0	3050				
94·26		1·0	750				
23·47							
10·0							
24·99						T_{gl_m}	

MINERALISATION

X — 5·18m

10·26m

11·0m

F

GEOLOGY

SKARN 0·00m - 45·10m.

NO CORE RECOVERY.

SLUDGE COLLECTED.
CLAY AND MAGNETITE SKARN.

SKARN.
WEATHERED MAGNETITE SKARN.
MAGNETITE 40%. THIS RUN COULD ALMOST BE CALLED PARTIALLY WEATHERED.

SKARN.
WEATHERED SKARN + CLAY.
HIGHLY OXIDISED - LIGHT WEIGHT.
LIMONITE - GOETHITE REPLACEMENT.

FINE SPECKS SCHEELITE AT 13·20 TO 14·00m. (0·15% VISUAL)

SKARN.
GARNET DIOPSIDE (MAGNETITE) SKARN.
BANDED MAGNETITE UP TO 20% CONTENT
NARROW SOFT CLAY BANDS.

13·80m

SKARN.
MAGNETITE SKARN.
MAGNETITE 50%.
PARTIALLY WEATHERED.

17·70 - 18·20m - COARSE ABUNDANT SCHEELITE CRYSTALS. VISUAL - 0·90%.

MAGNETITE OCCURS AS VERY COARSE WELL CRYSTALLINE FORM.

FEW SCHEELITE SPECKS - 19·8m.

BETWEEN 18·30 - 20·25m, MORE WEATHERED.

Y — 20·26m

21·20 - 22·50m - FINE DISSEMINATED SCHEELITE.

22·50 - 23·20 - COARSE Sch.

23·90 - 24·08 COARSE SCHEELITE CRYSTALS.

23·25

24·50m

SKARN.
MAGNETITE SKARN.
MAGNETITE CONTENT AV - 60%.
LITTLE GARNET DIOPSIDE. (COARSE)
FRESH @ 24·55m.
MAGNETITE STILL COARSELY CRYSTALLINE.

SKARN.
GARNET MAGNETITE DIOPSIDE SKARN.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY
CONTRACTOR
CORE
CASING
DATE
LOGGED BY
STARTED 19 AUG 1981
FINISHED 26 AUG 1981

SCALE 1:100

LENGTH 48.46m NORTHING 5427161.5
AZIMUTH 270° EASTING 397176.0
DIP AT COLLAR 45° ELEVATION 456.1
LOCATION KARA. NORTH - 266 ZONE.

MINTARE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT

HOLE No 303 PAGE 1 OF 2/2

PROJECT KARA

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE gpm WO3	FRACTURING	BEDDING	GEOLOGY	MINERAL
100		1.0	2050			Tgdm	
26.52		1.0	480			Tm-gP	
		1.0	390			Td	
100		1.0	2000				
29.57		1.0	2500			Tmyo a	
30		1.0	2550				
32.00		1.0	900				
35.9		1.0	1200				
33.53		1.0	1200				
100							
34.44		1.0	7200			Tgda	
35		1.0	5300				
92.35		1.0	1300				
36.27		1.0	2600				
84.97		1.0	3300				
37.80		1.0	2800				
65.93		1.0	860			Tg	
39.62		1.0	420				
40		1.0	960			Tc	
100		1.0	1950				
42.37		1.0	290				
45		1.0	50				
45.62		1.0	65			Qe	
76.47							
46.02							
92.71		1.46	20			Ø Qe	
48.46							
50							

MINERALISATION

35.50 - 26.56m - COARSE SCHEELITE CRYSTALS

28.0 - 31.0m - COARSE WELL SEPERATED SCHEELITE.

34.6 - 36.0m - FINE, DISSEMINATED CRYC SCHEELITE VISUAL EST - 0.5 - 0.7%

39.00 - 39.50 - DISSETIM SCHEELITE VISUAL 0.80%

FRACTURES COMMONLY KNOW SPECUS + SMEARS SCHEELITE.

GEOLOGY

26.0m SKARN.

SKARN.
MAGNETITE AMPHIBOLE (LITTLE GARNET) SKARN.
27.25m 40% MAGNETITE.

27.80m DIOPSIDE SKARN. (MASSIVE)

SKARN.
AMPHIBOLE MAGNETITE SKARN.
40% MAGNETITE.
BANDED
RUBBLY - 30.40 - 30.80m.
and 31.40 - 32.85m.

32.40m

SKARN.
DIOPSIDE GARNET AMPHIBOLE SKARN.
GREENISH. - WEATHERED SLIGHTLY
(COULD ALMOST BE OFFICIALLY CLASSIFIED AS PARTIALLY WEATHERED)
BETWEEN 33.46 - 39.62.
EXT. RUBBLY, FRACTURED

F

39.62m

SKARN.
GARNETIFEROUS SKARN, LITTLE EPIDOTE. PRESA.

41.0m

SKARN.
EPIDOTE SKARN.
LITTLE DIOPSIDE, AND BIPRCX 10%.
BANDED MAGNETITE.

45.10m

QUARTZITE - EPIDOTE QUARTZITE.

47.30m

QUARTZ. EPIDOTE.

48.46m.

E.O.H. 48.46m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY
CONTRACTOR
CORE
DATE
LOGGED BY
STARTED

JOB. N° 1209/82. CORE - ½ SPLIT. 303. 1/2.

18 SEPT. 1981. + SLUDGE.

KARA. N - 266 ZONE.

713143

SECTION:

SAMPLE Feet N°	Metres Interval	Lgth	% WO3	ASSAY Sn	Ag			AVE: INVL	LGTH %M·%	MT AR AV.	AVE: INVL	LGTH %M·%	MT AR AV.
D308													
E/1	0·00 - 6·18	6·18	2300	—	—								
E/2	6·18 - 6·70	1·52	1650	—	—								
E/3	6·70 - 8·23	1·53	1400	—	—								
E/4	8·23 - 9·75	1·52	2760	—	—								
E/5	9·75 - 11·27	1·52	3800	—	—								
E/6.	11·27 - 12·80	1·53	1750.	—	—								
				ppm Sn	ppm Ag								
D303													
E 1	6·18 - 6·00	0·82	720	1600	< 1								
2	6·0 - 7·0	1·0	1900	3800	< 1								
3	7·0 - 8·0	1·0	1600	3600	< 1								
4	8·0 - 9·0	1·0	780	4350	< 1								
5	9·0 - 10·0	1·0	2750	4600	< 1								
6	10·0 - 11·0	1·0	2500	2300	< 1								
7	11·0 - 12·0	1·0	3400	1900	< 1								
8	12·0 - 13·0	1·0	600	1850	< 1								
9	13·0 - 14·0	1·0	1450	1750	< 1								
10	14·0 - 15·0	1·0	260	960	< 1								
11	15·0 - 16·0	1·0	940	1150	< 1								
12	16·0 - 17·0	1·0	430	900	< 1								
13	17·0 - 18·0	1·0	540	920	< 1								
14	18·0 - 19·0	1·0	3850	1300	< 1								
15	19·0 - 20·0	1·0	2150	1350	< 1								
16	20·0 - 21·0	1·0	640	920	< 1								
17	21·0 - 22·0	1·0	820	1100	< 1								
18	22·0 - 23·0	1·0	1700	1250	< 1								
19.	23·0 - 24·0	1·0	3050	1800	< 1								

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

DDH.N . 1209/82 CORE - ½ SPLIT. 005

DATE - 18 SEPT 1981 KARA.N- 266 ZONE.

SECTION:

SAMPLE No.	Metres Interval	Lgth	ASSAY ppm %WO3	ppm Sn	ppm Ag			AVE: INVL	LGTH gm-%	WT AR AV	AVE: INVL	LGTH gm-%	WT AR AV.
D303													
20	24·0-25·0	1·0	780	860	<1								
21	25·0-26·0	1·0	2050	1150	<1								
22	26·0-27·0	1·0	480	1050	<1								
23	27·0-28·0	1·0	390	1550	<1								
24	28·0-29·0	1·0	2000	1750	<1								
25	29·0-30·0	1·0	2500	1850	<1								
26	30·0-31·0	1·0	2550	1150	<1.								
27	31·0-32·0	1·0	900	1800	<1								
28	32·0-33·0	1·0	1200	1800	<1								
29	33·0-34·0	1·0	1200	1150	<1								
30	34·0-35·0	1·0	7200	840	<1								
31	35·0-36·0	1·0	6300	1800	<1								
32	36·0-37·0	1·0	7300	1950	<1								
33	37·0-38·0	1·0	2600	1300	<1								
34	38·0-39·0	1·0	3300	1150	<1								
35	39·0-40·0	1·0	2800	600	<1								
36	40·0-41·0	1·0	860	1350	<1								
37	41·0-42·0	1·0	436	540	<1								
38	42·0-43·0	1·0	960	800	<1								
39	43·0-44·0	1·0	1950	240	<1								
40	44·0-45·0	1·0	290	270	<1								
41	45·0-46·0	1·0	50	110	<1								
42	46·0-47·0	1·0	55	140	<1								
43.	47·0-48·46	1·46.	20	160	<1								

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

713144

IMENT PROJECT KARA.N. 266 ZONE. DDH 303.

EXPLORATION DEPARTMENT 007

RECOVERY SHEET 713145

HOLE No. 303 | PAGE 1 OF 111.

CORE RECOVERY (CR) > 91% EXCEPT AS NOTED

KARA. N. 266 ZONE.

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0·00	6·18	6·18	NO CORE.						
6·18	6·71	1·53	0·68	44·4%					
6·71	9·75	3·04	2·86	94·1%					
9·76	11·28	1·53	1·53	100%.					
11·28	12·80	1·52	1·52	100%					
12·80	14·02	1·22	1·22	100%					
14·02	17·07	3·05	3·05	100%					
17·07	20·00	2·93	2·93	100%.					
20·00	21·03	1·03	0·96	93·20%					
21·03	22·25	1·22	1·17	95·90%.					
22·25	23·47	1·22	1·15	94·26%					
23·47	24·99	1·52	1·52	100·%					
24·99	26·52	1·53	1·53	100%.					
26·52	29·57	3·05	3·05	100%					
29·57	32·00	2·43	1·60	68·5%					
32·00	33·53	1·53	0·55	35·9%.					
33·53	34·44	0·91	0·91	100%.					
34·44	36·27	1·83	1·69	92·35%					
36·27	37·80	1·53	1·30	84·97%					
37·80	39·62	1·82	1·20	65·93%.					
39·62	42·37	2·75	2·75	100%.					
42·37	45·42	3·05	3·05	100%					
45·42	46·02	0·60	0·46	76·67%					
46·02	48·46	2·44	2·02	82·79%.					

CORE	BOXES	
N°1	6·18	10·00
N°2	10·00	13·52
N°3	13·52	16·83
N°4	16·83	20·49
N°5	20·49	24·35
N°6	24·35	27·94
N°7	27·94	30·06
N°8	30·06	36·93
N°9	36·93	41·23
N°10	41·23	45·94
N°11	45·94	48·46

SCALE 1:100

LENGTH 77.11m NORTHING 5427073.5
AZIMUTH 270° EASTING 397198.6
DIP AT COLLAR 55°W ELEVATION 1454
LOCATION KARA NORTH 266 ZONE.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 30N PAGE 1 OF 1
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm WO₃	FRACTURING	BEDDING	GEOLOGY	MINERAL
N.C.						NC.	
14.33 100							
14.94		0.61	210			Cl	
46.15 15.85		1.0	30			Tm(50)	
84.62 16.76		1.0	110			Tm(30)	
98.04 18.29		1.0	140				
88.52 19.51		1.0	260				
76.92 20.42		1.0	460			Tdg.	
86.96 21.34		1.0	460				
70.33 22.25		1.0	460				
74.73 23.16		1.0	220				
35.04 24.08		1.0	160			Tgd.	
57.14 24.99		1.0	320				

MINERALISATION

GEOLOGY

NO CORE.

SLUDGE REPRESENTING SKARN.

14.33m.

CLAY -
14.94m. LIGHT BROWN - SOFT.

MAGNETITE SKARN - 60% MAG.
15.58m. PARTIALLY WEATHERED.

MAGNETITE SKARN.
26% MAGNETITE.
LIMONITE PRMINENT.
HIGHLY WEATHERED.
17.66m.

SKARN

DIOPSIDE - GARNET SKARN.

OXIDISED.
HEMATITIC STAINING.
COARSE DIOPSIDE.
VUGGY + PALEOLY.

21.80m

SKARN.

GARNET, DIOPSIDE SKARN.

COARSE GRAINED.

MORE IMPREGNATION WITH IRON

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY

CONTRACTOR
CORE
CASING

DATE
LOGGED BY
STARTED 27 AUG. 1981
FINISHED 11 SEPT. 1981.

SCALE 1:100

LENGTH 77.11m NORTHING 5427073.5
AZIMUTH 270° EASTING 397198.6
DIP AT COLLAR 65°W ELEVATION 454.1.
LOCATION KARA. NORTH 266 ZONE.

MINTARE MINES (ADST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 304 PAGE 7 OF 14
PROJECT KARA.

% CORE RECOVERY	CORE SIZE	FEATURE INTERVAL	FEATURE mm/M	FRACTURING	BEDDING	GEOLOGY	MINERAL
38.04		1.0	540				
25.91							
72.18		1.0	560				
27.18							
		1.0	1450				
76.69		1.0	1250				
28.96							
		1.0	2250			Tgd.	
79.67							
30.98		1.0	760				
		1.0	2410				
94.23							
32.34		1.0	140				
77.73							
93.22		1.0	75				
100							
83.22		1.0	160			Tgdm	
81.42							
35.36		1.0	65				
100							
36.58		1.0	95				
		1.0	95			$Tm_{(30)}$	
78.95		1.0	225				
39.62		1.0	40				
63.40		1.0	35			$Tm_{(2c)}$	
111.15							
91.80							
41.76		1.0	230			Te.	
100.		1.0	10				
42.98							
		1.0	1-2%			Tmec	0.9 EST.
100		1.0	130				
		1.0	150				
46.02							
		1.0	250			Tm_{30}	
100		1.0	35				
		1.0	130				
49.07							
		1.0	40.			Tmge.	

MINERALISATION

X

27.66m

Y

F

GEOLOGY

SKARN.

GARNET, DIOPSIDE SKARN (AS ABOVE).

83.22m

SKARN.

GARNET, DIOPSIDE, MAGNETITE Skarn.

MAGNETITE INCONSISTENT IN ELONGATED BLEBS.

35.10m

SKARN.

GARNET MAGNETITE DIOPSIDE Skarn.

GREENISH GREY.

MEDIUM GRAINED TO COARSE.

MAINLY FRESH, BUT WEATHERED ZONE 35.16 - 35.82.

39.06m

SKARN.

MAGNETITE SKARN.

20% MAGNETITE.

BLEBS OF MAGNETITE.

41.0m.

EPIDOTE SKARN.

41.82m.

42.0m

SKARN.

MAGNETITE EPIDOTE AMPHIBOLE SKARN.

HARD FINE GRAINED MASSIVE.

15% MAGNETITE CONTENT. - FINE GRAINED.

GOOD SCHEELITE CRYSTALS 43.10 - 43.40.

FINE SCHEELITE DISSEMINATIONS THROUGHOUT.

45.56m

SKARN.

MAGNETITE EPIDOTE SKARN.

30% MAGNETITE.

48.20m.

SKARN.

MAGNETITE. EPIDOTE GARNET SKARN.

ANGLE READ

ANGLE CORRECTED

AZIMUTH

DEPTH

SURVEY

CONTRACTOR

CORE

CASING

DATE

LOGGED BY

STARTED 27 AUG. 1981

FINISHED 11 SEPT. 1981

713148

010

SCALE 1:100

LENGTH 77·11m NORTHING 5427073·5
AZIMUTH 270° EASTING 397198·6
DIP AT COLLAR 55°N ELEVATION 454·7.
LOCATION KARA. NORTH. 266 ZONE.

MINTARE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 304 PAGE 1 OF 3

PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE PPM WO_3	FRACTURING	BEDDING	GEOLOGY	MINERAL	MINERALISATION	GEOLOGY
						Tmg_{sk}			50·30m GEOLOGY
98·86		1·0	1700			Tm_{30}	0·2 EST.	SCHEELITE CRYSTALS WIDELY DISPERSED	SKARN. MAGNETITE SKARN.
52·12		1·0	1150·						61·50m
		1·0	1000				0·3	WO_3 U.V ESTIMATES ✓	SKARN.
99·67		1·0	720			Tm_{sk}	0·2	EXCELLENT SCHEELITE MINERALISATION CRYSTALS + DISSEM.	MAGNETITE SKARN. COARSE GRAINED DISSEMINATED EPIDOTE.
		1·0	1·41%				1·2		
55·17		1·0	1·02%						55·0m
		1·0	1·31%				1·2		SKARN.
77·87		1·0	1·23%				1·1		MAGNETITE DIOPSIDE SKARN. MAGNETITE 20% — PATCHY.
57·61		1·0	0·91%			Tm_{26}	1·0		
81·97		1·0	N100				0·8	GOOD SCHEELITE MINERALISATION DECREASING TO 63m.	
59·44		1·0	2550				·4		
		1·0	4000				·5		60·80m
98·02		1·0	1150				·4		SKARN.
67·49		1·0	325 0			Tmg	·2	FEW SPECKS SCHEELITE. F	MAGNETITE GARNET SKARN. GREY, FINE GRAINED MAGNETITE WELL DISTRIBUTED.
80 5		1·0	370·				·2		
65·15		1·0	50						65·00m.
100		1·0	70			Tme			SKARN. MAGNETITE EPIDOTE SKARN. GREENISH-, FINE GRAINED. QUARTZ STRINGERS.
66·15		1·0	110						66·80m
100		1·0	420						SKARN.
68·59		1·0	40			Tmm			MAGNETITE EPIDOTE AMPHIBOLE SKARN. FINE GRAINED, BANDED. SLIGHTLY WEATHERED FRACTURED.
98·36		1·0	210						
71·03		1·0	120·						71·50m.
100						Qc			QUARTZ EPIDOTE. FREE QUARTZ. ABUNDANT. FRACTURE ZONE.
71·90									72·80m.
100									GRANITE
100						Gr.			FINE GRAINED, PINK. LITTLE EPIDOTISATION. FREE QUARTZ. 76·80m.
72·54									
100									
74·46									

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY
CONTRACTOR
CORE
CASING
DATE
LOGGED BY
STARTED 27 AUG. 1981

713149 011

SCALE 1:100

% CORE RECOVERY	CORE SPLIT	FEATURE: INTERVAL	FEATURE: ORIENTATION	FRACTURING	BEDDING	GEOLOGY	MINERAL
100.						Gr.	
77.11							

LENGTH 77.11m NORTHING 6427073.5
AZIMUTH 270° EASTING 397148.6
DIP AT COLLAR 53°N ELEVATION 454.7
LOCATION KARA. NORTH - 266 ZONE

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT

HOLE No 304 PAGE 1 OF 4/4.

PROJECT KARA.

MINERALISATION	GEOLOGY
F ↓	GRANITE (AS ABOVE).
	77.11m
	E.O.H. 77.11m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY

CONTRACTOR
CORE
CASING

LOGGED BY DATE
STARTED 27.AUG.1981
FINISHED 11 SEPT.1981.

JOB. N° 1584/82. CORE LIBRARY

(REC) 4 NOV. 1981. RECOVERY, CONSIDER 100% EXCEPT AS NOTED

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

KARA. N 266 ZONE.

D.D.H. 304

11.

SECTION:

SAMP NO.	REC WX	INTERVAL	LGTH	ASSAY ppm Au	% WO3	WO3 B2	ppm Sn	AVE: INVL	LGTH SM-%	WT AR AV.	AVE: INVL	LGTH SM-%	WT AR AV.
—		0·0 - 14·33	14·33	—									
D30H 1	CORE	14·33 - 15·00	0·67	210			340					713	50
2		15·0 - 16·0	1·0	30			55						
3		16·0 - 17·0	1·0	110			130						
4		17·0 - 18·0	1·0	140			210						
5		18·0 - 19·0	1·0	250			140						
6		19·0 - 20·0	1·0	460			220						
7		20·0 - 21·0	1·0	460			660						
8		21·0 - 22·0	1·0	460			450						
9		22·0 - 23·0	1·0	220			250						
10		23·0 - 24·0	1·0	160			680						
11		24·0 - 25·0	1·0	320			740						
12		25·0 - 26·0	1·0	640			600						
13		26·0 - 27·0	1·0	560			760						
14		27·0 - 28·0	1·0	1450			1450						
15		28·0 - 29·0	1·0	1250			1750						
16		29·0 - 30·0	1·0	2250			1750						
17		30·0 - 31·0	1·0	760			2400						
18		31·0 - 32·0	1·0	240			2450						
19		32·0 - 33·0	1·0	140			2400						
20		33·0 - 34·0	1·0	75			1350						
21		34·0 - 35·0	1·0	160			1050						
22		35·0 - 36·0	1·0	55			920						
23		36·0 - 37·0	1·0	95			740						
24		37·0 - 38·0	1·0	95			760						
25		38·0 - 39·0.	1·0	25.			1850						

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

COMMENT PROJECT

JOB. N° 1684/82 CORE ... LIBRARY KARA. N. 266 ZONE. DDH. 304 U16 2/3

(REC) 4. NOV. 1981.
RECOVERY, CONSIDER 100% EXCEPT AS NOTED

(W/X) MINERALIZED, CONSIDER FROM ROCK EXCEPT AS NOTED. W/X INDICATES CLAYEY, LIMONITIC MATERIAL

SECTION:

ASSAY

AVE:

AVE:

SAMP NO.	REC W/X	INTERVAL	LGTH		ppm/% WO3	WO3 B2	ppm Sn		INVL	LGTH SM-%	WT AR AV.	INVL	LGTH SM-%	WT AR AV.
D304														
26	CORE	39.0-40.0	1.0		40		1450							
27		40.0-41.0	1.0		35		880							
28		41.0-42.0	1.0		230		1450							
29		42.0-43.0	1.0		10		500							
30		43.0-44.0	1.0		1.21%	0.99%	560							
31		44.0-45.0	1.0		130		390							
32		45.0-46.0	1.0		150		920							
33		46.0-47.0	1.0		250		980							
34		47.0-48.0	1.0		35		720							
35		48.0-49.0	1.0		130		1300							
36		49.0-50.0	1.0		40		1100							
37		50.0-51.0	1.0		1700		600							
38		51.0-52.0	1.0		1150		780							
39		52.0-53.0	1.0		1900		520							
40		53.0-54.0	1.0		780		460							
41		54.0-55.0	1.0		1.82%	1.41%	660							
42		55.0-56.0	1.0		1.73%	1.42%	820							
43		56.0-57.0	1.0		1.55%	1.31%	2250							
44		57.0-58.0	1.0		1.62%	1.33%	1500							
45		58.0-59.0	1.0		1.03%	0.91%	3150							
46		59.0-60.0	1.0		4100		2800							
47		60.0-61.0	1.0		2850		760							
48		61.0-62.0	1.0		4000		580							
49		62.0-63.0	1.0		1150		180							
50		63.0-64.0	1.0		3250		140							
51		64.0-65.0	1.0		870		960							

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

COMMENT PROJECT

71151

JOB. N°. 158482. CORE ½ SPLIT. LIBRARY KARA. N. D.D.H. 014

4-NOV. 1981. 266 ZONE. 304.

(REC) RECOVERY, CONSIDER 95% EXCEPT AS NOTED

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

SECTION:

SAMP NO.	REC WX	INTERVAL	LGTH
D304 52.	CORE.	65·0-66·0	1·0
53	"	66·0-67·0	1·0
54	"	67·0-68·0	1·0
55	"	68·0-69·0	1·0
56	"	69·0-70·0	1·0
57	"	70·0-71·0	1·0
58.	"	71·0-72·0.	1·0.

ASSAY

	ppm WO_3	WO_3 B2.	ppm Sn.	
	80		140	
	70		130	
	110		390	
	420		340	
	40		370	
	210		160	
	120.		90.	

AVE:

INVL	LGTH SM-%	WT AR AV.

AVE:

INVL	LGTH SM-%	WT AR AV.
7	31	52

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

COMMENT PROJECT

RECOVERY SHEET 713153 015

HOLE No. 304 PAGE 1 OF 11

CORE RECOVERY (REC) IS 95% EXCEPT AS NOTED KARA N. 266 ZONE.

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0.00	14.33	14.33	N/C.						
14.33	14.94	0.61	0.61	100%					
14.94	15.85	0.91	0.42	46.15%					
15.85	16.76	0.91	0.77	84.62%.					
16.76	18.29	1.53	1.50	98.04%					
18.29	19.51	1.22	1.08	88.52%					
19.61	20.42	0.91	0.70	76.92%					
20.42	21.34	0.92	0.80	86.96%					
21.34	22.25	0.91	0.64	70.33%					
22.25	23.16	0.91	0.68	74.73%					
23.16	24.08	0.92	0.35	38.04%					
24.08	24.99	0.91	0.52	57.14%					
24.99	25.91	0.92	0.35	38.04%					
25.91	27.13	1.22	0.88	72.13%.					
27.13	28.96	1.83	1.44	78.69%					
28.96	30.78	1.82	1.45	79.67%					
30.78	32.34	1.56	1.47	94.23%					
32.34	33.22	0.88	0.86	97.73%					
33.22	33.53	0.31	0.31	100.0%					
33.53	35.36	1.83	1.49	81.42%					
35.36	36.58	1.22	1.22	100%					
36.58	39.62	3.04	2.40	78.95%					
39.62	41.15	1.53	0.97	63.40%.					
41.15	41.76	0.61	0.56	91.80%					
41.76	42.98	1.22	1.22	100%					
42.98	46.02	3.04	3.04	100%					
46.02	49.07	3.05	3.05	100%.					
49.07	52.12	3.05	3.00	98.36%					
52.12	55.17	3.05	3.04	99.67%					
55.17	57.61	2.44	1.90	77.87%					
57.61	59.44	1.83	1.50	81.97%					
59.44	62.49	3.05	3.02	99.02%					
62.49	65.15	2.66	2.23	83.8%					
65.15	66.15	1.00	1.00	100%.					
66.15	68.59	2.44	2.44	100%					
68.59	71.03	2.44	2.40	98.36%					
71.03	71.94	0.91	0.91	100%					
71.94	72.26	0.32	0.32	100%					
72.26	72.54	0.28	0.28	100%					
72.54	74.06	1.52	1.52	100%					
74.06	77.11	3.05	3.05	100%.					

713154 016

SCALE 1:100.

LENGTH 38·71m NORTHING 6427111·0
AZIMUTH 270° EASTING 347166·5
DIP AT COLLAR 65°N ELEVATION 457·6
LOCATION KARA NORTH 266 ZONE.

MINTARE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 305 PAGE 1 OF 1/2.
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm W₀₃	FRACTURING	BEDDING	GEOLOGY	MINERAL
N.C.						N.C.	
57·3		1·85	620			Cl.	
26·8		1·27	2800			Tm_{2a} W	
31·5		1·27	1350				
14·1		0·92	440				
N.C.		N.C.	—			Tu.	
21·3		1·0	1950				
93·1		1·0	2000				
85·4		1·0	4950				
91·9		1·0	770				
100		1·0	2150			Tgd.	
100		1·0	1200			Tma	
95·9		1·0	1·7%			Tmgd	
90·3		1·0	1·0%				
82·6		1·0	1600				
66·4		1·0	9000				
99·1		1·0	5%.			Tge	

MINERALISATION

GEOLOGY

NO CORE.
SLUDGE REPRESENTING SKARN.

8·84m
CLAY. - SKARN.
9·70m CLAY REPRESENTING SKARN ARGIL. BRECHA.

SKARN.
MAGNETITE SKARN.
WEATHERED - RUBBLY.
20% MAGNETITE.
13·11m.

SKARN.
MAGNETITE SKARN.
WEATHERED.
17·98m

DISSEMINATED SPECK SCHEELITE 17·40 - 66. 18·29

SKARN 18·50m.
DIOPSIDE GARNET SKARN.
COARSE GRAINED - PART WEATHERED.

SKARN.
MAGNETITE AMMIOLITE SKARN.
19·98m

SKARN
MAGNETITE DIOPSIDE GARNET SKARN.
MAGNETITE WELL DEVELOPED 20·60 - 21·00m.
GOOD FINE DISSEMINATED SCHEELITE THROUGHOUT
0·5 - 1·1% WO_3 EST.
23·45m.

SKARN.
GARNET - EPIDOTE SKARN

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY
CONTRACTOR
CORE
CASING
DATE
LOGGED BY
STARTED 15 SEPT. 1987
FINISHED 21 SEPT. 1987.

713155 017

SCALE 1:100

LENGTH 38·71m. NORTHING 6427111·0
AZIMUTH 270° EASTING 387166·5
DIP AT COLLAR 55°N ELEVATION 457·6
LOCATION KARA-NORTH - 266 ZONE.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 305 PAGE 1 OF 2/2.
PROJECT KARA

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm WO₃	FRACTURING	BEDDING	GEOLOGY	MINERAL
25·0							
61·2		1·0	400			Tge	
		1·0	1500				
27·74		1·0	520				
27·9							
28·65		1·0	120				
10°							
29·26		1·0	370			Tgd.	
30·0							
100		1·0	350				
		1·0	1650				
32·31		1·0	150				
100		1·0	45				
		1·0	55			Tgda	
35·0							
35·26		1·0	210			Tme	
97·32		1·0	—				
27·49		1·0	70·				
57·3						Tgd.	
32·71						Gr.	
40·0							

MINERALISATION	GEOLOGY
	SKARN.
SCHEELITE SPECKS DISSEMINATED 25·26·0m.	GARNET EPIDOTE : FINE GRAINED. - GREENISH GREY. ONLY LITTLE MAGNETITE.
	28·65m.
	SKARN
F.	GARNET, DIOPSIDE SKARN. FINE GRAINED GREY.
SCHEELITE DISSEMINATED 29·0 - 31·6m.	
	33·50m.
	SKARN. GARNET, DIOPSIDE, AMPHIBOLE SKARN.
	34·50m.
	SKARN
LITTLE SCHEELITE AT 36·56	EPIDOTE MAGNETITE SKARN. SPECULARITE Fe.
	37·16m
	GARNET DIOPSIDE SKARN
	38·16m.
	GRANITE 38·71m. GRANITE - RUBBLY.
	E.O.H. 38·71m.

ANGLE READ
ANGLE CORRECTE
AZIMUTH
DEPTH
SURVEY

CONTRACTOR
CORE

LOGGED BY DATE
STARTED 15 SEPT. 1981.

ANDEL JOB. Nº AC 1784/82.

DATE. 23 OCT. 1981.

CORE SAMPLES.

305

KARA NORTH – 266 ZONE.

1/1

71315 6

SECTION:				ASSAY				AVE:				AVE:			
Sample No.	Feet	Metres Interval	Lgth.	%WO3		ppm Sn.		INVL	LGTH %M-%	INT AR AV		INVL	LGTH %M-%	INT AR AV.	
7305 1	CORE	8.40 - 9.75	1.35	620		60									
2		9.75 - 10.97	1.27	2800		95									
3		10.97 - 12.19	1.27	1350		290									
4		12.19 - 13.11	0.92	640		430									
5		14.00 - 15.0	1.00	1950		190									
6		15.0 - 16.0	1.00	2000		1300									
7		16.0 - 17.0	1.00	4050		1350									
8		17.0 - 18.0	1.00	780		1250									
9		18.0 - 19.0	1.00	2150		1700									
10		19.0 - 20.0	1.00	1200		2150									
11		20.0 - 21.0	1.00	1.71%		1600									
12		21.0 - 22.0	1.00	1.04%		1550									
13		22.0 - 23.0	1.00	1600		2200									
14		23.0 - 24.0	1.00	9000		1000									
15		24.0 - 25.0	1.00	660		2000									
16		25.0 - 26.0	1.00	400		620									
17		26.0 - 27.0	1.00	1500		1050									
18		27.0 - 28.0	1.00	620		1400									
19		28.0 - 29.0	1.00	120		490									
20		29.0 - 30.0	1.00	370		700									
21		30.0 - 31.0	1.00	360		560									
22		31.0 - 32.0	1.00	1650		340.									
23		32.0 - 33.0	1.00	150		310									
24		33.0 - 34.0	1.00	45		200									
25		34.0 - 35.0	1.00	55		200									
26		35.0 - 36.0	1.00	210		120									
27		37.0 - 38.0	1.00	70.		120.									

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

COMMENT
NOT ASSAYED 38.0 – 38.7

PROJECT KARA

DDH 305.

EXPLORATION DEPARTMENT. 019

RECOVERY SHEET 713157

HOLE No. 306 | PAGE 1 OF 1/1.

CORE RECOVERY (%) > 95% EXCEPT AS NOTED KARA. N. 266 ZONE.

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0·00	8·40	8·40	NO CORE.	—					
8·40	9·75	1·35	0·80.	59·3%.					
9·75	10·97	1·27	0·34	26·8%.					
10·97	12·19	1·27	0·40	31·5%.					
12·19	13·11	0·92	0·13.	14·1%.					
13·11	14·02	0·91	N.C.	—					
14·02	14·96	0·94	0·20	21·3%.					
14·96	15·54	0·68	0·54	93·1%.					
15·64	16·50	0·76	0·82	85·4%.					
16·50	17·98	1·48	1·36	91·9%.					
17·98	18·29	0·31	0·31	100%					
18·29	18·90	0·61	0·61	100%.					
18·90	19·20	0·30	0·30	100%.					
19·20	20·42	1·22	1·17	95·9%.					
20·42	21·34	0·92	0·83	90·2%.					
21·34	21·95	0·61	0·24	39·3%.					
21·95	22·56	0·61	0·32	52·5%.					
22·56	23·47	0·91	0·55	60·4%.					
23·47	24·66	1·19	1·12	94·1.					
26·52	27·74	1·22	0·82	67·2%.					
27·74	28·65	0·91	0·80	87·9%.					
28·65	29·26	0·61	0·61	100%					
29·26	32·31	3·05	3·05	100%.					
32·31	35·36	3·05	3·05	100%.					
35·36	37·49	2·13	1·86.	87·32%					
37·49	38·71	1·22	0·70.	57·3%.					

713158 020

SCALE 1:100.

LENGTH 86.19m NORTHING 6427024.6
AZIMUTH 270° EASTING 397215.6
DIP AT COLLAR 45°W ELEVATION 448.9
LOCATION KARA. NORTH 266 ZONE.

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 306 PAGE 1 OF 1/4
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ADM N°S	FRACTURING	BEDDING	GEOLOGY	MINERAL
19.09		N.S.				Gw	
3.66							
16.0		1.62	340				
5.85		1.53	540				
		1.52	520				
		1.52	280			NC.	
81		1.53	260				
		1.52	270				
		1.53	200				
		0.41	220				
		0.91	370				
		0.91	340				
		0.92	260				
17.68							
19.5		N.S	N.S				
18.89							
326		0.92	220			Tu.	
19.51							
32.79		0.41	210				
20.13							
19.78		0.91	140				
21.69							
41.3		0.92	170				
21.95							
39.56		0.91	320				
22.86							
63.		0.41	310				
		0.92	300			T_{mu}	

MINERALISATION
x/y = 34.0m
r/f = 45.80m.

NO VISIBLE SCHEELITE IN SLUDGE SAMPLES

X

GEOLOGY

CLAY + SAND REPRESENTING DECOMPOSED GRANITE.

8.40m.

NO CORE.

15.65m

SKARN.

UNDIFFERENTIATED SKARN + CLAY.

VERY WEATHERED, GREENISH.

POOR CORE RECOVERY.

NIL
WO3

21.95m

SKARN.

(GARNET) MAGNETITE SKARN.

MAGNETITE ~ 40%.

NIL
WO3

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY
CONTRACTOR
CORE
CASING
DATE
LOGGED BY
STARTED 28 SEPT. 1981
FINISHED 21 OCT. 1981.

713159 021

SCALE 1:100

LENGTH 86-19m NORTHING 5427024·6
AZIMUTH 270° EASTING 397215·6
DIP AT COLLAR 45°N ELEVATION 448·9
LOCATION KARA. NORTH. 266 ZONE.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 306. PAGE 1 OF 2/4.
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm Mo	FRACTURING	BEDDING	GEOLOGY	MINERAL
		0·92	370				
		0·91	410				
		0·91	360				
		0·92	370				
		0·92	290			Tm_{40}	
		0·91	250				
		0·91	170				
		0·91	190				
		0·92	170				
92·92							
16·9		1·0	200			Tm_{30}	
34·16							
73·3		1·0	160				
34·46							
10C		1·0	NIL				
35·66							
71·6		1·0	55			Tu.	
36·58							
10C		1·0	110				
37·49							
10C							
38·19							
100		1·0	370			Tm_{100}	
38·71							
100							
39·81							
10C		1·0	360			$Tg\,dm$	
40·54							
100		1·0	420				
40·64							
41·15							
100		1·0	85				
42·67						Tgd.	
10C		1·0	170				
43·26							
91·8		1·0	60				
43·89							
		1·0	40			Tga.	
94·26							
		1·0	60				
44·23							
100		0·94	50				
44·42							
100							
44·92							
100		1·06	95			Tgd.	
46·24							
88·63		1·0	95				
48·65		1·0	390			Tgd_a	

MINERALISATION	GEOLOGY
NIL	AS. ABOVE.
	31·60m
NIL	SKARN. MAGNETITE SKARN. 30% MAGNETITE. WEATHERED TO 34·0m. POOR CORE - MAINLY SLUDGE.
	34·40m
NIL	SKARN. UNDIFFERENTIATED SKARN. DARK GREEN.
	38·00m.
NIL	SKARN 38·50m. MAGNETITE SKARN, 60% Fe, MASSIVE.
NIL	SKARN. GARNET, MAGNETITE, DIOPSIDE QUARTZ SKARN 10% MAGNETITE. RUBBLY.
	40·54m.
NIL	SKARN. GARNET, DIOPSIDE SKARN. BROWNISH GREEN. PARTIALLY WEATHERED, COARSE.
	44·20.
NIL	SKARN. GARNET, AMPHIBOLE SKARN.
	45·18.
	45·80
NIL	SKARN. GARNET, DIOPSIDE (MAGNETITE) SKARN FRESH MEDIUM TO COARSE. 15% MAGNETITE.
	48·50
NIL.	SKARN. GARNET, DIOPSIDE, AMPHIBOLE SKARN. BROWNISH. SOME SULPHIDE.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY
CONTRACTOR
CORE
CASING
DATE
LOGGED BY
STARTED 28 SEPT. 1981
FINISHED 21 OCT. 1981

713160 U22

SCALE 1:100

LENGTH 86.19m. NORTHING 5427024.6
AZIMUTH 270° EASTING 397215.6.
DIP AT COLLAR 45°N ELEVATION 448.9.
LOCATION KARA N. 266 ZONE.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT

HOLE No 306 PAGE 1 OF 3/4.

PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm WO_3	FRACTURING	BEDDING	GEOLOGY	MINERAL
71.59		1.0	660				
67.21		1.0	700				
100 52.12		1.0	450			Tgda	
70 c 53 cm		1.0	140				
100 56.08		1.0	1300			Tea	
100		1.0	1650				
		1.0	600				
		1.0	320				
59.13		1.0	1.10%			Tm_{80}	
100		1.0	1.20%				
		1.0	1.28%				
62.16		1.0	2.15%				
100		1.0	2.32%				
		1.0	6000			Tm_{60}	
65.23		1.0	1.66%				
100 66.66		1.0	9000				
100 67.25		1.0	5300				
100 68.30		1.0	310			Tme_{30}	
100		1.0	360				
70.68		1.0	100				
100 71.55		1.0	140				
		1.0	120				
100		1.0	250			Tgda	
		1.0	660				
		1.0	95				

MINERALISATION

51.20 - 30m - COARSE YELLOW SCHEELITE.

REMAINDER OF RUN - NIL.

NIL.

55.50 - 58.50m - VERY FINE, BUT WELL DISSEMINATED SCHEELITE.

58.50 - 59.50 - VERY COARSE WHITISH YELLOW SCHEELITE. GOOD EVEN DISTRIBUTION 0.8 - 1.0%.

59.50 - 60.50 - FINER DISSEMINATIONS OF SCHEELITE.

60.50 - 66.3c. EXCELLENT COARSE AND FINE WHITISH-YELLOW SCHEELITE MINERALISATION. EST. U.V. GRADE. 0.8 - 1.5% WO_3.

66.30 - 68.0 ONLY VERY FEW ISOLATED SPECKS OF SCHEELITE. NOT ORE GRADE.

FEW ISOLATED SPECKS OF SCHEELITE BETWEEN 71.50 - 72.0.

72.0 - 75.0 - EXTREMELY ISOLATED SPECKS MED GRAINED SCHEELITE.

GEOLOGY

53.60m SKARN. 54.20m. AMPHIBOLE EPIDOTE RICH SKARN

SKARN.

MAGNETITE SKARN. 50% MAGNETITE. LITTLE DIOPSIDE. MAGNETITE FINE TO MEDIUM-COARSE.

GOOD VISIBLE COARSE SCHEELITE MINERALISATION.

62.50m

SKARN.

MAGNETITE - AMPHIBOLE SKARN. MAGNETITE QUITE COARSE.

66.00m

SKARN.

MAGNETITE - AMPHIBOLE SKARN. MAGNETITE LESS - 30%.

69.10

SKARN.

GARNET, AMPHIBOLE DIOPSIDE SKARN. FINE GRAINED. SLIGHTLY WEATHERED 69.10 - 70.50m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY
CONTRACTOR
CORE
CASING
DATE

LOGGED BY
STARTED 28 SEPT. 1981.
FINISHED 21 OCT 1981.

713161 U23

SCALE 1:100.

LENGTH 86·19m NORTHING 5427024·6
AZIMUTH 270° EASTING 397215·6
DIP AT COLLAR 45°N ELEVATION 448·9
LOCATION KARA. NORTH. 266 ZONE.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 806. PAGE 1 OF 4/4.
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE AZIMUTHS	FRACTURING	BEDDING	GEOLOGY	MINERAL
75·85		1·0	65°			Tgda	
86·9		1·0	1300			Tga.	
77·96		1·0	1820				
100		1·0	220.			Tme	
79·77		0·77	260				
100		1·23	1600				
87·29		1·0	35°.			Te	
95·97							
82·53		1·0	45°.			Tdc	
100							
83·14		1·0	25°				
100						Gr.	
84·36							
87·43							
86·19							

MINERALISATION	GEOLOGY
	75·60m. GEOLOGY
79·3c - 33. SCHEELITE VISIBLE. NIL - REMAINDER OF RUN.	SKARN. GARNET, AMPHIBOLE SKARN. GREENISH. 77·96m.
NIL	SKARN. EPIDOTE, MAGNETITE SKARN. 79·70m.
NIL.	SKARN. GREEN, FINE GRAINED. EPIDOTE SKARN. 82·00m.
NIL	SKARN QUARTZ, EPIDOTE. DIOPSIDE SKARN. 83·40m.
NIL.	GRANITE. GRANITE. FINE GRAINED, FEW MAFICS. 86·19m.
E.O.H. 86·19m.	

F

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY
CONTRACTOR
CORE
CASING
LOGGED BY
DATE
STARTED 28 SEPT. 1981
FINISHED 21 OCT. 1981

(REC) DATE. 21/7/82 NOV '81 AND SLUDGE. KARA.N 266 ZONE. 306. 114

(WX) RECOVERY, CONSIDER 100% EXCEPT AS NOTED

WEATHERING. CONSIDER FRESH ROCK EXCEPT AS NOTED. WX INDICATES CLAYEY, LIMONITIC MATERIAL 024

713162

SECTION:

SAMP NO.	REC WX	INTERVAL	LGTH	ASSAY ppm WO3.	AVE: INVL	AVE: LGTH %M-%	AVE: WT AR AV.	AVE: INVL	AVE: LGTH %M-%	AVE: WT AR AV.
D306 1S	SLUDGE	3.66-5.18	1.52	340						
2S	"	5.18-6.71	1.53	640						
3S	"	6.71-8.23	1.52	620						
4S	"	8.23-9.75	1.52	280						
5S	"	9.75-11.28	1.53	260						
6S	"	11.28-12.80	1.52	270						
7S	"	12.80-14.33	1.53	200						
8S	"	14.33-14.94	0.61	220						
9S	"	14.94-15.85	0.91	370						
10S	"	15.85-16.76	0.91	340						
11S	"	16.76-17.68	0.92	260						
12S	"	17.68-18.59 N.S. 18.59-19.51	0.92	220						
13S.	"	19.51.-20.12	0.61	210						
14S	"	20.12-21.03	0.91	140						
15S	"	21.03-21.95	0.92	170						
16S	"	21.95-22.86.	0.91	220						
17S	"	22.86-23.77	0.91	310						
18S	"	23.77-24.69	0.92	300						
19S	"	24.89-25.60	0.91	370						
20S	"	25.60-26.52	0.92	410						
21S	"	26.52-27.43	0.91	380						
22S	"	27.43-28.34	0.91	370						
23S	"	28.34-29.26	0.92	290						
24S	"	29.26-30.18	0.92	250						
25S	"	30.18-31.09	0.91	170						
26S.	"	31.09-32.00	0.91.	190						

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

COMMENT

PROJECT KARA.N. 266 ZONE.

DDH 306.

2106/82 2187/82 NOV'81 AND SLUDGE. LIBRARY KARA. N. 266 ZONE. 306 025 214

(REC) DATE. RECOVERY, CONSIDER 100% EXCEPT AS NOTED

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

713163

SECTION:				ASSAY		AVE:			AVE:		
SAMP NO.	REC WX	INTERVAL	LGTH	ppm WO_3	ppm Sn.	INVL	LGTH SM^{-2}	WT AR AV.	INVL	LGTH SM^{-2}	WT AR AV.
D306 275	SLUDGE	32.00 - 32.92	0.92	170							
285	"	32.92 - 33.83	0.91	190.							
D306 39	CORE	33.0 - 34.0	1.0	200	180						
40	"	34.0 - 35.0	1.0	160	180						
41	"	35.0 - 36.0	1.0	NIL	95						
42	"	36.0 - 37.0	1.0	55	170						
43	"	37.0 - 38.0	1.0	110	270						
44	"	38.0 - 39.0	1.0	270	250						
45	"	39.0 - 40.0	1.0	360	210						
46	"	40.0 - 41.0	1.0	420	680						
47	"	41.0 - 42.0	1.0	85	760						
48	"	42.0 - 43.0	1.0	170	1450						
49	"	43.0 - 44.0	1.0	60	1700						
50	"	44.0 - 45.0	1.0	40	1560						
51	"	45.0 - 46.0	1.0	60	1800						
52.	"	46.0 - 46.94	0.94	50.	1650						
53	"	46.94 - 48.0	1.06	95	1250						
54	"	48.0 - 49.0	1.0	95	1600						
55	"	49.0 - 50.0	1.0	390	1300						
56	"	50.0 - 51.0	1.0	600	2000						
57	"	51.0 - 52.0	1.0	700	2450						
58	"	52.0 - 53.0	1.0	400	1800						
59	"	53.0 - 54.0	1.0	140	1450						
60	"	54.0 - 55.0	1.0	1300	880						
61	"	55.0 - 56.0.	1.0.	1650.	1200						

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

COMMENT

PROJECT KARA. N. 266 ZONE.

DDH 306

FREP 2106182 CORE (½ SPLIT) LIBRARY KARA. N. D.D.H. 026

2106182
2187182. NOV '81 306 21

(REC) DATE. RECOVERY, CONSIDER 95% EXCEPT AS NOTED 266 ZONE.

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

71164

SECTION:				ASSAY		AVE:			AVE:		
SAMP NO.	REC WX	INTERVAL	LGTH	ppm WO_3	ppm Sn	INVL	LGTH SM-%	WT AR AV.	INVL	LGTH SM-%	WT AR AV.
D306 62.	CORE	56.0-57.0	1.0	600	920						
63	"	57.0-58.0	1.0	320	540						
64	"	58.0-59.0	1.0	1.40%	600						
65	"	59.0-60.0	1.0	1.20%	820						
66	"	60.0-61.0	1.0	1.20%	580						
67	"	61.0-62.0	1.0	2.16%	150						
68	"	62.0-63.0	1.0	2.32%	780						
69	"	63.0-64.0	1.0	6000	540						
70.	"	64.0-65.0	1.0.	1.66%	440						
71	"	65.0-66.0	1.0	9000	840						
72	"	66.0-67.0	1.0	6300	1000						
73	"	67.0-68.0	1.0	310	250						
74	"	68.0-69.0	1.0	360	180						
75	"	69.0-70.0	1.0	100	270						
76	"	70.0-71.0	1.0	140	440						
77	"	71.0-72.0	1.0	120	150						
78	"	72.0-73.0.	1.0.	280	110						
79	"	73.0-74.0	1.0	660	300						
80	"	74.0-75.0	1.0	95	540						
81	"	75.0-76.0	1.0	55	660						
82	"	76.0-77.0	1.0	1300	1200						
83	"	77.0-78.0	1.0	1800	580						
84	"	78.0-79.0	1.0.	220	280						
85	"	79.0-79.77	0.77	260.	340						
86	"	79.77-81.00	1.23	1000	280						
87.	"	81.0-82.0	1.0	35 10	12.						

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

COMMENT PROJECT

(REC) DATE - 21/8/82, NOV '81

(REC) RECOVERY, CONSIDER >90% EXCEPT AS NOTED

(W'X) WEATHERING, CONSIDER FRESH ROCK EXCEPT AS NOTED. W'X INDICATES CLAYEY, LIMONITIC MATERIAL

266 ZONE.

306. U21 414

713165

SECTION:

SAMP NO.	REC W'X	INTERVAL	LGTH	ASSAY ppm WO_3	ASSAY ppm Sn	AVE: INVL	AVE: LGTH %M-%	AVE: WT AR AV.	AVE: INVL	AVE: LGTH %M-%	AVE: WT AR AV.
D306 88	CORE	82.0-83.0	1.0	45	12						
89	"	83.0-84.0	1.0	25.	200.						
		84.0-86.19	NOT SAMPLED FOR ASSAY.								

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

COMMENT

PROJECT KARA N. 266 ZONE

D.D.H. 306.

RECOVERY SHEET 713166

HOLE No. 306 | PAGE 1 OF 1/2.

CORE RECOVERY (CR) @ 95% EXCEPT AS NOTED KARA. N. 266 ZONE.

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0.00	3.66	3.66	1.09	29.9%					
3.66	5.85	2.19	0.35	16.0%					
5.85	17.68	11.83	0.96	8.1%					
17.68	18.59	0.91	0.18	19.8%					
18.59	19.51	0.92	0.30	32.6%					
19.51	20.12	0.61	0.20	32.79%					
20.12	21.03	0.91	0.18	19.78%					
21.03	21.95	0.92	0.38	41.3%					
21.95	22.86	0.91	0.36	39.56%					
22.86	32.92	10.06	0.63	6.26%.					
32.92	34.16	1.24	0.21	16.9%					
34.16	34.46	0.30	0.22	73.3%					
34.46	34.73	0.27	0.27	100%.					
34.73	35.06	0.33	0.28	84.8%					
35.06	35.60	0.54	0.54	100%.					
35.60	36.58	0.98	0.78	79.6%					
35.58	37.49	0.91	0.91	100%					
37.49	38.10	0.61	0.61	100%.					
38.10	38.71	0.61	0.61	100%.					
38.71	39.01	0.30	0.30	100%					
39.01	40.54	1.53	1.53	100%.					
40.54	40.84	0.30	0.30	100%					
40.84	41.15	0.31	0.31	100%					
41.15	42.67	1.52	1.52	100%					
42.67	43.28	0.61	0.61	100%					
43.28	43.89	0.61	0.56	91.8%.					
43.89	46.33	2.44	2.30	94.26%					
46.33	46.63	0.30	0.30	100%.					
46.63	46.94	0.31	0.31	100%.					
46.94	47.24	0.30	0.24	80.0%					
47.24	49.68	2.44	2.10	86.07%					
49.68	51.21	1.53	1.10	71.89%					
51.21	61.51	0.30	0.30	100%.					
51.51	52.12	0.61	0.61	100%.					
52.12	53.04	0.92	0.70	76.1%					
53.04	53.64	0.60	0.42	70.0%					
53.64	56.08	2.44	2.44	100%.					
56.08	59.13	3.05	3.05	100%					
59.13	62.18	3.05	3.05	100%.					
62.18	65.23	3.05	3.05	100%					
65.23	66.06	0.83	0.83	100%.					

EXPLORATION DEPARTMENT.

RECOVERY SHEET 713167

029

HOLE No. 306 | PAGE 1 OF 212.

CORE RECOVERY (CR) > 95% EXCEPT AS NOTED

KARA. N. 266 ZONE.

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
66·86	67·28	1·22	1·22	100·0%					
67·28	68·50	1·22	1·22	100·0%					
68·50	70·63	2·13	2·13	100·0%					
70·63	71·85	1·22	1·22	100·0%					
71·85	75·81	3·96	3·96	100·0%.					
75·81	77·96	2·15	1·74	80·9%.					
77·96	79·77	1·81	1·81	100·0%.					
79·77	81·29	1·52	1·52	100%.					
81·29	82·53	1·24	1·19	95·97%.					
82·53	83·14	0·61	0·61	100%.					
83·14	84·36	1·22	1·22	100%					
84·36	86·19	1·83	1·60	87·43%.					

713168 050

SCALE 1:100.

LENGTH 66.14m NORTHING 5427220.5
AZIMUTH 270° EASTING 397166.3
DIP AT COLLAR 65°N ELEVATION 472.8.
LOCATION KARA. NORTH - 266 ZONE.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 307 PAGE 1 OF 1/3
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE FROM WO3	FRACTURING	BEDDING	GEOLOGY	MINERAL
No CORE 3.65		NS				NC	
87.9 3.96		0.95	10c				
86.96 4.88		1.0	130				
87.91 5.79		1.0	95				
10c 6.10							
84.95 7.01		1.0	20c			Tu_W	
6.53		4.0	660				
10.67							
50.55 11.58		1.0	110				
36.7		2.0	1300				
16.62							
21.34 14.94		2.0	1300			Tgd.	
19.78							
15.85							
62.64 16.76		1.0	1250				
23.91							
17.68		1.0	640				
100							
15.59		1.0	1210			W Tgo.	
77.0		1.0	240				
20.42							
100		1.0	110				
21.34							
100		1.0	120				
22.25							
92.89		1.0	75			Tg_A	
24.08		1.0	30				
100		1.0	20.				

MINERALISATION
X/Y = 20.42m
Y/F = 39.0m.

GEOLOGY

0.00 – 3.05m: NO CORE (CASING)

3.05 – 10.67m: SKARN.
CLAY AND Fe SAND REPRESENTING SKARN.
WEATHERED, LIGHT COLOURED CLAYS.
ONLY LITTLE REMNANT IRON.
NIL WO_3.
FLUORESCENCE.

10.67 – 17.70m: SKARN
GARNET DIOPSIDE SKARN.
VERY WEATHERED, RUBBLY & FRAGMENTED.
STRONGLY HEMATITIC.
NIL WO_3.

17.70 – 20.35m: SKARN.
WEATHERED GARNET EPIDOTE SKARN
NIL WO_3.

20.35 – 20.42m: GARNET AMPHIBOLE SKARN.
PARTIALLY WEATHERED.
FINE GRAINED.
NIL WO_3

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY
CONTRACTOR
CORE
CASING
LOGGED BY
DATE
STARTED 23 OCT. 1981
COMPLETED 7 NOV. 1981

713169 051

SCALE 1:100

LENGTH 66.14m NORTHING 6407220.5
AZIMUTH 270° EASTING 397166.3
DIP AT COLLAR 55°N ELEVATION 472.8
LOCATION KARA. NORTH - 266 ZONE.

M'INTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 307 PAGE 1 OF 3
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE From WO3	FRACTURING	BEDDING	GEOLOGY	MINERAL
25.0						Tgu.	
100		1.0	0c				
24.82		1.0	26c				
100		1.0	60			Tgdc	
		1.0	7x0				
29.26							
29.37		1.0	960				
30.0							
		1.0	1100				
29.7		1.0	880				
29.00							
100		1.0	600				
		1.0	730				
33.80							
100		1.0	1180			Tgd	
35.0							
35.66		1.0	4530				
100		1.0	150				
37.19							
100							
37.80		1.0	640				
100		1.0	330				
39.81							
39.92							
100		1.0	140				
40.0							
40.34		1.0	1.87%				
41.71		1.0	2700			Tm20	
42.37							
		1.0	6180				
100		1.0	11250				
		1.0	280				
45.0							
46.42		1.0	1.05%			Tmx	
100		1.0	2.02%				
47.55		1.0	3050			Tm50	
100		1.0	3250				
49.46							
50.0		1.0	3660				

MINERALISATION

NIL.
WO_3
MINERAL.

3c.50-60m - VERY FINE ISOLATED SPECKS OF SCHEELITE. (0.1% WO_3)

34.8-34.10. FINE DISSEMINATED SCHEELITE. (0.5%).

35.50-35.6c. 0.8% SCHEELITE.

41.56-41.26m VERY COARSE HIGH GRADE (1.0%) SCHEELITE.

42.8-44.6m - SPASMODIC BUT COARSE SCHEELITE. VARIABLE GRADE. FROM 0.2 TO 1.0%.

45.6-46.50 - EXCELLENT COARSE SCHEELITE MINERAL - > 1.0% WO_3.

SPASMODIC MEDIUM TO COARSE WHITE TO YELLOW SCHEELITE GRADE EST - 0.3 - 0.4% WO_3.

GEOLOGY

25.40m SKARN.

GARNET, EPIDOTE, DIOPSIDE SKARN MEDIUM TO COARSE GRAINED.

EPIDOTE RICH - 27.0 - 27.80m.

29.20m SKARN.

DIOPSIDE GARNET SKARN PARTIALLY WEATHERED TO 39.0m.

34.0

40.50. SKARN.

GARNET MAGNETITE SKARN. 30% MAGNETITE, COARSE SCHEELITE CRYSTALS.

45.00. SKARN.

MAGNETITE SKARN. 70% MAGNETITE. COARSE SCHEELITE. LITTLE EPIDOTE.

46.50. SKARN.

MAGNETITE EPIDOTE SKARN.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY
CONTRACTOR
CORE
CASING
DATE

LOGGED BY
STARTED 23 OCT. 1981
FINISHED 4 NOV. 1981.

713170 032

SCALE 1:100

LENGTH 66.14 NORTHING 5407220.5
AZIMUTH 270° EASTING 397166.3
DIP AT COLLAR 56°W ELEVATION 4728
LOCATION KARA NORTH – 266 ZONE.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 307 PAGE 1 OF 3
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm WO3	FRACTURING	BEDDING	GEOLOGY	MINERAL
100		1.0	2850			Tms0	
50.40		1.0	410				
86.9		1.0	300				
53.04		1.0	1060			Tdg.	
100		1.0	640				
55.16		1.0	1050				
100		1.30	580				
56.38							
100		1.67	150				
57.36							
100		1.12	10			Q	
57.80							
100		1.0	<10				
61.87		1.0	10				
100		1.0	30			Qe	
64.92		1.0	<10				
100		1.14	10				
66.14							

MINERALISATION	50.40m GEOLOGY
SPASMODIC MEDIUM GRAINED SCHEELITE 48.0 TO 50.50m. (0.2% WO_3).	SKARN.
	DIOPSIDE RICH SKARN. SOME GARNET. GREYISH – BROWN.
53.50 – 54.40m. FINE YELLOW DISSEM SCHEELITE.	
56.80 – 56.85m – FINE WELL DISSEMINATED SCHEELITE	
	57.00m.
NIL WO_3	QUARTZITE.
	61.80
NIL WO_3.	QUARTZ – EPIDOTE FACIES.
	66.14
	E.O.H. 66.14m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY
CONTRACTOR
CORE
CASING
LOGGED BY
DATE
STARTED 23 OCT. 1981
FINISHED 6 NOV 1981

2699182 NOV'81.

(REC) RECOVERY, CONSIDER >90% EXCEPT AS NOTED

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

266 ZONE.

307. 1/3

SECTION:				ASSAY					AVE:			AVE: 033		
SAMP NO.	REC WX	INTERVAL	LGTH	ppm WO3					INVL	LGTH %M-%	WT AR AV.	INVL	LGTH %M-%	WT AR AV.
D307 1	CORE	3.05 - 4.00	0.95	100								7	13	171
2	"	4.0 - 5.0	1.0	130										
3	"	5.0 - 6.0	1.0	95										
4	"	6.0 - 7.0	1.0	200										
5	"	7.0 - 11.0	4.0	660										
6	"	11.0 - 12.0	1.0	190										
7	"	12.0 - 14.0	2.0	1300										
8	"	14.0 - 16.0	2.0	1300										
9	"	16.0 - 17.0	1.0	1250										
10	"	17.0 - 18.0	1.0	640										
11	"	18.0 - 19.0	1.0	490										
12	"	19.0 - 20.0	1.0	240										
13	"	20.0 - 21.0	1.0	110										
14	"	21.0 - 22.0	1.0	120										
15	"	22.0 - 23.0	1.0	75										
16	"	23.0 - 24.0	1.0	30										
17	"	24.0 - 25.0	1.0	20										
18	"	25.0 - 26.0	1.0	90										
19	"	26.0 - 27.0	1.0	260										
20	"	27.0 - 28.0	1.0	60										
21	"	28.0 - 29.0	1.0	740										
22	"	29.0 - 30.0	1.0	960										
23	"	30.0 - 31.0	1.0	1100										
24	"	31.0 - 32.0	1.0	860										
25	"	32.0 - 33.0	1.0	500										
26	"	33.0 - 34.0	1.0.	230										

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

COMMENT

PROJECT KARA. N. 266 ZONE.

D.D.H. 307.

LIBRARY

2699182. NOV '81

307. 2/3

(REC) RECOVERY, CONSIDER 100% EXCEPT AS NOTED KARA. N. 266 ZONE

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

034

SECTION:					ASSAY				AVE:			AVE:		
SAMP NO.	REC WX	INTERVAL	LGTH		ppm WO3				INVL	LGTH SM-%	WT AR AV.	INVL	LGTH SM-%	WT AR AV.
D307 27	CORE.	34.0-35.0	1.0		1700								71317	2
28	"	35.0-36.0	1.0		1650									
29	"	36.0-37.0	1.0		180									
30	"	37.0-38.0	1.0		640									
31	"	38.0-39.0	1.0		230									
32	"	39.0-40.0	1.0		190									
33	"	40.0-41.0	1.0		1.84%									
34	"	41.0-42.0	1.0		2700									
35	"	42.0-43.0	1.0		6100									
36	"	43.0-44.0	1.0		4250									
37	"	44.0-45.0	1.0		200									
38	"	45.0-46.0	1.0		1.08%									
39	"	46.0-47.0	1.0		2.02%									
40	"	47.0-48.0	1.0		3050									
41	"	48.0-49.0	1.0		3250									
42	"	49.0-50.0	1.0		3600									
43	"	50.0-51.0	1.0		2850									
44	"	51.0-52.0	1.0		410									
45	"	52.0-53.0	1.0		300									
46	"	53.0-54.0	1.0		1060									
47	"	54.0-55.0	1.0		640									
48	"	55.0-56.0	1.0.		1050									
49	"	56.0-57.30	1.30		660									
50	"	57.30-68.82	1.52.		150									
51	"	68.82-60.0	1.12		10									
52.	"	60.0-61.0	1.0.		<10									

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

COMMENT

PROJECT KARA. N. 266 ZONE.

DDH 307

PREP [illegible] CORE 1/2 SPLIT. LIBRARY D.D.H. 307 5/3

JOB. N° 2544/82
2699/82. NOV '81

(REC) RECOVERY, CONSIDER 100% EXCEPT AS NOTED KARA. N. 266 ZONE.

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

SECTION:				ASSAY					AVE:			AVE:		
SAMP NO.	REC WX	INTERVAL	LGTH		ppm WO_3				INVL	LGTH WO_3-%	WT AV.	INVL	LGTH WO_3-%	WT AV.
D267 53	CORE	61.0-62.0	1.0		10								71317	
54	"	62.0-63.0	1.0		30									
55	"	63.0-64.0	1.0		<10									
56	"	64.0-65.0	1.0		<10									
57	"	65.0-66.14	1.14		10.									

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

COMMENT PROJECT

EXPLORATION DEPARTMENT. 036

RECOVERY SHEET 713174

HOLE No. 307 | PAGE 1 OF 1/2.

CORE RECOVERY (CR) > 98% EXCEPT AS NOTED

KARA. N. 266 ZONE.

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0.00	3.05	3.05	NO CORE.						
3.05	3.96	0.91	0.80	87.9%					
3.96	4.88	0.92	0.80	86.96%					
4.88	5.79	0.91	0.80	87.91%					
5.79	6.10	0.31	0.31	100%.					
6.10	7.01	0.91	0.50	54.95%.					
7.01	10.67	3.66	0.25	6.83%					
10.67	11.58	0.91	0.46	50.55%					
11.58	14.02	2.44	0.75	30.7%					
14.02	14.94	0.92	0.20	21.74%					
14.94	15.85	0.91	0.18	19.78%.					
15.85	16.76	0.91	0.57	62.64%.					
16.76	17.68	0.92	0.22	23.91%					
17.68	18.59	0.91	0.91	100%.					
18.59	20.42	1.83	1.41	77.05%.					
20.42	21.34	0.92	0.92	100%					
21.34	22.25	0.91	0.91	100%					
22.25	24.08	1.83	1.70	92.84%.					
24.08	26.82	2.74	2.74	100%					
26.82	29.26	2.44	2.44	100%.					
29.26	29.57	0.31	0.31	100%.					
29.57	32.00	2.43	2.18	89.7%.					
32.00	33.83	1.83	1.83	100%.					
33.83	35.66	1.83	1.83	100%.					
35.66	37.19	1.53	1.53	100%.					
37.19	37.80	0.61	0.61	100%.					
37.80	39.01	1.21	1.21	100%.					
39.01	39.32	0.31	0.31	100%.					
39.32	40.34	1.02	1.02	100%.					
40.34	42.37	2.03	1.66	81.77%					
42.37	45.42	3.05	3.06	100%					
45.42	47.55	2.13	2.13	100%.					
47.55	49.68	2.13	2.13	100%					
49.68	50.90	1.22	1.22	100%.					
50.90	53.04	2.14	1.86	86.9%					
53.04	55.16	2.12	2.12	100%.					
55.16	56.38	1.22	1.22	100%					
56.38	56.69	0.31	0.31	100%					
56.69	57.30	0.61	0.61	100%					
57.30	57.60	0.30	0.30	100%					
57.60	58.82	1.22	1.22	100%.					

[illegible] MINES (AUST) PTY. LTD
EXPLORATION DEPARTMENT. 037

713175

RECOVERY SHEET

HOLE No. 307 | PAGE 1 OF 2/2

CORE RECOVERY (ca) > 95% EXCEPT AS NOTED KARA N. 266 ZONE.

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
58.82	61.87	3.05	3.05	100%					
61.87	64.92	3.05	3.05	100%					
64.92	66.14	1.22	1.22	100%.					
E.O.H	66.14.								

713176 038

SCALE 1:100.

LENGTH 67.97m NORTHING 5425723·0
AZIMUTH 98° EASTING 397664·8
DIP AT COLLAR 65°E ELEVATION 543·8
LOCATION BOBS BONANZA.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 308 PAGE 1 OF 1/3
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE: INTERVAL	FEATURE: ANALYSIS	FRACTURING	BEDDING	GEOLOGY	MINERAL
N.C						NC (Tu)	
4·57							
52·28		1·43	160			W Tu	
6·10							
100		1·0	45				
7·01							
87·91		1·0	15				
7·92							
55·12		1·0	130				
9·19							
82·75		1·0	140				
10·06							
95·4		1·0	170				
10·67							
77·06		1·0	140			x Tge	
11·35							
65·06		1·0	200				
13·11							
83·21		1·0	150				
14·0							
65·18		1·0	220				
14·94							
15·24	ICE					Tgd	
96·5		1·0	140				
14·52							
78·21		1·0	230			x Tgd.	
15·29							
100		1·0	25				
19·81							
98·4			190			Tgd.	
20·73							
92·2							
23·52						Tad.	
83·6							
24·69							

MINERALISATION
Zones of Oxidation:-
X: Y = 9.15m
Y: F = 20.58m.

NO SCHEELITE MINERALISATION IN ANY SECTION OF HOLE.

GEOLOGY

NO CORE - CASED TO 4·57m.
OVERBURDEN + WEATHERED SKARN AND CLAYS.

X

4·57m.
SKARN.
SOFT WEATHERED LIMONITIC CLAYS AND SKARNS.
FRIABLE, RUBBLY, ONLY A LITTLE REMNANT MAGNETITE.
YELLOWISH-BROWN COLOR.
8·06m.

SKARN.
WEATHERED SKARN, PROBABLY REPRESENTING GARNET-EPIDOTE FACIES.
MEDIUM GRAINED, BROWNISH WITH SLIGHT GREENISH DISCOLORATION.

9.15m

Y

14·94m.
SKARN.
FRESH GARNET DIOPSIDE SKARN.
GREENISH BROWN.
15·66m.
SKARN.
GARNET DIOPSIDE SKARN.
MEDIUM GRAINED TEXTURE.
WEATHERED, BROKEN, RUBBLY GROUND
19·36m.
SKARN.
COARSE EQUIGRANULAR GARNET DIOPSIDE SKARN.
20·73m. LIGHT GREY TO BROWN.

20.58m.

F

SKARN.
FINE GRAINED EPIDOTE-DIOPSIDE SKARN.
GREYISH-GREEN COLOR.
FRESH.
LITTLE (5-10%) MAGNETITE CONTENT.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.
CONTRACTOR McINTYRE MINES (P.N.G.) COMPANY
CORE NX
CASING NX (4·67m)
DATE 12 DEC 1981.
LOGGED BY CHW. 9. NOV. 1981.
TYPED 17. NOV. 1981.

713177 039

SCALE 1:100

LENGTH 67.97m | NORTHING 6425723.0
AZIMUTH 90° | EASTING 397684.8
DIP AT COLLAR 65°E | ELEVATION 543.8
LOCATION BOBS BONANZA.

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 308 | PAGE 1 OF 2/3
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
100					Ted.	
27.18						
100					Tgd.	
30.18						
100						
32.80					Tma.	
88.8						
33.53						
100						
34.58						
61.8						
38.10						
100					Tgd.	
39.40						
47.7						
39.93						
91.13						
42.37						
100					Tgd.	
45.92						
100					Tmqo.	
48.40						
91.6						

MINERALISATION

NIL SCHEELITE MINERALISATION.

F

Y

F

GEOLOGY

AS ABOVE.

26.60m.

SKARN.

DIOPSIDE GARNET SKARN.
COARSE GRAINED + VUGGY.
LIGHT BROWN COLOUR.

30.18m.

SKARN.

MAGNETITE AMPHIBOLE SKARN.
GENERALLY FINE GRAINED TEXTURE
BUT COARSE BETWEEN 32.0 - 33.0m.
WEATHERED ALONG FRACTURES.
DARK GREY TO GREEN COLOUR.

35.50m.

SKARN.

PARTIALLY WEATHERED
GARNET DIOPSIDE SKARN.
LIGHT BROWN + COARSE GRAINED
BUT FRACTURED + RUBBY.

37.50m.

41.50m.

41.50m.

SKARN.

AS ABOVE - RUN - GARNET DIOPSIDE SKARN, BUT NOT FRACTURED + OXIDISED.
FINE TO MEDIUM GRAINED TEXTURE.
LIGHT BROWN.

46.60m.

SKARN.

BANDED MAGNETITE SKARN.
FINE GRAINED TEXTURE - HOMOGENEOUS
40% MAGNETITE CONTENT
FRESH + HARD

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES (P. McCORMACK)
CORE NX NX (4.157m)
CASING

DATE 12 DEC 1981.

LOGGED BY CHW. 9 NOV 1981
STARTED 17 NOV 1981

713178 040

SCALE 1:100

LENGTH 67.97m NORTHING 6425728.0
AZIMUTH 90° EASTING 397684.8
DIP AT COLLAR 65°E ELEVATION 543.8
LOCATION BOBS BONANZA.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 308 PAGE 1 OF 3
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL	MINERALISATION	GEOLOGY
91.6								SKARN (AS ABOVE) BUT GRADATIONAL CONTACT TO:-
94.2					Q.			51.40m. QUARTZITE. FINE GRAINED GREYISH GREEN CLT.
89.4					Ta			52.40m. SKARN. AMPHIBOLE SKARN. GREENISH - SOFT, SLIGHTLY WEATHERED.
100					Ta			54.20m. GREENISH RIBBONING ACTINOLITE. AS. ABOVE BUT WITH INCREASING ARENACEOUS CONTENT.
100					Q		NIL SCHEELITE MINERALISATION.	55.50m. ARENACEOUS UNIT. FINE GRAINED METAMORPHOSED SANDSTONES + QUARTZITES SLIGHTLY SKARNIFIED - LITTLE fe. LIGHT GREY TO BROWN. JOINTED. LITTLE REMNANT BANDING. SKARN BANDS INCREASING TO END OF RUN.
100					T_{m40} g			61.0m. SKARN MAGNETITE GARNET SKARN. MAGNETITE CONTENT - 40% SLIGHTLY WTHED ALONG FRACTURES. LITTLE MINOR GRANITE VEINING.
100					Gr.			65.0m. GRANITE. MEDIUM TO COARSE GRAINED PINKISH COLOUR LITTLE EPIDOTISATION.
								67.97m. E.O.H. 67.97m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.
CONTRACTOR McINTYRE MINES / P. McCORMACK
CORE NX
CASING NX 4.57m

LOGGED BY CHN. DATE 12 DEC. 1981
DRAWN 2 NOV. 1981
FINISHED 17 NOV. 1981

MODEL JOB N° 2816/82.

18 DEC. 1981.

308

BOBS BONANZA.

7131179

SECTION:

	Feet	Metres Interval	Lgth	ASSAY % WO3					AVE: INVL	LGTH %M·%	INT AV	AVE: INVL	LGTH %M·%	INT AV.
		0·0 - 4·57	4·57	N/C.										
1	CORE	4·57 - 6·0	1·43	160										
2		6·0 - 7·0	1·0	45										
3		7·0 - 8·0	1·0	15										
4		8·0 - 9·0	1·0	130										
5		9·0 - 10·0	1·0	140										
6		10·0 - 11·0	1·0	170										
7		11·0 - 12·0	1·0	140										
8		12·0 - 13·0	1·0	240										
9		13·0 - 14·0	1·0	150										
10		14·0 - 15·0	1·0	220										
11		15·0 - 16·0	1·0	140										
12		16·0 - 17·0	1·0	230										
13		17·0 - 18·0	1·0	25										
14		18·0 - 19·0	1·0.	190										

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

MOUNT ISA MINES (AUST) PTY. LTD.
EXPLORATION DEPARTMENT.

713180

042

RECOVERY SHEET

HOLE No. 308 | PAGE / OF 1/1

CORE RECOVERY (CR) ≥ 90% EXCEPT AS NOTED

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0 00	4.57	4.57	NIL	——					
4.57	6.10	1.53	0.80	52.28%					
6.10	7.01	0.91	0.91	100%					
7.01	7.92	0.91	0.80	87.91					
7.92	9.14	1.27	0.70	55.12%					
9.14	10.06	0.91	0.72	82.75%					
10.06	10.67	0.61	0.58	95.1%					
10.76	11.85	1.09	0.84	77.36%					
11.85	13.11	1.26	0.82	65.08%					
13.11	14.00	0.81	0.35	43.21%					
14.00	14.94	0.94	0.30	66.18%					
14.94	15.24	0.30	0.30	100%					
15.24	16.50	1.26	1.22	96.8%					
16.50	18.29	1.79	1.40	78.21%					
18.29	19.51	1.22	1.22	100%					
19.51	20.73	1.22	1.20	98.4%					
20.73	22.86	2.13	1.75	82.2%					
22.86	24.69	1.83	1.53	83.6%					
24.69	27.13	2.44	2.44	100%					
27.13	30.18	3.05	3.05	100%					
30.18	32.00	1.82	1.82	100%					
32.00	33.53	1.53	1.36	88.8%					
33.53	36.58	3.05	3.05	100%					
36.58	38.10	1.52	0.94	61.8%					
38.10	38.40	0.30	0.30	100%					
38.40	39.93	1.53	0.73	47.7%					
39.93	42.37	2.44	2.27	91.13%					
42.37	45.42	3.05	3.05	100%					
45.42	48.48	3.06	3.06	100%					
48.40	51.51	3.11	2.85	91.6%					
51.51	52.46	0.95	0.80	84.2%					
52.46	54.25	1.79	1.60	89.4%					
54.25	56.38	2.13	2.13	100%					
56.38	59.43	3.05	3.05	100%					
59.43	62.48	3.05	3.05	100%					
62.48	65.53	3.05	3.05	100%					
65.53	67.97	2.44	2.44	100%					
67.97									
E.O.H	67.97	m							

SCALE 1:100

LENGTH 64.86m NORTHING 6425828.1
AZIMUTH 90° EASTING 397687.1
DIP AT COLLAR 60°E ELEVATION 645.0
LOCATION BOBS BONANZA.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 309 PAGE 1 OF 1/3
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE mm WIDE	FRACTURING	BEDDING	GEOLOGY	MINERAL
N.C.						NC.	
3.09							
100						B.	
3.96							
82							
5.16							
57.9						wB.	
7.81							
84.2							
8.53							
68.0						wB.	
9.75							
62.25							
11.28							
72.8						wB.	
12.50							
91.0							
13.72							
90.2						wB.	
15.94							
67.0						↓	
16.76							
98.4							
17.37							
97.7							
17.68							
100							
20.73							
100						Bs.	
22.56							
100							
23.16							
95.7							
24.66							
59.0						To 25.40m.	

MINERALISATION
X/Y = 26.0m
Y/F = 38.50m.

GEOLOGY

NO CORE - CASED TO 3.09m (LARGELY OVERBURDEN BULLDOZER FILL).
3.09m

BASALT.
TERTIARY BASALT.
HARD UNWEATHERED MASSIVE FINE TO MEDIUM GRAINED OLIVINE BASALT.
NIL.
5.20m.

BASALT.
SOFT WEATHERED CREAMISH BROWN CLAYS EX BASALT.
VESICLES ("1/8") OF CREAM SOFT MATERIAL.
NIL.
8.50m.

BASALT.
SOFT WEATHERED VERY FINE MEDIUM BROWN COLOURED CLAYS EX BASALT.
RELICT VESICLES LESS OBSERVABLE.
NIL
11.60m.

BASALT/CLAYS.
CREAMISH BROWN - LIGHT BROWN CLAYS LIGHT WEIGHT, WEATHERED WITH RETINANT VESICULAR STRUCTURES - EX BASALT.
INCLUDES SOME NON-DESCRIPT CLAY AND SANDY HORIZONS.
VESICULAR BETWEEN 17.50 - 18.50m.
NIL. X.
18.56m.

AS ABOVE.
18.56m.

TERTIARY SEDIMENTS.
NON DESCRIPT CLAYS, SILTS, SANDS VARIOUS COLOURS, LIGHT IN WEIGHT. WEATHERED.
TRANSITION ZONE TO UNDERLYING RUN.
NIL.
25.40m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.

CONTRACTOR McINTYRE MINES (P. O'CONNOR)
CORE N.X.
CASING 3.09m.

LOGGED BY CTW. DATE 3 DEC. 1981
STARTED 25 NOV 1981
FINISHED 25 NOV 1981

713182 044

SCALE 1: 100.

LENGTH 64.86m NORTHING 5425823.6
AZIMUTH 90° EASTING 397687.1
DIP AT COLLAR 60°E ELEVATION 6545.0
LOCATION BOB BONANZA.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 309 PAGE / OF 2/3
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm WO_3	FRACTURING	BEDDING	GEOLOGY	MINERAL
25.30						B_S	
66.7							
27.13						T_u.	
70.5							
27.74							
86.7							
28.34							
100							
29.87							
100							
31.70							
100							
32.31						Q_S.	
100							
34.14							
100							
34.75							
100							
35.46							
100							
35.36							
37.4							
36.27							
65.57							
37.49		1.0	440			T_{ed}	
100							
38.71		1.0	260				
82.7		1.0	3650				
40.0							
41.84		1.0	14450				
97.5		1.0	1750			T_{le}	
43.28		1.0	1950			T_e	
100		1.0	75				
45.0		1.0	46000				
45.42		1.0	3200			T_{gd}	
100		1.0	2250				
46.85		1.0	4950				
100		1.0	1.00%			$T_{m_{60}}$.	
		1.0	1000				
50.0							

MINERALISATION

NIL.
WO_3 MINERALISATION.

25.40m. GEOLOGY

SKARN (UPPER UNIT)
WEATHERED SKARN, SLIGHTLY IMPREGNATED WITH IRON, AND WITH A LARGE ADMIXTURE OF SKARNIFIED ARENACEOUS MEMBERS.
HEAVIER IN WEIGHT.
FRACTURED, JOINTED.

25.80m.

UPPER ARENACEOUS UNIT.

28.0 - 29.0m. - SLIGHTLY SKARNIFIED FINE GRAINED SANDSTONE, SLIGHTLY FRACTURED AND JOINTED WITH A LITTLE IRON IMPREGNATION.

29.0 - 30.20m. - GREY SANDSTONE, HIGHER DEGREE OF SILICIFICATION.

30.20 - 31.80. - SANDSTONE-GRITS - RUBBLY, COARSE, CREAM GREY, SLIGHTLY WEATHERED, FRACTURED.

NIL.

31.80 - 33.50 - LIGHT BROWN SANDSTONE/QUARTZITES. SLIGHT IRON IMPREGNATION.

33.50

33.50 - 36.0 - SILICIFIED SANDS AND GRITS.

36.0 - 37.30 - HARD SILICIFIED QUARTZITE.

37.30m.

SKARN (LOWER UNIT?)

YELLOW SCHEELITE CRYSTALS 38.60 - 38.60m.

STRONG CONC YLW. SCH. CRYSTALS. 39.45 - 39.60.

40.80 - 42.30m - GOOD WELL DISTRIBUTED CONCENTRATION OF COARSE SCHEELITE 0.48 - 65.69.

QUARTZ, EPIDOTE, DIOPSIDE SKARN.
FRESH - UNWEATHERED.
MAGNETITE BECOMING MORE PROMINENT WITH DEPTH.

41.84m

DIOPSIDE, EPIDOTE SKARN.
COARSELY CRYSTALLINE.

F 44.50m

LIGHT TO MEDIUM GREEN EPIDOTE SKARN
FINE GRAINED
LITTLE OR NO MAGNETITE.

44.40m.

EXCELLENT COARSE FRESH SCHEELITE ZONES
44.75 - 45.20m
45.70 - 46.6m.

GARNET, EPIDOTE, DIOPSIDE SKARN.
LARGELY CRYSTALLINE.
IRON BECOMING MORE PROMINENT.

46.60m.

DISSEMINATED SPECKS AND COARSE BLEBS OF SCHEELITE.
46.6 - 48.80m
AVERAGE = 0.6% WO_3

MAGNETITE SKARN
WITH DIOPSIDE, GARNET, LITTLE EPIDOTE.
FRESH
MAGNETITE CONTENT - 60%

48.6 - 61.60
ONLY FEW ISOLATED SPECKS OF SCHEELITE

61.60m

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES (P. McCANNICK) MV 3.09m
CORE CASING

LOGGED BY CHW. DATE 3 OCT. 1981.
STARTED 15 NOV 1981
FINISHED 26 NOV. 1981.

713183045

SCALE 1:100

LENGTH 54·86m NORTHING 6425828·4
AZIMUTH 90° EASTING 397687·1
DIP AT COLLAR 60°E ELEVATION 645·0
LOCATION BOBS BONANZA.

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

HOLE No 309 PAGE 2 OF 3

PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE: INTERVAL	FEATURE: ppm NO3	FRACTURING	BEDDING	GEOLOGY	MINERAL	MINERALISATION	SKARN(CONTIN) GEOLOGY
100									
80 90		1·0	680			Im_{50}		SEE ABOVE	MAGNETITE SKARN
93·4									67·50m.
52·12		1·0	40						GRANITE
						Gr		NIL.	FINE TO MEDIUM GRAINED PINK GRANITE. SHARP CONTACT, BUT EPIDOTISATION FOR 60cm at CONTACT ZONE
93·4									
64·86									54·86m
									E.O.H - 64·86m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR N'INTIRE MINES C/- McCRAMMOND
CORE N.X.
CASING 3·0m.

LOGGED BY PHN. DATE 2 DEC. 1981.
STARTED 18 NOV 1981
FINISHED 25 NOV 1981

JOB. N°. Ac. 8093/82 SPLIT. LIBRARY

24 DEC 1981.

(REC) RECOVERY, CONSIDER 95% EXCEPT AS NOTED

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

BOBS BONANZA | 309 | 046 | 1/1

71184

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.
D309														
1		37.0 - 38.0	1.0		440									
2		38.0 - 39.0	1.0		260									
3		39.0 - 40.0	1.0		3660									
4		40.0 - 41.0	1.0		1450									
5		41.0 - 42.0	1.0		1750									
6		42.0 - 43.0	1.0		1950									
7		43.0 - 44.0	1.0		75									
8		44.0 - 45.0	1.0		9600									
9		45.0 - 46.0	1.0		3200									
10		46.0 - 47.0	1.0		2250									
11		47.0 - 48.0	1.0		4950									
12		48.0 - 49.0	1.0		1.00%									
13		49.0 - 50.0	1.0		1000									
14		50.0 - 51.0	1.0		680									
15		51.0 - 62.0.	1.0.		90.									

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

COMMENT

PROJECT BOBS. BONANZA.

DDH 309

MOUNT ISA MINES (A.S.T.) PTY. LTD.
EXPLORATION DEPARTMENT.

047

RECOVERY SHEET 713185

HOLE No. 309 | PAGE / OF 1 / 1

CORE RECOVERY (CR) ≥ 95% EXCEPT AS NOTED

BOBS BONANZA.

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0.00	3.04	3.04	NO CORE	—					
3.04	3.96	0.87	0.87	100%					
3.96	5.18	1.22	1.00	82%					
5.18	7.01	1.83	1.06	57.9%					
7.01	8.53	1.52	1.28	84.2%					
8.53	9.75	1.22	0.83	68%					
9.75	11.28	1.53	0.80	52.2%					
11.28	12.50	1.22	0.90	73.8%					
12.50	13.72	1.22	1.11	91%					
13.72	14.94	1.22	1.10	90.2%					
14.94	16.76	1.82	1.22	67.0%					
16.76	17.37	0.61	0.57	93.4%					
17.37	17.68	0.31	0.24	45.7%					
17.68	20.73	3.05	3.05	100%					
20.73	22.56	1.83	1.83	100%					
22.56	23.16	0.60	0.60	100%					
23.16	24.08	0.92	0.88	95.7%					
24.08	25.30	1.22	0.72	59.0%					
25.30	27.13	1.83	1.22	66.7%					
27.13	27.74	0.61	0.43	70.5%					
27.74	28.34	0.60	0.52	86.67					
28.34	29.87	1.53	1.53	100%					
29.87	31.70	1.83	1.83	100%					
31.70	32.31	0.61	0.61	100%					
32.31	34.14	1.83	1.83	100%					
34.14	34.75	0.61	0.61	100%					
34.75	35.06	0.31	0.31	100%					
35.06	35.36	0.30	0.30	100%					
35.36	36.27	0.91	0.34	37.4%					
36.27	37.49	1.22	0.80	65.57%					
37.49	38.71	1.22	1.22	100%					
38.71	40.84	2.13	1.89	88.7%					
40.84	43.28	2.44	2.38	97.5%					
43.28	45.42	2.14	2.14	100%					
45.42	47.85	2.43	2.43	100%					
47.85	50.90	3.05	3.05	100%					
50.90	52.12	1.22	1.14	93.4%					
52.12	54.86	2.74	2.56	93.4%					
E.O.H	54.86								

713186 048

SCALE 1:100

LENGTH 105·11 NORTHING 5425824·0
AZIMUTH 90° EASTING 397687·1
DIP AT COLLAR 83°E ELEVATION 545·0
LOCATION BOBS BONANZA.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 310 PAGE 1 OF 1/5.
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm Wo3.	FRACTURING	BEDDING	GEOLOGY	MINERAL
						Td.	
NO CORE ROLLER BIT.		NOT SAMPLED.				Tds.	
26.42							
24.6						Tts.	
22.25 – 22.86							
81 c.							

MINERALISATION

LEVELS OF OXIDATION.
X/Y - 35·50m.
Y/F - 40·36m.

GEOLOGY

TERTIARY BASALT AND SEDIMENTS.
GROUND TO 20·42m - ROLLER BIT.
1·0m - OVERBURDEN.
1·6 - 7·50m - BASALT + CLAY.
7·50m - 20·42 - TERTIARY SEDIMENTS CLAYS + SANDS. SOFT - EASY PENETRATION.

20·42m.

TERTIARY SEDIMENTS. SEE BELOW.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES. P McCORMACK
CORE NX
CASING NX.

LOGGED BY CHW. DATE 17 DEC 1981
STARTED 26 NOV 1981
FINISHED 2 DEC. 1981.

713187 049

SCALE 1:100

LENGTH 105.11m. NORTHING 5425828.4
AZIMUTH 90° EASTING 397687.1
DIP AT COLLAR 83°E ELEVATION 545.0
LOCATION BOBS BONANZA.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 210 PAGE 2/5
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm WO3	FRACTURING	BEDDING	GEOLOGY	MINERAL
81.0							
27.43							
79.8							
29.26							
100							
29.57							
74.3						Tbs	
22.78							
100							
32.61							
91.9							
34.58							
52.7						Ss	
39.01							
78.1							
46.54						Tgd	
89.7						Q	
42.67							
96.7							
45.11							
93.6							
44.93						Tgd	
100							
46.77							
83.1							

25.0 30.0 35.0 40.0 45.0 50.0 60.0

MINERALISATION

X

35.50.

NIL MINERALISATION.

Y.

40.65m.

F.

NO MINERALISATION.

GEOLOGY

TERTIARY SEDIMENTS.

SOFT, WEATHERED CLAYS, SILTS AND SANDSTONES.

VARIEGATED COLOURS - OVERALL BROWNISH-ORANGE.

GRADATIONAL CONTACT TO SKARN? AT 36.00m.

36.85m.

ARENACEOUS UNIT.

SANDSTONE - QUARTZITE.

YELLOWISH BROWN - FINE GRAINED, LITTE Fe IMPREGNATION.

RUBBLY & FRIABLE.

39.06m.

SKARN.

GARNET DIOPSIDE SKARN.

COARSE GRAINED

40.65m.

QUARTZITE.

VERY FINE GRAINED GREYISH GREEN QUARTZITE.

43.10m.

SKARN.

LIGHT GREY-BROWN, MEDIUM TEXTURED GARNET DIOPSIDE SKARN.

RUBBLY, DISSEMINTED.

SLIGHTLY WEATHERED IN RUNS.
44.80 - 46.00m.
49.00 - 58.66m.

87.55m.

AS ABOVE - GARNET DIOPSIDE SKARN.
BUT COARSER GRAINED.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES. P. McCORMACK.
CORE NY NX.
CASING

LOGGED BY C.A.W. DATE 17. DEC. 1980.
STARTED 26 NOV 1981
FINISHED 9 DEC 1981.

713188 U50

SCALE 1:100

LENGTH 105·11m NORTHING 5425923·6
AZIMUTH 90° EASTING 397687·1
DIP AT COLLAR 83°E ELEVATION 545·0
LOCATION BOBS. BONANZA.

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

HOLE No 310 PAGE 3/5

PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
83·1						
80 40						
80·1						
52·66						
100						
53·95						
98·9						
56·08						
46·7						
57·60					Tgd.	
75·8						
62·51						
85·2						
60 34						
75·4						
62·39						
100						
65·22						
100						
66·13						
100						
66·42						
100					Qa.	
67·65						
77·0						
69·17						
100						
71·91					Tgl.	
100						
74·65						

MINERALISATION

NIL MINERALISATION.

F.

GEOLOGY

GARNET DIOPSIDE SKARN. (CONTINUED).
COARSE GRAINED – VUGGY.
BROWNISH GREY GREENY BROWN.
WOULD CLASSIFY AS FRESH TO PARTIALLY WEATHERED.
NOT COMPETENT.

ARENACEOUS MEMBERS, WHICH ARE SLIGHTLY SILICIFIED BETWEEN 64·50 - 55·35m AND 59·20 - 60·10m.

65·00m.

ARENACEOUS MEMBERS.
SANDSTONE.
FINE GRAINED, MOTTLED GREYISH BROWN.
FRESH.
FE IMPREGNATIONS ALONG FRACTURES.

69·90m.

SKARN.
GARNET DIOPSIDE (EPIDOTE) SKARN.
MEDIUM GRAINED, VUGGY.
LITTLE WEATHERING ALONG FRACTURES.

↓ 77·30m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES / A. McCORMACK
CORE NX
CASING NX.

DATE 17 DEC / 981

LOGGED BY C.H.W.
STARTED 26 NOV 1981
FINISHED 9 DEC 1981.

713189 051

SCALE 1:100

LENGTH 105.11m NORTHING 5425928.0
AZIMUTH 90° EASTING 397687.1
DIP AT COLLAR 83°E ELEVATION 545.0.
LOCATION BOBS BONANZA.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 310 PAGE 1 OF 4/6
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL	MINERALISATION	GEOLOGY
75.0.								
100								
76.48					Tgdc.			AS ABOVE.
100								77.30m
77.70								ARENACEOUS UNIT.
95.1							F	FINE GRAINED "SKARNIFIED" SANDSTONE AND QRITE.
80.0								BANDED - Fe IMPREGNATED LAYERS.
80.75					Qs (T)			SKARN MEMBER - 81.50 - 82.60 m.
738								
81.97								
85.5								
83.49								83.60m.
61.5					F Cl		X	CONTACT - FAULT? ZONE.
85.0							X	YELLOWISH ORANGE SOFT ROCK RUBBLE + CLAYS.
85.93								86.00m.
94.0								ARENACEOUS UNIT/SKARN
87.76					Q+ Tgd			"SKARNIFIED" SANDSTONE + QUARTZITE.
84.5								WITH GARNET DIOPSIDE SKARN.
89.69								89.40m.
90.0							F.	SKARN.
82.2					Tm.		NO MINERALISATION EXCEPT 93.50 - 94.15m. FINE DISSEMINATED SCHEELITE.	MAGNETITE WITH EPIDOTE SKARN. HOMOGENEOUSLY FINE GRAINED.
								91.60m.
92.63					Tma			SKARN.
76.3								MAGNETITE - AMPHIBOLE SKARN.
94.15								VERY, COULD ALMOST BE CLASSIFIED AS PARTIALLY WITHER.
								92.00 - 94.15 - RUBBLY FRACTURED ZONE?
95.0								94.76m.
100								ARENACEOUS MEMBER.
93.67								Fe IMPREGNATED SANDSTONE.
93.4								YELLOWISH ORANGE
97.19								JOINTED.
								97.20m.
100					Qs.			FINE GRAINED GREYISH GREEN
99.32								FRESH. SANDSTONES + QUARTZITES.
								LITTLE EPIDOTE.
101.0								V 103.00m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES (P. O'CONNOR).
CORE NX
CASING NX.

LOGGED BY C.H.W. DATE 17 DEC. 1981.
STARTED 26 NOV 1981
FINISHED 9 DEC. 1981.

KMV 052

SCALE 1:100

LENGTH 105·11m.	NORTHING 5425828·0
AZIMUTH 90°	EASTING 397687·1
DIP AT COLLAR 83°E	ELEVATION 545·0
LOCATION BOBS BONANZA.	

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

HOLE No 210 PAGE 6 OF 6

PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
67·5					Qs.	
102·66						
100					Gr	
105·11						

MINERALISATION	GEOLOGY
	AS ABOVE (ARENACEOUS MEMBER).
	102·90m. GRANITE. FINE GRAINED - PINK. LITTLE EPIDOTE ALONG FRACTURES.
	105·11m E.O.H. 105·11m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES LD. N'CARMEN
CORE NY
CASING NX

LOGGED BY C.H.W. DATE 27 DEC. 1981.
STARTED 26 NOV 1981
FINISHED 9 DEC. 1981.

EXPLORATION DEPARTMENT.

RECOVERY SHEET

713191

053

BOSS BONANZA. HOLE No. 310 PAGE 1 OF 1 1

CORE RECOVERY (%) > 95% EXCEPT AS NOTED

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0.00	20.42	20.42	N/C	ROLLER BIT.	94.15	95.67	1.52	1.52	100.
					95.67	97.19	1.52	1.42	93.4
20.42	22.25	1.83	0.45	24.6.	97.19	99.32	2.13	2.13	100
22.25	22.86	0.61	0.22	36.1	99.32	102.06	2.74	1.85	67.5
22.86	27.43	4.57	3.70	81.0	102.06	105.11	3.05	3.05	100
27.43	29.26	1.83	1.46	79.8					
29.26	29.57	0.31	0.31	100.					
29.57	30.78	1.21	0.96	79.3.					
30.78	32.61	1.83	1.83	100.					
32.61	36.58	3.97	3.65	91.9					
36.58	39.01	2.43	1.28	52.7					
39.01	40.54	1.53	0.20	13.1					
40.54	42.67	2.13	1.91	89.7					
42.67	45.11	2.44	2.36	96.7					
45.11	46.33	1.22	1.02	83.6					
46.33	48.77	2.44	2.44	100.					
48.77	50.60	1.83	1.52	83.1					
50.60	52.66	2.06	1.65	80.1					
52.66	53.95	1.29	1.29	100					
53.95	56.08	2.13	2.00	93.9					
56.08	57.60	1.52	0.71	46.7					
57.60	58.51	0.91	0.69	75.8					
58.51	60.34	1.83	1.56	85.2.					
60.34	63.39	3.05	2.30	75.4.					
63.39	65.22	1.83	1.83	100					
65.22	66.13	0.91	0.91	100.					
66.13	66.43	0.30	0.30	100					
66.43	67.65	1.22	1.22	100.					
67.65	69.17	1.52	1.17	77.0					
69.17	71.91	2.74	2.74	100.					
71.91	74.65	2.74	2.74	100.					
74.65	76.48	1.83	1.83	100					
76.48	77.70	1.22	1.22	100.					
77.70	80.75	3.05	2.90	95.1					
80.75	81.97	1.22	0.90	73.8					
81.97	83.49	1.52	1.30	85.5					
83.49	85.93	2.44	1.50	61.5					
85.93	87.76	1.83	1.72	94.0					
87.76	89.89	2.13	1.80	84.5					
89.89	92.63	2.74	2.28	83.2					
92.63	94.15	1.52	1.16	76.3.					

713192 054

SCALE 1:100

LENGTH 57.22m. NORTHING 6425678.2
AZIMUTH 268° EASTING 397328.8
DIP AT COLLAR 70° W ELEVATION 535.7
LOCATION KARA - SOUTHERN EXTENSION.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 311. PAGE 1 OF 1/3.
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm WO_3	FRACTURING	BEDDING	GEOLOGY	MINERAL
N.C.		N.S.				NC.	
4.57							
25.72		2.75.	7100			Tm_{40} W	
7.32							
93.41		0.68	10%			Tuw	
8.23							
23.05		1.0	1.00%			Tm_{40} W	
9.14							
60.87		1.0	1.12%			Tuw	
10.06							
67.21		1.0	1.11%				
11.28							
24.59		1.0	3300			Tu.	
12.50							
73.77		1.0	5900				
13.11							
100		1.0	4.50%				
14.63		1.0	9200				
100		1.0	7300			Tgd.	
16.50		1.0	3050				
95.53		1.0	6600				
18.29		1.0	7900				
97.90		1.0	230			Tgd.	
20.40		1.0	7500				
91.50		1.0	380			Tea	
24.95		1.0	7400				
100.		1.0	9700			Ta.	
24.99		1.0	9200				

MINERALISATION

SKARN 0.00 - 47.50m.

NIL. WO_3 MINERALISATION.

FINE DISSEMINATED TUNGSTITE.

NIL. WO_3.

NIL SCHEELITE.

13.20 - 13.50m - 6000 COARSE SCHEELITE. VERY SLIGHTLY OXIDISED. 1.8%.
13.50 - 14.90m - SCHEELITE NOT AS ABUNDANT 0.4%

COARSE SLIGHTLY OXIDISED SCHEELITE. CRYSTALS EVIDENT THROUGHOUT THIS RUN. EST - 1.0% WO_3.
17.20 - 18.0m - BETTER GRADE 1.2% WO_3.

20.50 - 21.0m - 6000 DISSEMINATED SCHEELITE.

NIL.

22.40 - 25.00 - EXCELLENT 1% WO_3 DISSEMINATED EVENLY DISTRIBUTED SCHEELITE.

GEOLOGY

SKARN.

NO CORE.

4.57m.

SKARN.

MAGNETITE SKARN.
HIGHLY OXIDISED TO HEMATITE.
HARD.

7.40m

SKARN. CLAY AND MAGNETITE SKARN. BANDED.
8.23m.

SKARN MAGNETITE SKARN - 40% MAGNETITE.
9.14m. MASSIVE POOR CORE RECOVERY.

SKARN
VERY WEATHERED / OXIDISED SKARN.
ONLY SMALL PROPORTION REMNANT MAGNETITE.
NOT OXIDISED COMPLETELY TO CLAY - KAOLINITE.
11.20m. LITTLE EPIDOTE.

SKARN.
AS ABOVE RUN, BUT LESS OXIDISED.
UNDIFFERENTIATED SKARN.
KAOLINITE STILL PRESENT.
LIGHT IN WEIGHT.

13.0m

14.90m.

SKARN
PARTIALLY WEATHERED GARNET, DIOPSIDE SKARN.
ONLY LITTLE MAGNETITE.
BROWN BIOTITE, LITTLE REMNANT QUARTZ.

18.00m.

SKARN
GARNET DIOPSIDE SKARN.
AS ABOVE RUN, BUT BECOMING LESS OXIDISED AND FRESHER.

21.05m.

SKARN TRANSITIONAL ZONE.
21.95m. EPIDOTE, ACTINOLITE SKARN.

SKARN.
ACTINOLITE SKARN
GREEN, MASSIVE.
MAGNETITE INCREASING WITH DEPTH.

25.00m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES / P. MCGRATH
CORE N.X.
CASING 4.57m.

DATE JAN. 12/1982.

LOGGED BY CHM
STARTED 10 DEC. 1981
FINISHED 22 DEC 1981

SCALE 1:100

LENGTH 61.22m NORTHING 54256 TE·2
AZIMUTH 266° EASTING 39732E·8
DIP AT COLLAR 70°W ELEVATION 535·7
LOCATION KARA I. SOUTH EXTENSION.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 311 PAGE / OF 2/3
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE: INTERVAL	FEATURE: ppm WO_3	FRACTURING	BEDDING	GEOLOGY	MINERAL
25·0							
100		1·0	7400			Tm_{Gr}	F
		1·0	6500				
27·74		1·0	2400				
		1·0	2650				
86·9		1·0	2000			Tu.	
30·0							
30·48		1·0	680				
74·3		1·0	830				
32·00		1·0	70			Tgd.	
100		1·0	190				
33·83		1·0	1800				
100		1·0	270				
35·0							
35·36		1·0	390				
78·7		1·0	190			Tu.	Y.
36·58		1·0	180				
41·1		1·0	130				
39·62		1·0	40				
40·0							
65·4		1·0	30				
41·76		1·0	120			Tgd.	
100		1·0	820			Qe	
43·28		1·0	300			Tu	
98·2		1·0	150				
45·0							
45·72						T/Qe	
100							
48·17						Qe.	F
100.							
50·0							

MINERALISATION

25·0 - 26·70m - SCHEELITE WELL DISSEMINATED THROUGHOUT. VISIBLE EST - 0·8% WO_3.

20·0 - 31·0m - DISSEMINATED SCHEELITE LOW GRADE.

31·70 - 31·70. ONLY FEW ISOLATED SPECKS.

VERY ISOLATED SPECKS SCHEELITE. BELOW ORE CUT OFF GRADE.

NO FLUORESCENT TUNGSTEN MINERALISATION.

NIL.

LITTE DISSEMINATED SCHEELITE AT 43·10 TO 43·20m.

NIL.

45·45 - 45·65m. FLUORESCENCE.

NIL.

GEOLOGY

SKARN

MAGNETITE (ACTINOLITE) SKARN. MASSIVE, FRESH. 60% MAGNETITE.

RUBBLE ZONE - 27.70 - 29.30m.

29·30m.

SKARN. GRADATIONAL ZONE INTO WEATHERED KAOLINITIC MAGNETITE SKARN.

31·70m.

SKARN. MOTTLED BROWN, PARTIALLY WEATHERED, GARNETIFEROUS SKARN, ONLY LITTLE MAGNETITE.

34·30m.

SKARN. UNDIFFERENTIATED SKARN. PARTIALLY WEATHERED, RUBBLY, ONLY LITTLE MAGNETITE CONTENT. KAOLIN PROMINENT 35·80 - 36·58.

41·66m.

SKARN. PARTIALLY WEATHERED GARNET (DIOPSIDE) SKARN.

42·50m.

QE. MASSIVE, FINE GRAINED, QUARTZ EPIDOTE FACIES.

43·50m.

SKARN. PARTIALLY WEATHERED UNDIFFERENTIATED SKARN.

46·85m.

SKARN/QE MIXED ZONE OF PARTIALLY WEATHERED SKARN AND QUARTZ EPIDOTE FACIES.

47·50m.

QE. QUARTZ EPIDOTE FACIES. INCREASING IN COARSENESS WITH DEPTH.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES (P. McCORMACK). NX.
CORE 4·87m.
CASING

DATE JAN 13/1982

LOGGED BY CHW. 10 DEC. 1981
STARTED 22 DEC. 1981.
FINISHED

11515 056

SCALE 1:100

LENGTH 51.22m NORTHING 5425678.2
AZIMUTH 66° EASTING 397328.8
DIP AT COLLAR 70°N ELEVATION 535.7
LOCATION KARA. 1. SOUTH EXTENSION

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 311 PAGE 2/3
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE: INTERVAL	FEATURE: ppm Mo	FRACTURING	BEDDING	GEOLOGY	MINERAL	MINERALISATION	GEOLOGY
50.0									
100.						Qe			50.40m GEOLOGY
51.22						(Qe) Gr.		NIL.	GRANITE/Qe TRANSITIONAL. FROM Qe TO GRANITE.
									51.22 SLIGHTLY ANK - MEDIUM GRAINED.
									E.O.H. 51.22m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY 1980.

CONTRACTOR McINTYRE MINES (P. McCOMBE)
CORE NX.
CASING 46.87m.

LOGGED BY GAW. DATE THUR. 13. 1982.
STARTED 10 DEC. 1981
FINISHED 22 DEC 1981.

AC SECTION

(REC) RECOVERY, CONSIDER 99% EXCEPT AS NOTED — KARA No 1 SOUTHERN EXT — 311 057 1/2

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

713195

SECTION:				ASSAY					AVE:			AVE:		
SAMP NO.	REC WX	INTERVAL	LGTH		ppm WO3	CORE B.2.			INVL	LGTH SM-%	WT AR AV.	INVL	LGTH SM-%	WT AR AV.
D311 1	SLUDGE	4·57-6·10	1·53		9700									
2	"	6·10-7·31	1·21		1·05%									
3	"	7·31-8·23	0·92		9450									
4	"	8·23-9·14	0·91		9900									
5	"	9·14-10·06	0·92		9000									
6	"	10·06-11·28	1·22		1·17%									
7	"	11·28-12·50	1·22		3950									
8	"	12·50-13·11	0·61		7700									
9	"	13·11-14·63	1·52		3·63%									
					CORE E.1.	CORE B.2.								
D311 10	CORE	4·57-7·32	2·75		7100									
11	"	7·32-8·0	0·68		1·00%									
12	"	8·0-9·0	1·0	x	1·46%	1·06%								
13	"	9·0-10·0	1·0		1·12%									
14	"	10·0-11·0	1·0	x	1·47%	1·17%								
15	"	11·0-12·0	1·0		3300									
16	"	12·0-13·0	1·0		5900									
17	"	13·0-14·0	1·0	x	4·14%	4·50%								
18	"	14·0-15·0	1·0		9200									
19	"	15·0-16·0	1·0		7300									
20	"	16·0-17·0	1·0		3050									
21	"	17·0-18·0	1·0		6600									
22	"	18·0-19·0	1·0		7000									
23	"	19·0-20·0	1·0		330									
24	"	20·0-21·0	1·0		7500									
25	"	21·0-22·0	1·0		380									

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

COMMENT

PROJECT KARA 1 S. EXTENSION.

D.D.H. 311

LIBRARY

KARA. N°1

D.D.H. 058

311 2/2

(REC) RECOVERY, CONSIDER 100% EXCEPT AS NOTED SOUTHERN EXT.

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

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.
D311 26	CORE	22·0 - 23·0	1·0.	7400						
27	"	23·0 - 24·0	1·0	9900						
28	"	24·0 - 25·0	1·0	9300						
29	"	25·0 - 26·0	1·0	7400						
30	"	26·0 - 27·0	1·0.	6500						
31	"	27·0 - 28·0	1·0	2400						
32	"	28·0 - 29·0	1·0	2650						
33	"	29·0 - 30·0	1·0	2000						
34	"	30·0 - 31·0	1·0	980						
35	"	31·0 - 32·0	1·0	880						
36	"	32·0 - 33·0	1·0	70						
37	"	33·0 - 34·0	1·0	140						
38	"	34·0 - 35·0	1·0	1050						
39	"	35·0 - 36·0	1·0	270						
40.	"	36·0 - 37·0	1·0	390						
41	"	37·0 - 38·0	1·0	140						
42	"	38·0 - 39·0	1·0	180						
43	"	39·0 - 40·0	1·0	130						
44	"	40·0 - 41·0	1·0	40						
45	"	41·0 - 42·0	1·0	30						
46	"	42·0 - 43·0	1·0	120						
47	"	43·0 - 44·0	1·0	820						
48	"	44·0 - 45·0	1·0	300						
49	"	45·0 - 46·0.	1·0.	150.						
				core kl						

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

COMMENT

PROJECT KARA N°1 EXTENSION

DDH 311

EXPLORATION DEPARTMENT.

RECOVERY SHEET

713197

059

KARA N°1

HOLE No. 311

PAGE 1 OF 1

CORE RECOVERY (CR) > 95% EXCEPT AS NOTED

SOUTHERN EXTENSION.

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0.00	4.57	4.57	NIL.						
4.57	7.32	2.75	0.79	28.72.					
7.32	8.23	0.91	0.85	93.41					
8.23	9.14	0.91	0.21	23.08					
9.14	10.06	0.92	0.56	60.87					
10.06	11.28	1.22	0.82	67.21					
11.28	12.50	1.22	0.30	24.59					
12.50	13.11	0.61	0.45	73.77					
13.11	14.63	1.52	1.52	100%.					
14.63	16.50	1.87	1.87	100%.					
16.50	18.29	1.79	1.71	95.53					
18.29	20.42	2.13	2.00	93.90					
20.42	21.95	1.53	1.40	91.50.					
21.45	24.99	3.04	3.04	100.					
24.99	27.74.	2.75	2.75	100.					
27.74	30.48	2.74	2.38	86.9%					
30.48	32.00	1.52	1.13	74.3.					
32.00	33.83	1.83	1.83	100.					
33.83	35.36	1.53	1.53	100.					
35.36	36.58	1.22	0.96	78.7.					
36.58	39.62	3.04	1.25	41.1					
39.62	41.76	2.14	1.40	65.4.					
41.76	43.28	1.52	1.52	100.					
43.28	45.72	2.44	2.20	90.2					
45.72	48.17	2.45	2.45	100.					
48.17	51.22	3.05	3.05	100.					
E.O.H.	51.22m								

713198

060

SCALE 1:100

LENGTH 37.49m NORTHING 5425681·2
AZIMUTH 90° EASTING 397329·2
DIP AT COLLAR 55°E ELEVATION 635·6
LOCATION KARA SOUTHERN EXTENSION PROJECT KARA.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 312. PAGE 1 OF 1/2.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE Mm Wo3	FRACTURING	BEDDING	GEOLOGY	MINERAL
NO CORE 4·57		N.C	N.S.			NC	
20·9 6·10		1·43	760			CI	
71·4 7·36		1·0	2750			xTu	
23·5 8·84		1·0	3·79% / 650				
51·97 10·06		1·0	1·65%				
40·66 10·97		1·0	1·05%				
15·22 11·89		1·0	4·36%				
98·11 12·80		1·0	2·93%				
35·95		1·0	2850			xTm	
14·94		1·0	1·40%				
93·46 15·85		1·0	7100			Tm_{20}	
100 17·07		1·0	28000			Tm_{40}	
100 17·98		1·0	6·82%				
100 18·90		1·0	1·96%			Tm_{80}	
86·9 19·20		1·0	330			Tem	
100 20·12		1·0	2100			Tm_{10}	
86·9 21·06		1·0	1200			Tm_{30}	
22·56		1·0	1·58%				
100 24·08		1·0	1·25%			Tm_{50}	
79·5 25·0		1·0	1·69%				

MINERALISATION SUMMARY - GEOLOGY
SKARN 0·0 - 34·14m
GRANITE 34·14 - 37·49m
X/Y - 14·94m
Y/F - 30·30cm.

GEOLOGY

NO CORE.
(CASED TO 4·57m).

4·57m
SKARN.

NO SCHEELITE OR FLUORESCENCE.

WEATHERED, BANDED, GREEN AND YELLOW CLAY AND SKARN.

6·10m
SKARN.

10·97 - 11·89m - WELL DEVELOPED FINE DISSEMINATED SPECKS OF YELLOW SCHEELITE.

13·20 - 3L - WELL DEVELOPED SLIGHT OXIDISED SCHEELITE CRYSTALS.

WEATHERED CLAY AND MAGNETITE SKARN.
OXIDATION PROMINENT, WITH AN ABUNDANCE OF GOETHITE, LIMONITE AND HEMATITE.
SOFT, LIGHT AND RUBBLY.
MAGNETITE CONTENT MORE EXTENSIVE IN RUN 9·06m - 10·66m.

12·80m
SKARN

NIL.

MOTTLED SKARN
MAGNETITE CONTENT LOW.
BECOMING LESS OXIDISED

14·20m
SKARN

15·0 - 15·26m - LITTLE DISSEM SCHEELITE (0·56% WO_3)

14·94m

MAGNETITE SKARN, RUBBLY.
20% MAGNETITE, MOST OXIDISED TO HEMATITE.

15·60m
SKARN.

NIL.

MAGNETITE SKARN
PARTIALLY WEATHERED.

17·10m
SKARN

17·40 - 18·80 - EXCELLENT SCHEELITE MINERAL - CRYSTALS AND DISSEMINATIONS. 2% WO_3.

MAGNETITE SKARN.
STRONGLY DEVELOPED (80%) MASSIVE HOMOGENEOUS MAGNETITE.

18·80m
COARSE WO_3 MINERALISATION.

GOOD SCHEELITE THROUGHOUT.

Sk 19·20m
EPIDOTE MAGNETITE SKARN.

ONLY A FEW VISIBLE SPECKS OF SCHEELITE.

SKARN
SKARN.
RUBBLY, FRAGMENTED, POWDERY
SOFT + LIGHT.
MORE OXIDISED THAN ABOVE.

21·00m.
SKARN

FLUORESCENT TUNGSTITE VISIBLE.

PARTIALLY OXIDISED MAGNETITE (20%) SKARN
GLOSSY, SOFT + ADMIXED CLAY.

22·56m.
SKARN.

EXCELLENT FINE TO COARSE SCHEELITE MINERALISATION DEVELOPED THROUGHOUT.

MAGNETITE SKARN (60% - MAG)
STILL WEATHERED TO SOME EXTENT.
LITTLE REMNANT QUARTZ.
LESS MAGNETITE IN RUN 23·10 - 23·2

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.

CONTRACTOR McINTYRE MINES - P. McCORMACK
CORE N/L - 4·57m - 37·49m
CASING 0·80 - 4·57m.

LOGGED BY CHW DATE 13 JAN 1982.
STARTED 23 DEC. 1981
FINISHED 6 JAN. 1982.

11000 UD1

SCALE 1: 100

LENGTH 37.49m NORTHING 5425681.2
AZIMUTH 98° EASTING 397329.2
DIP AT COLLAR -55°E ELEVATION 535.5
LOCATION KARA 1. SOUTHERN EXTENSION. PROJECT KARA.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 312. PAGE 1 OF 2/2

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm WO3	FRACTURING	BEDDING	GEOLOGY	MINERAL
25.30		1.0	2.05%			Tm_{Lc}	
100							
26.21		1.0	2612			$Tm_{.}$	
100							
27.13		1.0	7500			Tm_{3c}	
34.96		1.0	4200				
35.96		1.0	3100				
70.83							
29.87		1.0	1.76%			Tm_{30c}	
100							
21.70		1.0	470			Tm_{80}	
100							
32.61		1.0	220				
100		1.44	110.				
29.44							
100						Gr.	
36.27							
100							
37.49							

MINERALISATION

SEE ABOVE.

6000 COARSE SCHEELITE.

NONE OR LITTLE SCHEELITE MINERAL (FEW SPECKS)

GOOD COARSE AND DISSEMINATED SCHEELITE (ELONGATED BANDS

ONLY A VERY FEW SPARSE SPECKS OF SCHEELITE.

NIL.

GEOLOGY

26.25m. MAGNETITE SKARN (SEE ABOVE)

SKARN

26.76m. WEATHERED CLAY + SKARN.

Y SKARN.

MAGNETITE SKARN.

EXTREMELY ALTERED AND WEATHERED. MAGNETITE OXIDISED.

30.10m.

SKARN

EPIDOTE MAGNETITE SKARN. - FRESH UNOXIDISED. EPIDOTE IN ELONGATED BANDS.

31.05m.

SKARN

MAGNETITE SKARN.

20% MAGNETITE

MASSIVE UNOXIDISED EQUIGRANULAR MAGNETITE.

MAGNETITE STRONGLY DEVELOPED THROUGHOUT, EXCEPT 33.6 - 33.40m.

F

34.14m.

SKARN. GRANITE.

GRANITE.

CONTACT WITH OVERLYING SKARN VERY SHARP.

FINE TO MEDIUM GRAINED, PINK.

LITTLE WEATHERING AND MAGNETITE ALONG JOINTS AND FRACTURES.

EPIDOTISATION AT CONTACT AND BETWEEN 36.56 - 37.35m.

27.49m

E.O.H. 37.49m.

ANGLE READ

ANGLE CORRECTED

AZIMUTH

DEPTH

SURVEY PDA.

CONTRACTOR McINTYRE MINES (P.N. CONTRACT)
CORE NX - 4.57 - 37.49m.
CASING 0.0 - 4.57m.

LOGGED BY CHW DATE 13 JAN 1982.
STARTED 23 DEC. 1981
FINISHED 6 JAN. 1982.

AC. 3631/82.
AC. 3684/82.

(REC) RECOVERY, CONSIDER 100% EXCEPT AS NOTED SOUTH EXTEN. 312 1/2.

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

713200

SECTION:				ASSAY				AVE:			AVE:		
SAMP NO.	REC WX	INTERVAL	LGTH		ppm WO3			INVL	LGTH SM-%	WT AR AV.	INVL	LGTH SM-%	WT AR AV.
D312 1	SLUDGE	4.57-6.10	1.53										
2	"	6.10-7.36	1.26										
3	"	7.36-8.84	1.48										
4	"	8.84-10.06	1.22										
5	"	10.06-10.97	0.91										
6	"	10.97-11.89	0.92										
7	"	11.89-12.80	0.91										
8	"	12.80-14.94	2.14										
9	"	14.94-15.85	0.92										
10	"	15.85-16.76	0.91.										
					CODE B.1.	CODE B2.							
D312 11	CORE.	4.57-6.00	1.43		760								
12	"	6.0-7.0	1.0		2760			6.0-16.0	9m	2.03			
13	"	7.0-8.0	1.0		1650								
14	"	8.0-9.0	1.0		4.08%	3.79					8.0-15.0	7m	2.55
15	"	9.0-10.0	1.0		2.08%	1.65							
16	"	10.0-11.0	1.0		1.05%								
17	"	11.0-12.0	1.0		5.15%	4.80							
18	"	12.0-13.0	1.0		3.48%	2.93							
19	"	13.0-14.0	1.0		2050								
20	"	14.0-15.0	1.0		1.78%	1.40							
21	"	15.0-16.0	1.0		7100			15.0-31.0	16.0m	1.69%			
22		16.0-17.0	1.0		2800								
23		17.0-18.0	1.0		7.55%	6.84							
24		18.0-19.0	1.0		2.30%	1.90							
25		19.0-20.0	1.0		330								

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

COMMENT | PROJECT | DDH

AC. 3621/82.
AC. 3684/82.

KARA. N°1 SOUTH EXT.

312 063 2/2

(REC) RECENT, CONSIDER 100% EXCEPT AS NOTED
(W'X) WEATHERING, CONSIDER FRESH ROCK EXCEPT AS NOTED. W'X INDICATES CLAYEY, LIMONITIC MATERIAL

SECTION:				ASSAY			AVE:			AVE:		
SAMP NO.	REC W'X	INTERVAL	LGTH		PPM WO3	CODE B2	INVL	LGTH SM-%	WT AR AV.	INVL	LGTH SM-%	WT AR AV.
D312 26	CORE	20.0 - 21.0	1.0		2100							
27	"	21.0 - 22.0	1.0		1200							
28	"	22.0 - 23.0	1.0		1.96%	1.54						
29	"	23.0 - 24.0	1.0.		1.67%	1.28						
30	"	24.0 - 25.0	1.0	*	2.06%	1.60%						
31	"	25.0 - 26.0	1.0	*	2.72%	2.13%						
32	"	26.0 - 27.0	1.0	*	3.32%	2.65%						
33	"	27.0 - 28.0	1.0		7500							
34	"	28.0 - 29.0	1.0		4200							
35	"	29.0 - 30.0	1.0		8100							
36	"	30.0 - 31.0	1.0	*	2.12%	1.70%						
37	"	31.0 - 32.0	1.0		470							
38	"	32.0 - 33.0	1.0		320							
39	"	33.0 - 34.14	1.14		110							
					CODE B.1.							

INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE
	1														

COMMENT

PROJECT KARA. N°1 - S. EXTENSION DDH 312

T0234

713202

EXPLORATION DEPARTMENT.

064

RECOVERY SHEET

KARA. N° 1.

HOLE No. 212

PAGE 1 OF 1

SOUTHERN EXT.

CORE RECOVERY (ca) > 95% EXCEPT AS NOTED

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0.00	4.57	4.57	N.R.						
4.57	6.10	1.53	0.32	20.9%					
6.10	7.36	1.26	0.90	71.4%					
7.36	8.84	1.48	0.50	33.8%					
8.84	10.06	1.22	1.00	81.97%.					
10.06	10.97	0.91	0.37	40.66%					
10.97	11.89	0.92	0.14	15.22%					
11.89	12.80	0.91	0.82	90.11%					
12.80	14.94	2.14	0.77	35.98%					
14.94	15.85	0.92	0.86	93.48%.					
15.85	17.07	1.22	1.22	100%.					
17.07	17.98	0.91	0.91	100%.					
17.98	18.90	0.92	0.92	100%.					
18.90	19.20	0.30	0.26	86.66%.					
19.20	20.12	0.92	0.92	100%					
20.12	22.56	2.44	2.12	86.9%.					
22.56	24.08	1.52	1.52	100%.					
24.08	25.30	1.22	0.97	79.5%					
25.30	26.21	0.91	0.91	100%					
26.21	27.13	0.92	0.92	100%					
27.13	28.96	1.43	0.50	34.96.					
28.96	29.87	0.91	0.64	70.33.					
29.87	31.70	1.83	1.83	100%					
31.70	32.61	0.91	0.91	100%					
32.61	34.44	1.53	1.53	100%					
34.14	26.27	2.07	2.07	100%					
86.27	37.49	1.22	1.22	100%.					
E.OH.	37.49								

713203 065

SCALE 1:100

LENGTH 67.65m NORTHING 6425698.0
AZIMUTH 266° EASTING 397347.8
DIP AT COLLAR 45°N ELEVATION 535.3
LOCATION KARA. SOUTHERN EXTENSION. PROJECT KARA.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 313 PAGE 1 OF 1/3

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm WO_3	FRACTURING	BEDDING	GEOLOGY	MINERAL
NC		NC				NC.	
27.17 / 5.49		0.92	720			W Tm_{30}	
32.79 / 6.71		1.22	140				
6.59 / 8.53		1.82	240				
19.57 / 4.45		0.92	220				
15.39 / 10.62		1.17	160				
23.33 / 11.58		0.96	380				
69.57 / 12.50		0.92	460			W Tm_{20}	
100 / 13.41		1.50	720				
78.36 / 14.33		1.0	940				
100 / 15.55		1.0	940				
100 / 16.50		1.0	1100				
90.64 / 17.98		1.0	1100			Tu.	
100 / 20.13		1.0	2650				
		1.0	6300				
100 / 20.73		1.0	3500			Tm_{30}	
87.97 / 21.93		1.0	3450			Tu.	
85.25 / 22.56		1.0	1600			$Tm_{20}gl$	
74.70 / 23.43		1.0	410				
100. / 24.98		1.0	4550			Tu.	
87.5							

MINERALISATION
X/Y - 27.0m
Y/F - 31.70 m.

GEOLOGY

NO CORE.

4.57m.

SKARN.

NO VISIBLE WO_3 MINERALISATION.

MAGNETITE SKARN - WEATHERED.
MAGNETITE 30%
POOR CORE RECOVERY.
DRILLING PROGRESS WOULD INDICATE LARGE PROPORTION CLAY.

10.62m.

SKARN.

NO VISIBLE. WO_3 MINERALISATION. X

WEATHERED SKARN.
REMNANT MAGNETITE, LARGE PROPORTION OF LIMONITE-HEMATITE.
LIGHT IN WEIGHT.

LITTLE KAOLINITE - 14.20 - 14.60 m.

16.50m

SKARN.

NIL.

WEATHERED SKARN.
GREATER PROPORTION OF LIMONITIC SKARN AND KAOLIN.
SOFT, FRIABLE.

18.80m.

SKARN.

NIL

OXIDISED MAG-HEMATITE SKARN.

21.40m.

SKARN.

NIL.

SOFT KAOLINITIC SKARN + CLAY.

22.20m.

SKARN.

24.0 - 24.38m - DISSEMINATED YELLOW TUNGSTITE + Sch.

SOFT, RUBBLY, WEATHERED MAGNETITE, GARNET DIOPSIDE SKARN.
MAGNETITE 20%.

24.38m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.

CONTRACTOR McINTYRE MINES. (P. N° COMPACT)
CORE NX
CASING

LOGGED BY CHN. DATE JAN. 25th 1982.
STARTED JANUARY 7. 1982
FINISHED JANUARY 20. 1982.

713204 U66

SCALE 1: 100.

LENGTH 67.65m NORTHING 6425698.0
AZIMUTH 266° EASTING 397347.8
DIP AT COLLAR 45°N ELEVATION 535.3.
LOCATION KARA 1. SOUTHERN EXTENSION

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 313. PAGE 2 OF 3.
PROJECT KARA

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm WO_3	FRACTURING	BEDDING	GEOLOGY	MINERAL	GEOLOGY
25.0								
87.5		1.0	100			Tu.		MINERALISATION NIL, EXCEPT 24.80 TO 24.98m - VIS EST - 1% WO_3. X
26.67		1.0	700					SKARN. 27.0m.
82.4		1.0	2350			Tm_{10}		SKARN NIL. TRANSITIONAL ZONE FROM ABOVE TO MAGNETITE SKARN. 28.05m.
28.34		1.0	5700					SKARN.
100		1.0	130			T_{mea} 50		28.05m - 28.60m. GOOD DISSEMINATED FINE YELLOW SCHEELITE. (0.5% WO_3) FEW SPECKS IN REST OF RUN. Y MAGNETITE, ACTINOLITE, EPIDOTE SKARN. MASSIVE, 60% MAGNETITE. HOMOGENEOUS, FINE TO MEDIUM GRAINED.
29.67		1.0	270					
100		1.0	4100.					31.70m.
32.61		1.0	9600			T_{egO}		SKARN. 32.00 - 32.65 - VERY HIGH GRADE DISSEMINATED SCHEELITE. MAGNETITE SKARN. WELL DEVELOPED MASSIVE AND CRYSTALLINE MAGNETITE - 80%. LITTLE EPIDOTE.
100		1.0	9700					33.60m.
34.44		1.0	1.39%			T_{me}		EXCELLENT SCHEELITE MINERALISATION AS DISSEMINATIONS AND ALONG FRACTURES 1-5% WO_3. SKARN. EPIDOTE MAGNETITE SKARN. 34.65m.
35.0								
100		1.0	8800					SKARN. 0.75% GOOD SCHEELITE DEVELOPED AT - 35.65 - 36.00 AND 37.20 - 37.40m. 38.0 - 38.50 - EXCELLENT 1.5 - 2.0% SCHEELITE. MAGNETITE, EPIDOTE, ACTINOLITE SKARN. MAGNETITE 40-50% CONTENT.
36.27		1.0	7200			Tm_{50}		
100		1.0	3700					
		1.0	1.12%					38.50m.
39.82		1.0	490.					SKARN. ONLY WELL SEPERATED SPECKS OF SCHEELITE IN RUN. MAGNETITE EPIDOTE SKARN. MASSIVE, FRESH, GREENISH. BETWEEN 41.0 - 41.50 - MAGNETITE CONTENT INCREASES TO 50%. F
100		1.0	56			T_{mc}		
		1.0	170					
42.37		1.0	480					
100		1.0	1750					43.80m.
		1.0	1.20%					SKARN. WELL DISSEMINATED SCHEELITE THROUGHOUT. 1.0% GRADE BETWEEN 46.0 - 47.0m. MAGNETITE EPIDOTE SKARN. MAGNETITE 30%. FINE TO MEDIUM GRAINED MAGNETITE.
45.0								
45.42		1.0	4300			$T_{m_{30}}$		
		1.0	2.60%					47.0m.
100		1.0	1900			T_{m40}		47.0 - 48.0 SCHEELITE MINERAL 0.6% WO_3. SKARN. MAGNETITE SKARN. FINE GRAINED - HARD.
48.46		1.0	1400					48.0m.
100		1.0	3300.			T_{om}.		FINE DISSEMINATED SPECKS. 2%? SKARN. EPIDOTE, MAGNETITE SKARN. MASSIVE, FINE GRAINED.
50.0								49.80m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.
CONTRACTOR McINTYRE MINES. (P. HEDDERWICK) NY.
CORE
CASING

LOGGED BY GHW. DATE JAN 25 1982.
STARTED JANUARY 7 1982.
FINISHED JANUARY 20. 1982.

713205 067

SCALE 1:

LENGTH 67.65m NORTHING 6R25698·0
AZIMUTH 266° EASTING 397347·E
DIP AT COLLAR 45°N ELEVATION 535·3.
LOCATION KARA. N°1 - SOUTHERN EXTENSION PROJECT KARA

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 313 PAGE 1 OF 3

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm WO_3	FRACTURING	BEDDING	GEOLOGY	MINERAL
100		1.0	3400			Tm_{GO}	
51.51		1.0	200				
86.89		1.0	490			Tm_c	
52.73		1.0	310				
40.38		1.0	1600				
54.86		1.0	620			TQ.	
30.74		1.0	120				
57.30		1.0	75				
66.83		1.0	40				
69.13							
40.31		1.65	150			S.	
60.65							
90.98							
61.97							
100						TQ.	
44.00							
100							
66.13							
100						G/Qc	
67.65							

MINERALISATION

SPECKS OF SCHEELITE WELL DEVELOPED THROUGHOUT - 0·6%. — F — 61·50m.

FEW MINOR SPECKS < ORE GRADE — F — 62·75m.

NIL OR LITTLE SPECKS. SCHEELITE. — Y — 69·00m.

NIL. — F — 66·10m.

NIL. — F — 67·65m.

GEOLOGY

MAGNETITE SKARN. COARSE, WELL DEVELOPED CRYSTALLINE MAGNETITE

EPIDOTE MAGNETITE SKARN. QUENTLY WEATHERED.

PARTIALLY WEATHERED SKARN AND QUARTZOSE ROCK.

LIGHT GREEN MUDSTONE. 60·15m.

FRESH SILICIFIED SKARNIFIED ARENACEOUS SEDIMENT.

QUARTZ EPIDOTE FACIES AND GRANITE DYKES.

E.O.H. 67·65m

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.

CONTRACTOR McINTYRE MINES (CALCORP) NX
CORE
CASING

LOGGED BY CHW. DATE JAN 25 1982.
STARTED JANUARY 7 1982.
FINISHED JANUARY 20 1982.

(REC) RECOVERY, CONSIDER 95% EXCEPT AS NOTED
(W'X) WEATHERING, CONSIDER FRESH ROCK EXCEPT AS NOTED. W'X INDICATES CLAYEY, LIMONITIC MATERIAL

713206 | 313 | 1/3

KARA. N°1 - S. EXT.

068

SECTION:

SAMP NO.	REC W'X	INTERVAL	LGTH	ASSAY ppm Wo3	AVE: INVL	AVE: LGTH %M-%	AVE: WT AR AV.	AVE: INVL	AVE: LGTH %M-%	AVE: WT AR AV.
D313 1	CORE	4.57-5.49	0.92	720						
2	"	5.49-6.71	1.22	140						
3	"	6.71-8.53	1.82	240						
4	"	8.53-9.45	0.92	220						
5	"	9.45-10.62	1.17	160						
6	"	10.62-11.58	0.96	380						
7	"	11.58-12.50	0.92	420						
8	"	12.50-14.0	1.50	760						
9	"	14.0-15.0	1.0	940						
10	"	15.0-16.0	1.0	940						
11	"	16.0-17.0	1.0	1100						
12	"	17.0-18.0	1.0	1100						
13	"	18.0-19.0	1.0	2650						
14	"	19.0-20.0	1.0	6300						
15	"	20.0-21.0	1.0	3500						
16	"	21.0-22.0	1.0	3450						
17	"	22.0-23.0	1.0	1600						
18	"	23.0-24.0	1.0	440						
19	"	24.0-25.0	1.0	1550						
20	"	25.0-26.0	1.0	100						
21	"	26.0-27.0	1.0	700						
22	"	27.0-28.0	1.0	2350						
23	"	28.0-29.0	1.0	5700						
24	"	29.0-30.0	1.0	130						
25	"	30.0-31.0	1.0	270						
26	"	31.0-32.0	1.0	4100						

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

COMMENT

PROJECT KARA. 1 - S. EXTENSION

D.D.H. 313

(REC) RECEIVED, CONSIDER >90% EXCEPT AS NOTED
(WX) WEATHERED, CONSIDER FRESH ROCK EXCEPT AS NOTED. WX INDICATES CLAYEY, LIMONITIC MATERIAL

713207 | 313 | 2/3

KARA No 1 - SEXT

069

SECTION:					ASSAY					AVE:				AVE:			
SAMP NO.	REC WX	INTERVAL		LGTH		PPT (MS)	CODE B2			INVL	LGTH SM-%	WT AR AV.		INVL	LGTH SM-%	WT AR AV.	
DDH 313																	
27	CORE	32.0 - 33.0		1.0		9600											
28	"	33.0 - 34.0		1.0		9100											
29	"	34.0 - 35.0		1.0		1.74%	1.39										
30	"	35.0 - 36.0		1.0		8800											
31	"	36.0 - 37.0		1.0		7200											
32	"	37.0 - 38.0		1.0		3700											
33	"	38.0 - 39.0		1.0		1.14%	1.12										
34	"	39.0 - 40.0		1.0		1490											
35	"	40.0 - 41.0		1.0		55											
36	"	41.0 - 42.0		1.0		170											
37	"	42.0 - 43.0		1.0		480											
38	"	43.0 - 44.0		1.0		1750											
39	"	44.0 - 45.0		1.0		1.11%	1.20										
40	"	45.0 - 46.0		1.0		1300											
41	"	46.0 - 47.0		1.0		2.75%	2.50										
42	"	47.0 - 48.0		1.0		1900											
43	"	48.0 - 49.0		1.0		1400											
44	"	49.0 - 50.0		1.0		3300											
45	"	50.0 - 51.0		1.0		3600											
46	"	51.0 - 52.0		1.0		200											
47	"	52.0 - 53.0		1.0		490											
48	"	53.0 - 54.0		1.0		310											
49	"	54.0 - 55.0		1.0		1600											
50	"	55.0 - 56.0		1.0		620											
51	"	56.0 - 57.0		1.0		120											
52.	"	57.0 - 58.0		1.0		75											

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

COMMENT

PROJECT KARA 1 SOUTH EXT

D.D.H. 313.

AC 37E 1E2
AC 38E 33 1E2

713208 313 3/3.

(REC) RECOVERY, CONSIDER 100% EXCEPT AS NOTED KARA N°1 - S EXT.

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

070

SECTION:				ASSAY				AVE:			AVE:		
SAMP NO.	REC WX	INTERVAL	LGTH		ppm W			INVL	LGTH %M-%	WT AR AV.	INVL	LGTH %M-%	WT AR AV.
D-31-3 53	CORE.	58.0 - 59.0	1.0		40								
54	"	59.0 - 66.65	1.65		150								

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

COMMENT

PROJECT KARA N°1 - S. EXT.

D.D.H. 313

EXPLORATION DEPARTMENT. 071

RECOVERY SHEET 713209

HOLE No. 313 | PAGE / OF 1/1

CORE RECOVERY (ft) & % EXCEPT AS NOTED

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0.00	4.57	4.57	N.C.						
4.57	5.49	0.92	0.25	27.17					
5.49	6.71	1.22	0.40	32.79					
6.71	8.53	1.82	0.12	6.59					
8.53	9.45	0.92	0.18	19.57					
9.45	10.62	1.17	0.18	15.39					
10.62	11.58	0.96	0.32	33.33.					
11.58	12.50	0.92	0.64	69.57.					
12.50	13.41	0.91	0.91	100.					
13.41	14.23	0.92	0.72	78.26.					
14.33	15.85	1.52	1.52	100.					
15.85	16.50	0.65	0.65	100.					
16.50	17.96	1.46	1.34	90.54					
17.96	20.12	2.14	2.14	100.					
20.12	20.73	0.61	0.61	100.					
20.73	21.95	1.22	1.00	81.97					
21.95	22.56	0.61	0.52	85.25					
22.56	23.43	0.87	0.65	74.70					
23.43	24.38	0.95	0.95	100.					
24.38	26.82	2.48	2.17	87.5.					
26.82	28.34	1.52	1.25	82.2.					
28.34	29.57	1.23	1.23	100					
29.57	32.61	3.04	3.04	100					
32.61	34.44	1.83	1.83	100.					
34.44	36.27	1.83	1.83	100					
36.27	39.32	3.05	3.05	100.					
39.32	42.37	3.05	3.05	100.					
42.37	45.42	3.05	3.05	100.					
45.42	48.46	3.04	3.04	100					
48.46	51.51	3.05	3.05	100					
51.51	52.73	1.22	1.06	86.89					
52.73	54.86	2.13	0.86	40.38					
54.86	57.30	2.44	0.75	30.74					
57.30	59.13	1.83	1.04	56.83					
59.13	60.65	1.52	0.12	47.37.					
60.65	61.87	1.22	1.11	90.98					
61.87	64.00	2.13	2.13	100.					
64.00	66.13	2.13	2.13	100					
66.13	67.65	1.52	1.52	100					
	E.O.H.	67.65	m.						

713210 072

SCALE 1:100.

LENGTH 42.98m. NORTHING 5426653.0
AZIMUTH ~~267°~~ 267° EASTING 397385.2
DIP AT COLLAR 55° ELEVATION 537.6
LOCATION KARA N° 1 – SOUTHERN EXTENSION. PROJECT KARA

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 314. PAGE 1 OF 1/2.

RECOVERY %	CORE SPLIT	TEST LEE INTERVAL	TEST LEE ppm WO3	FRACTURING	BEDDING	GEOLOGY	MINERAL
72.99		1.0	(1.60) 1.60				
2.74		1.0	(1.44) 1.64			W Tu	
28.21		1.0	(1.72) 1.78				
39.4		1.0	(930c) 9300				
4.24		1.0	(1.20) 1.20			W Tm 80	
4.98		1.0	(2.03) 2.03				
52.58		1.0	(2.45) 2.45				
1.40		1.0	(2.02) 1.99				
45.65		1.0	(7.65) 7.03			W Tu.	
7.92		1.0	(8.15) 4.14				
26.19		1.0	9100				
10.0		1.0	7700				
11.67		1.0	2500				
100		1.0	2550				
12.19		1.0	3350				
100		1.0	4850				
14.02		1.0	4200			xTgd	
85.85		1.0	6600				
16.50		1.0	(1.45) 1.19				
100		1.0	(1.25) 1.02				
17.95		1.0	7700				
100		1.0	8000				
20.73		1.0	7200				
95.36		1.0	5500			xTgm	
22.56		1.0	2400				
100.		1.0	2400			xTa	
23.47							
100.							
24.99							

MINERALISATION

x/Y = 30.60m
Y/F = 39.00m.

QUITE GOOD FLUORESCENT TUNGSTITE AND FEW SPECKS OF REMNANT SCHEELITE. 1.0%.

FEW WELL DEVELOPED BLEBS OF TUNGSTITE FLUORESCENCE. To 41.60m.

NIL FLUORESCING MINERAL.

OVERALL ONLY MINOR SPECKS OF SCHEELITE AND FLUORESCENT TUNGSTITE.

SCHEELITE SPECKS BEST OBSERVABLE AT 11.50-11.[illegible]

WELL DISSEMINATED FINE DISTRIBUTED SPECKS BETWEEN 16.50-17.30m.

EXCELLENT (ALTHOUGH VERY SLIGHTLY WEATHERED) SCHEELITE DISTRIBUTION BETWEEN 18.0m – 19.50m.

LITTLE OR NO FLUORESCING MINERALS OR SCHEELITE.

18cm FLUORESCENCE BETWEEN 23.50-23.65m and 6cm at 24.9m.

GEOLOGY SKARN 0.00-37.20m

SKARN.

UNDIFFERENTIATED WEATHERED SKARN. HEMATITE, LIMONITE, GOETHITE PREDOMINATE. ONLY LITTLE REMNANT MAGNETITE.

2.90m.

SKARN.

COMPLETELY WEATHERED MAGNETITE SKARN.
MAGNETITE SLUDGE/SAND.
30% MAGNETITE.
FEW KAOLINITIC CLAY BANDS.

6.26m.

SKARN.

SOFT COMPLETELY WEATHERED INDIFFERENTIATED SKARN.

SAMPLE PREDOMINANTLY MAGNETITE/HEMATITE SLUDGE/GRIT.

POOR CORE RECOVERY.

10.80m.

SKARN.

WEATHERED DIOPSIDE(GARNET)? SKARN.

GREENISH BROWN, SOFT & CLAYEY.

VERY LITTLE MAGNETITE CONTENT, EXCEPT IN RUN 16.30m TO 17.50m.

REMNANT BANDING ONLY SLIGHTLY OBSERVABLE.

19.50m.

SKARN.

WEATHERED (MAGNETIFEROUS?) SKARN WITH MAGNETITE.

MAGNETITE MINERAL VERY DECOMPOSED.

BROWNISH.
ALTHOUGH WEATHERED, STILL A HIGH S.G.

23.50m.

SKARN.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.

CONTRACTOR McINTYRE MINES (P. N'CHANGA).
CORE NX.
CASING NX

LOGGED BY CHN. DATE 8 FEB 1982.
STARTED JANUARY 20. 1982.
FINISHED JANUARY 25. 1982.

713211

SCALE 1:100

LENGTH 42.98m. NORTHING 5425653.0
AZIMUTH 267° EASTING 397335.2
DIP AT COLLAR 65° ELEVATION 637.6
LOCATION KARA-N°1 - SOUTHERN EXTENSION PROJECT KARA.

MCINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 31N PAGE 1 OF 2/2.

% RECOVERY	CORE SPLIT	FEATURE INTENSITY	FEATURE /m	FRACTURING	BEDDING	GEOLOGY	MINERAL
44.39		1.0	130			xTu.	
27.13		1.0	120				
100		1.0	120				
28.04		1.0	150				
74.86		1.0	150			xTum	
39.87		1.0	640			Tu	
92.02		1.0	45			Tem	
22.00		1.0	90			Tca	
93.42		1.0	25				
33.43		1.0	15				
100		1.0	45			Tu	
35.46		1.0	60				
57.56		1.0	35				
26.27		1.0	20				
30.43							
37.19							
70.49							
37.80						Q	
09.01							
39.62							
88.27							
44.15							
46.95							
42.37							
100							
42.98						Gr/Q.	

MINERALISATION

NIL. U.V. MINERALISATION.

X

NIL.

FEW ISOLATED SPECKS SCHEELITE

FEW DISSEM SPECKS SCHEELITE.

NIL

NIL

Y

NIL

F

NIL.

GEOLOGY

SKARN.

OXIDISED LIGHT BROWN / CREAM "BARREN" SKARN UNIT. SKARNS & WEATHERED ARENACEOUS MEMBERS. SOFT, LIGHT AND FRIABLE.

28.50m.

SKARN.

AS ABOVE UNIT, BUT SLIGHT INCREASE IN WEATHERED MAGNETITE CONTENT.

30.00m.

80.50m ANTHIBOLE SKARN (GREENISH BROWN)

SKARN.

EPIDOTE MAGNETITE SKARN. PARTIALLY WEATHERED.

31.50m.

SKARN

EPIDOTE AMPHIBOLE SKARN. DARK GREENISH - PARTIALLY WTHED TO FRESH. FINE GRAINED - MASSIVE.

33.15m.

SKARN.

BARREN UNDIFFERENTIATED SKARN. ONLY LITTLE MAGNETITE. DENDRITIC MnO2 IDES.

37.20m.

SANDSTONE.

LIGHT BROWN FAWN SANDSTONES. PARTIALLY WEATHERED TO FRESH.

39.80m

MORE SILICIFIED AND QUARTZITIC WITH DEPTH. SLIGHT EPIDOTIZATION. SKARNIFIED UNIT - 33.25m - 34.0m.

42.40m.

42.98m GRANITISED ARENACEOUS UNIT.

E.O.H. - 42.98m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.

CONTRACTOR McINTYRE MINES. (C.P. McGARVEY)
CORE NX.
CASING NX.

LOGGED BY CHN. DATE 8.28.1982.
STARTED JANUARY 26.1982.
- JANUARY 28TH 1982

AC. 4029/82

(REC) RECOVERY, CONSIDER 95% EXCEPT AS NOTED KARA 1 - S. EXTENSION

(WX) WEATHERING. CONSIDER FRESH ROCK EXCEPT AS NOTED. WX INDICATES CLAYEY, LIMONITIC MATERIAL 1/2.

314

074

713212

SECTION:				ASSAY					AVE:			AVE:		
SAMP NO.	REC WX	INTERVAL	LGTH		ppm WO_3	CORE 82			INVL	LGTH SM-%	WT AR AV.	INVL	LGTH SM-%	WT AR AV.
DDH 314														
1	CORE	0.0 - 1.0	1.0		1.60%	1.60%								
2	"	1.0 - 2.0	1.0		1.64%	1.64%								
3	"	2.0 - 3.0	1.0		1.78%	1.78%								
4	"	3.0 - 4.0	1.0		9300	9300								
5	"	4.0 - 5.0	1.0		1.20%	1.20%								
6	"	5.0 - 6.0	1.0		2.03%	2.03%								
7	"	6.0 - 7.0	1.0		2.45%	2.45%								
8	"	7.0 - 8.0	1.0		2.42%	1.99%								
9	"	8.0 - 9.0	1.0		7.65%	7.03%								
10	"	9.0 - 10.0	1.0		5.15%	4.41%								
11	"	10.0 - 11.0	1.0		9100									
12	"	11.0 - 12.0	1.0		7700									
13	"	12.0 - 13.0	1.0		2500									
14	"	13.0 - 14.0	1.0		2550									
15	"	14.0 - 15.0	1.0		3550									
16	"	15.0 - 16.0	1.0		4050									
17	"	16.0 - 17.0	1.0		4200									
18	"	17.0 - 18.0	1.0		5600									
19	"	18.0 - 19.0	1.0		1.48%	1.19%								
20	"	19.0 - 20.0	1.0		1.25%	1.02%								
21	"	20.0 - 21.0	1.0		7800									
22	"	21.0 - 22.0	1.0		8000									
23	"	22.0 - 23.0	1.0		7200									
24	"	23.0 - 24.0	1.0		5600									
25	"	24.0 - 25.0	1.0		2400									
26	"	25.0 - 26.0	1.0		130									

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

COMMENT

PROJECT KARA 1 - S. EXTENSION

DDH 314

AC. N029/82.

(REC) RECOVERY, CONSIDER >90% EXCEPT AS NOTED KARA 1-S. EXTENSION

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

3114 212.

SECTION:				ASSAY					AVE:			AVE:		
SAMP NO.	REC W'X	INTERVAL	LGTH		ppm WO3				INVL	LGTH SM-%	WT AR AV.	INVL	LGTH SM-%	WT AR AV.
D814 27	CORE	26·0 - 27·0	1·0		120									
28	"	27·0 - 28·0	1·0		120									
29	"	28·0 - 29·0	1·0		150									
30	"	29·0 - 30·0	1·0		180									
31	"	30·0 - 31·0	1·0		640									
32	"	31·0 - 32·0	1·0		45									
33	"	32·0 - 33·0	1·0		90									
34	"	33·0 - 34·0	1·0		25									
35	"	34·0 - 35·0	1·0		15									
36	"	35·0 - 36·0	1·0		45									
37	"	36·0 - 37·0	1·0		60									
38	"	37·0 - 38·0	1·0		35									
39	"	38·0 - 39·0	1·0		20									

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

COMMENT

PROJECT KARA 1 - S. EXTENSION

D.D.H. 3114.

EXPLORATION DEPARTMENT.

RECOVERY SHEET 713214 076

HOLE No. 314 | PAGE 1 OF 1

KARA 1 - SOUTH EXTENSION.

CORE RECOVERY (ca) > 98% EXCEPT AS NOTED

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0·00	2·74	2·74	2·00	72·99					
2·74	3·91	1·17	0·33	28·21.					
3·91	4·88	0·97	0·40	41·24					
4·88	6·40.	1·52	0·86.	56·58					
6·40	7·92.	1·52	0·74	48·68.					
7·92.	10·67	2·75	0·72	26·18.					
10·67	12·19	1·52	1·52	100.					
12·19	14·02	1·83	1·83	100.					
14·02.	16·50	2·48	2·13	86·88					
16·50	17·98	1·48	1·48	100.					
17·98	20·73	2·75	2·75	100.					
20·73	22·56	1·83	1·80	98·36.					
22·56	23·47	0·91	0·91	100.					
23·47	24·99	1·52	1·52	100.					
24·99	27·13	2·14	2·02.	94·39.					
27·13	28·04	0·91	0·91	100					
28·04	29·87	1·83	1·37	74·86.					
29·87.	32·00	2·13	1·96	92·02.					
32·00	32·31	0·31	0·29	93·54					
32·31	33·83	1·52	1·42	93·42.					
33·83	35·06	1·23	1·23	100%.					
35·06	36·27	1·21	0·72	59·50.					
36·27	37·19	0·92	0·28	30·43.					
37·19	37·80	0·61	0·43	70·49					
37·80	3962	1·82	1·62	89·01					
3962	41·15	1·53	1·32	86·27.					
41·15	42·37	1·22	0·50	40·98					
42·37	42·98	0·61	0·61	100%.					
E.O.H	42·98m.								

713215

077

SCALE 1: 100

LENGTH 24.99m. NORTHING 54256~~85~~73.0
AZIMUTH 96°65' EASTING 3973~~87~~90.6.
DIP AT COLLAR 60°E ELEVATION 537.7
LOCATION KARA N°1. S. EXTENSION.

M'INTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 315 PAGE 1 OF 1 1 1
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm WO3	FRACTURING	BEDDING	GEOLOGY	MINERAL	DESCRIPTION
NC 1.52.		N.C	-			NC.		MINERALISATION X/Y - 15.40m. NC. GEOLOGY SKARN. 0.00 - 22.50m. NO CORE (CASED) 1.52m.
100 2.18		1.53	1.06%			$X Tm_{3c}$		SKARN. WEATHERED MAGNETITE SKARN. 30% MAGNETITE CONTENT. COULD ALMOST BE CATEGORISED PARTIALLY WEATHERED. NIL. U.V. MINERALISATION. 3.10m.
96.5 3.05								
17.4		2.95	8400					SKARN. WEATHERED UNDIFFERENTIATED SKARN. BLEBS OF REMNANT MAGNETITE, BUT MAINLY LIMONITE. BROWNISH-ORANGE COLOURATION. NIL UV MINERALISATION.
7.62.		2.0	6300					
83.60 8.84		1.0	1550			$X Tu.$		
		1.0	1300					
10.0 85.25		1.0	960					
11.89		1.0	1700					
65.79		1.0	4200					
13.41		1.0	4950					
81.97		1.0	1100					
14.63								14.50m.
76.7 15.54		1.0	500			$Tgdm.$		SKARN. GARNET, EPIDOTE, MAGNETITE SKARN. NIL. 16.40m.
100 16.50		1.0	240					SKARN. MAGNETITE SKARN. MAGNETITE WELL PRESERVED - 70% CONCENT. MEDIUM TO COARSE TEXTURE. BECOMING MORE RUBBLY AND FRIABLE WITH DEPTH. VERY FEW ISOLATED FINE SPECKS OF SCHEELITE VISUAL EST DUE SCHEELITE 0.2% WO3.
100		1.0	280			Tm_{7b}		
18.90.		1.0	75					18.90m.
62.32 20.0		1.0	1700					SKARN. MAGNETITE, EPIDOTE SKARN. COARSE TO MEDIUM GRAINED TEXTURE. PART WITHED. GREENISH. VERY FEW ISOLATED SPECKS, EXCEPT 19.20 - 19.60m - 0.4% VIS. EST CONCENTRATION.
		1.0	330			$Tm_{25}e$		
21.34		1.0	70					
89.47.		1.0	130					22.50m.
22.48.								GRANITE. GRANITE - COARSE TO MEDIUM. GRAINED. SLIGHTLY WEATHERED. ONLY LITTLE EPIDOTISATION. NIL.
9765.						Gr.		
24.99 25.0.								24.99m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.DOG

CONTRACTOR MCINTYRE MINES / P.H°CONNACK).
CORE NX
CASING NX

LOGGED BY CHN. DATE 8 FEB. 1982.
STARTED 29 JANUARY 1982.
FINISHED 3 FEBRUARY 1982

EOH 24.99m

315 078

(REC) RECOVERY, CONSIDER 90% EXCEPT AS NOTED KARA N°1 S. EXTENSION
(WX) WEATHERING, CONSIDER FRESH ROCK EXCEPT AS NOTED. WX INDICATES CLAYEY, LIMONITIC MATERIAL ///

SECTION:				ASSAY				AVE:			AVE:		
SAMP NO.	REC WX	INTERVAL	LGTH		oz/ton			INVL	LGTH SM-%	WT AR AV.	INVL	LGTH SM-%	WT AR AV.
D315 1	CORE	152 - 305	153		1067								
2	"	305 - 600	2.95		6400								
3	"	6.0 - 8.0	2.0		6300								
4	"	8.0 - 9.0	1.0		1550								
5	"	9.0 - 10.0	1.0		1300								
6	"	10.0 - 11.0	1.0		960								
7	"	11.0 - 12.0	1.0		1700								
8	"	12.0 - 13.0	1.0		4200								
9	"	13.0 - 14.0	1.0		11950								
10	"	14.0 - 15.0	1.0		1100								
11	"	15.0 - 16.0	1.0		500								
12	"	16.0 - 17.0	1.0		240								
13	"	17.0 - 18.0	1.0		280								
14	"	18.0 - 19.0	1.0		75								
15	"	19.0 - 20.0	1.0		1700								
16	"	20.0 - 21.0	1.0		330								
17	"	21.0 - 22.0	1.0		70								
18	"	22.0 - 23.0	1.0		130								

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

COMMENT

PROJECT KARA N°1. S. EXTENSION

D.D.H. 315.

713217 EXPLORATION DEPARTMENT 079

RECOVERY SHEET

HOLE No. 315 | PAGE 1 OF 1 1

CORE RECOVERY (%) > 95% EXCEPT AS NOTED KARA N°1 - S EXTENSION

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0·00	1·52	1·52	N·C						
1·52	2·13	0·61	0·61	100%					
2·13	3·05	0·92	0·88	95·65%					
3·05	7·62	2·57	0·82	17·94%					
7·62	8·84	1·22	1·02	83·60%					
8·84	11·89	3·05	2·60	85·25%					
11·89	13·41	1·52	1·00	65·79%					
13·41	14·63	1·22	1·00	21·97%					
14·63	15·54	0·91	0·70	76·92%					
15·54	16·60	0·96	1·05	100%					
16·56	18·90	2·40	2·40	100%					
18·90	21·34	2·44	1·52	62·30%					
21·34	22·86	1·52	1·36	89·47%					
22·86	24·99	2·13	2·08	97·65%					
E·O·H	24·99m								

713218 080

SCALE 1:100

LENGTH 91.44m. NORTHING 5425811.0
AZIMUTH ——— EASTING 397359.2
DIP AT COLLAR 45°. ELEVATION 503.7.
LOCATION KARA N°1 - MAIN ORE ZONE

MINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 316. PAGE 1 OF 1/4
PROJECT KARA

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm WO_3	FRACTURING	BEDDING	GEOLOGY	MINERAL
NC						NC	
4.57							
SLUDGE						SLUDGE	
7.92							
47.83		1.0	780			WTu	
8.84							
35.52		1.0	1050				
10.36							
35.67		1.0	620				
11.28							
85.83		1.0	4150				
12.90							
100		1.0	4780				
14.33							
87.91		1.0	2360			WTm	
16.15							
26.89		1.0	1370				
17.37							
54.35		1.0	2250				
18.29							
47.18		1.0	440				
20.12							
87.25		1.0	660				
21.61							
21.92		1.0	540			W Tu.	
82.64							
28.16		1.0	3150			WTm 20	
		1.0	3300				
		1.0	2250				
		1.0	2650				
93.98							
24.99		1.0	5790			X Tu.	
			4300				

MINERALISATION
X/Y CONTACT - 25.0m
Y/F CONTACT - 29.70m

GEOLOGY

CASED - NC CORE.
4.57m.

SKARN.
NIL
WO_3
MINERALISATION.
SLUDGE SAMPLES OF SILT, SAND CLAY REPRESENTING SKARN.
4.92m.

SKARN.
NIL.
FLUORESCENT.
WO_3
COMPLETELY WEATHERED PALE AND LIGHT BROWN CLAYS. REPRESENTING SKARN.
LITTLE REMNANT BANDING
LITTLE KAOLIN CONTENT
SOFT, FRIABLE, LIGHT.
11.60m.

SKARN.
NIL
FLUORESCENT
WO_3.
WEATHERED MAGNETITE SKARN + CLAYS.
SOFT - LIGHT IN WEIGHT.
MORE MASSIVE THAN ABOVE ROCK.
ONLY LITTLE KAOLIN.
RUBBLY, FRIABLE ON TOUCH.
17.40m.

SKARN.
NIL.
WO_3.
SOFT, SOAPY CLAYS. REPRESENTING SKARN.
ONLY LITTLE MAGNETITE CONTENT.
19.10m.

SKARN
NIL. SCHEELITE.
SKARN - MORE IRON CONTENT.
MASSIVE.
20.20m.

SKARN.
NO FLUORESCENT
WO_3.
SOFT FRIABLE CLAYS + IRON SKARN.
GREENISH, LIGHT BROWN COLOUR.
LIGHT IN WEIGHT.
IRON IMPREGNATED ON FRACTURES AND JOINTS.
25.00m 30.00m

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY PDA.

CONTRACTOR MINTYRE MINES (AUST.) PTY LTD.
CORE NX.
CASING NX (44.57m)

LOGGED BY CHN. DATE MARCH-E 1982.
STARTED FEBRUARY 14 1982.
FINISHED FEBRUARY 15 1982.

713219 081

SCALE 1:100

LENGTH 91.46m NORTHING 3425810.0
AZIMUTH — EASTING 397356.2
DIP AT COLLAR 45° ELEVATION 503.7
LOCATION KARA. N°1 - MAIN ORE ZONE.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 316 PAGE 1 OF 2 & 4
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE ppm WO3	FRACTURING	BEDDING	GEOLOGY	MINERAL
100		1.0	210				
26.21							
100		1.0	130			Tgd.	
27.43		1.0	300				
89.07		1.0	70				
29.26		1.0	35				
90.16						Tm60	
30.48		1.0	40				
100		1.0	350				
32.31		1.0	5400				
94.05						Tm80	
33.83		1.0	6000				
100		1.0	680				
35.06							
78.94		1.0	90				
36.58		1.0	110			Tmc	
100		1.0	4417 (4.45)				
31.80							
84.62		1.0	4.52 (6.25)				
38.62		1.0	3.23 (9.35)				
100		1.0	3.17 (9.72)				
39.62		1.0	1.65 (3.06)			Tm80	
100		1.0	4.26 (5.95)				
42.67		1.0	2900				
100		1.0	6100				
45.72		1.0	4500				
100		1.0	1.2%			Tm50e	
48.74		1.0	2200				
100		1.0	6500				
		1.0	46++			Tem	

MINERALISATION

Nil WO3 MINERALISATION

NIL WO3 MINERALISATION. 29.70m

30.0 - 31.50 - FEW ISOLATED SPECKS
0.4%- CONCENTRATION OF FINE SCHEELITE AT 31.50 - 55m.
NIL TO 33.0 FROM 31.55m.
GOOD FINE DISSEMINATIONS (+ ALONG FRACTURES) OF SCHEELITE (YELLOW) BETWEEN 33.0 - 34.10m.

NIL WO3 MINERAL.

BETWEEN 27.0 - 43.6m
EXCELLENT WO3 SCHEELITE MINERALISATION.
FRESH.
AVERAGE ESTIMATE OF 2%.
PATCHES UP TO 6% WO3.

43 - 45.0m.
FINE SPECKS OF SCHEELITE BUT WELL DISTRIBUTED.
ESTIMATE OF 0.4 - 0.5%

WELL DISTRIBUTED FINE + MEDIUM COARSE YELLOW SCHEELITE.
GOOD (1.0%) CONCENTRATION 46.0 - 47.0m.

AVERAGE OF THIS RUN.
ESTIMATE 0.5 - 0.6% WO3

AS ABOVE RUN

GEOLOGY

25.00m.
SKARN.
PARTIALLY WEATHERED GREENISH GARNET DIOPSIDE (MAGNETITE) SKARN.
ONLY LITTLE RANDOMLY DISTRIBUTED MAGNETITE CONTENT.
28.55m.

SKARN.
MAGNETITE SKARN.
PARTIALLY WITHED TO 29.70m.
THEREAFTER - FRESH.
30.48m.

SKARN.
MAGNETITE SKARN.
MAGNETITE CONTENT AVERAGES 80% AND IS FINE TO MEDIUM GRAINED.
ACTINOLITE CONTENT APPARENT AT 31.0 - 32.50m.
35.20m.

SKARN -
MASSIVE DARK GREEN.
ACTINOLITE MAGNETITE SKARN.
37.00m.

SKARN.
MAGNETITE SKARN.
MAGNETITE CONTENT - 80%.
EXCELLENT VISIBLE SCHEELITE MINERALISATION.
MAGNETITE IS MEDIUM GRAINED AND QUITE CRYSTALLINE.
LITTLE EPIDOTE CONTENT EVENLY DISTRIBUTED.
45.20m.

SKARN.
MAGNETITE EPIDOTE SKARN.
FRESH, MASSIVE AND UNFRACTURED.
MAGNETITE EST. 40 - 50%.
49.26m.

SKARN EPIDOTE, MAGNETITE SKARN.
60.40m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.
CONTRACTOR McINTYRE MINES (P. McCORMACK).
CORE NX. NX (46.57m).
CASING

LOGGED BY CHN DATE MAR. 8 1982.
STARTED FEB. 4. 1982
FINISHED FEB. 15. 1982.

713220 082

SCALE 1:100

LENGTH 41·46m NORTHING 5428817·0
AZIMUTH ____ EASTING 397365·2
DIP AT COLLAR 45° ELEVATION 603·7
LOCATION KARA. N° 1 – MAIN ORE ZONE.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE Nº 316 PAGE 3 OF 14
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	SAMPLE INTERVAL	SAMPLE ppm WO_3	FRACTURING	BEDDING	GEOLOGY	MINERAL
100		1.0	710				
97·92		1.0	1300				
		1.0	2.7%				
100		1.0	1.87%				
		1.0	860			Tm_{70}	
98·96		1.0	740				
100		1.0	490				
97·91		1.0	820				
		1.0	570				
100		1.0	620				
		1.0	800			Tcm	
99·91		1.0	300			Tgd	
100		1.0	200				
		1.0	150				
94·91		1.0	260			Tcm	
		1.0	110				
100		1.0	220				
		1.0	1350			Tm_{100}	
97·96		1.0	380				
100		1.0	200				
		1.0	85			Tm_{75}	
98·8		1.0	290				
100		1.0	1650				
		1.0	160			Tm_{80}	
100		1.0	620				

2.35%

MINERALISATION

EXCELLENT COARSE AND FINE SCHEELITE DISTRIBUTION IN RUN 52–54m.

ONLY FEW ISOLATED SPECKS OF SCHEELITE EST GRADE 0·1% BETWEEN 54–67m.

↑

EXCEPT 61·50–55m, NIL. WO_3 FLUORESCENCE.

VERY FEW ISOLATED SCHEELITE SPECKS.

NIL. WO_3 FLUORESCENCE. F.

FEW SPECKS IN RUN 67·8 – 68·8m. Est – 0·1% WO_3.

VERY FEW SPECKS TO NIL MINERALISATION.

NIL WO_3.

SKARN. GEOLOGY

MAGNETITE SKARN.
70% MAGNETITE CONTENT.
MASSIVE FINE TO MEDIUM GRAINED
LITTLE EPIDOTE CONTENT.

GARNET–DIOPSIDE FACIES 58·50–58·90m

↑ 58·50m.

SKARN. EPIDOTE MAGNETITE SKARN. MAGNETITE APPROX 15–20%, EXCEPT 60·66m IN RUN 60·40–60·60m WHERE 70%.

SKARN.
GARNET DIOPSIDE SKARN.
MEDIUM TO COARSE GRAINED.

62·45m.

SKARN
EPIDOTE MAGNETITE SKARN.
MAGNETITE – 20%.
FRESH, CRYSTALLINE.
FINE TO MEDIUM GRAINED.

65·80m.

SKARN.
MAGNETITE SKARN.
ALMOST 100% MAGNETITE
MEDIUM GRAINED.

67·80m.

SKARN.
MAGNETITE SKARN.
LITTLE EPIDOTE + DIOPSIDE/GARNET.
MAGNETITE AV – 70%.

71·80m.

SKARN.
MAGNETITE (100%) SKARN.

↓ 90·10m

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH
SURVEY POA.

CONTRACTOR McINTYRE MINES (P.N.G.) PTY LTD
CORE NX
CASING NX – 4·87m

LOGGED BY CHN. DATE MAR. 8. 1982
STARTED FEB. 4. 1982
FINISHED FEB 15. 1982

713221 083

SCALE 1:100

LENGTH 91.46m NORTHING 5425617.0
AZIMUTH ——— EASTING 397355.2
DIP AT COLLAR 45° ELEVATION 603.7.
LOCATION KARA. N°1 - MAIN ORE ZONE.

MINTARE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 316. PAGE 7 OF 414
PROJECT KARA.

% CORE RECOVERY	CORE SIZE	TEST ORE MINERAL	TEST ORE WO_3	FRACTURING	BEDDING	GEOLOGY	MINERAL
100		1.0	360.				
76.21		1.0	60.				
100		1.0	170				
		1.0	140				
79.26		1.0	95				
100		1.0	75				
		1.0	150				
82.31		1.0	85			Tm_{80}	
100		1.0	120				
		1.0	45				
85.36		1.0	35				
100		1.0	70				
		1.0	110				
88.41		1.0	15				
100		1.0	170				
						Gr/ Gr	
91.46.							

MINERALISATION

NIL
WO_3 - SCHEELITE
MINERALISATION.

F

GEOLOGY

SKARN.

MAGNETITE (80%) SKARN (CONTINUED).

MEDIUM TO COARSE GRAINED TO 77.0m.

EPIDOTE MORE PROMINENT AT 77.20 - 78.66m.

EPIDOTE/DIOPSIDE FACIES AT 81.10 - 83.60m.

FINE GRAINED MASSIVE MAGNETITE FROM 83.60 - 90.0m.

LITTLE EPIDOTE FILTERING IN AT END OF RUN TO GRANIT.

90.15m.

GRANITE.

VERY FINE GRAINED GRANITE QUARTZ RICH - LITTLE EPIDOTE.

91.46m.

CONTACT WITH SKARN GRADATIONAL OVER 20cm.

E.O.H. 91.46m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.

CONTRACTOR MCINTYRE MINES (P. McCONNACHIE).
CORE NK. (44.57m)
CASING NK.

LOGGED BY CHM. DATE MARCH. 5/1982.
STARTED FEB. 4. 1982
FINISHED FEB. 15 1982.

(REC) RECOVERY, CONSIDER 95% EXCEPT AS NOTED
(WX) WEATHERING, CONSIDER FRESH ROCK EXCEPT AS NOTED. WX INDICATES CLAYEY, LIMONITIC MATERIAL 1/4

LARA-No 1 MAIN ORE ZONE.

316. 084

SECTION:

SAMP NO.	REC WX	INTERVAL	LGTH
D3161 1	CORE	7.92-9.0	1.08
2	"	9.0-10.0	1.0
3	"	10.0-11.0	1.0
4	"	11.0-12.0	1.0
5	"	12.0-13.0	1.0
6	"	13.0-14.0	1.0
7	"	14.0-15.0	1.0
8	"	15.0-16.0	1.0
9	"	16.0-17.0	1.0
10	"	17.0-18.0	1.0
11	"	18.0-19.0	1.0
12	"	19.0-20.0	1.0
13	"	20.0-21.0	1.0
14	"	21.0-22.0	1.0
15	"	22.0-23.0	1.0
16	"	23.0-24.0	1.0
17	"	24.0-25.0	1.0
18	"	25.0-26.0	1.0
19	"	26.0-27.0	1.0
20	"	27.0-28.0	1.0
21	"	28.0-29.0	1.0
22	"	29.0-30.0	1.0
23	"	30.0-31.0	1.0
24	"	31.0-32.0	1.0
25	"	32.0-33.0	1.0
26.	"	33.0-34.0.	1.0.

ASSAY

ppm WO_3				
780				
1050				
620				
2150				
4700				
2750				
1350				
2250				
410				
560				
540				
3150				
3300				
2250				
2650				
5900				
4300				
210				
130				
380				
TO				
35				
40				
380				
540				
6000				

AVE:

INVL	LGTH SM-%	WT AR AV.

AVE:

INVL	LGTH SM-%	WT AR AV.

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

COMMENT

PROJECT LOAD 1 MAIN ORE ZONE

DDH 31

2222214

AC 42501[illegible] AC 4453[illegible]
AC-4277/82.

LIGRANT

KARA-N°1-MAIN ORE ZONE

316

085

713223

(REC) RECOVERY, CONSIDER >90% EXCEPT AS NOTED

(W'X) WEATHERING, CONSIDER FRESH ROCK EXCEPT AS NOTED. W'X INDICATES CLAYEY, LIMONITIC MATERIAL 2/4

SECTION:				ASSAY			AVE:			AVE:		
SAMP NO.	REC W'X	INTERVAL	LGTH	ppm WO_2	CODE B2.		INVL	LGTH %M-%	WT AR AV.	INVL	LGTH %M-%	WT AR AV.
D3161 27	CORE	34.0 - 35.0	1.0	680								
28	"	35.0 - 36.0	1.0	90								
29	"	36.0 - 37.0	1.0	110								
30	"	37.0 - 38.0	1.0	4.88%	4.17%							
31	"	38.0 - 39.0	1.0	5.25%	4.52%							
32	"	39.0 - 40.0	1.0	9.35%	8.23%							
33	"	40.0 - 41.0	1.0	2.72%	2.17%							
34	"	41.0 - 42.0	1.0	2.06%	1.65%							
35	"	42.0 - 43.0	1.0	5.05%	4.26%							
36	"	43.0 - 44.0	1.0	2900								
37	"	44.0 - 45.0	1.0	6100								
38	"	45.0 - 46.0	1.0	4500								
39	"	46.0 - 47.0	1.0	1.29%								
40	"	47.0 - 48.0	1.0.	3200								
41	"	48.0 - 49.0	1.0	6800								
42	"	49.0 - 50.0	1.0	4600								
43	"	50.0 - 51.0	1.0	7100								
44	"	51.0 - 52.0	1.0	4300								
45	"	52.0 - 53.0	1.0	2.76%	2.35%							
46	"	53.0 - 54.0	1.0	1.89%	1.57%							
47	"	54.0 - 55.0	1.0	860								
48	"	55.0 - 56.0	1.0	740								
49	"	56.0 - 57.0	1.0	490								
50	"	57.0 - 58.0	1.0	820								
51	"	58.0 - 59.0	1.0	680								
52	"	59.0 - 60.0	1.0	620								

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

COMMENT

PROJECT KARA.1. MAINORE ZONE.

DDH 316.

AK 277182

(REC) RECOVERY, CONSIDER 100% EXCEPT AS NOTED KARA N°4-MAIN ZONE. 316. 086

(WX) WEATHERING, CONSIDER FRESH ROCK EXCEPT AS NOTED. WX INDICATES CLAYEY, LIMONITIC MATERIAL 3/4

SECTION:

SAMP NO.	REC WX	INTERVAL	LGTH	ASSAY Ppm WO3	AVE: INVL	AVE: LGTH SM-%	AVE: WT AR AV	AVE: INVL	AVE: LGTH SM-%	AVE: WT AR AV
D316-63	CORE	60.0 - 61.0	1.0	300						
64	"	61.0 - 62.0	1.0	300						
65	"	62.0 - 63.0	1.0	200						
66	"	63.0 - 64.0	1.0	150						
67	"	64.0 - 65.0	1.0	260						
68	"	65.0 - 66.0	1.0	110						
69	"	66.0 - 67.0	1.0	220						
70	"	67.0 - 68.0	1.0	1350						
71	"	68.0 - 69.0	1.0	380						
72	"	69.0 - 70.0	1.0	200						
73	"	70.0 - 71.0	1.0	35						
74	"	71.0 - 72.0	1.0	290						
75	"	72.0 - 73.0	1.0	1850						
76	"	73.0 - 74.0	1.0	160						
77	"	74.0 - 75.0	1.0	620						
78	"	75.0 - 76.0	1.0	360.						
79	"	76.0 - 77.0.	1.0	60.						
80	"	77.0 - 78.0	1.0	170						
81	"	78.0 - 79.0	1.0	140						
82	"	79.0 - 80.0	1.0	55						
83	"	80.0 - 81.0	1.0	75						
84	"	81.0 - 82.0	1.0	150						
85	"	82.0 - 83.0	1.0	85						
86	"	83.0 - 84.0	1.0	120						
87	"	84.0 - 85.0	1.0	45						
88.	"	85.0 - 86.0	1.0	35						

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

COMMENT

PROJECT

AC-42 TO 122.

(REC) RECOVERY, CONSIDER 95% EXCEPT AS NOTED KARA N°1 - MAIN ORE ZONE.

(W/X) WEATHERING, CONSIDER FRESH ROCK EXCEPT AS NOTED. W/X INDICATES CLAYEY, LIMONITIC MATERIAL 4/4.

316. 087

A13223

SECTION:				ASSAY		AVE:			AVE:		
SAMP NO.	REC W/X	INTERVAL	LGTH	Apm WC3		INVL	LGTH SM-%	WT AR AV.	INVL	LGTH SM-%	WT AR AV.
D316 79	CORE	86·0 - 87·0	1·0	70							
80	"	87·0 - 88·0	1·0	2.10							
81	"	88·0 - 89·0	1·0	15							
82	"	89·0 - 90·0	1·0.	170.							

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

COMMENT

PROJECT KARA N°1 MOUNTAIN

EXPLORATION DEPARTMENT. 088

RECOVERY SHEET

713226

HOLE No. 316 | PAGE 1 OF 1 1.

CORE RECOVERY (Rec) & RQD'S EXCEPT AS NOTED

KARA N°1 - MAIN ORE ZONE.

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0.00	4.57	4.57	N.C.		85.36	88.41	3.05	3.05	100
4.57	7.92	3.35	SLUDGE		88.41	91.46	3.05	3.05	100.
7.92	8.84	0.92	0.44	47.82.	E.O.H.	91.46.			
8.84	10.36	1.52	0.54	35.52.					
10.36	11.28	0.92	0.83	35.87					
11.28	12.80	1.52	1.30	85.52					
12.80	14.33	1.53	1.73	100.					
14.33	16.15	1.82	1.60	87.91					
16.15	17.37	1.22	0.45	36.89					
17.37	18.29	0.92	0.50	54.35					
18.29	20.12	1.83	0.90	49.18					
20.12	21.61	1.49	1.30	87.25					
21.61	21.95	0.34	0.14	41.17					
21.95	23.16	1.21	1.00	82.64					
23.16	24.99	1.83	1.72	93.99.					
24.99	26.21	1.22	1.22	100					
26.21	27.43	1.22	1.22	100					
27.43	29.26	1.83	1.63	89.07					
29.26	30.48	1.22	1.10	90.16.					
30.48	32.31	1.83	1.83	100.					
32.31	33.83	1.52	1.43	94.08					
33.83	35.06	1.23	1.22	100					
35.06	36.68	1.52	1.20	78.94.					
36.68	37.80	1.22	1.22	100					
37.80	39.62	1.82	1.54	84.62.					
39.62	42.67	3.05	3.05	100.					
42.67	45.72	3.05	3.05	100					
45.72	48.74	3.02	3.02	100					
48.74	51.82.	3.08	3.08	100					
51.82	54.86.	3.04	3.15	100					
54.86	57.91	3.05	3.05	100					
57.91	60.96	3.05	3.32	100					
60.96.	64.01	3.05	3.05	100.					
64.01	67.06	3.05	3.05	100.					
67.06	70.11	3.05	3.05	100					
70.11	73.16	3.05	3.05	100					
73.16	76.21	3.05	3.05	100.					
76.21	79.26	3.05	3.05	100					
79.26	82.31	3.05	3.05	100					
82.31	85.36	3.05	3.05	100.					

713227

089

SCALE 1:100

LENGTH 36.27m. NORTHING 6828.2
AZIMUTH 82°MD' EASTING 7710.9
DIP AT COLLAR 65° ELEVATION 546.6
LOCATION BOBS BONANZA.

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 322 PAGE 1 OF 1/2.
PROJECT KARA

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
NC.		NO SAMPLES SUBMITTED FOR ASSAY.			Gr Td. WTb Tbs Gs Qu Qs	

MINERALISATION
XY - 10.50m
Y/F - 26.40m.

No Mineralisation.

No Mineralisation.

GEOLOGY

OVERBURDEN + BULLDOZED RUBBLE. 1.20m.

TERTIARY BASALT.
BOULDERS/PEBBLES FROM OLIVINE BASALT + WEATHERED CLAY. 3.48m.

X

TERTIARY BASALT AND CLAYS/SEDIMENTS
WEATHERED SOFT BASALTIC MATERIAL
SANDS AND CLAYS.

GRADATIONAL CONTACT, EXTREMELY WEATHERED. 8.80m.

8.81m.

Y

ARENACEOUS UNIT.
SANDSTONE, CREAMISH-WHITE.
FINE TO MEDIUM GRAINED.
PARTIALLY WEATHERED.
JOINTED - LITTLE Fe IMPREGNATION ALONG JOINTS. 15.26m.

ARENACEOUS UNIT.
FINE GRAINED ORANGE-BROWN SANDSTONE.
SOFT, PARTIALLY WEATHERED.
BLOTCHY IMPREGNATIONS OF IRON. 18.48m.

ARENACEOUS UNIT.
SOFT WHITISH-CREAM SILTSTONE.
PARTIALLY WEATHERED TO WEATHERED
EXTREMELY FRACTURED - BLOCKY CORE.
POOR CORE RECOVERY. 23.47m.

Fe IMPREGNATED SANDSTONE.
MAGNETITE.
PARTIALLY WEATHERED - WELL LAMINATED 24.78m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR McINTYRE MINES / P. McCONNACHIE
CORE NX
CASING NX (4.57m)

DATE JUNE 16, 1982

LOGGED BY CHW.
STARTED JUNE 11, 1982

SCALE 1" = 100'

LENGTH 36.27m. NORTHING 5823.2
AZIMUTH 68°40' EASTING 7710.9
DIP AT COLLAR 65° ELEVATION 546.6.
LOCATION BOBS BONANZA.

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 302 PAGE 1 OF 2

PROJECT KARA

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
100					Q_{SN}	
100					Tr_{MO}	
100					Q_G	
100					G_r	

MINERALISATION

NIL
FLUORESCENCE

26.40m

F

NIL
MINERALISATION.

GEOLOGY

ARENACEOUS UNIT
GREY SILTSTONE / QUARTZITE.
BANDED WITH MAGNETITE - Fe CONTENT INCREASING ALONG RUN - GRADATIONAL CONTACT

0 - 26.40m.

SKARN.

MAGNETITE SKARN.
MAGNETITE CONTENT APPROX 40%
FRESH + BANDED
MAGNETITE - MEDIUM TEXTURED.

26.40m - 31.36m.

ARENACEOUS UNIT.
SILTSTONE - QUARTZITE.
PARTIALLY WEATHERED - SLIGHTLY EPIDOTISED.

31.36m - 32.15m.

GRANITE.

FINE TO MEDIUM GRAINED.
SHARP CONTACT WITH ABOVE.
FEW MAFIC MINERALS.

32.15m - 36.27m.

E.O.H. 36.27m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.

CONTRACTOR McINTYRE MINES (P. McCORMACK)
CORE NX
CASING NX (46.57m)

LOGGED BY C.H.W. DATE 16. JUNE 1982
STARTED 7. JUNE 1982
" FINISHED 10.82

713229 091

RECOVERY SHEET

HOLE No. 322. PAGE 1 OF 111.

"BOBS BONANZA"

CORE RECOVERY (CR) 3 95% EXCEPT AS NOTED

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0.00	4.57	4.57	—	CASING.					
4.57	8.53	3.96	1.58	39.89					
8.53	11.58	3.05	0.96	31.47.					
11.58	12.50	0.92	0.92	100%.					
12.50	13.41	0.91	0.91	100%.					
13.41	14.63	1.22	1.10	90.16%.					
14.63	16.15	1.52	1.00	65.78%.					
16.15	17.68	1.53	1.21	79.08%					
17.68	18.29	0.61	0.61	100%.					
18.29	20.73	2.44	1.11	45.49%.					
20.73	23.47	2.74	0.74	27.00%.					
23.47	24.08	0.61	0.06	9.8%.					
24.08	24.99	0.91	0.73	80.2%					
24.99	27.13	2.14	2.14	100%					
27.13	30.18	3.05	2.05	100%.					
30.18	31.09	0.91	0.66	72.52.					
31.09	33.22	2.13	1.92	90.14%					
33.22	36.27	3.05	3.05	100%.					
	36.27	E.O.H.							

713230 092

SCALE 1:10

LENGTH 251.35m NORTHING 6271.0
AZIMUTH 108°10' EASTING 7676.0
DIP AT COLLAR 64° ELEVATION 479.4
LOCATION EASTERN RIDGE.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 323 PAGE 1 OF 4.
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE IN FEET	FEATURE IN mm	FRACTURING	BEDDING	GEOLOGY	MINERAL
NC						W Tu	
4.57							
30.11							
6.10							
7.12						X Tu	
7.98							
29.45							
9.14							
78.02							
10.06							
28.52							
10.97							
100							
12.19							
74.81							
13.11							
79.81		1.0	80				
15.24		1.0	30				
95.08		1.0	180				
15.29		1.0	100				
30.76		1.0	83				
19.20		1.0	130			Tgd m 10	
100		1.0	120				
20.17		1.0	260				
100		1.0	210				
22.25		1.0	150				
100		1.0	100				
24.68		1.0	130				
100							

MINERALISATION
LEVELS OF CHLORITION.
W - 0.00 - 4.57.
X - 4.57 - 12.00.
Y - 12.00 - 23.50
F - 23.50 - 251.35m.

W
4.57.
X
9.80m.
12.00.
Y.
23.50
F.
26.15m

Nil MINERALISATION

13.00 - 15.36m
· Nil SCHEELITE.

15.36 - 15.45m.
A LITTLE DISSEMINATED WHITISH-YELLOW FINE SCHEELITE ALONG FRACTURES

Nil SCHEELITE OR VERY, VERY ISOLATED SPECKS. NO GRADE ESTIMATED.

23.50 - 26.15.
GOOD CLEAN UNCONTAMINATED FRESH GARNET DIOPSIDE SKARN.

GEOLOGY
MAIN LITHOLOGICAL UNITS.
UPPER SKARN ZONE - 0.00 - 45.95m.
UPPER SST UNIT - 45.95 - 59.40m
LOWER SKARN ZONE - 59.40m - 74.90m.
LOWER SST UNIT - 74.90m - 80.45m.
GRANITE - 80.45m - 81.35m.

UPPER SKARN UNIT:-
NC CORE - CASED TO 4.57m.
CLAYEY Fe SMUDGE REPRESENTING SKARN

4.57.
SKARN

UNDIFFERENTIATED UNIT.
WEATHERED (x)
PROBABLY MAGNETITE (ORIGINALLY) SKARN.

ANTHONITIC

7.25 - 9.80m - CLAYEY AND FRIABLE

9.80m.

GARNET DIOPSIDE SKARN.
WEATHERED TO 12.00m, PARTIALLY MINED THEREAFTER.

12.00.

EPIDOTE RICH ZONE 14.6 - 15.40m.

WEATHERED ZONE 17.25 - 18.35.

RUBBLY, AND MEDIUM TO COARSE GRAINED TEXTURE.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.
CONTRACTOR MCINTYRE MINES PTY LTD. NX.
CORE NX.
CASING

LOGGED BY CHM DATE 30 JUNE 1982.
STARTED 16 JUNE 1982

713231 093

SCALE 1:100

LENGTH 51.35m NORTHING 6270 C
AZIMUTH 102°10' EASTING 7176 C
DIP AT COLLAR -64° ELEVATION 4779
LOCATION EASTERN RIDGE

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 323 PAGE 1 OF 2

PROJECT KARA

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE Ø mm/m	FRACTURING	BEDDING	GEOLOGY	MINERAL
25.5		1.0	35C				
100		1.0	30C				
27.13		1.0	25C			Tc	
100		1.0	40C				
29.83		1.0	45C				
100		1.0	35C			Tlg	
32.92		1.0	45C				
100		1.0	30C			Tgdm	
35.97		1.0	45C				
100		1.0	14C			Tmqz	
39.01		1.0	26C				
100		1.0	12C				
42.06		1.0	35C			Tdg	
43.0		1.0	22C				
44.20		1.0	13C				
45.96		1.0	1C			Tlc	
45.42		1.0	2C				
100						Q.	
48.36							

MINERALISATION

25.7C 26.70m
MINERALISATION SCHEELITE VEINS + STKWK BLOW CUT OFF GRADE.

30.20 31.40m
CRYSTALLINE (0.5cm) CC SCHEELITE AND FINE DISSEMINATIONS WITHIN YELLOW FLUORESCENCE EST @ 0.5-0.9%

31.40 - 33.0m
LIMESTONE, BUT WELL DISPERSED
EST GRADE 0.1-0.2%

33.0 - 44.6m
FEW ISOLATED VEINLETS EST NOT TO REACH 0.1% GRADE.

46.0 - 45.0m.
NIL SCHEELITE OR THE ISOLATED SPECK
NO GRADE.

NIL MINERALISATION.

GEOLOGY

25.13 m
LIMESTONE GRAIN
FINE GRAINED - MEDIUM TO DARK GREEN COLOUR
SLIGHTLY BANDED - NO MAGNETITE.

29.20 m.
DIOPSIDE - GARNET SKARN
BLUISH GREEN
MEDIUM TEXTURE,
FRESH & BRITTLE.

31.80 m
GARNET, DIOPSIDE, MAGNETITE SKARN
FRESH, COARSE FRACTURE, HARD
OVERALL Fe CONTENT, ESTIMATED AT 2-3%.

35.82 m
MAGNETITE SKARN.
MASS AMPHIBOLE, GARNET, DIOPSIDE
MAGNETITE 40%. WELL DISTRIBUTED - FINE GRAINED.

39.15 m.
DIOPSIDE GARNET SKARN
COARSE-MEDIUM GRAINED TEXTURE
SLIGHTLY WEATHERED

44.20 m
TRANSITIONAL ZONE FROM SKARN TO LIMESTONE
HARD FINE GRAINED
LIGHT GREY COLOUR

45.45 m
UPPER SANDSTONE UNIT - 45.45 - 51.40
QUARTZITE UNIT
MASSIVE, VERY HARD & RECRYSTALLISED
FINE GRAINED
LIGHT GREY
EXTREMELY SLOW DRILLING PROGRESS

51.35 m

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY POA.
CONTRACTOR McINTYRE MINES (AUST) PTY LTD. KALGOORLIE
CORE NX
CASING NX

DATE 30 AUG 1982.
LOGGED BY CHW
STARTED 16 JUNE 1982
FINISHED 1 JULY 1982

713232 094

SCALE 1:100

LENGTH 81.35m NORTHING 6271.0
AZIMUTH 102°16' EASTING 7476.0
DIP AT COLLAR 61° ELEVATION 474.9
LOCATION EASTERN RIDGE

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 323 PAGE 1 OF 3 4
PROJECT KARA

% CORE RECOVERY	CORE SIZE	FEATURE: MATERIAL	FEATURE: (mm)	FRACTURING	BEDDING	GEOLOGY	MINERAL
100						C	
51.51							
100							
74.76							
100							
55.47							
100							
64.35		10	600				
100		10	2950				
67.91		10	700				
100		10	1650			Tfg	
66.65		10	2100				
100		10	3000			Tyd	
69.76		10	500				
100		10	1752				
66.75		10	720			Tmfe	
100		10	1000			Tyd	
69.75		10	760				
100		10	440				
19.76		10	5500			Tm	
100		10	400				
72.65		10	310				
100		10	75				
		10	100			Tmss	
100		10	45				

MINERALISATION

57.40 - 57.45m
ISOLATED SPECKS AND CRYSTALS OF FRESH MAGNETITE DISSEMINATED IN SCHEELITE (0.15-0.20%)

57.45 - 60.50m
WELL DISTRIBUTED SPECKS OF SCHEELITE EST GRADE 0.40%
60.50 - 63.20m
AS ABOVE BUT LOWER GRADE
EST AV 0.25%.

63.20 - 66.75m
WELL DISPERSED SPECKS OF SCHEELITE (FINE) WITH NARROW (2cm) ZONES OF VERY FINE DISSEMINATING.

66.75 - 73.9%
ISOLATED SPECKS ONLY
EST 0.05 - 0.10%.

GEOLOGY

QUARTZITE UNIT AS ABOVE
VERY CRYSTALLINE

METAMORPHOSED FROM 67.00m.
TRANSITIONAL TO UNDERLYING UNIT
VERY HARD DRILLING
57.50

TRANSITIONAL ZONE
QUARTZITE TO SKARN
57.90

LOWER SKARN UNIT
57.90 - 74.90m.
SKARN - CHIEFLY GARNET DIOPSIDE FACIES
BUT NARROW ALTERNATING ZONES OF AMPHIBOLE RICH SKARN.

63.40
MAGNETITE SKARN
63.90 APPROX 60% MAG.
GARNET DIOPSIDE SKARN.
FINE, MEDIUM GRAINED TEXTURE.

66.90
EPIDOTE RICH SKARN
FINE GRAINED TEXTURE.
MINOR DIOPSIDE GREEN COLOUR.

76.90
MAGNETITE SKARN
MAGNETITE WELL DISTRIBUTED THROUGHOUT
60-70% CONTENT

74.90m

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDA.
CONTRACTOR McINTYRE MINES (C.D. O'REGAN & ATTACK) NX
CORE

LOGGED BY CHW DATE 30 AUG 1982.

713233 095

SCALE 1:100

LENGTH	51.35m	NORTHING	6271.0
AZIMUTH	102°18'	EASTING	7676.0
DIP AT COLLAR	64°	ELEVATION	4749
LOCATION	EASTERN RIDGE.		

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT

HOLE No 323. PAGE 1 OF 4

PROJECT KARA

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
76.54						
96.54						
74.51					Q	
100						
76.64						
100						
51.35					Gr	

MINERALISATION

GEOLOGY

UPPER SST UNIT 74.90 - EC 45m

QUARTZITE.

LIGHT GREY, HARD, BRITTLE

FINE GRAINED TEXTURE

MORE JOINTED THAN LOWER SANDSTONE UNIT.

FEW QUARTZ STRINGERS IN LOWEST SECTION.

EC 45

GRANITE - SHARP CONTACT, FINE GRAINED HOMOGENEOUS, LIGHT PINK.

E.O.H. 51.35

ANGLE READ

ANGLE CORRECTED

AZIMUTH

DEPTH

SURVEY POA.

CONTRACTOR McINTYRE MINES LTD (COMPACT)

CORE NX

CASING NX.

LOGGED BY C.M.W. DATE 30 AUG. 1982.

STARTED 16 JUNE 1982 / FINISHED 1 JULY 1982.

Ac 176/82
Ac 126/83
Ac 127/83

713234

096

323.

EASTERN RIDGE 1/3

SECTION:

ASSAY

AVE:

AVE:

Sludge Core	Feet	Metres Interval	Lgth	% WDS	ppm AU				INVL	LGTH SM-%	WT AV AU	INVL	LGTH SM-%	WT AV AU
0223/1	CORE	13.0 - 14.0	1.0		80									
2	"	14.0 - 15.0	1.0		30									
3	"	15.0 - 16.0	1.0		180									
4	"	16.0 - 17.0	1.0		100									
5	"	17.0 - 18.0	1.0		85									
6	"	18.0 - 19.0	1.0		130									
7	"	19.6 - 20.0	1.0		120									
8	"	20.0 - 21.0	1.0		260									
9	"	21.0 - 22.0	1.0		210									
10	"	22.0 - 23.0	1.0		150									
11	"	23.0 - 24.0	1.0		100									
12	"	24.0 - 25.0	1.0		130									
13	"	25.0 - 26.0	1.0		350									
14	"	26.0 - 27.0	1.0		200									
15	"	27.0 - 28.0	1.0		25									
16	"	28.0 - 29.0	1.0		400									
17	"	29.0 - 30.0	1.0		3900									
18	"	30.0 - 31.0	1.0		7500									
19	"	31.0 - 32.0	1.0		3900									
20	"	32.0 - 33.0	1.0		2550									
21	"	33.0 - 34.0	1.0		310									
22	"	34.0 - 35.0	1.0		240									
23	"	35.0 - 36.0	1.0		450									
24	"	36.0 - 37.0	1.0		140									
25.	"	37.0 - 38.0	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 KARA

AC. 126193
AC. 127193

713235

323

EASTERN RIDGE 2/3

SECTION:					ASSAY					AVE:				AVE:			
Sludge or Core	Feet	Metres Interval	Lgth	% WO_3	ppm WO_3					INVL	LGTH WO_3 %	WT AV		INVL	LGTH WO_3 %	WT AV	
D223																	
26	CORE	38.0 - 39.0	1.0		260												
27	"	39.0 - 40.0	1.0		120												
28	"	40.0 - 41.0	1.0		250												
29	"	41.0 - 42.0	1.0		220												
30	"	42.0 - 43.0	1.0		230												
31	"	43.0 - 44.0	1.0		130												
32	"	44.0 - 45.0	1.0		10												
33	"	45.0 - 46.0	1.0		20												
D223																	
34	CORE	56.0 - 57.0	1.0		640												
35	"	57.0 - 58.0	1.0		2950												
36	"	58.0 - 59.0	1.0		780												
37	"	59.0 - 60.0	1.0		1650												
38	"	60.0 - 61.0	1.0		2900												
39	"	61.0 - 62.0	1.0		3000												
40	"	62.0 - 63.0	1.0		500												
41	"	63.0 - 64.0	1.0		1750												
42	"	64.0 - 65.0	1.0		720												
43	"	65.0 - 66.0	1.0		1000												
44	"	66.0 - 67.0	1.0		760												
45		67.0 - 68.0	1.0		1440												
46		68.0 - 69.0	1.0		5500												
47		69.0 - 70.0	1.0		400												
D223																	
48	CORE	70.0 - 71.0	1.0		210												
49	"	71.0 - 72.0	1.0		75												

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

COMMENT

PROJECT KARA. EASTERN RIDGE

DDH 713

AC 126/83
AC 127/83

713236

325

3/3

098

SECTION:

ASSAY

AVE:

AVE:

Sludge No.	Feet	Metres Interval	Lgth	% WO3	ppm WO3											
										INVL	LGTH %M-%	WT AR AV	INVL	LGTH %M-%	WT AR AV
323															
50	CORE	72.0 - 73.0	1.0		100										
51	"	73.0 - 74.0	1.0		45										
52	"	74.0 - 75.0	1.0		45										

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

COMMENT

PROJECT LARA

DDH 323

RECOVERY SHEET

713237 HOLE No. 323 PAGE 1 OF 1

EASTERN RIDGE

CORE RECOVERY (%) > 95% EXCEPT AS NOTED

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0.00	4.57	4.57	-	CASED					
4.57	6.10	1.53	0.47	30.71%					
6.10	7.98	1.88	1.45	77.12%					
7.98	9.14	1.16	1.04	89.65%					
9.14	10.06	0.92	0.80	86.96%					
10.06	10.97	0.91	0.71	78.02%					
10.97	12.19	1.22	1.05	88.52%					
12.19	13.11	0.92	0.92	100%					
13.11	15.24	2.13	1.70	79.81%					
15.24	18.29	3.05	2.90	95.08%					
18.29	19.20	0.91	0.28	30.76%					
19.20	20.12	0.92	0.92	100%					
20.12	22.25	2.13	2.13	100%					
22.25	24.08	1.83	1.83	100%					
24.08	25.30	1.22	1.22	100%					
25.30	27.13	1.83	1.83	100%					
27.13	29.87	2.74	2.74	100%					
29.87	32.92	3.05	3.05	100%					
32.92	35.97	3.05	3.05	100%					
35.97	39.01	3.04	3.04	100%					
39.01	42.06	3.05	3.05	100%					
42.06	44.20	2.14	0.92	43.0%					
44.20	45.42	1.22	1.00	81.96%					
45.42	48.46	3.04	3.04	100%					
48.46	51.51	3.05	3.00	98.36%					
51.51	54.56	3.05	3.05	100%					
54.56	55.47	0.91	0.91	100%					
55.47	56.38	0.91	0.91	100%					
56.38	57.91	1.53	1.53	100%					
57.91	60.65	2.74	2.74	100%					
60.65	63.70	3.05	3.05	100%					
63.70	66.75	3.05	3.05	100%					
66.75	69.80	3.05	3.05	100%					
69.80	72.85	3.05	3.12	100%					
72.85	75.59	2.74	2.74	100%					
75.59	76.81	1.22	1.15	94.26%					
76.81	78.64	1.83	1.83	100%					
78.64	81.38	2.74	2.74	100%					

713238 100

SCALE 1:100

LENGTH 63·70m NORTHING 6184·1
AZIMUTH 89°50' EASTING 7662·9
DIP AT COLLAR 50°E ELEVATION 496·1
LOCATION EASTERN RIDGE.

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT
HOLE No 324 PAGE 1 OF 1/3.
PROJECT KARA

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
					B.	
12·20						
14·94						
16·15						
71·03					Bc	
17·98						
88·65						
21·03						
100						
23·47						
24·05						

MINERALISATION

LEVELS OF OXIDATION:-

W = 0·00 - 16·60m.
X = 16·60 - 25·50m.
W = 25·50 - 29·10m.
X = 29·10 - 53·20m.
Y = 63·20 - 63·70m.

Nil

MINERALISATION.

GEOLOGY

24TH SUMMARY.

TERTIARY BASALT - 0·00 - 12·20m.
TERTIARY SEDS - 12·20 - 53·20m.
LOWER SAARN SST UNIT - 53·20 - 58·00m.
LOWER SAARN UNIT - 58·00 - 63·70m.
HOLE ABANDONED.

NO CORE REQUESTED.
0·00 - 12·20m.
RESIDUAL TERTIARY BASALT.
SLUDGE COLLECTED.

12·20m.

DARK BROWN TERTIARY.
MUDS REPRESENTING TUFFS?
GRADES INTO UNDERLYING UNIT.

14·20m.

FAWN COLOURED MUDS REPRESENTING TUFFS.
COMPLETELY OXIDISED.

16·60m.

TERTIARY SEDIMENTS
16·60m - 63·20m.

LIGHT FAWN TO GREY TERTIARY SILTS AND SANDS.

SLIGHTLY BANDED/CROSS BEDDED.

SLIGHTLY INDURATED.

1 25·50m

W

X.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY POD.

CONTRACTOR McINTYRE MINES (J.P. McCORMACK) XV XV.
CORE
CASING

LOGGED BY CHN DATE 31 AUG. 1982.
STARTED 16 JULY 1982
FINISHED 22 JULY 1982

713239 101

SCALE 1:100

LENGTH 63.70m NORTHING 6114.1
AZIMUTH 59°00' EASTING 7662.9
DIP AT COLLAR 50° ELEVATION 496.1
LOCATION EASTERN RIDGE.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 324 PAGE 1 OF 2 & 3
PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
52.45						
76.52						
90 e						
29.57						
100						
31.72						
20.09						
33.53						
88.89						
35.36						
32.60					BS.	
38.40						
41.64						
41.45						
54.32						
44.30						
22.52						
46.98						
0						
58.41						
82.64						
49.87						

MINERALISATION

25.50 x

w

29.10

x

Nil MINERALISATION

25.50 GEOLOGY

TERTIARY SEDS.
CLAYS & MUDSTONE.
LIGHT GREY.
CARBONACEOUS CONTENT.

29.40.

TERTIARY FAWN AND YELLOW SLIGHTLY INDURATED SANDS AND CONGLOMERATE BANDS.
SUB ROUNDED CONGLOMERATE FRAGMENTS.
HARD SAND UNITS.

33.53

TERTIARY. FAWN AND GREY ALTERNATING BANDS OF SANDS AND CRITE.
GENERALLY OXIDISED AND SOFT.

44.40

LIGHT FAWN TERTIARY FINE GRAINED SILTS

▼ 53.20m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY POA.

CONTRACTOR. ASHMORE TUNNELLING (QLD)
CORE NX
CASING NIL

LOGGED BY MMS DATE 31 AUG 1982.
STARTED 5 JULY 1982
FINISHED 16 JULY 1982

713240

SCALE 1" = 100'

LENGTH 63.70m NORTHING 6184.1
AZIMUTH 89°50' EASTING 7662.9
DIP AT COLLAR 60° ELEVATION 498.1
LOCATION EASTERN RIDGE.

M'INTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No. 324 PAGE / OF 8/3
PROJECT KARA.

% CORE RECOVERY	CORE BREAK	FEATURE	FRACTURING	BEDDING	GEOLOGY	MINERAL
77 10						
51 81					B_s	
55 30						
53 80						
100						
54 35						
					Q.	
100						
52 60						
100						
59 13						
54 60					T_u	
94 90						
100						
61 5						
100						
62 70						

MINERALISATION

X

NIL. 53·36

MINERALISATION.

62·00 - 63·20m.
FINE DISSEMINATED SCHEELITE
0.2 - 0.4 EST GRADE
NOT ASSAYED

Y

GEOLOGY

AS ABOVE - TERTIARY SILTS.

53·20m.

"LOWER SANDSTONE UNIT"

QUARTZITE / SANDSTONES.
(SLIGHTLY ALTERED AND SKARNIFIED FROM 63·10 TO 64·00m).

LIGHT GREY TO BROWN
FINE GRAINED
JOINTED + FRACTURED
INTERPRETATED AS LOWER SST UNIT.

62·00m.

"LOWER SKARN UNIT.

SKARN., AJINOUBN COULD BE CLASSIFED AS SKARNIFIED ARENACEOUS UNIT.

FAULTED ZONE OF FINE-MEDIUM SAND - UNCONSOLIDATED BETWEEN 59·15-60·90m.

LITTLE OR NO MAGNETITE CONTENT.

E.O.H. 63·70m.

HOLE ABANDONED.

(ON WITHDRAWING RODS AT 63·70m TO CHANGE CORE BIT., CORE BARREL STUCK AT 60·90m. RODS BROKEN AT BARREL CONNECTION).

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDP.

CONTRACTOR M'INTYRE MINES (P. McFORYAN)
CORE NX
CASING NX

LOGGED BY CMW DATE 31 JUNE 1982.
STARTED 5 JULY 1982.
FINISHED 16 JULY 1982.

RECOVERY SHEET 713241

HOLE No. 324 | PAGE 1 OF 1.

CORE RECOVERY (CR) > 99% EXCEPT AS NOTED

EASTERN RIDGE.

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
000	12.20	12.20	–	ROLLER BIT					
12.20	14.94	2.74	1.10	40.14.					
14.94	16.15	1.21	1.00	826.					
16.15	17.98	1.83.	1.30	71.03.					
17.98	21.03	3.05.	2.71	88.85.					
21.03	23.47	2.44.	2.44	100.					
23.47	26.52	3.05.	1.60	52.45.					
26.52	29.57	3.05.	1.22	40.0%					
29.57	31.72	2.15.	2.15	100%.					
31.72	33.83	2.11.	1.69	80.09.					
33.83	35.36	1.53.	1.36	88.89.					
35.36	38.40	3.04.	1.00	32.80.					
38.40	41.45	2.95.	1.23	41.69.					
41.45	44.30	2.85.	1.56	54.74.					
44.30	46.94	2.64.	0.86	32.58.					
46.94	48.16	1.22.	NIL	0%					
48.16	49.37	1.21	1.00	826.					
49.37	51.51	2.14.	1.65	77.10.					
51.51	53.84	2.33	1.29	55.36.					
53.84.	54.56	1.22.	1.22	100%.					
54.56	57.60	3.04.	3.04	100%					
57.60	59.13	1.53.	1.53	100%					
59.13	60.96	1.83.	1.00.	52.64.					
60.96	61.57.	0.61.	0.61	100%					
61.57.	63.70.	2.13.	2.13	100%.					
		EOH		63.70m.					

713242 104

SCALE 1:100

LENGTH 69.50m. NORTHING 6227.5
AZIMUTH 87°30' EASTING 7674.6
DIP AT COLLAR 55°E. ELEVATION 492.3
LOCATION EASTERN RIDGE.

McINTYRE MINES (AUST.) PTY LTD
EXPLORATION DEPARTMENT
HOLE No 325 PAGE 1 OF 113.
PROJECT AARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE GRAMS/m	FRACTURING	BEDDING	GEOLOGY	MINERAL
NC CASED							
4.57							
94.2L							
5.79							
100							
7.32							
15.76							
2.44		1.0	780			W	
7.11		1.0	560			Tu	
11.58		1.0	780				
100		1.0	1400				
14.63		1.0	900				
100		1.0	760				
17.65		1.0	1.11%				
19.50		1.0	1600				
20.42		1.0	1300				
100		1.0	470				
23.46		1.0	150				
24.64		1.0	470				
100		1.0	190				
26.58		1.0	330			X	
23.47		1.0	120			Tu.	
81.97		1.0	1350				
24.69		1.0	4.52%			Te.	

MINERALISATION

MAIN LITH. LOG SUMMARY:-
"UPPER SKARN UNIT" 0.0 - 40.25
UPPER SST UNIT" 40.25 - 62.60
LOWER SKARN 62.60 - 66.50
LOWER SST - 66.56 - EOH.

LEVELS OF OXIDATION.
W = 0.00 - 26.40m
X = 26.40 - 26.90m
Y = 26.90 - 62.30m.
F = 56.30 - E.O.H.

NIL SCHEELITE MINERALISATION.

14.30m - 14.60m.
EXCELLENT ACCUMULATION OF WHITE 'OXIDISED' SOFT SCHEELITE.
EST. 1.0 - 1.2% WO3

24.20 - 24.2 - EXCELLENT SOFT WELL DISSEMINATED WHITE - YELLOW SCHEELITE ESTIMATED + 2.0% WO3

GEOLOGY

NO CORE
NX CASED TO 4.57m.

OVERBURDEN, CLAYS AND COMPLETELY WEATHERED SKARN SLUDGE.
HOLE COLLARED ON SKARN.

4.57m.

4.57 - 20.46m.
UNDIFFERENTIATED SKARNS.
COMPLETELY OXIDISED.
GOETHITE/LIMONITE ABUNDANT
CLAY ZONES COMMON.
SOFT, RUBBLY, LIGHT, VERY LITTLE REMNANT MAGNETITE.

W

20.46m. J 20.46m.

20.46 - 24.46m.
UNDIFFERENTIATED SKARN.
AS ABOVE UNIT, BUT LESS OXIDISED
BROKEN, JOINTED
GOETHITE, LIMONITE STILL ABUNDANT

X

24.46m.

@ 27.80m. SEE BELOW.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY P.D.A.

CONTRACTOR LONGYEAR (MINES) LTD (CANADA) NX
CORE NX (44.5.7m)
CASING

LOGGED BY CHW. DATE 31. AUG 1982.
STARTED 26. JULY 1982. FINISHED 5TH AUG 1982.

713243 105

SCALE 1:100

LENGTH 69.50m. NORTHING 6227.05
AZIMUTH 87°30' EASTING 76.746
DIP AT COLLAR 55° ELEVATION 492.3.
LOCATION EASTERN RIDGE.

McINTYRE MINES (AUST.) PTY. LTD.
EXPLORATION DEPARTMENT
HOLE No 325 PAGE 1 OF 2/3.
PROJECT KARN.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE POINTS	FRACTURING	BEDDING	GEOLOGY	MINERAL
35.6c		1.0.	1350			T_c	
44.26		1.0	820				
41.82		1.0	640				
100		1.0	1150			T_m $_{3c}$	
27.34		1.0	880				
100		1.0	480			T_{gd}	
30.76		1.0	2100				
42.5		1.0	420				
32.61		1.0	1730			$T_{m_{20}a}$	
100		1.0	430				
35.61		1.0	840				
100		1.0	640				
100		1.0	1200				
37.71		1.0	350			T_{gd} (m)	
100		1.0	6100				
40.75		1.0	390			Q_1 (e)	
44.60							
44.81							
45.11							
45.76							
46.06							
46.43							
46.94						Q.	
89.47							
47.98							
100.							
98.48							

MINERALISATION

X

21.90m

27.30 - 27.75m.
COLD ACCUM FINE WHITE SPECKS OF SCHEELITE 0.2% WO3 EST.

27.80m.

30.10m.

28.78 - 31.30m MEDIUM TO COARSE WHITE FLUORESCENCE 0.25% WO3 EST

31.80m.

31.80 - 39.15
FINE SPECKS OF SCHEELITE DISTRIBUTED THROUGHOUT, BUT WELL DISPERSED.
CUT OFF GRADE. 0.1 - 0.15%.

35.00m.

39.15 - 39.85 - VERY FINE. BUT WELL DISSEMINATED SCHEELITE. EST 1.0% WO3.

Y

40.26m.

NIL OR VERY FEW ISOLATED FINE SPECKS SCHEELITE.

44.20m.

30.80m

GEOLOGY

EPIDOTE SKARN.
STILL OXIDISED.
ANTHONINITE CUTTING TO 25.30m.

MAGNETITE SKARN.
MAG APPROX 30%.
STILL OXIDISED.

GARNET DIOPSIDE SKARN.
LIGHT BROWN TO FAWN
WELL CRYSTALLINE - HARD.

MAGNETITE, AMPHIBOLE SKARN.
AMPHIBOLE, FINE SOFT AND DISSEMINATED.
MAGNETITE CONTENT ESTIMATED AT 20-25%.
ALMOST FRESH AND UNOXIDISED
BRITTLE.
FINE TO MEDIUM GRAINED TEXTURE.
LITTLE DIOPSIDE CONTENT.

GARNET DIOPSIDE (MAGNETITE 10%) SKARN.
ALMOST UNOXIDISED, EXCEPT AT END OF RUN.

STRONGLY EPIDOTISED ARENACEOUS SEQUENCE.
VERY SOFT DECOMPOSED, SOAPY.
POOR CORE RECOVERY.

QUARTZITE.
FINE GRAINED, HARD, LIGHT GREY QUARTZITE.
BLOCKY, JOINTED.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY POD

CONTRACTOR McINTYRE MINES (AUST.) PTY. LTD. (UNDERGROUND).
CORE NX NX (45.57m.)
CASING

DATE BEGUN 1952

LOGGED BY CHN. 26 JULY 1962
STARTED 27 JULY 1962

713244 10b

SCALE 1:100

LENGTH 69.50m NORTHING 6227.6
AZIMUTH 87°30' EASTING 7179.6
DIP AT COLLAR 59° ELEVATION 492.3
LOCATION EASTERN RIDGE.

McINTYRE MINES (AUST.) PTY. LTD
EXPLORATION DEPARTMENT

HOLE No 325. PAGE 1 OF 3/3.

PROJECT KARA.

% CORE RECOVERY	CORE SPLIT	FEATURE INTERVAL	FEATURE gpm WC%	FRACTURING	BEDDING	GEOLOGY	MINERAL
51.81		1.0	490				
		1.0	40				
100		1.0	410			$Q_{(c)}$	
56.56		1.0	340				
		1.0	110				
100		1.0	160				
57.61		1.0	80				
		1.0	420				
100		1.0	3100			T_c	
66.66		1.0	3500				
		1.0	860				
100		1.0	1560				
63.71		1.0	360				
		1.0	370			T_m (56)	
100		1.0	65				
64.45		1.0	130			T_m	
100						Qs.	
69.50							

MINERALISATION 50.30

50.30 - 58.50 VERY FEW ISOLATED SCHEELITE SPECKS.

58.50 - 61.06 - WELL DISSEMINATED FINE YELLOW SCHEELITE EST UV 0.55% WC

61.06 - 62.56m - AS ABOVE BUT NOT AS DISSEMINATED 0.20% EST WC

GEOLOGY

50.50m

QUARTZITIC UNIT
HIGHLY INDURATED.
FINE TO MEDIUM GRAINED TEXTURE.
VERY TRANSITIONAL TO BEING CLASSIFIED AS SKARN.
MINOR UNITS ARE SKARNIFIED AND EPIDOTISED.

CONTACT WITH UNDERLYING SKARN UNIT IS VERY GRADATIONAL.

56.50m

LOWER SKARN UNIT.
FINE GRAINED TEXTURE.
HARD FRESH UNWEATHERED
EPIDOTE COMMON.
MAGNETITE, OF FINE GRAINED DISSEM VARIES INCREASES WITH DEPTH OF RUN.
62.06 - 63.70 - BLOTCHY PATCHES OF MAGNETITE.

63.70m

MAGNETITE SKARN.
MAGNETITE CONTENT ~60%.
FINE + WELL DISSEMINATED
HARD + BRITTLE UNIT.

66.00m

66.50m TRANSITIONAL SKARN (MAG) + QZT.

LOWER SANDSTONE UNIT.
FINE GRAINED SST/QZT.
MEDIUM SOFT.
LIGHT GREY.
JOINTING NOT TOO COMMON.

HOLE STOPPED BEFORE GRANITE.
69.50m THIS UNIT (SST) COMPARABLE TO THAT IN DDH 323.

E.O.H. 69.50m.

ANGLE READ
ANGLE CORRECTED
AZIMUTH
DEPTH

SURVEY PDO.

CONTRACTOR McINTYRE MINES (P.N.G) COMPANY LTD.
CORE NX (NX 69.57m)
CASING

LOGGED BY CHW DATE 31 AUG 1982
STARTED 26 JULY 1982.
FINISHED 5 AUG 1982.

AC. 1053153. 713245 1/2.

EASTERN RIDGE. 107

CTION:

[redacted]	Sect CORE	Interval Metres	Lgth metres	% WO_3	ppm WO_3										
325					ASSAY					AVE:			AVE:		
[redacted]	CORE	8.0 - 9.0	1.0		760					INVL	LGTH %M-%	WT AR AV	INVL	LGTH %M-%	WT AR AV
[redacted]	"	9.0 - 10.0	1.0		560										
3	"	10.0 - 11.0	1.0		780										
[redacted]	"	11.0 - 12.0	1.0		1400										
5 [redacted]	"	12.0 - 13.0	1.0		500										
[redacted]	"	13.0 - 14.0	1.0		760										
[redacted]	"	14.0 - 15.0	1.0		1.11%										
8	"	15.0 - 16.0	1.0		1600										
[redacted]	"	16.0 - 17.0	1.0		1300										
10	"	17.0 - 18.0	1.0		450										
[redacted]	"	18.0 - 19.0	1.0		150										
[redacted]	"	19.0 - 20.0	1.0		470										
13	"	20.0 - 21.0	1.0		190										
[redacted]	"	21.0 - 22.0	1.0		330										
15	"	22.0 - 23.0	1.0		140										
[redacted]	"	23.0 - 24.0	1.0		1550										
[redacted]	"	24.0 - 25.0	1.0		4.50%										
18	"	25.0 - 26.0	1.0		1350										
[redacted]	"	26.0 - 27.0	1.0		580										
20	"	27.0 - 28.0	1.0		640										
[redacted]	"	28.0 - 29.0	1.0		1150										
[redacted]	"	29.0 - 30.0	1.0		580										
23	"	30.0 - 31.0	1.0		480										
[redacted]	"	31.0 - 32.0	1.0		2100										
25	"	32.0 - 33.0	1.0		420										
[redacted]	"	33.0 - 34.0	1.0		1750										

INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE	INVL	CORE LGTH	WIDTH	AVE
[redacted]															

COMMENT

PROJECT KIARA-EASTERN RIDGE.

DDH 325.

Ac 1033/83 713246 225 2/2

KARA - EASTERN RIDGE. 108

SECTION:

Sludge or Core	Feet	Metres Interval METRES	Lgth	% WO_3	ASSAY ppm WO_3				AVE: INVL	LGTH SM-%	WT AR AV	AVE: INVL	LGTH SM-%	WT AR AV.
325 27	CORE	34·0 - 35·0	1·0		430									
28	"	35·0 - 36·0	1·0		340									
29	"	36·0 - 37·0	1·0		640									
30	"	37·0 - 38·0	1·0		1200									
31	"	38·0 - 39·0	1·0		350									
32	"	39·0 - 40·0	1·0		6100									
33	"	40·0 - 41·0	1·0		390									
325 34	CORE	51·0 - 52·0	1·0		490									
35	"	52·0 - 53·0	1·0		40									
36	"	53·0 - 54·0	1·0		410									
37	"	54·0 - 55·0	1·0		340									
38	"	55·0 - 56·0	1·0		110									
39	"	56·0 - 57·0	1·0		160									
40	"	57·0 - 58·0	1·0		80									
41	"	58·0 - 59·0	1·0		420									
42	"	59·0 - 60·0	1·0		3100									
43		60·0 - 61·0	1·0		3500									
44		61·0 - 62·0	1·0		860									
45		62·0 - 63·0	1·0		1550									
46		63·0 - 64·0	1·0		360									
47		64·0 - 65·0	1·0		270									
48		65·0 - 66·0	1·0		55									
49		66·0 - 67·0	1·0		130.									

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

COMMENT

PROJECT KARA - EASTERN RIDGE. DDH 225.

RECOVERY SHEET 713247

HOLE No. 325 | PAGE 1 OF 1 1

CORE RECOVERY (CR) > 90% EXCEPT AS NOTED

FROM	TO	INT.	REC.	COMMENTS	FROM	TO	INT.	REC.	COMMENTS
0.00	4.57	4.57	NIL	CASED					
4.57	5.79	1.22	1.15	94.26%					
5.79	7.32	1.53	1.53	100%					
7.32	8.84	1.52	1.00	65.78%					
8.84	11.58	2.74	1.95	71.16%					
11.58	14.63	3.05	3.05	100%					
14.63	17.68	3.05	3.05	100%					
17.68	20.42	2.74	2.70	98.50%					
20.42	21.64	1.22	1.22	100%					
21.64	21.95	0.31	0.31	100%					
21.95	23.47	1.52	0.86	62.58%					
23.47	24.69	1.22	1.00	81.97%					
24.69	25.60	0.91	0.29	31.87%					
25.60	26.82	1.22	0.54	44.26%					
26.82	28.34	1.52	1.52	100%					
28.34	30.78	2.44	2.44	100%					
30.78	32.61	1.87	1.73	92.51%					
32.61	35.66	3.05	3.05	100%					
35.66	38.71	3.05	3.05	100%					
38.71	41.75	3.04	3.04	100%					
41.75	44.81	3.05	1.24	40.65%					
44.81	45.11	0.30	0.28	93.33%					
45.11	45.72	0.61	0.36	59.01%					
45.72	46.00	0.28	0.28	100%					
46.00	46.63	0.63	0.63	100%					
46.63	46.94	0.31	0.31	100%					
46.94	48.46	1.52	1.36	89.47%					
48.46	49.68	1.22	1.22	100					
49.68	51.51	1.83	1.57	85.79%					
51.51	54.56	3.05	3.05	100%					
54.56	57.61	3.05	3.05	100%					
57.61	60.66	3.05	3.05	100%					
60.66	63.71	3.05	3.05	100%					
63.71	66.45	2.74	2.75	100%					
66.45	69.50	3.05	3.05	100%					
			E.011	69.50m.					

REPORT NO.
2A/82

[redacted]

82-1828
10/19

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713248

REPORT NO. 2A/82

of M. | A.O. | C.G. | E.O. | D.S.M.E | Registrar | E & IL
Received Answered - 1 OCT 1982
DEPT. OF MINES
REF. No. 809 0A 82

McINTYRE MINES (AUSTRALIA) PTY. LTD.

SUMMARY GEOLOGICAL ORE RESERVES & RESOURCES KARA NO. 1 & KARA NORTH

C. H. WHITEHEAD.

August, 1982.

713249

REPORT NO. 2A/82

McINTYRE MINES (AUSTRALIA) PTY. LTD.

SUMMARY - GEOLOGICAL ORE RESERVES & RESOURCES.

KARA NO. 1 & KARA NORTH

In May 1982, Golder Associates as part of their geolgoical engineering - economic evaluation studies at the Kara properties, completed a recalculation of geological ore reserves and resources at the two main tungsten bearing deposits of possible open pit mining potential, namely Kara No. 1 and Kara North.

The attached tables Nos. 1 to 4 summarise the results of these new recalculations.

For methods of calculations of tonnages and grade, a classification of ore types, and more detailed tabulations of reserves and resources for each individual deposit, the reader is referred to accompanying reports Nos. 2B/82 and 2C/82.

C. H. WHITEHEAD.

August, 1982.

SUMMARY - GEOLOGICAL ORE RESERVES AND RESOURCES.

KARA. N° 1 (EAST AND WEST ZONES) AND KARA NORTH.

DEPOSIT.	GEOLOGICAL RESERVES.				GEOLOGICAL RESOURCES.				TOTAL.	
	FRESH (F) ORE.		PARTIALLY WEATHERED (V) ORE.		WEATHERED MATERIAL WITH SCHEELITE. (X)		WEATHERED MATERIAL. NO SCHEELITE. (W)			
	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3.
KARA. N°1 - WEST.	458,200	0·86	397,771	0·79	308,508	0·66.	290,377	0·63	1,454,856.	0·75.
KARA. N°1 - EAST.	210,400	0·62.	20,350	0·85	14,001	0·63	10,260	0·35	255,001.	0·62.
KARA NORTH.	466,800	1·00	56,240	0·61.	20,750	0·59	—	—	543,790	0·93.
TOTALS.	1,135,400	0·87.	474,361.	0·76.	343,259	0·65	300,627	0·62.	2,253,647	0·78
TOTAL GEOLOGICAL RESERVES. 1,609,761 TONNES AT 0·84% WO_3					TOTAL GEOLOGICAL RESOURCES. 643,886 TONNES AT. 0·64% WO_3.					

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KARA N° 1 - WEST ZONE.

SUMMARY - GEOLOGICAL RESERVES AND RESOURCES.

SECTION BLOCK.	GEOLOGICAL RESERVES.				GEOLOGICAL RESOURCES.			
	FRESH ORE (F)		PARTIALLY WEATHERED ORE (Y)		WEATHERED MATERIAL WITH SCHEELITE. (X)		WEATHERED MATERIAL. NO SCHEELITE (W)	
	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3.
5620N	–	–	–	–	874	0·77	22,600	0·77
5660N	15,200	0·71	39,590	1·33.	35,750	0·73	41,126	0·80
5700N	76,400	0·50	36,260	0·84	78,125	0·69.	72,000	0·66
5740N.	40,800	0·75	61,050	1·01	82,762	0·75	67,125	0·84
5780N	46,800	0·62	72,631	0·42.	68,251	0·53	49,999	0·47
5820N.	65,200	1·24	87,606	0·92	32,499	0·79	27,876	0·84
5860N.	92,000	1·04	53,281	0·71	11,748	0·47.	15,000	0·87.
5900N.	85,000	0·93	32,283	0·39	8,499	0·46.	–	–
5940N	25,200	0·36.	4,440	0·50	–	–	–	–
5980N.	11,600	0·74.	10,730	0·77	–	–	4450	0·54
TOTAL.	458,200	0·86	397,771	0·79	308,508	0·65	290,406	0·65.
	TOTAL GEOLOGICAL RESERVES		865,971 TONNES. 0·82% WO_3.		TOTAL GEOLOGICAL RESOURCES		598,914 TONNES 0·65% WO_3.	

TABLE N° 3

004
713252

KARA. Nº 1 - EAST ZONE.

SUMMARY - GEOLOGICAL RESERVES AND RESOURCES.

SECTION BLOCK.	GEOLOGICAL RESERVES.				GEOLOGICAL RESOURCES.			
	FRESH ORE (F)		PARTIALLY WEATHERED ORE (Y)		WEATHERED MATERIAL WITH SCHEELITE. (X)		WEATHERED MATERIAL. NO SCHEELITE (W)	
	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3.
5620N								
5660 N								
5700 N								
5740 N					7750	0·63		
5780 N					2500	0·45	1250	0·21.
5820 N	14,000	1·02.			2502	0·82		
5860 N	41,800	0·46.	7770	1·13	3502	0·37	9000	0·37.
5900 N.	87,600	0·64	8880	0·64	3760	0·49.		
5940 N	41,800	0·64	3700	0·76.				
5980 N	25,200	0·58.						
TOTAL.	210,400	0·62.	20,350	0·86	20,005	0·63.		
	TOTAL GEOLOGICAL RESERVES.		230,750 TONNES 0·64% WO_3.					

TABLE Nº 1

005
713253

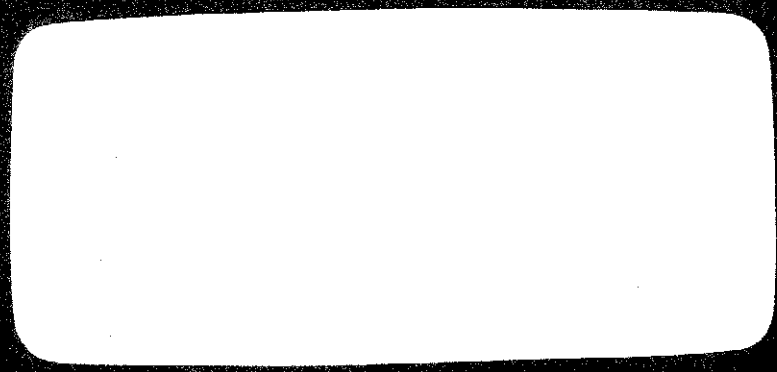
KARA NORTH DEPOSIT.

SUMMARY GEOLOGICAL RESERVES AND RESOURCES.

SECTION BLOCK.	GEOLOGICAL RESERVES.				GEOLOGICAL RESOURCES.			
	FRESH ORE (F)		PARTIALLY WEATHERED ORE (Y)		WEATHERED MATERIAL WITH SCHEELITE. (X)		WEATHERED MATERIAL. NO SCHEELITE (W)	
	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3.
6980N	29,000	0·46						
7020N	55,600	1·35	4,810	1·42				
7060N	37,000	0·87	8,140	0·72	1,250	0·72		
7100N	64,000	0·73	10,730	0·64	7,000	0·50		
7140N	92,400	1·11	6,920	0·41	12,500	0·63.		
7180N	113,600	1·27	9,250	0·28				
7220N	70,400	0·79	11,100	0·30				
7260N	14,800	0·28	6,290	0·28				
TOTALS.	466,800	1·00	56,240	0·51.	20,750	0·59	NIL.	
	TOTAL. GEOLOGICAL RESERVES.		623,040 TONNES. 0·95% WO_3.		TOTAL. GEOLOGICAL RESOURCES		20,750 TONNES 0·59% WO_3	

TABLE No 4

Report No.
2B/82



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REPORT NO. 2B/82

D of M | A.O. | C.G. | E.O. | D.S.M.E.
Registrar
Received Answered - 1 OCT 1982
DEPT. OF MINES
REF. No. 8090A/82

McINTYRE MINES (AUSTRALIA) PTY. LTD.

GEOLOGICAL ORE RESERVES & RESOURCES

KARA NO. 1 DEPOSIT

MAY 1982

C. H. WHITEHEAD

AUGUST 1982

REPORT NO. 2B/82

McINTYRE MINES (AUSTRALIA) PTY. LTD.

GEOLOGICAL ORE RESERVES AND RESOURCES.

KARA NO. 1 DEPOSIT

During May 1982, Golder Associates (Sydney) working in conjunction with McIntyre Mines regional exploration office personnel, recalculated the geological ore reserves and resources of the Kara No. 1 deposit.

This recalculation was made utilising McIntyre Mines reinterpretation of the orezones of this deposit after the completion of an infill diamond drill programme completed late 1981 - early 1982.

In previous reserve calculations for this deposit, Kara No. 1 had been subdivided into the Main Zone, the Southern Extension and the Western Limb zones. During the recent Golder Associates recalculation, the Kara No. 1 deposit covers the area between drill section lines 5620N and 5980N, and has been subdivided into two zones - the Main East Zone and the Main West Zone. The Western Limb Zone is considered to be of possible underground potential, and not included in the recent recalculations of reserves and resources.

At the Kara No. 1 deposit, zones of tungsten mineralisation have been broken down into four ore type categories, namely:-

- Fresh (F) - containing unaltered scheelite ore amenable to normal recovery processes.
- Partially Weathered (Y) - partially weathered scheelite ore, to a large extent amenable to normal recovery processes.
- Weathered Material (X) - weathered tungsten bearing material containing variable amounts of scheelite mineral.
- Weathered Material (W) - weathered tungsten bearing material containing nil or insignificant amounts of scheelite for which no economic recovery process has been proved to date.

Ore blocks were subdivided into Geological Reserves (consisting of fresh ore and/or partially weathered ore types) and Geological Resources (consisting of weathered material).

The new geological reserves and resources were calculated by transferring the available geological information from the drill cross sections showing ore block interpretations and ore type categories onto bench plans of 10 metre intervals. During this process, N-S longitudinal sections of the deposit were also compiled at 10 metre intervals. Each bench plan was subdivided into 40 metre blocks along strike, and further dubdivided into specific ore types.

Ore block areas for each ore type were measured by planimeter and volume figures calculated for each five metre bench. Volume to tonnage conversions were made using the following factors for the various ore types:-

Fresh (F)	1 cubic metre	=	4 tonnes
Partially Weathered (Y)	1 " "	=	3.7 tonnes
Weathered material, with scheelite (X)	1 " "	=	2.5 tonnes
Weathered material, no scheelite (W)	1 " "	=	2.5 tonnes

According to the U.S.B.M. and U.S.G.S. reserves calculations and definitions of ore reserves, it is the belief that the Kara No. 1 ore blocks can be classified as measured ore.

Grade calculations were made on the basis of the total % of WO_3. A cut off grade of 0.2% WO_3 was used. Grade averages for each mineralised zone per block were obtained by weighting all relevant grade intersections within the zone, by length of mineralisation.

The attached Tables No. 1 to 18 summarise the tonnage and grade figures for this deposit as calculated by Golder Associates.

C. H. WHITEHEAD. 20th August 1982.

713257

GEOLOGICAL ORE RESERVES & RESOURCES - KARA NO. 1 DEPOSIT.

TABLES

RESERVES AND RESOURCES

Table No. 1 - Kara No. 1 deposit - Summary of geological ore reserves and resources.

Table No. 2 - Kara No. 1 deposit - West and East Zones. Summary of geological reserves and resources.

GEOLOGICAL RESERVES

Table No. 3 - West Zone - Bench x Bench Summary F and Y ore.

Table No. 4 - West Zone - Section x Section Summary F and Y ore.

Table No. 5 - East Zone - Bench x Bench Summary F and Y ore.

Table No. 6 - East Zone - Section x Section Summary F and Y ore.

Table No. 7 - West Zone - Geological Reserves of Fresh Ore.

Table No. 8 - West Zone - Geological Reserves of Partially Weathered Ore.

Table No. 9 - East Zone - Geological Reserves of Fresh Ore.

Table No.10 - East Zone - Geological Reserves of Partially Weathered Ore.

GEOLOGICAL RESOURCES

Table No 11 - West Zone - Bench x Bench Summary X and W material

Table No.12 - West Zone - Section x Section Summary X and W material

Table No.13 - East Zone - Bench x Bench Summary X and W material

Table No.14 - East Zone - Section x Section X and W material

Table No.15 - West Zone - Geological Resources of X material

Table No.16 - West Zone - Geological Resources of W material

Table No.17 - East Zone - Geological Resources of X material

Table No.18 - East Zone - Geological Resources of W material

TABLE NO. 1

KARA NO. 1 - DEPOSIT

GEOLOGICAL ORE RESERVES AND RESOURCES SUMMARY

ORE TYPE	MEASURED GEOLOGICAL ORE RESERVE		GEOLOGICAL RESOURCE	
	Tonnes	% WO_3	Tonnes	% WO_3
Fresh (F)	668,600	0.78	-	-
Partially Weathered (Y)	418,121	0.79	-	-
Weathered with scheelite (X)	-	-	322,509	0.65
Weathered no scheelite (W)	-	-	300,627	0.62
Total	1,086,721	0.78	625,514	0.64

TABLE NO. 2

KARA NO. 1 DEPOSIT - WEST & EAST ZONES

GEOLOGICAL ORE RESERVES & RESOURCES

A. WEST ZONE

ORE TYPE	MEASURED GEOLOGICAL ORE RESERVES		GEOLOGICAL RESOURCES	
	Tonnes	% WO_3	Tonnes	% WO_3
Fresh (F)	458,200	0.85	-	-
Partially Weathered (Y)	397,771	0.79	-	-
Weathered - with scheelite (X)	-	-	308,508	0.66
Weathered - no scheelite (W)	-	-	290,377	0.63
Total	855,971	0.82	777,433	0.65

B. EAST ZONE

ORE TYPE	MEASURED GEOLOGICAL ORE RESERVES		GEOLOGICAL RESOURCES	
	Tonnes	% WO_3	Tonnes	% WO_3
Fresh (F)	210,400	0.62	-	-
Partially Weathered (Y)	20,350	0.85	-	-
Weathered with scheelite (X)	-	-	14,001	0.53
Weathered no scheelite (W)	-	-	10,250	0.35
Total	230,750	0.64	15,250	0.49

TABLE NO. 3

KARA NO. 1 DEPOSIT - WEST ZONE

GEOLOGICAL ORE RESERVES — BENCH X BENCH SUMMARY

BENCH	FRESH ORE (F)		PARTIALLY WEATHERED ORE (Y)	
	Tonnes	% WO_3	Tonnes	%WO_3
525	-	-	6,244	1.69
520	-	-	18,731	1.69
515	7,650	1.05	21,228	0.97
510	22,950	1.05	13,737	0.83
505	28,300	0.54	18,389	0.76
500	23,700	0.62	35,187	0.87
495	21,400	0.53	50,112	0.75
490	21,400	0.66	63,201	0.65
485	21,450	0.71	59,849	0.91
480	21,550	0.77	40,052	0.80
475	27,600	1.13	26,664	0.46
470	39,600	1.33	19,679	0.44
465	47,700	0.99	13,205	0.51
460	51,900	1.02	7,238	0.50
455	46,900	0.61	3,191	0.45
450	32,700	0.60	1,064	0.45
445	23,650	0.94	-	-
440	19,750	0.79	-	-
Total	458,200	0.85	397,771	0.79

TOTAL GEOLOGICAL RESERVES KARA NO. 1 WEST ZONE

= 855,971 Tonnes @ 0.82% WO_3

TABLE NO. 4

KARA NO. 1 DEPOSIT - WEST ZONE

GEOLOGICAL RESERVES - SECTION x SECTION SUMMARY

SECTION BLOCK	FRESH ORE(F)		PARTIALLY WEATHERED ORE (Y)	
	Tonnes	% WO_3	Tonnes	%WO_3
5660N	15,200	0.71	39,590	1.33
5700N	76,400	0.50	36,260	0.84
5740N	40,800	0.75	61,050	1.01
5780N	46,800	0.52	72,631	0.42
5820N	65,200	1.24	87,506	0.92
5860N	92,000	1.04	53,281	0.71
5900N	85,000	0.93	32,283	0.39
5940N	25,200	0.36	4,440	0.50
5980N	11,600	0.74	10,730	0.77
Total	458,200	0.85	397,771	0.79

TOTAL GEOLOGICAL RESERVES KARA NO. 1 WEST ZONE

855,971 Tonnes @ 0.82% WO_3

TABLE NO 5

KARA NO. 1 DEPOSIT - EAST ZONE

GEOLOGICAL ORE RESERVES - BENCH x BENCH SUMMARY

BENCH	FRESH ORE (F)		PARTIALLY WEATHERED ORE (Y)	
	Tonnes	$\%WO_3$	Tonnes	$\% WO_3$
495	2,650	1.19	-	-
490	7,950	1.19	-	-
485	17,850	0.64	2,544	0.66
480	32,350	0.59	7,631	0.66
475	41,400	0.52	7,631	1.04
470	45,000	0.60	2,544	1.04
465	37,150	0.64	-	-
460	17,850	0.62	-	-
455	8,200	0.56	-	-
Total	210,400	0.62	20,350	0.85

Total Geological Reserves - Kara No. 1 East Zone

= 230,750 Tonnes @ 0.64% WO_3

TABLE NO. 6

KARA NO. 1 DEPOSIT - EAST ZONE

GEOLOGICAL RESERVES - SECTION x SECTION SUMMARY

SECTION BLOCK	FRESH ORE (F)		PARTIALLY WEATHERED ORE (Y)	
	Tonnes	% WO_3	Tonnes	% WO_3
5820N	14,000	1.02	-	-
5860N	41,800	0.46	7,770	1.13
5900N	87,600	0.64	8,880	0.64
5940N	41,800	0.64	3,700	0.76
5980N	25,200	0.58	-	-
Total	210,400	0.62	20,350	0.85

Total Geological Reserves - Kara No. 1 East Zone

230,750 Tonnes @ 0.64% WO_3

GEOLOGICAL RESERVES.

KARA N°1 DEPOSIT – WEST ZONE.

7132 64

ORE TYPE- FRESH (F)

BENCH	5620N		5660N		5700N		5740N		5780N		5820N		5860N		5900N		5940N		5980N		TOTAL.	
	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3
635																						
630																						
625																						
620																						
615			1900	0.96.	5760	1.08															7650	1.05
610			5700	0.96	17250	1.08															22950	1.05
606			5700	0.46	21050	0.53	1150	1.03	400	1.03											28300	0.54
500			1900	0.46.	17150	0.53	3450	1.03	1200	1.03											23700	0.62
495					11460	0.36	7400	0.72	2600	0.72											21400	0.63
490					3800	0.36.	13000	0.72	4600	0.72											21400	0.66
486							11850	0.71	7000	0.60	2600	1.03									21450	0.71
480							3950	0.71.	9800	0.60	7800	1.03									21550	0.71
475									9650	0.34	11900	1.79	6750	1.18			200	0.50	700	0.77	27600	1.13
470									6550	0.34	14900	2.03	15450	1.18			600	0.50	2100	0.77	39600	1.33
465									3750	0.34	13750	0.67	19900	1.40	6400	0.95	1150	0.50	2750	0.77	47700	0.99
460									1250	0.34.	8450	0.67	18500	1.40	19200	0.95	1850	0.50	2650	0.77	51900	1.02
455											4350	0.67	16250	0.54	22700	0.67	2650	0.36	1950	0.77	46900	0.61
450											1450	0.67.	10150	0.54	16900	0.67	3550	0.36	650	0.77	32700	0.60
445													6700	0.54	11950	1.44	6800	0.33	200	0.33	23600	0.94
440.													1900	0.54.	7850	1.44.	9400	0.33.	600	0.33.	19750	0.79
TOTAL	NIL		15200	0.71	76400	0.50	40800	0.75	46800	0.52	65200	1.24	92000	1.04	86000	0.93	25200	0.36	11600	0.74	458200	0.86

TABLE N°1

GEOLOGICAL. RESERVES.

KARA Nº 1 DEPOSIT – WEST ZONE.

713265

ORE TYPE – PARTIALLY WEATHERED (Y)

011

BENCH	6620N		5660N		5700N		5740N		5780N		5820N		5860N		5900N		5940N		5980N		TOTAL.	
	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3
635																						
630																						
625			4949	1·69	1295	1·69															6244	1·69
620			14846	1·69	3885	1·69															18731	1·69
615			14846	0·97	6382	0·76															21228	0·91
610			4949	0·97	8788	0·76															13737	0·83
605					8233	0·57	7631	1·04	2625	0·56											18389	0·76
600					4717	0·57	22894	1·04	7576	0·56											35187	0·87
595					2220	0·96	22894	0·97	15064	0·36	9713	0·80							231	0·77	50112	0·75
590					740	0·96	7631	0·97	24998	0·36	29138	0·80							694	0·77	63201	0·65
585									22478	0·47	31643	1·31	3793	0·81			416	0·50	1619	0·77	69849	0·91
580											7492	0·47	16928	1·31	11377	0·31	1249	0·50	3006	0·77	40052	0·80
575											7215	0·48	13413	0·39	1688	0·43	1388	0·50	2960	0·77	26664	0·46
570											2405	0·48	9897	0·39	5065	0·43	832	0·60	1480	0·77	19679	0·44
565													6244	0·57	5990	0·43	416	0·60	865	0·77	13205	0·61
560													2451	0·57	4463	0·44	139	0·60	185	0·77	7238	0·50
555													416	0·45	2775	0·45					3191	0·45
550													139	0·45	925	0·45					1064	0·45
545																						
540																						
TOTAL			39584	1·33	34260	0·80	61060	1·01	72631	0·47	87696	0·97	68281	0·71	32283	0·39	4440	0·60	10730	0·77	397,771	

80m ELEV

GEOLOGICAL. RESERVES.

KARA N°1 DEPOSIT - MAIN EAST.

713266

ORE TYPE - FRESH(F).

012

BENCH	5620N		5660N		5700N		5740N		5780N		5820N		5860N		5900N		5940N		5980N		TOTAL.	
	TONNES	%WO3	TONNES	%WO3	TONNES	%WO3	TONNES	%WO3	TONNES	%WO3	TONNES	%WO3	TONNES	%WO3	TONNES	%WO3	TONNES	%WO3	TONNES	%WO3	TONNES	%WO3
535																						
530																						
525																						
520																						
515																						
510																						
505																						
500																						
495											1750	1·26			900	1·06					2650	1·19
490											6250	1·26			2700	1·06					7950	1·19
485											6250	0·77	6150	0·56	7450	0·61					17850	0·64
480											1750	0·77	16460	0·56	15150	0·61					32350	0·59
475													15525	0·36	19550	0·61	6225	0·64	1100	0·68	41400	0·52
470													5375	0·26	20650	0·61	15675	0·64	3300	0·68	45000	0·60
465													225	0·37	15900	0·67	15675	0·64	5350	0·56	37150	0·64
460													75	0·37	5300	0·67	6225	0·64	7250	0·56	17850	0·62
455																			8200	0·56	8200	0·56
450																						
445																						
440.																						
											11000	1·17	41800	0·46	87600	0·64	41800	0·64	25200	0·58	210400	

TABLE N°5

GEOLOGICAL. RESERVES.

KARA. N° 1 DEPOSIT - MAIN EAST. 713267 ORE TYPE - PARTIALLY WEATHERED (Y). 013

BENCH	5620N		5660N		5700N		5740N		5780N		5820N		5860N		5900N		5940N		5980N		TOTAL.	
	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3
635																						
630																						
625																						
620																						
515																						
510																						
605																						
500																						
495																						
490																						
485													971	0·80	1110	0·49	463	0·76			2544	0·66
480													2914	0·80	3330	0·49	1387	0·76			7631	066.
475													2914	1·45	3330	0·79	1387	0·76			7631	1·04
470													971	1·45	1110	0·79	463	0·76			2544	1·04
465																						
460																						
455																						
450																						
445																						
440.																						
TAL													7770	1·13	8880	0·64	3700	0·76			20,350	0·86

TABLE N°1

TABLE NO. 11

GEOLOGICAL RESOURCES

KARA NO. 1 WEST ZONE - BENCH x BENCH SUMMARY

BENCH	WEATHERED(X) SOME SCHEELITE		WEATHERED (W) NO SCHEELITE	
	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$
535	2,406	0.57	23,265	0.81
530	7,219	0.57	40,548	0.82
525	18,375	0.79	45,687	0.68
520	35,874	0.72	38,688	0.73
515	45,438	0.59	33,249	0.77
510	46,312	0.70	26,876	0.65
505	43,675	0.68	22,375	0.44
500	37,525	0.66	19,750	0.42
495	29,546	0.55	16,516	0.35
490	19,765	0.59	12,672	0.36
485	11,969	0.62	8,063	0.43
480	6,154	0.57	2,687	0.63
475	2,562	0.45	-	-
470	1,187	0.45	-	-
465	375	0.29	-	-
460	125	0.29	-	-
Total	308,508	0.65	290,406	0.65

Total Geological Resources Kara No. 1 West Zone =

598,914 Tonnes @ 0.65% WO_3

TABLE NO. 12

GEOLOGICAL RESOURCES

KARA NO. 1 WEST ZONE - SECTION x SECTION SUMMARY

SECTION BLOCK	WEATHERED (X) SOME SCHEELITE		WEATHERED (W) NO SCHEELITE	
	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$
5620N	874	0.77	22,500	0.77
5660N	35,750	0.73	41,126	0.80
5700N	78,125	0.59	72,000	0.66
5740N	82,762	0.75	57,125	0.84
5780N	58,251	0.53	49,999	0.47
5820N	32,499	0.79	27,876	0.34
5860N	11,748	0.47	15,000	0.37
5900N	8,499	0.45	-	-
5940N	-	-	-	-
5980N	-	-	4,750	0.59
Total	308,308	0.65	290,406	0.65

Total Geological Resources- Kara No. 1 West Zone =

598,914 Tonnes @ 0.65% WO_3

TABLE NO. 13

GEOLOGICAL RESOURCES

KARA NO. 1 - EAST ZONE BENCH x BENCH SUMMARY

BENCH	WEATHERED (X) SOME SCHEELITE		WEATHERED (W) NO SCHEELITE	
	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$
515	1,844	0.54	156	0.21
510	2,531	0.54	469	0.21
505	2,968	0.53	469	0.21
500	2,157	0.50	156	0.21
495	2,064	0.49	1,125	0.37
490	2,689	0.54	3,375	0.37
485	2,719	0.55	3,375	0.37
480	2,158	0.51	1,125	0.37
475	1,407	0.49	-	-
470	468	0.49	-	-
Total	20,005	0.53	10,250	0.35

Total Geological Resources - Kara No. 1 East Zone

30,255 Tonnes @ 0.47% WO_3

TABLE NO. 14

GEOLOGICAL RESOURCES

KARA NO. 1 EAST ZONE SECTION x SECTION SUMMARY

SECTION BLOCK	WEATHERED (X) SOME SCHEELITE		WEATHERED (W) NO SCHEELITE	
	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$
5740N	7,750	0.53	-	-
5780N	2,500	0.45	1,250	0.21
5820N	2,502	0.82	-	-
5860N	3,502	0.37	9,000	0.37
5900N	3,750	0.49	-	-
Total	20,005	0.53	10,250	0.35

Total Geological Resources - Kara No. 1 East Zone

30,255 Tonnes @ 0.47% WO_3

GEOLOGICAL. RESOURCES.

KARA. N° 1 DEPOSIT – WEST ZONE.

713272

ORE TYPE – WEATHERED WITH SCHEELITE (X)

BENCH	5620N		5660N		5700N		5740N		5780N		5820N		5860N		5900N		5940N		5980N		TOTAL.	
	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3
635	109	0·77	2000	0·56	297	0·56															2406	0·57
630	328	0·77	6000	0·56	891	0·56															7219	0·57
625	328	0·77	8469	0·96	8953	0·64	625	0·56													18375	0·79
620	109	0·77	9406	0·96	24484	0·64	1875	0·56													35874	0·72
615			7406	0·46	26694	0·52	10969	0·82	1469	0·60											45438	0·59
610			2469	0·46	12281	0·62	27156	0·82	4406	0·60											46312	0·70
605					4219	0·75	27800	0·68	10219	0·61	1937	0·79									43675	0·68
600					1406	0·75	11400	0·68	18906	0·61	5813	0·79									37625	0·66
595							2578	0·79	17438	0·41	7937	0·82	1218	0·37	376	0·45					29546	0·55
590							869	0·79.	6813	0·41.	8312	0·82	3656	0·37	1125	0·45					19765	0·59
585											6375	0·71	3906	0·51	1688	0·45					11969	062
580											2126	0·71.	1968	0·51	2062	0·45					6154	057
575													750	0·45	1812	0·45					2562	0·46
570													250	0·45	937	0·45					1187	0·45
565															375	0·29					375	0·29
560															125	0·29.					125	0·29
555																						
550																						
545																						
540.																					-	
TAL	874	0·77	35,750	0·73	78,125	0·69	82762	0·75	68,261	0·53	32499	0·79	11748	0·47	8499	0·45					308508	

TABLE N° 15.

GEOLOGICAL RESOURCES.

KARA N°1 – MAIN WEST. 713273

ORE TYPE - COMPLETELY WEATHERED (W)

BENCH.	5620N		5660N		5700N		5740N		5780N		5820N		5860N		5980N		TOTAL.	
	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3
535	10781	0·77	5922	0·93	6562	0·76											23266	0·81
530	6844	0·77	14016	0·93	19688	0·76											40648	0·82
525	3656	0·77	13937	0·69	22125	0·61	5969	0·83									45687	0·68
520	1219	0·77	5688	0·69	13875	0·61	17906	0·83.									38688	0·73
515			1172	0·42	7312	0·60	19469	0·93	5062	0·46	234	0·87					33249	0·77
510			391	0·42	2438	0·60	9406	0·93	13938	0·46	703	0·87					26876	0·65
505							3281	0·27	15359	0·50	2797	0·37	625	0·32	313	0·35	22375	0·44
500							10914	0·27	9328	0·50	6516	0·37	1875	0·32	937	0·35	19750	0·42
495									4734	0·38	7428	0·27	3125	0·37	1219	0·63	16616	0·35
490									1578	0·38	6563	0·27	4376	0·37	1156	0·63	12672	0·36
486											3469	0·37	3750	0·38	844	0·77	8063	0·43
480.											1156	0·37	1250	0·38	281	0·77.	2687	0·43
	22500	0·77	41,126	0·80	72,000	0·66	57,126	0·84	49,999	0·47	27,876	0·84	15000	0·37	4750	0·59.	290,406	0·65

TABLE N° 16.

GEOLOGICAL. RESOURCES.

KARA. N° 1 DEPOSIT - MAIN EAST.

713274

ORE TYPE - WEATHERED WITH SCHEELITE (X)

BENCH	5620N		5660N		5700N		5740N		5780N		5820N		5860N		5900N		5940N		5980N		TOTAL.	
	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3
635																						
630																						
625																						
620																						
615							844	0·54													844	0·54
610							2531	0·54													2631	0·54
605							2656	0·54	312	0·45											2968	0·53
500							1219	0·64	938	0·45											2157	0·60
495							875	0·45	988	0·45	313	0·82	428	0·37							2064	0·49
490							125	0·45	812	0·45	938	0·82	1313	0·37							2689	0·54
485											938	0·82	1313	0·37	468	0·49					2719	0·55
480											313	0·82	438	0·37	1407	0·49					2158	0·51
476															1407	0·49					1407	0·49
470															468	0·49					468	0·49
465																						
460																						
455																						
450																						
445																						
440.																						
TAL							7750	0·53	2500	0·45	2602	0·82	3502	0·37	3750	0·49					20,005	4·53

TABLE N°17

GEOLOGICAL RESOURCES.

KARA. N°1 - MAIN EAST.

713275

ORE TYPE - COMPLETELY WEATHERED (W)

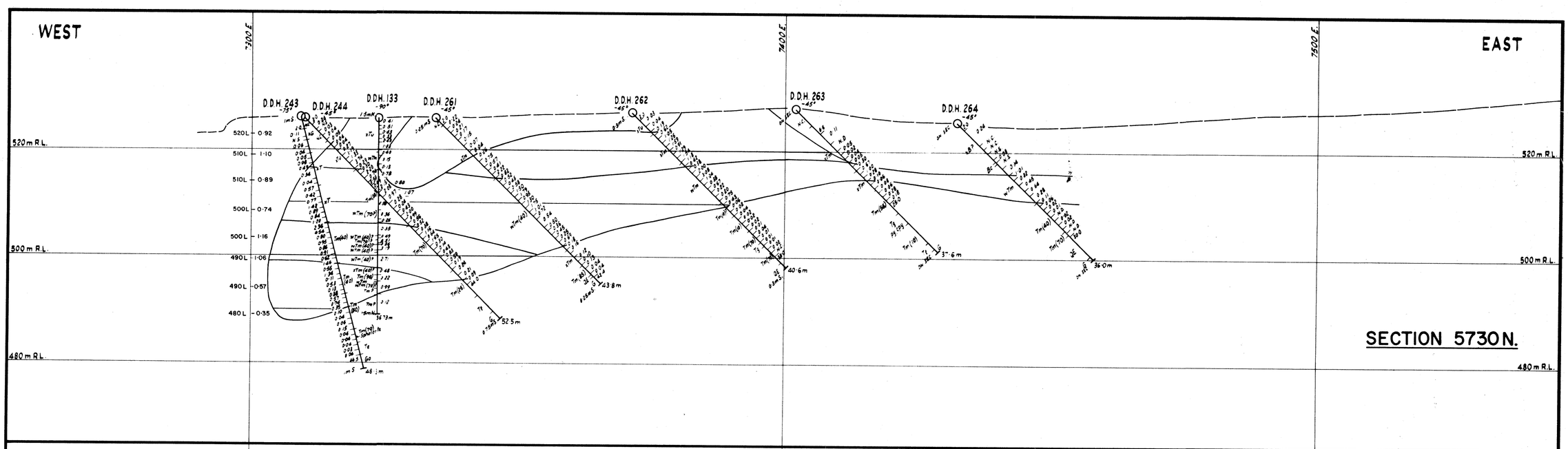
BENCH.	5620N		5660N		5700N		5740N		5780N		5820N		5860N		5900N		TOTAL.	
	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3
535																		
530																		
525																		
520																		
515									156	0·21							156	0·21
510									469	0·21							469	0·21
505									469	0·21							469	0·21
500									156	0·21							156	0·21
495													1125	0·37			1125	0·37
490													3376	0·37			3375	0·37
485													2375	0·37			3375	0·37
480.													1125	0·37			1125	0·37
									1250	0·21			9000	0·37.			10250	0·35

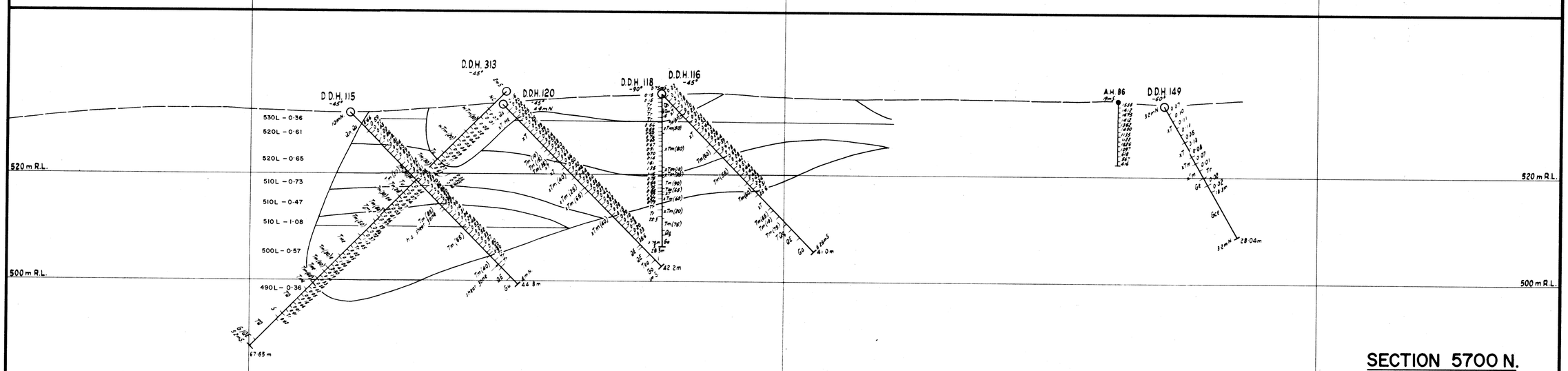
TABLE N° 18.

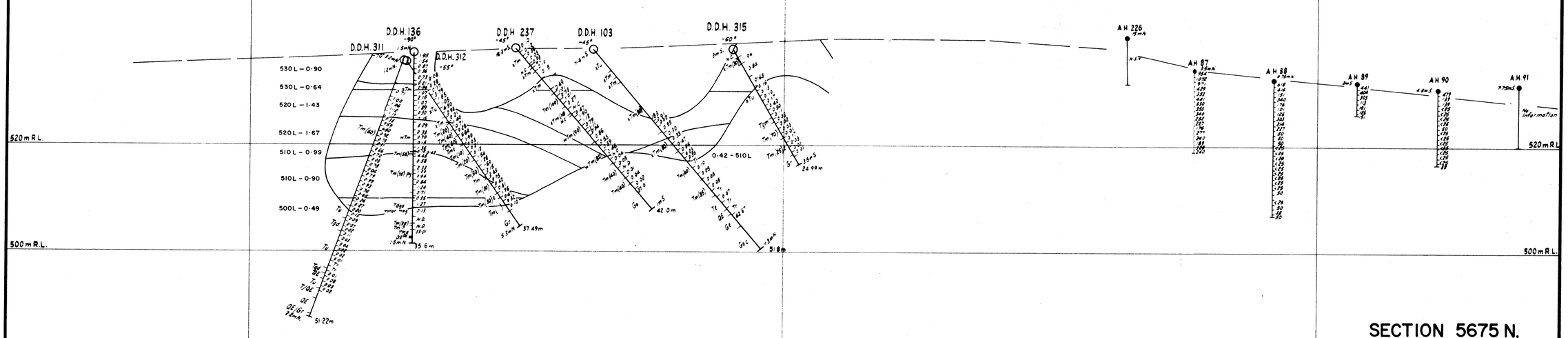
713276

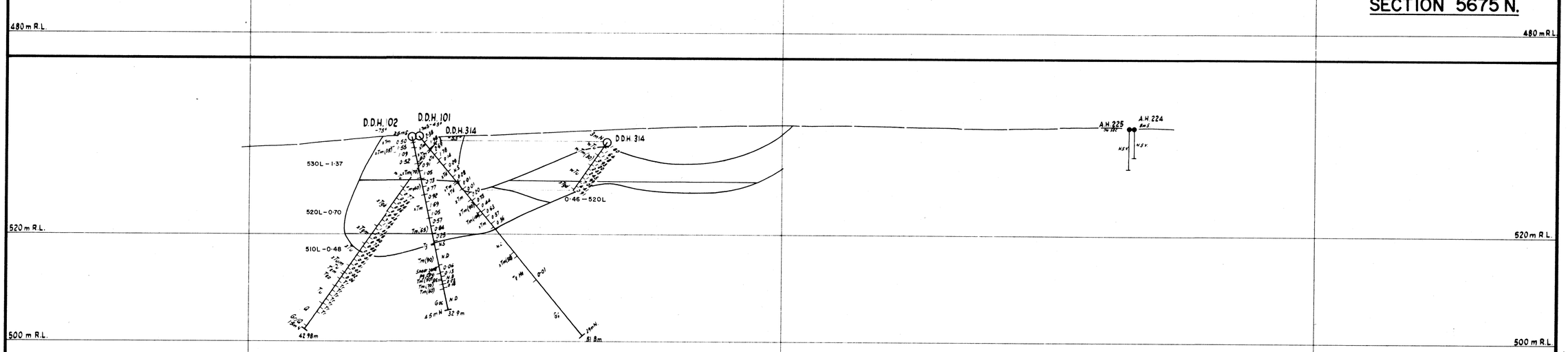
PLANS

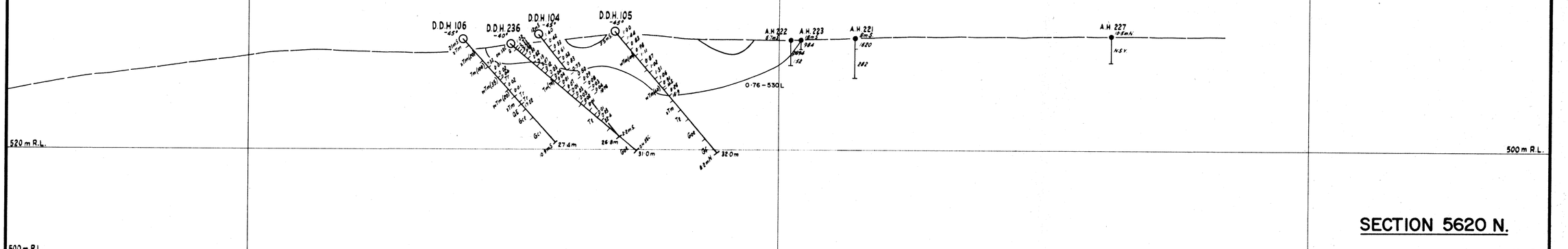
		Scale
Plan A	- Kara No. 1 Southern Extension - Ore Blocks	1:500
Plan B	- Kara No. 1 Section Line 5750N - Ore Reserve Blocks	1:500
Plan C	- " " 1 " " 5780N - " " "	1:500
Plan D	- " " 1 " " 5820N - " " "	1:500
Plan E	- " " 1 " " 5860N - " " "	1:500
Plan F	- " " 1 " " 5900N - " " "	1:500
Plan G	- " " 1 " " 5940N - " " "	1:500
Plan H	- " " 1 " " 5980N - " " "	1:500











ROCK TYPE

Q — ALLUVIUM SERIES
n - clay, s - sand, c - gravel

B — BASALT SERIES
b - basalt, s - fine-grained siliciclastic
c - conglomerate, t - tuff, tuffaceous
v - fossil alluvium

S — SEDIMENTARY SERIES
Rock units readily distinguished
M - siltstone, C - conglomerate,
S - sandstone, L - limestone

(h) chloritic, (d) diopsidic, (v) vesuvianite,
(r) brecciated, (y) stylolitic (z) massive,
(b) bedded

T — SKARN SERIES
Mineralogy

u - undivided	h - chlorite
g - garnet	l - calcite
d - diopside	q - quartz
e - epidote	m(zo) - magnetite, percent indicated
a - amphibole	

TR - Marble

TQ - Quartzose rock, uncertain derivation
s - siliceous sandstone, sedimentary texture
q - quartzite, no remnant texture
(e) epidote, (a) amphibole, (i) biotite
k - hornfels

QE — QUARTZ - EPIDOTE ROCK
Quartz mosaic with interstitial epidote, associated with granite/skarn contact zone. Probably late-stage feature of intrusion history.

G — GRANITE

a - porphyritic	q - quartz rich
p - pegmatite	e - epidote altered
u - undivided	j - aplite

NOTE: Rock type, dominant mineralogy and related features of rock unit shown by suffix: e.g. Tgd - garnet diopside skarn, TQq - quartzite, SLr - brecciated limestone

GRAIN SIZE
(f) fine (m) medium (c) coarse ; shown by subscript e.g. S_{fc} - fine-grained sandstone, T_{Qm} - medium-grained garnet skarn, G_c - coarse-grained granite

MINERALS
FL - fluorite, PY - pyrite MO - molybdenite,
HE - hematite, CPY - chalcopyrite
MA - malachite, - CH - chrysocolla

ORE TYPES

F = FRESH
Y = PARTIALLY WEATHERED
X = WEATHERED (some scheelite)
W = WEATHERED (no scheelite)

REFERENCE:
McIntyre diamond drill hole
Anzeco diamond drill hole
Tasminex diamond drill hole
Anzeco auger hole

500L-1·01 = Mine level with average %WO_3

713277

10 5 0 10 20 Metres

SCALE: 1:500

5 cm

82-1828 Vol.11/19.

McINTYRE MINES (AUST.) PTY. LTD.

KARA N°1 SOUTHERN EXTENSION

CROSS SECTIONS WITH ORE BLOCKS

DRAWN: C.H.W.	SCALE: 1:500
TRACED: T.G.D.S.	DATE: February 1982

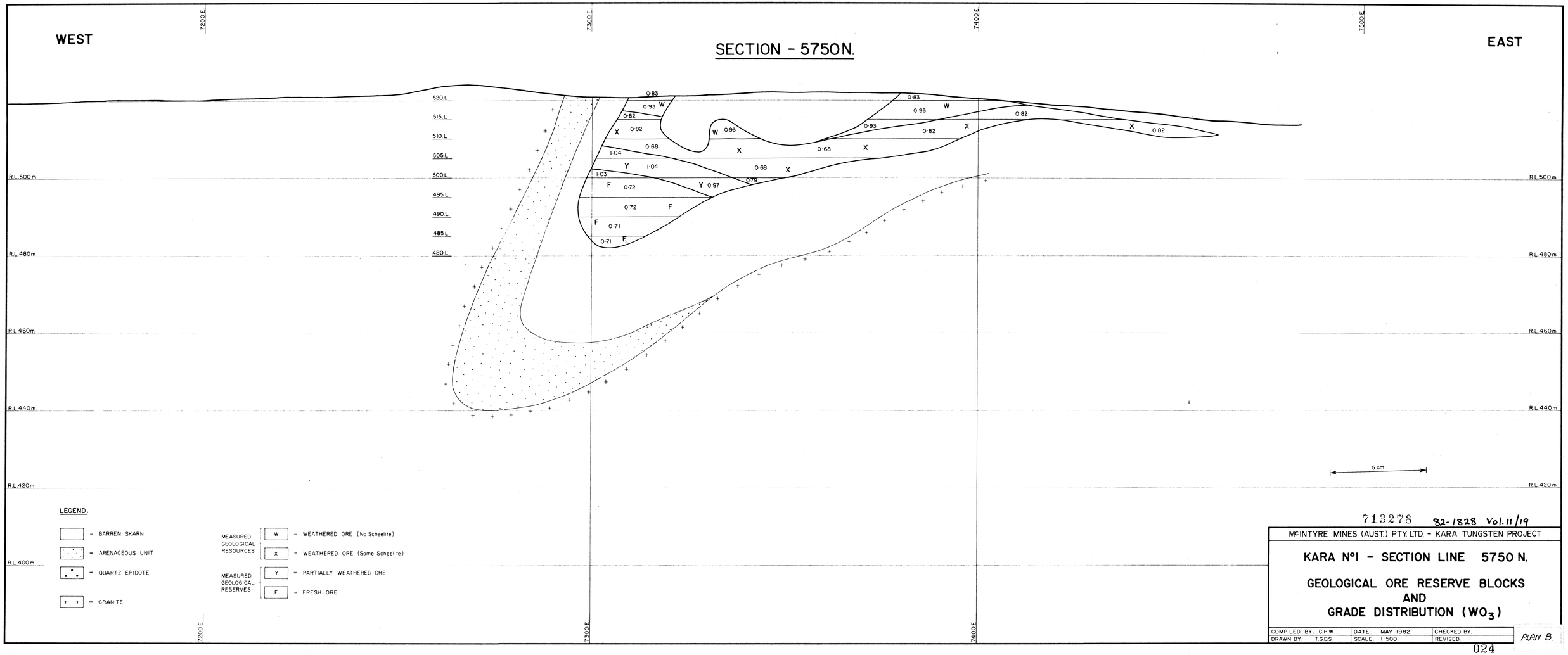
PLAN. A.

023

WEST

EAST

SECTION - 5750N.



LEGEND:

- = BARREN SKARN
- = ARENACEOUS UNIT
- = QUARTZ EPIDOTE
- + + = GRANITE

MEASURED GEOLOGICAL RESOURCES
- W = WEATHERED ORE (No Scheelite)
- X = WEATHERED ORE (Some Scheelite)

MEASURED GEOLOGICAL RESERVES
- Y = PARTIALLY WEATHERED ORE
- F = FRESH ORE

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McINTYRE MINES (AUST.) PTY. LTD. - KARA TUNGSTEN PROJECT

KARA N°1 - SECTION LINE 5750 N.

GEOLOGICAL ORE RESERVE BLOCKS AND GRADE DISTRIBUTION (WO_3)

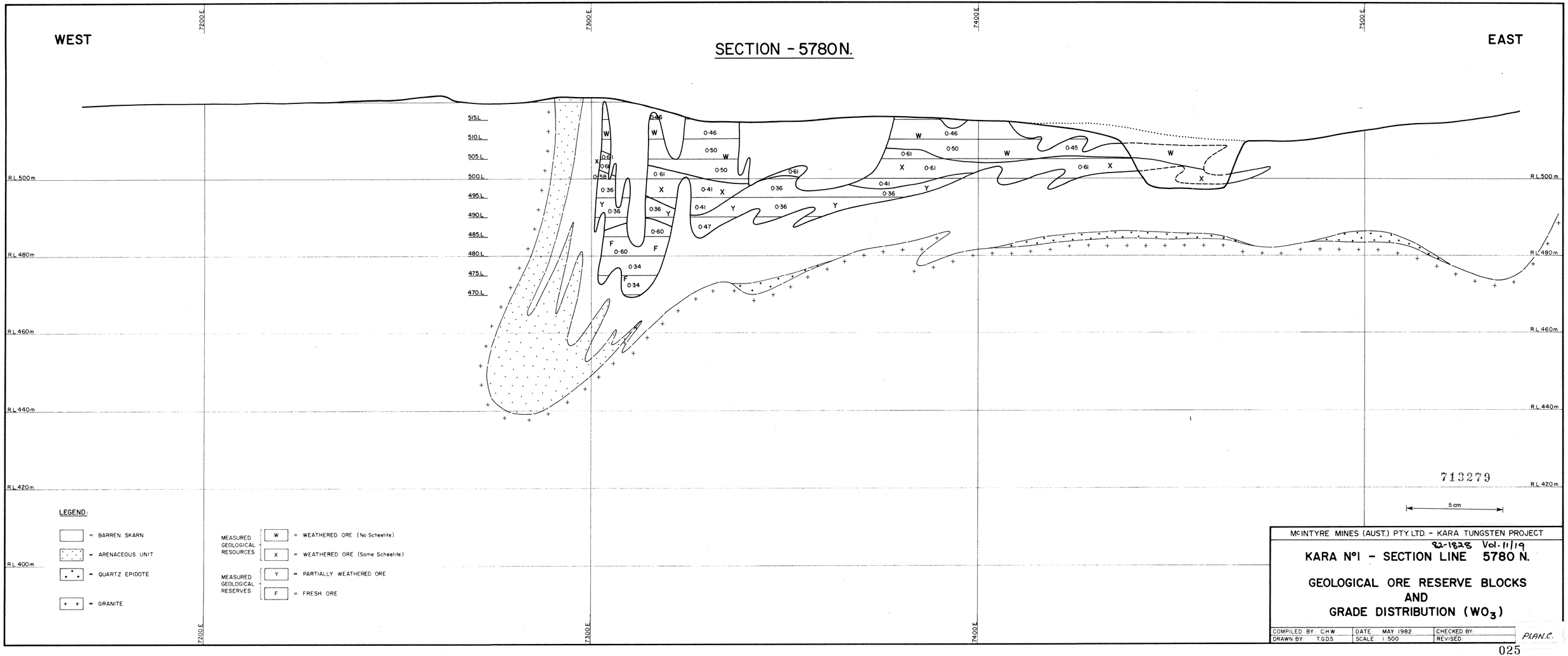
COMPILED BY: C.H.W.	DATE: MAY 1982	CHECKED BY:
DRAWN BY: T.G.D.S.	SCALE: 1:500	REVISED:

PLAN B.

WEST

EAST

SECTION - 5780N.



LEGEND:

- = BARREN SKARN
- = ARENACEOUS UNIT
- = QUARTZ EPIDOTE
- + + = GRANITE

MEASURED GEOLOGICAL RESOURCES
- W = WEATHERED ORE (No Scheelite)
- X = WEATHERED ORE (Some Scheelite)

MEASURED GEOLOGICAL RESERVES
- Y = PARTIALLY WEATHERED ORE
- F = FRESH ORE

McINTYRE MINES (AUST.) PTY. LTD. - KARA TUNGSTEN PROJECT

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KARA N°1 - SECTION LINE 5780 N.

GEOLOGICAL ORE RESERVE BLOCKS AND GRADE DISTRIBUTION (WO_3)

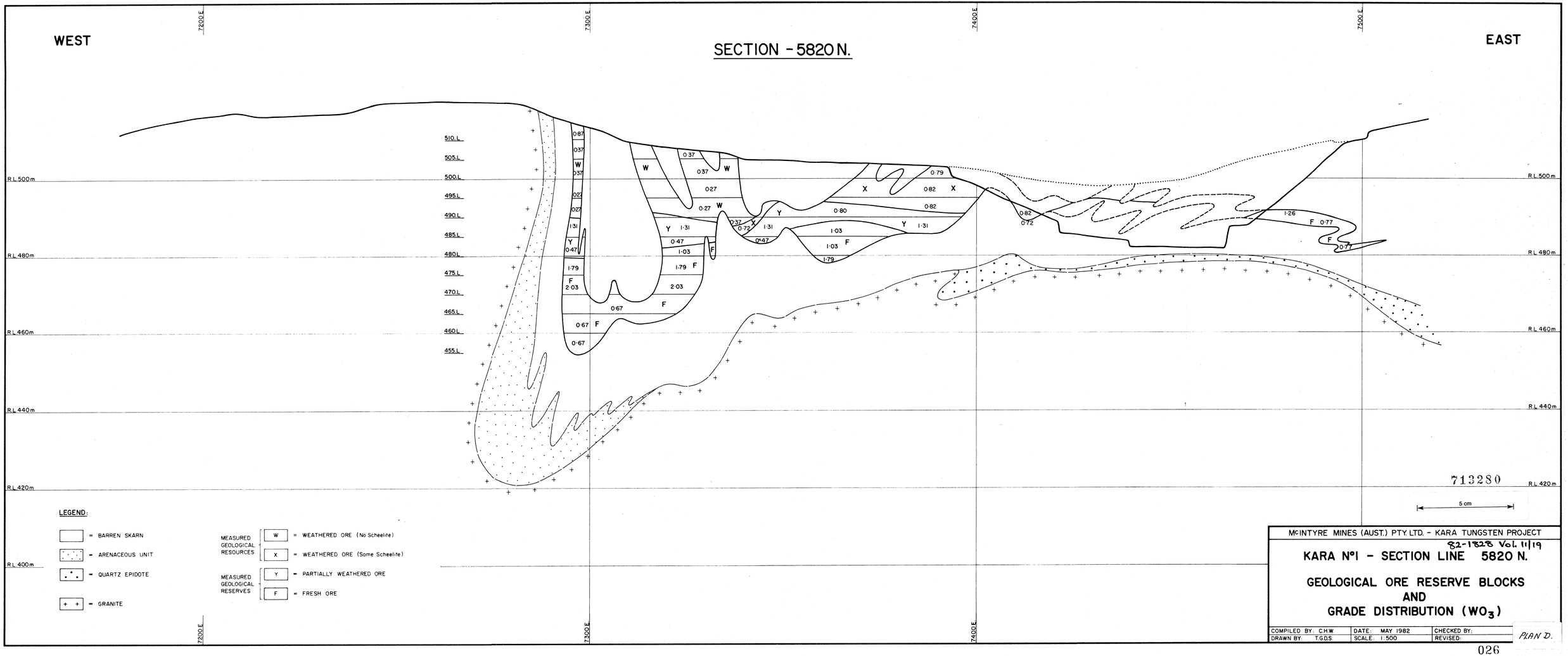
COMPILED BY C.H.W.	DATE: MAY 1982	CHECKED BY:
DRAWN BY T.G.D.S.	SCALE 1:500	REVISED:

PLAN C.

WEST

EAST

SECTION - 5820 N.



LEGEND:

- = BARREN SKARN
- = ARENACEOUS UNIT
- = QUARTZ EPIDOTE
- + + = GRANITE

MEASURED GEOLOGICAL RESOURCES
- W = WEATHERED ORE (No Scheelite)
- X = WEATHERED ORE (Some Scheelite)

MEASURED GEOLOGICAL RESERVES
- Y = PARTIALLY WEATHERED ORE
- F = FRESH ORE

McINTYRE MINES (AUST.) PTY. LTD. - KARA TUNGSTEN PROJECT

82-1828 Vol. 11/19

KARA N°1 - SECTION LINE 5820 N.

GEOLOGICAL ORE RESERVE BLOCKS AND GRADE DISTRIBUTION (WO_3)

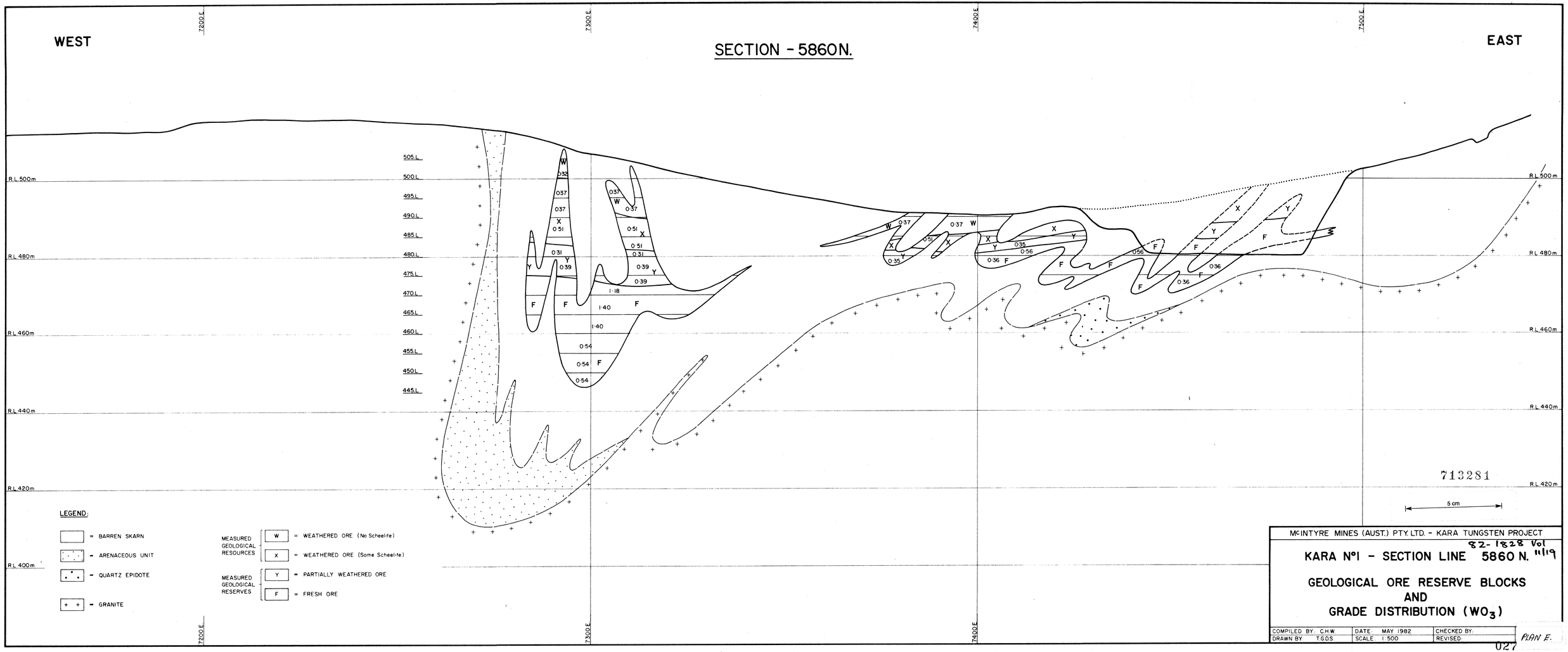
COMPILED BY: C.H.W	DATE: MAY 1982	CHECKED BY:
DRAWN BY: T.G.D.S.	SCALE: 1:500	REVISED:

PLAN D.

WEST

SECTION - 5860N.

EAST



LEGEND:

- = BARREN SKARN
- = ARENACEOUS UNIT
- = QUARTZ EPIDOTE
- + + = GRANITE

MEASURED GEOLOGICAL RESOURCES
- W = WEATHERED ORE (No Scheelite)
- X = WEATHERED ORE (Some Scheelite)

MEASURED GEOLOGICAL RESERVES
- Y = PARTIALLY WEATHERED ORE
- F = FRESH ORE

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82-1828 Vol 11 #19

KARA N°1 - SECTION LINE 5860 N.

GEOLOGICAL ORE RESERVE BLOCKS AND GRADE DISTRIBUTION (WO_3)

COMPILED BY: C.H.W.	DATE: MAY 1982	CHECKED BY:
DRAWN BY: T.G.D.S.	SCALE: 1:500	REVISED:

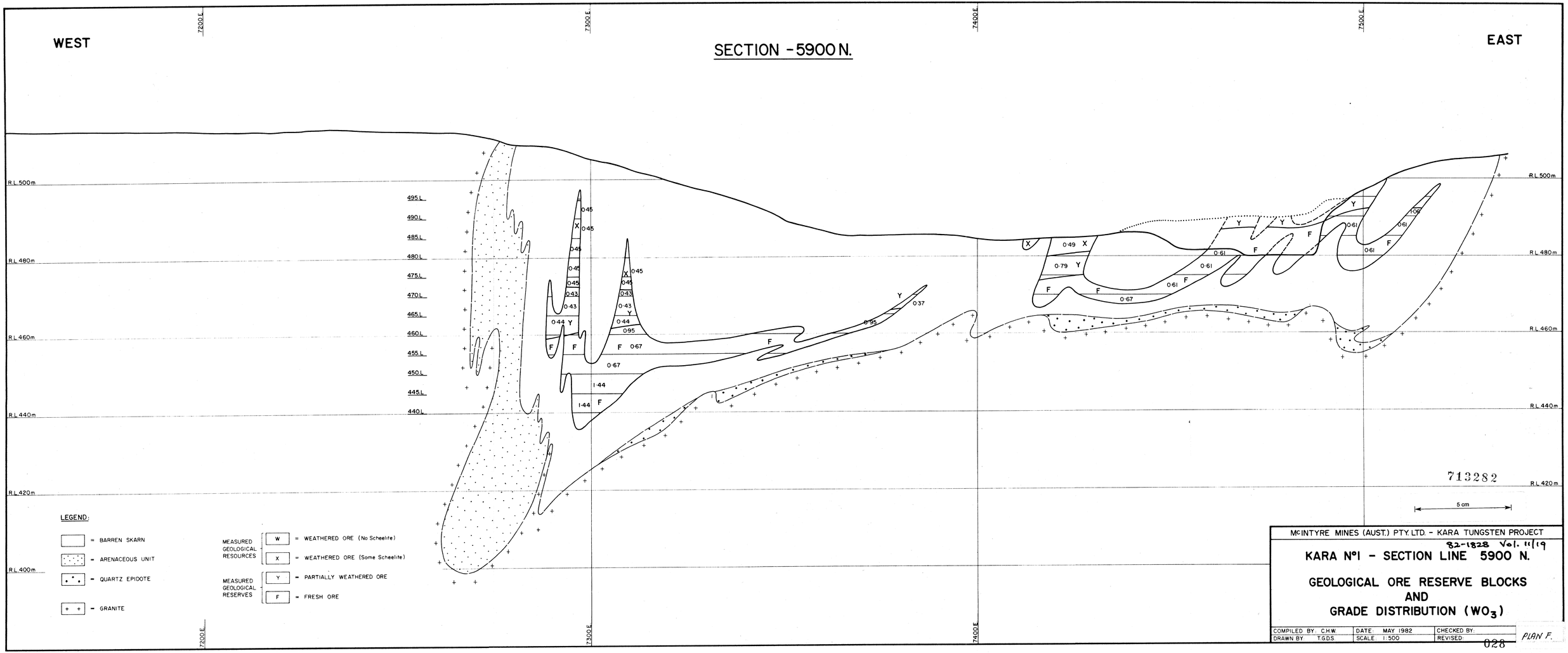
PLAN F.

027

WEST

EAST

SECTION - 5900 N.



713282

5 cm

LEGEND:

- = BARREN SKARN
- = ARENACEOUS UNIT
- = QUARTZ EPIDOTE
- + + = GRANITE

MEASURED GEOLOGICAL RESOURCES
- W = WEATHERED ORE (No Scheelite)
- X = WEATHERED ORE (Some Scheelite)

MEASURED GEOLOGICAL RESERVES
- Y = PARTIALLY WEATHERED ORE
- F = FRESH ORE

McINTYRE MINES (AUST.) PTY. LTD. - KARA TUNGSTEN PROJECT

82-1828 Vol. II(19

KARA N°1 - SECTION LINE 5900 N.

GEOLOGICAL ORE RESERVE BLOCKS AND GRADE DISTRIBUTION (WO_3)

COMPILED BY: C.H.W.	DATE: MAY 1982	CHECKED BY:	
DRAWN BY: T.G.D.S.	SCALE: 1:500	REVISED:	

PLAN F.

028

WEST

EAST

SECTION - 5940N.

7200 E 7300 E 7400 E 7500 E

R.L 500m
R.L 480m
R.L 460m
R.L 440m
R.L 420m
R.L 400m

485 L
480 L
475 L
470 L
465 L
460 L
455 L
450 L
445 L
440 L

0·50
0·50
0·50
0·50
0·50
0·50
F 0·36
0·36
0·33
0·33
F

Y
0·76
0·64
F
0·64
F
0·64
F

713283

5 cm

LEGEND:

- = BARREN SKARN
- = ARENACEOUS UNIT
- = QUARTZ EPIDOTE
- + + = GRANITE

MEASURED GEOLOGICAL RESOURCES
- W = WEATHERED ORE (No Scheelite)
- X = WEATHERED ORE (Some Scheelite)

MEASURED GEOLOGICAL RESERVES
- Y = PARTIALLY WEATHERED ORE
- F = FRESH ORE

McINTYRE MINES (AUST.) PTY. LTD. - KARA TUNGSTEN PROJECT

82-1828 Vol. 11/19

KARA N°1 - SECTION LINE 5940 N.

GEOLOGICAL ORE RESERVE BLOCKS AND GRADE DISTRIBUTION (WO_3)

COMPILED BY: C.H.W.	DATE: MAY 1982	CHECKED BY:	PLAN 6.
DRAWN BY: T.G.D.S.	SCALE: 1:500	REVISED:	

029

WEST

SECTION -5980N.

EAST

7200 E

7300 E

7400 E

7500 E

R.L. 500m

R.L. 480m

R.L. 460m

R.L. 440m

R.L. 420m

R.L. 400m

500 L

495 L

490 L

485 L

480 L

475 L

470 L

465 L

460 L

455 L

450 L

0·35 W 0·63 0·63 0·77 Y 0·77 0·77 0·77 0·77 F 0·77 0·77 0·33 0·33

0·56 F 0·56

F 0·56 0·56 F

713284

5 cm

LEGEND:

- = BARREN SKARN
- = ARENACEOUS UNIT
- = QUARTZ EPIDOTE
- + + = GRANITE

MEASURED GEOLOGICAL RESOURCES

- W = WEATHERED ORE (No Scheelite)
- X = WEATHERED ORE (Some Scheelite)

MEASURED GEOLOGICAL RESERVES

- Y = PARTIALLY WEATHERED ORE
- F = FRESH ORE

McINTYRE MINES (AUST.) PTY. LTD. - KARA TUNGSTEN PROJECT

82-1828 Vol. 11/19

KARA N°1 - SECTION LINE 5980 N.

GEOLOGICAL ORE RESERVE BLOCKS AND GRADE DISTRIBUTION (WO_3)

COMPILED BY: C.H.W.	DATE: MAY 1982	CHECKED BY:
DRAWN BY: T.G.D.S.	SCALE: 1:500	REVISED:

P.P.N. H.

Report No.
2C/82

[redacted]

82-1828
12/14

713C/2

713285

Dept of M | A.O. | C.G. | E.O. | D.S.M.E | Registrar | E & IL
Received
Answered 1 OCT 1982
DEPT. OF MINES
REF. No. 8090A/82

McINTYRE MINES (AUSTRALIA) PTY. LTD.

GEOLOGICAL ORE RESERVES & RESOURCES

KARA NORTH 266 ZONE

May, 1982.

C.H. WHITEHEAD.

20th August, 1982

REPORT NO. 2C/82

McINTYRE MINES (AUSTRALIA) PTY. LTD.

GEOLOGICAL ORE RESERVES & RESOURCES

KARA NORTH 266 ZONE.

During May 1982, Golder Associates (Sydney) working in conjunction with McIntyre Mines regional exploration office personnel, recalculated the geological ore reserves and resources of the Kara North 266 Zone deposit.

The attached Tables Nos. 1 - 6 summarise the tonnage and grade figures for this deposit as calculated by Golder Associates.

The accompanying drill cross sectional plans (Sec. Nos. 6980N to 7260N) outlining delineated ore blocks and ore type categories were interpretated and compiled by McIntyre Mines. These were drawn up in December 1981 after the recently completed infill drill programme, and were used as a basis for the Golder Associates tonnage and grade calculations.

At the Kara North deposit, zones of tungsten mineralisation have been broken down into three ore type categories, namely:-

- Fresh (F) ore - containing unaltered scheelite ore amenable to normal recovery process.
- Partially Weathered (Y) - partially weathered scheelite ore, to a large extent amenable to normal recovery processes.
- Weathered Material (X) - weathered tungsten bearing material for which no economic recovery process has been proved to date.

Ore blocks were subdivided into Geological Reserves (consisting of both fresh and partially weathered ore types) and Geological Resources (consisting of weathered material).

The new geological reserves and resources were calculated by transferring the available geological information from the drill cross sections showing ore block interpretations and ore type categorisation onto bench plans of 10 metre intervals. During this process N-S longitudinal sections of the deposit were also compiled at 10 metre intervals. Each bench plan was subdivided into 40 metre blocks along strike, and further subdivided into specific ore types.

Ore block areas for each ore type on each 5 metre bench were measured by planimeter, and volume figures calculated for the five metre bench. Volume to tonnage conversions were made using the following factors for the various ore types:-

Fresh Ore	1 Cubic metre	=	4 tonnes
Partially Weathered Ore	1 Cubic metre	=	3.7 tonnes
Weathered Material	1 Cubic metre	=	2.5 tonnes

According to the U.S.B.M. and U.S.G.S. reserves calculations and definition of ore reserves, it is the belief that the Kara North ore blocks can now be classified as measured ore.

Grade calculations were made on the basis of the total % of WO_3. A cut off grade of 0.2% WO_3 was used. Grade averages for each mineralised zone per block were obtained by weighting all relevant grade intersections within the zone, by length of mineralisation.

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

20th August, 1982.

713288

TABLES - KARA NORTH 266 ZONE

TABLE NO. 1 - Kara N. - Geological Ore Reserves & Resources Summary

TABLE NO. 2 - Kara N. - Bench x Bench Summary (Geol. Reserves & Resources)

TABLE NO. 3 - Kara N. - Section x Section Summary (Geol. Reserves & Resources)

TABLE NO. 4 - Kara N. - Geological Reserves - Fresh Ore

TABLE NO. 5 - Kara N. - Geological Reserves - Partially Weathered Ore

TABLE NO. 6 - Kara N. - Geological Resources - Weathered Material

713289

PLANS - KARA NORTH 266 ZONE

PLAN 1 - Kara N. 266 Zone, Drill Section Line 6980N

PLAN 2 - Kara N. 266 Zone, Drill Section Line 7020N

PLAN 3 - Kara N. 266 Zone, Drill Section Line 7060N

PLAN 4 - Kara N. 266 Zone, Drill Section Line 7120N

PLAN 5 - Kara N. 266 Zone, Drill Section Line 7160N

PLAN 6 - Kara N. 266 Zone, Drill Section Line 7220N

PLAN 7 - Kara N. 266 Zone, Drill Section Line 7260N

TABLE NO. 1

KARA NORTH - 266 ZONE

GEOLOGICAL ORE RESERVES & RESOURCES SUMMARY

ORE TYPE	MEASURED GEOLOGICAL ORE RESERVE		GEOLOGICAL RESOURCE	
	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$
Fresh -	466,800	1.00	-	-
Partially Weathered (Y) -	56,240	0.51	-	-
Weathered - With Scheelite (X) -	-	-	20,750	0.59
Weathered - No Scheelite (W) -			-	-
Total	523,040	0.95	20,750	0.59

713291

TABLE NO. 2

KARA NORTH - 266 ZONE

GEOLOGICAL ORE RESERVES & RESOURCES SUMMARY

BENCH x BENCH SUMMARY

BENCH	FRESH ORE (F)		PARTIALLY WTHED ORE (Y)		WEATHERED WITH SCHEELITE (X)		TOTAL	
	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$
455	-	-	9990	0.28	6469	0.76	16,459	0.47
450	-	-	3331	0.28	2156	0.76	5,487	0.47
445	6,550	0.31	11655	0.32	6906	0.43	25,111	0.35
440	19,650	0.31	8324	0.39	3469	0.48	31,443	0.35
435	33,900	0.51	7031	0.59	1313	0.58	42,244	0.53
430	49,300	0.51	7769	0.81	437	0.58	57,506	0.55
425	56,700	0.89	6104	0.91	-	-	62,804	0.89
420	56,100	0.90	2036	0.91	-	-	58,136	0.90
415	54,250	1.76	-	-	-	-	54,250	1.76
410	51,150	1.68	-	-	-	-	51,150	1.68
405	42,700	1.10	-	-	-	-	42,700	1.10
400	38,500	1.06	-	-	-	-	38,500	1.06
395	22,150	0.86	-	-	-	-	22.150	0.86
390	11,650	0.82	-	-	-	-	11,650	0.82
385	6,500	0.78	-	-	-	-	6,500	0.78
380	6,700	0.74	-	-	-	-	6,700	0.74
375	6,150	0.50	-	-	-	-	6,150	0.50
370	4.850	0.50	-	-	-	-	4,850	0.50
TOTAL	466,800	1.00	56,240	0.51	20,750	0.59	543,790	0.93

TABLE NO. 3

KARA NORTH - 266 ZONE

GEOLOGICAL ORE RESERVES & RESOURCES SUMMARY

SECTION x SECTION BLOCK SUMMARY

SECTION BLOCK	FRESH ORE (F)		PART/WTHED ORE (Y)		WEATHERED WITH SCHEELITE (X)		TOTAL	
	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$	Tonnes	$\%WO_3$
6980N	29,000	0.46	-	-	-	-	29,000	0.46
7020N	55,600	1.35	4,810	1.42	-	-	60,410	1.36
7060N	37,000	0.87	8,140	0.72	1,250	0.72	46,390	0.84
7100N	54,000	0.73	10,730	0.54	7,000	0.50	71,730	0.68
7140N	92,400	1.11	5,920	0.41	12,500	0.63	110,820	1.02
7180N	113,600	1.27	9,250	0.28	-	-	122,850	1.20
7220N	70,400	0.79	11,100	0.30	-	-	81,500	0.72
7260N	14,800	0.28	6,290	0.28	-	-	21,090	0.28
TOTALS	466,800	1.00	56,240	0.51	20,750	0.59	543,790	0.93

GEOLOGICAL RESERVES. [redacted] ORE TYPE [redacted] (FRESH)

KARA NORTH 266 ZONE.

TABLE NO 4

BENCH.	6980N		7020N		7060N		7100N		7140N		7180N		7220N		7260N		TOTAL.	
	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3
455																		
450																		
445									1000	0·39	2150	0·31	2550	0·30	850	0·28	6550	0·31.
440									3000	0·39	6450	0·31	7650	0·30	2550	0·28	19,650	0·31.
435							850	0·50	6000	0·42	11,650	0·50	12100	0·63	3300	0·28	33,900	0·51.
430							2550	0·50	10000	0·42	17,750	0·50	15900	0·63	3100	0·28	49,300	0·51.
425			1400	1·42	1600	0·72	4250	0·90	12200	0·74	19,700	0·89	16150	1·08	2500	0·28	56 700	0·89
420			4200	1·42	4500	0·72	6950	0·90	12600	0·74	17600	0·89	9850	1·08	1600	0·28	56,100	0·90.
415			5950	1·32	6500	0·82	7750	0·90	13200	2·02	14700	2·90	5400	1·08	750	0·28	64,250	1·76
410			6650	1·32	7500	0·90	9650	0·90	14000	1·94	11300	2·90	1800	1·08	250	0·28	51,150	1·68
405	700	0·42	8150	1·32	8250	0·93	9500	0·61	8650	1·26	7,550	1·54					42,700	1·10
400	2100	0·42	10,450	1·32	8750	0·93	7300	0·61	6450	1·26	3,450	1·54					38500	1·06.
395	3200	0·42	9,200	1·42			4650	0·40	4050	0·52	1050	0·73					22,150	0·86.
390	4000	0·42	4400	1·42			1650	0·40	1850	0·52	350	0·73					11,650	0·82
385	4600	0·46	1900	1·57													6500	0·78
380	5000	0·46	1700	1·57													6700	0·74
375	4950	0·50	1200	0·50													6150	0·60
370.	4450	0·50	400	0·50													4850	0·50
TOTAL.	29000	0·46.	66600	1·35	37000	0·87	54000	0·73	92400	1·11	113600	1·27	70400	0·79	14800	0·28	466800	1·00

21 22 23

008

TABLE NO. 5

GEOLOGICAL RESERVES.

ORE TYPE - PARTIALLY WEATHERED (V)

KARA NORTH 266 ZONE.

BENCH.	6980N		7020N		7060N		7100N		7140N		7180N		7220N		7260N		TOTAL.	
	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3
455											3468	0.26	4163	0.30	2359	0.28	9990	0.28
450											1158	0.26	1387	0.30	786	0.28	3331	0.28
445							925	0.50	740	0.39	3468	0.31	4163	0.30	2359	0.28	11655	0.32.
440							2785	0.50	2220	0.39	1156	0.31	1387	0.30	786	0.28	8324	0.39
435			601	1.42	1018	0.72	3192	0.51	2220	0.42.							7031.	0.59.
430			1804	1.42	3052	0.72	2173	0.55	740	0.42							7769	0.81.
425			1804	1.42	3062	0.72	1248	0.66									6104	0.91.
420			601	1.42	1018	0.72	417	0.66.									2036	0.91
415																		
410																		
405																		
400																		
395																		
390																		
385																		
380																		
375																		
370																		
TOTAL.			4810	1.42	8140	0.72	10730	0.54	5920	0.41	9250	0.28	11100	0.30	6290	0.28	66240	0.51.

713294 009

TABLE NO. 6

GEOLOGICAL RESOURCES

KARA NORTH 266 ZONE.

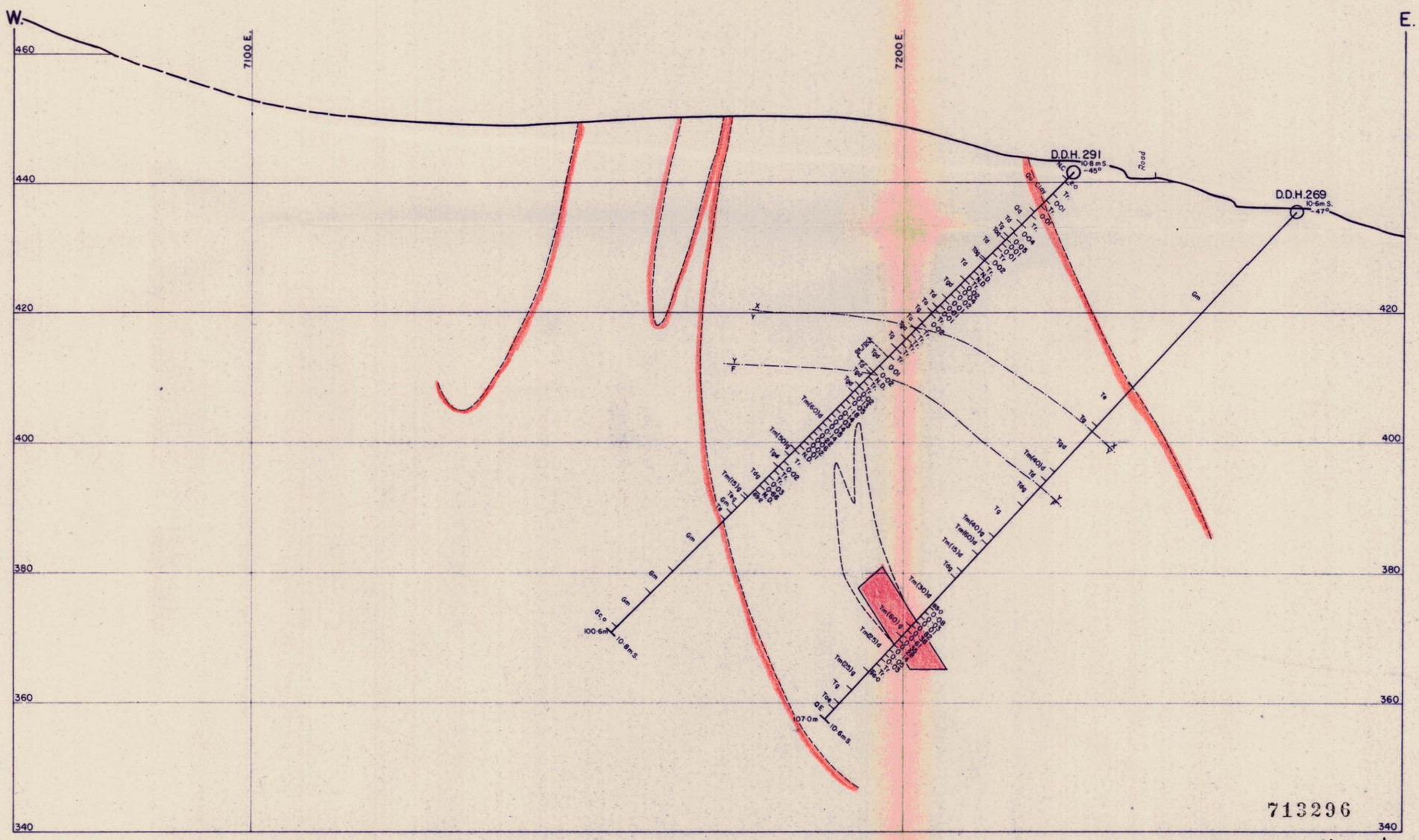
ORE TYPE – WEATHERED MATERIAL WITH SCHEELITE (x)

BENCH	6980N		7020N		7060N		7100N		7140N		7180N		7220N		7260N		TOTAL.	
	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3
455							1781	0.50	4688	0.86							6469	0.76
450							594	0.50	1562	0.86							2156	0.76
445					156	0.72	2063	0.50	4687	0.39							6906	0.43.
440					469	0.72	1437	0.50	1563	0.39							2469	0.48
435					469	0.72	844	0.50									1313	0.58
430					156	0.72	281	0.50									437	0.58
425																		
420																		
415																		
410																		
405																		
400																		
395																		
390																		
385																		
380																		
375																		
370																		
TOTAL.					1250	0.72	7000	0.50	12500	0.63.							20750	0.59.

113295

KARA NORTH - "266 ZONE"

6980 N.



713296

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LEGEND:

- = GRANITE
- = QUARTZITE + SANDSTONE
- = SKARN ZONE
- = MAGNETITE RICH ZONE
- X+Y / F = WEATHERED ZONES (X = WEATHERED, Y = PARTIALLY WEATHERED, F = FRESH)
- = BLOCKED OUT POTENTIAL WO_3 RESERVES (CUT OFF 0·2% WO_3)
- D.D.H.266 — 0·12 % WO_3 — INTERVAL ASSAYED FOR WO_3; N.A. = NOT ASSAYED
- A.H.76 = AUGER HOLE (ANZECO)

MEASURED ORE:

- = OXIDISED ORE (with scheelite)
- = PARTIALLY WEATHERED ORE
- = FRESH ORE
- = POSSIBLE ORE

10 5 0 10 20 30 METRES

SCALE: 1:500 (HOR.+VERT.)

5 cm

KARA NORTH — "266 ZONE"

DRILL SECTION — 6980 N.

GEOLOGY — TUNGSTEN ASSAYS

GEOLOGIC RESERVES

SCALE: 1:500 DATE: MAY 1982

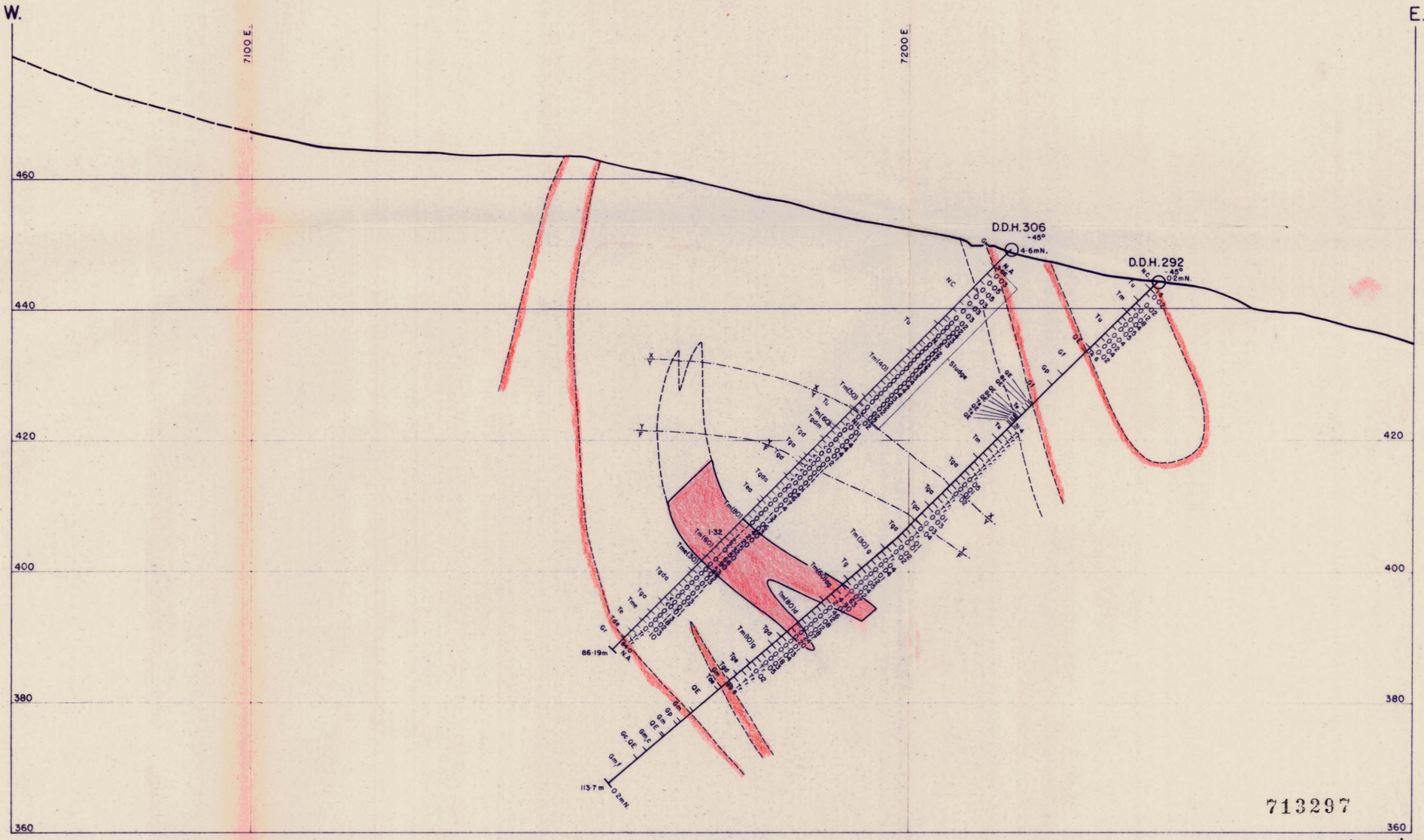
McINTYRE MINES (AUSTRALIA) PTY. LTD.

COMPILED: C.H.W. DRAWN: T.G.D.S.

PLAN N° 1

KARA NORTH - "266 ZONE"

7020 N.



713297

82-1828 Vol. 12/19

LEGEND:

- = GRANITE
- = QUARTZITE + SANDSTONE
- = SKARN ZONE
- = MAGNETITE RICH ZONE
- $\frac{X+Y}{F}$ = WEATHERED ZONES
  - X = WEATHERED
  - Y = PARTIALLY WEATHERED
  - F = FRESH
- = BLOCKED OUT POTENTIAL WO_3 RESERVES (CUT OFF 0·2% WO_3)

D.D.H.266
0·12% WO_3 — INTERVAL ASSAYED FOR WO_3
N.A = NOT ASSAYED

A.H.76 = AUGER HOLE (ANZECO)

MEASURED ORE:
- = OXIDISED ORE (with scheelite)
- = PARTIALLY WEATHERED ORE
- = FRESH ORE
- = POSSIBLE ORE

10 5 0 10 20 30 METRES
SCALE: 1:500 (HOR. + VERT.)

5 cm

KARA NORTH — "266 ZONE"

DRILL SECTION — 7020 N.

GEOLOGY — TUNGSTEN ASSAYS

GEOLOGIC RESERVES

SCALE: 1:500 DATE: MAY 1982

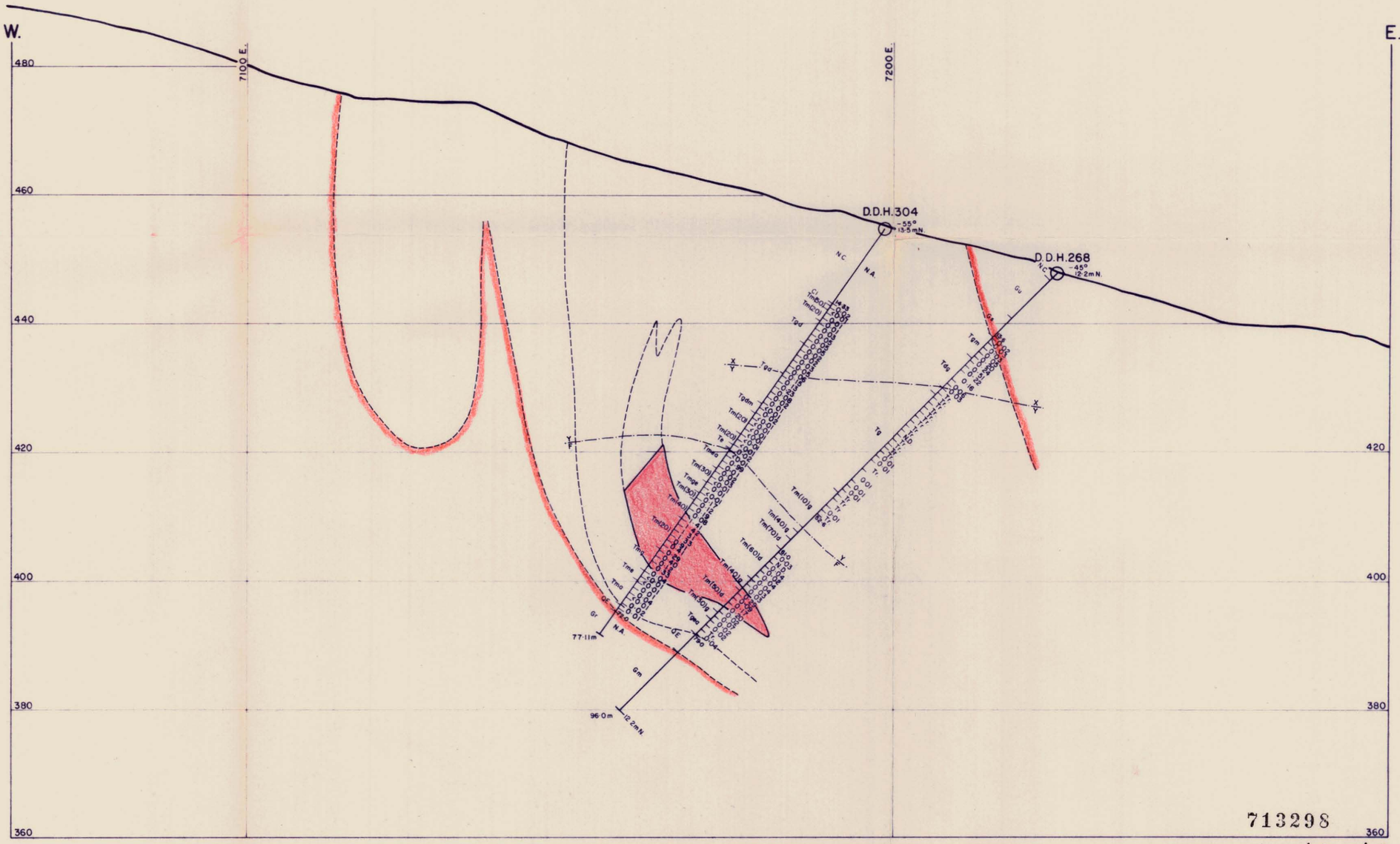
McINTYRE MINES (AUSTRALIA) PTY. LTD.

COMPILED: C.H.W. DRAWN: T.G.D.S.

PLAN. N° 2.

KARA NORTH - "266 ZONE"

7060 N.



713298

82-1828 Vol. 12/19

LEGEND:

- = GRANITE
- = QUARTZITE + SANDSTONE
- = SKARN ZONE
- = MAGNETITE RICH ZONE
- X+Y / F = WEATHERED ZONES
  - X = WEATHERED
  - Y = PARTIALLY WEATHERED
  - F = FRESH
- = BLOCKED OUT POTENTIAL WO_3 RESERVES (CUT OFF 0·2% WO_3)

D.D.H.266
0·12% WO_3 — INTERVAL ASSAYED FOR WO_3
N.A. : NOT ASSAYED

A.H.76 = AUGER HOLE (ANZECO)

10 5 0 10 20 30 METRES
SCALE: 1:500 (HOR.+VERT.)

MEASURED ORE:
- = OXIDISED ORE (with scheelite)
- = PARTIALLY WEATHERED ORE
- = FRESH ORE
- = POSSIBLE ORE

5 cm

KARA NORTH — "266 ZONE"

DRILL SECTION — 7060 N.

GEOLOGY — TUNGSTEN ASSAYS

GEOLOGIC RESERVES

SCALE: 1:500 DATE: MAY 1982

McINTYRE MINES (AUSTRALIA) PTY. LTD.

COMPILED: C.H.W. DRAWN: T.G.D.S.

PLAN. N°3.

013

KARA NORTH - "266 ZONE"

7120 N.

W. E.

7100 E. 7200 E.

460 440 420 400 380 360 340

D.D.H.305 -55° 9·0m S.
A.H.236
D.D.H.290 -45° 6·8m S.
A.H.235
A.H.234
D.D.H.270 -45° 9·7m S.
A.H.233
A.H.232

N.S. 10·06m 10·97m 10·97m

N.C. p.p.m. WO_3 N.D. N.D. 221 N.D. N.D. N.D. 721 1513 126 N.D. 631 N.D.

38·71m 87·0m 17·3m N. 100·0m 13·2m N.

713299

82-1828 Vol.12/19

LEGEND:

= GRANITE

= QUARTZITE + SANDSTONE

= SKARN ZONE
= MAGNETITE RICH ZONE

$\frac{X+Y}{F}$ = WEATHERED ZONES
X = WEATHERED
Y = PARTIALLY WEATHERED
F = FRESH

= BLOCKED OUT POTENTIAL WO_3 RESERVES (CUT OFF 0·2% WO_3)

D.D.H.266
0·12% WO_3 — INTERVAL ASSAYED FOR WO_3
N.A. = NOT ASSAYED

A.H.76 = AUGER HOLE (ANZECO)

10 5 0 10 20 30 METRES
SCALE: 1:500 (HOR + VERT.)

MEASURED ORE:
= OXIDISED ORE (with scheelite)
= PARTIALLY WEATHERED ORE
= FRESH ORE

= POSSIBLE ORE

5 cm

KARA NORTH — "266 ZONE"

DRILL SECTION — 7120 N.

GEOLOGY — TUNGSTEN ASSAYS

GEOLOGIC RESERVES

SCALE: 1:500 DATE: MAY 1982

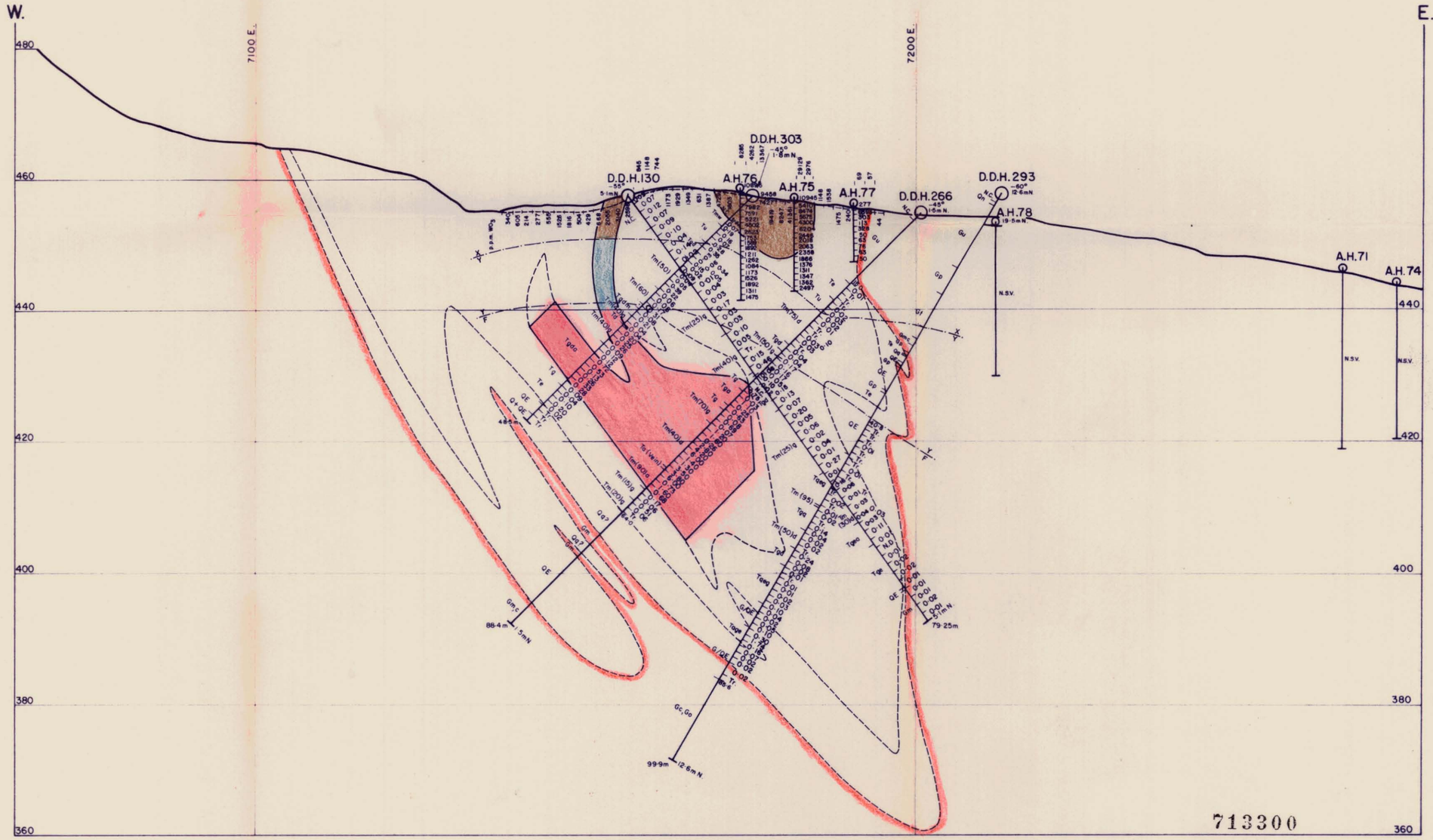
McINTYRE MINES (AUSTRALIA) PTY. LTD.

COMPILED: C.H.W. DRAWN: T.G.D.S.

PLAN. Nº 4.

KARA NORTH - "266 ZONE"

7160 N.



82-1828 Vol. 12/19

LEGEND:

- = GRANITE
- = QUARTZITE + SANDSTONE
- = SKARN ZONE
- = MAGNETITE RICH ZONE
- X+Y / F = WEATHERED ZONES
  - X = WEATHERED
  - Y = PARTIALLY WEATHERED
  - F = FRESH
- = BLOCKED OUT POTENTIAL WO_3 RESERVES (CUT OFF 0.2% WO_3)
- D.D.H.266 — 0.12% WO_3 — INTERVAL ASSAYED FOR WO_3; N.A. = NOT ASSAYED
- A.H.76 = AUGER HOLE (ANZECO)

MEASURED ORE:
- = OXIDISED ORE (with scheelite)
- = PARTIALLY WEATHERED ORE
- = FRESH ORE
- = POSSIBLE ORE

10 5 0 10 20 30 METRES

SCALE: 1:500 (HOR. + VERT.)

5 cm

KARA NORTH — "266 ZONE"

DRILL SECTION — 7160 N.

GEOLOGY — TUNGSTEN ASSAYS

GEOLOGIC RESERVES

SCALE: 1:500 DATE: MAY 1982

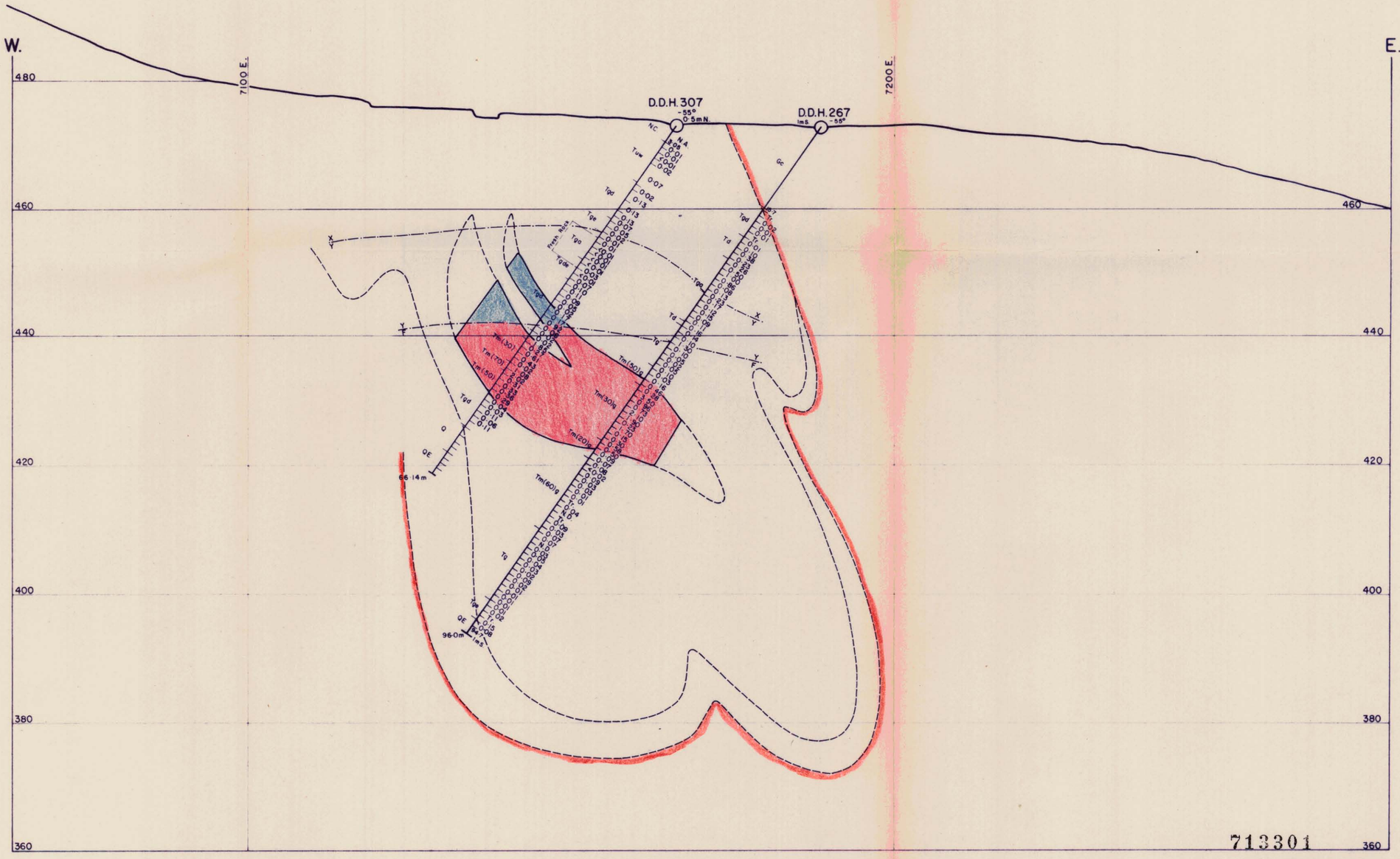
McINTYRE MINES (AUSTRALIA) PTY. LTD.

COMPILED: C.H.W. DRAWN: T.G.D.S.

PLAN Nº 5

KARA NORTH - "266 ZONE"

7220 N.



82-1828 Vol. 12119

LEGEND:

= GRANITE

= QUARTZITE + SANDSTONE

= SKARN ZONE
= MAGNETITE RICH ZONE

X+Y / F = WEATHERED ZONES
X = WEATHERED
Y = PARTIALLY WEATHERED
F = FRESH

= BLOCKED OUT POTENTIAL WO_3 RESERVES (CUT OFF 0·2% WO_3)

D.D.H. 266
0·12% WO_3 — INTERVAL ASSAYED FOR WO_3
N.A. = NOT ASSAYED

A.H. 76 = AUGER HOLE (ANZECO)

10 5 0 10 20 30 METRES
SCALE: 1:500 (HOR. + VERT.)

MEASURED ORE:
= OXIDISED ORE (with scheelite)
= PARTIALLY WEATHERED ORE
= FRESH ORE

= POSSIBLE ORE

5 cm

KARA NORTH — "266 ZONE"

DRILL SECTION — 7220 N.

GEOLOGY — TUNGSTEN ASSAYS

GEOLOGIC RESERVES

SCALE: 1:500 DATE: MAY 1982

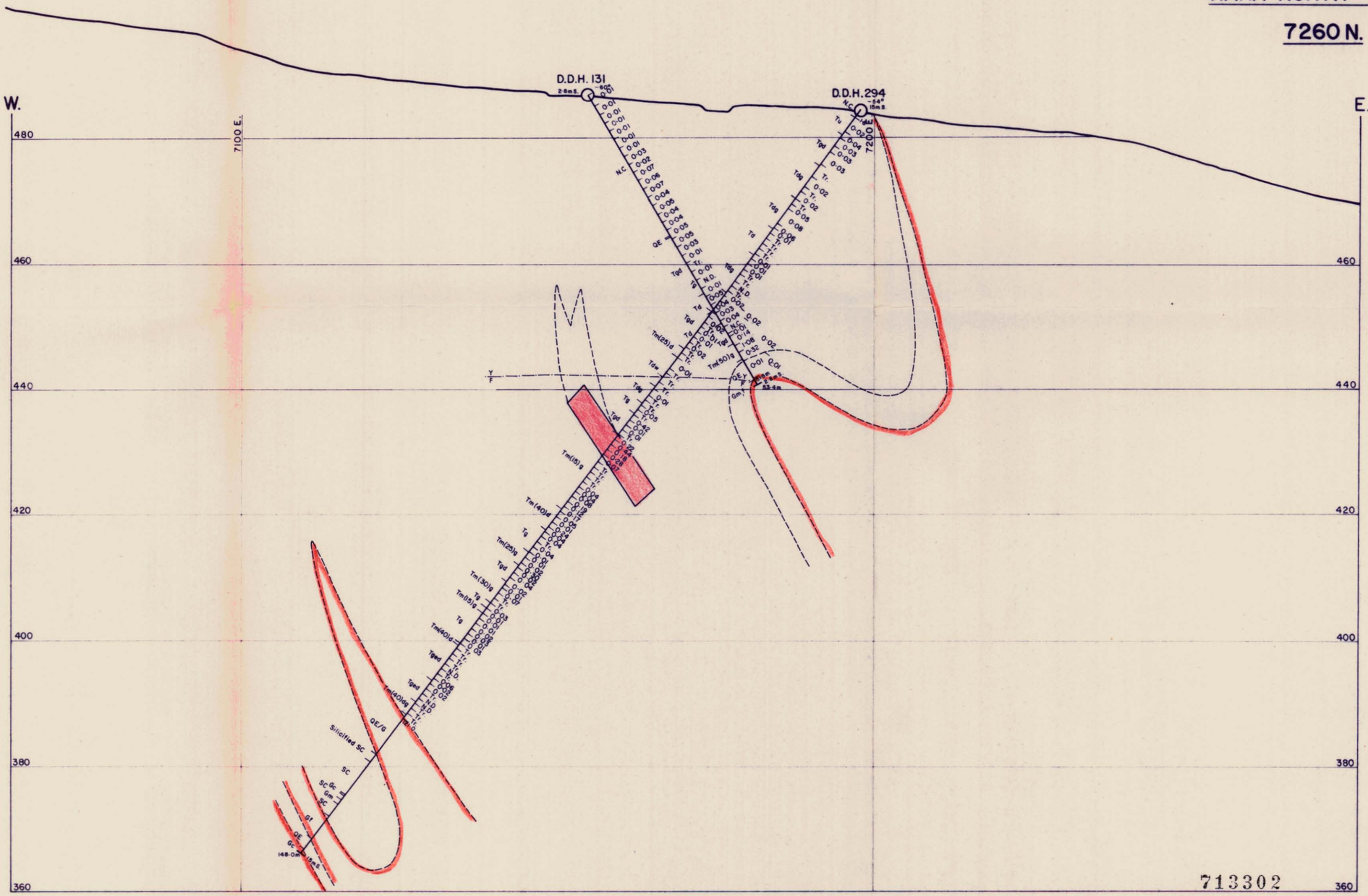
McINTYRE MINES (AUSTRALIA) PTY. LTD.

COMPILED: C.H.W. DRAWN: T.G.D.S.

PLAN. N° 6.

KARA NORTH - "266 ZONE"

7260 N.



713302

82-1828 Vol. 12/19

LEGEND:

- = GRANITE
- = QUARTZITE + SANDSTONE
- = SKARN ZONE
- = MAGNETITE RICH ZONE
- $\frac{X+Y}{F}$ = WEATHERED ZONES
  - X = WEATHERED
  - Y = PARTIALLY WEATHERED
  - F = FRESH
- = BLOCKED OUT POTENTIAL WO_3 RESERVES (CUT OFF 0·2% WO_3)

D.D.H. 266
- 0·12 % WO_3 — INTERVAL ASSAYED FOR WO_3
- N.A. : NOT ASSAYED

A.H. 76 = AUGER HOLE (ANZECO)

MEASURED ORE:
- = OXIDISED ORE (with scheelite)
- = PARTIALLY WEATHERED ORE
- = FRESH ORE
- = POSSIBLE ORE

10 5 0 10 20 30 METRES

SCALE: 1:500 (HOR. + VERT.)

5 cm

KARA NORTH — "266 ZONE"

DRILL SECTION — 7260 N.

GEOLOGY — TUNGSTEN ASSAYS

GEOLOGIC RESERVES

SCALE: 1:500 DATE: MAY 1982

McINTYRE MINES (AUSTRALIA) PTY. LTD.

COMPILED: C.H.W. DRAWN: T.G.D.S.

PLAN. N° 7.

Report No.
3A/82

82-1828
13/19

7130

713303

REPORT NO. 3A/82

Dept of M. | A.O. | G.G. | E.O. | D.S.M.E.
Received / Answered 1 OCT 1982
DEPT. OF MINES
REF. No. 8090A/82

McINTYRE MINES (AUSTRALIA) PTY. LTD.

GEOLOGICAL PLANS & GEOLOGICAL CROSS SECTIONS

EXPLORATION LICENCE 17/68

Period 4th November 1981 - 3rd November 1982

C. H. WHITEHEAD.

SEPTEMBER 1982.

REPORT NO. 3A/82

McINTYRE MINES (AUSTRALIA) PTY. LTD.

GEOLOGICAL PLANS & GEOLOGICAL CROSS SECTIONS

EXPLORATION LICENCE 17/68

Period 4th November 1981 To 3rd November, 1982

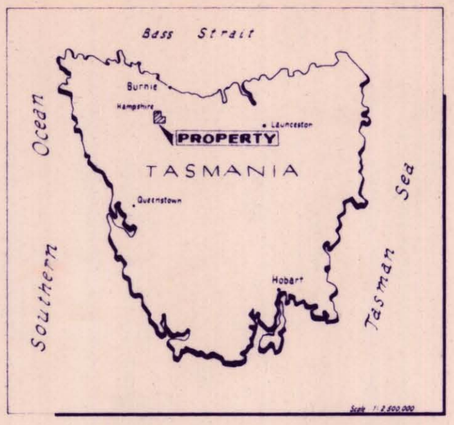
During the course of geological and exploration work carried out by McIntyre Mines within E.L. 17/68 and C.L. 105M/77 during the period 4th November 1981 to 3rd November 1982, a number of new geological plans and geological cross sectional plans have either been compiled or amended.

These updated plans are itemised below, and are attached:-

		Scale
Plan No. A -	Geological Plan - E.L. 17/68 - Kara Properties.	1:20,000
Plan No. B -	Geological Plan - E.L. 17/68 - Kara Properties	1:10,000
Plan No. C -	Geological Cross Section E.L. 17/68	1:10,000
Plan No. D -	Geological Plan - Kara Properties, Main Ore Zones	1:2,500
Plan No. E -	Geological Cross Sections, Kara Properties, Main Ore Zones	1:2,500
Plan No. F -	Geological Plan - Kara No. 1, Bob's Bonanza, Eastern Ridge	1:1000
Plan No. G -	Geological Plan - Kara North 266 Zone + Magnetite Anomaly	1:1000

82-1828 Vol. 13/19

PLAN A.



713305

McINTYRE MINES (AUST) PTY. LTD.

E. L. 17/68 - KARA PROPERTIES

GEOLOGICAL PLAN

N

SCALE 1:10000

5 cm

GEOLOGY

RECENT — Alluvium

TERTIARY — Basalt; Conglomerate, breccias etc.

DEVONIAN — Granite

ORDOVICIAN: GORDON LIMESTONE; TRANSITION BEDS; MOINA SANDSTONE (Oo); DIXON CONGLOMERATE (Oc)

CAMBRIAN: HORNFELS GROUP (Cb); ACID VOLCANICS (Cv)

Basic intrusives

REFERENCE

River; Creek; Road; Track; Railway; Trig. Beacon; Geological Boundary

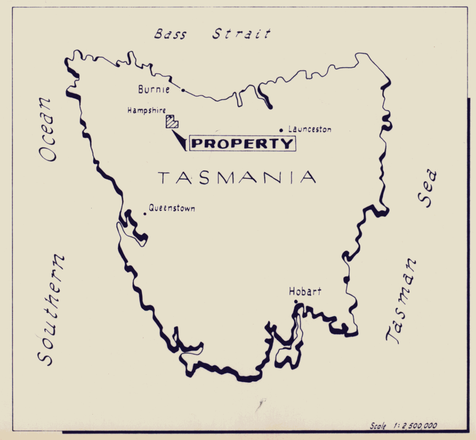
= Aeromag. High Trend

Base map enlarged from 1:50,000 Helger N.T.M. Sheet 8015 & Aerial Photographs

July '68

HAMPSHIRE; HAMPSHIRE MAGNETITE; KARA NORTH 266 ZONE; KARA NORTH MAGNETITE ZONE; COMPANION SKARN; CONSOLIDATED LEASE (KEW-IT) BOUNDARY; EASTERN RIDGE; WESTERN LINE; KARA 1st; KARA 2nd; KARA SOUTH; BOBS BONANZA; LOWREY'S PITS; SUTTONS SKARN; RINGWOOD GRANITE STOCK; KARA GRANITE STOCK; HOUSETOP GRANITE; KARA N°2 MAIN ZONE; KARA N°2 EAST; KARA N°2 SOUTH

713306
Vol. 1319
82 - 1928
PLAN B.
004



McINTYRE MINES (AUST.) PTY. LTD.

E.L. 17/68 - KARA PROPERTIES

N

0 100 200 300 400 500 Metres

SCALE 1:10000

5 cm

GEOLOGY

RECENT	A	Alluvium
TERTIARY	V V	Basalt
	Δ Δ	Conglomerate, breccias etc
DEVONIAN	+ +	Granite
ORDOVICIAN — GORDON LIMESTONE	⌊Ogl⌋	Limestone
ORDOVICIAN — TRANSITION BEDS	· ·	Sandstone with calcareous members
ORDOVICIAN — MOINA SANDSTONE	Oc	Sandstone and quartzite
ORDOVICIAN — OWEN CONGLOMERATE	Oo	Conglomerate and grits
CAMBRIAN — HORNFELS GROUP	€b	Hornfels
CAMBRIAN — ACID VOLCANICS	€v	Acid volcanics
		Skarn zones

REFERENCE

- River
- Creek
- Road
- Track
- Railway
- Trig. Beacon
- Geological Boundary
- AREAS INVESTIGATED MINTYRE MINES (Nov 1981 - Aug 1982)
- AREAS FOR PROPOSED INVESTIGATIONS MINTYRE MINES (Nov 1982 - Oct 1983)

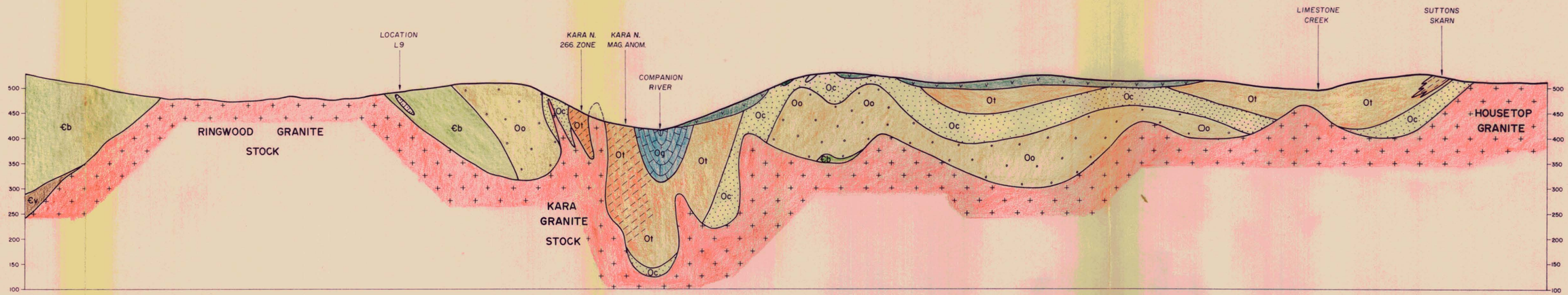
Base Map enlarged from 1:100,000 Hellyer N.T.M. Sheet 8015 & Aerial Photographs

July '82

HAMPSHIRE
HAMPSHIRE MAGNETITE
Guide River
Loudwater Creek
Hampshire Silver Mine
Emu Creek
Houston Creek
SUTTONS SKARN
KARA NORTH 266 ZONE
KARA NORTH MAGNETITE ZONE
COMPANION SKARN
COMPANION R.
CONSOLIDATED LEASE 105M-77 BOUNDARY
EASTERN RIDGE
WESTERN LIMB
KARA No1 HILL
TASMINEX MAIN PIT
SOUTH EXT.
BOBS BONANZA
RINGWOOD GRANITE STOCK
KARA GRANITE STOCK
LOHREYS PITS
KARA SOUTH
HOUSETOP GRANITE
KARA No2 MAIN ZONE
KARA No2 EAST
KARA No2 SOUTH
McKinlay
L1 L2 L3 L4 L5 L9 L10 L11 L12 L13
542 2000 N. to 542 8000 N.
40 2000 E. to 40 4000 E.

WEST

EAST



LEGEND

TERTIARY — BASALT + SEDIMENTS

DEVONIAN — GRANITE

ORDOVICIAN

- Og — GORDON LIMESTONE
- Ot — TRANSITION SERIES
- Oc — MOINA SANDSTONE
- Oo — OWEN CONGLOMERATE
- SKARN DEVELOPMENT

CAMBRIAN

- €b — HORNFELS UNIT
- €v — ACID VOLCANICS

VERTICAL SCALE 1:5000 — 100m, 50, 0

HORIZONTAL SCALE 1:10000 — 100, 200, 300, 400m

5 cm

713307

82-1828 Vol. 13&9

McINTYRE MINES (AUST.) PTY. LTD.

KARA TUNGSTEN PROJECT — TASMANIA

GEOLOGICAL CROSS SECTION

EXPLORATION LICENCE 17/68

Drawn: C.H.Whitehead	Scale: As shown
Traced: T.G.D.S.	Date: August 1982

PLAN C.

005

82-1828 Vol.13/19 PLAN D

McINTYRE MINES (AUST.) PTY. LTD.

713308

KARA PROPERTY
MAIN ORE ZONES

SCALE: 1:2500

5 cm

E.L. 17/68
(75 sq km)

SHEET COVERAGE

KARA NORTH "266 ZONE"

KARA NORTH "MAGNETITE ANOMALY"

EASTERN RIDGE

WESTERN LIMB

KARA N°1 MAIN ZONE

KARA N°1 SOUTHERN EXT.

BOBS BONANZA

MAIN PIT

SECTION A.

SECTION B.

SECTION C.

SECTION D.

SECTION E.

LEASE BOUNDARY CL 105 M/77

KARA N°1 RL 539.86

Companion River

East Kara Creek

Kara Creek

Old Park River

Horizontal Creek

Tailings Dam

CORE SHED

WORKSHOP

OFFICE

PUMP HOUSE

MINE ROAD TO HAMPSHIRE

TO KARA CAMP

Sections

7260 N.
7220 N.
7160 N.
7120 N.
7060 N.
7020 N.
7000 N.
6980 N.
6600 N.
6540 N.
6500 N.
6460 N.
6420 N.
6380 N.
6340 N.
6300 N.
6260 N.
6220 N.
6200 N.
6180 N.
6140 N.
6100 N.
6060 N.
6020 N.
5980 N.
5940 N.
5900 N.
5860 N.
5820 N.
5800 N.
5780 N.
5740 N.
5700 N.
5660 N.
5620 N.
5400 N.

7000 E.
7400 E.
7800 E.
8200 E.

N

Scale: 1:2500

50 25 0 50 100 Metres
100 0 100 200 300 Feet

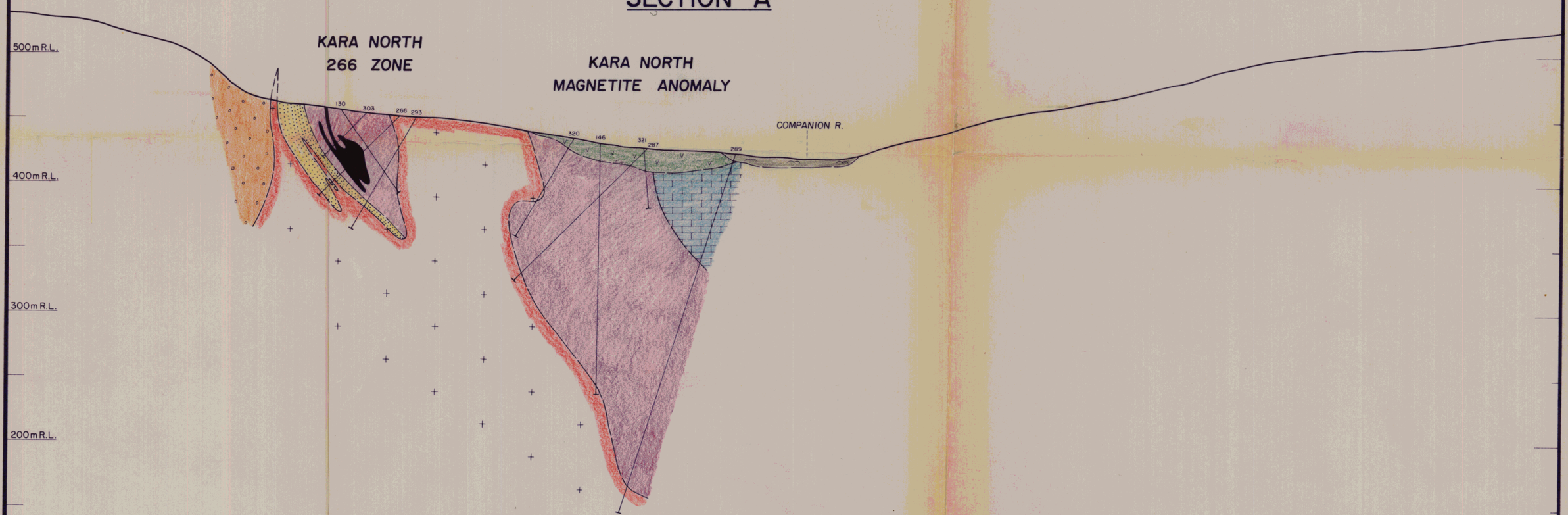
REFERENCE:

- McIntyre Diamond Drill Hole
- Anzeco Diamond Drill Hole
- Tasminex Diamond Drill Hole
- Auger Hole
- Trench

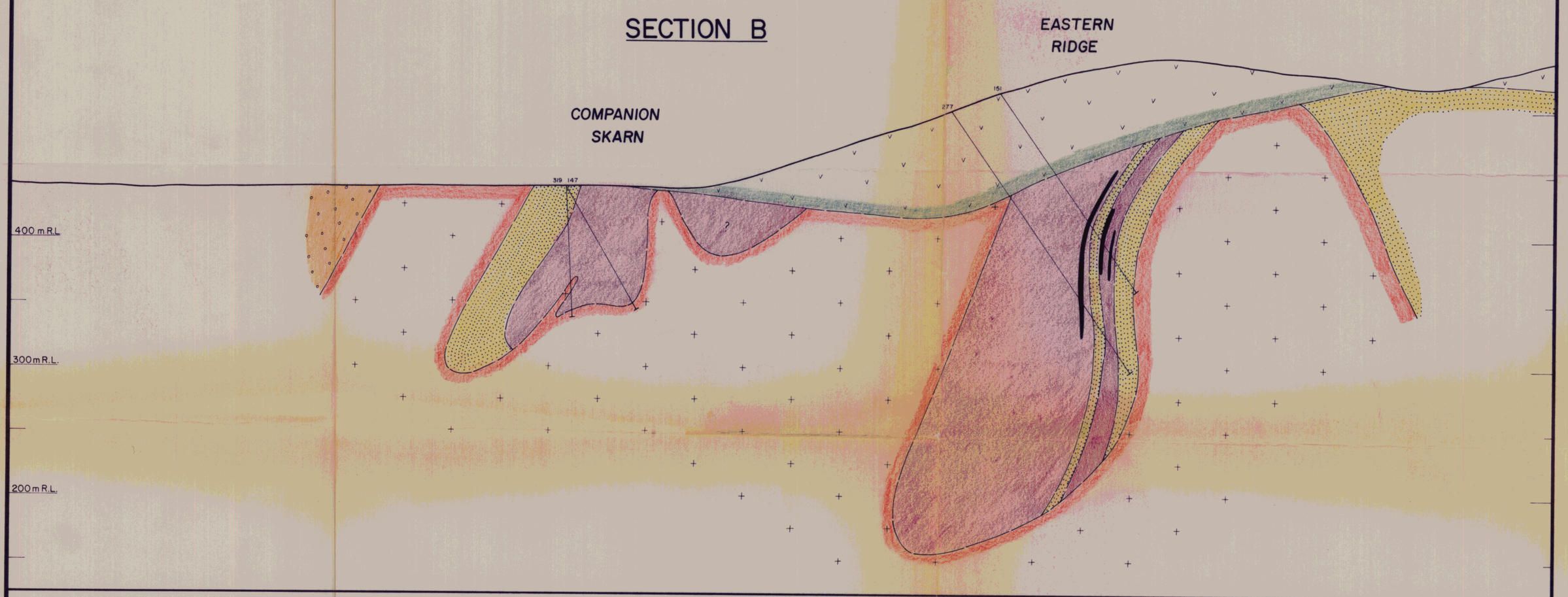
GEOLOGY LEGEND:

- ALLUVIUM
- TERTIARY BASALT
- DEVONIAN GRANITE
- SANDSTONE / QUARTZITE / CONGLOMERATE unit
- SKARN
- QUARTZ EPIDOTE unit

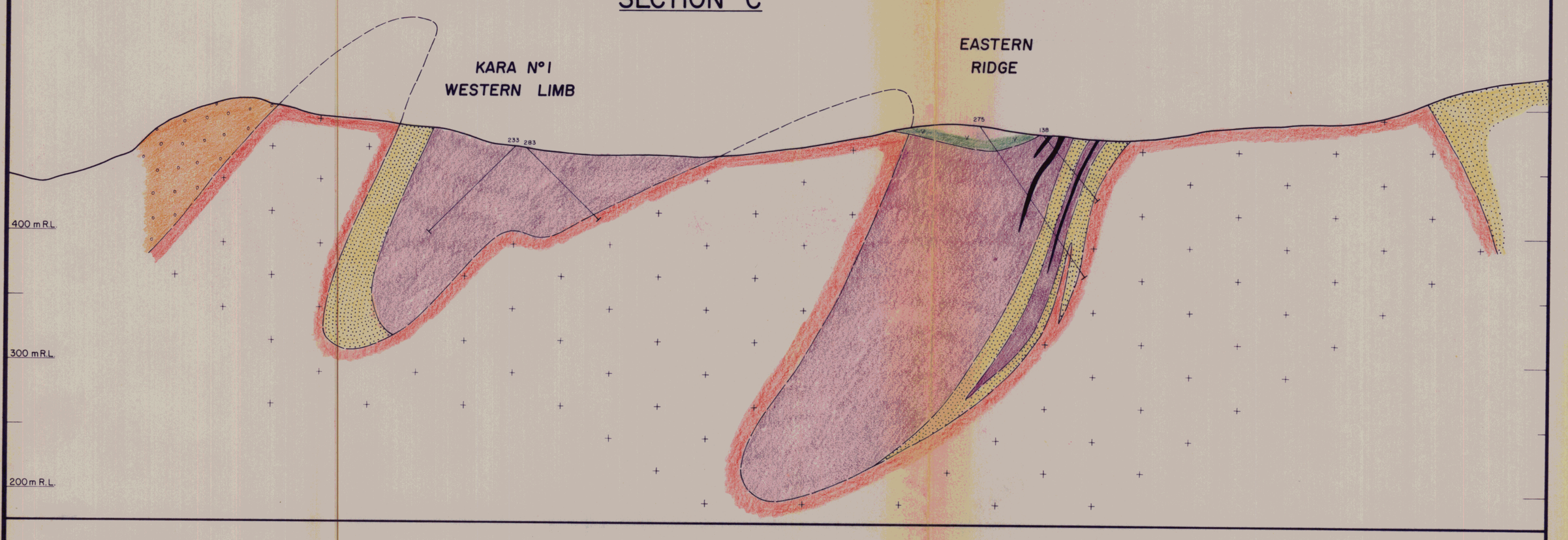
SECTION A



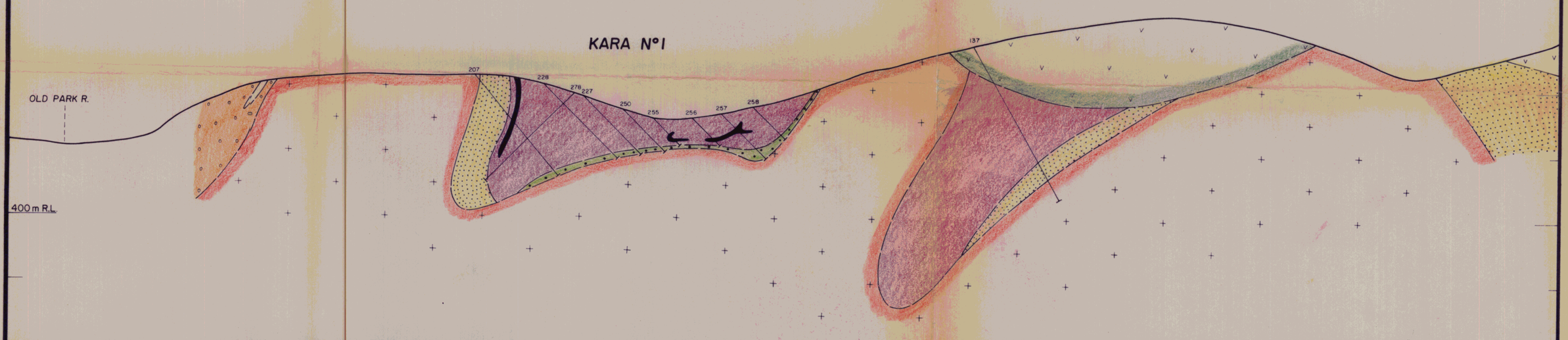
SECTION B



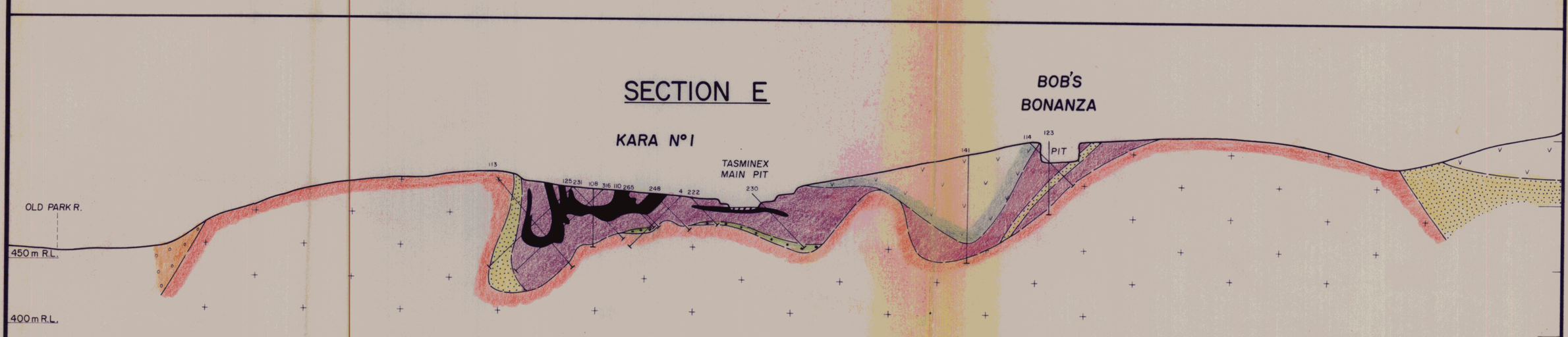
SECTION C



SECTION D



SECTION E



LEGEND:

- = ALLUVIUM
- = TERTIARY BASALT
- = DEVONIAN GRANITE
- = GORDON LIMESTONE
- = MOINA SANDSTONE — ORDOVICIAN
- = OWEN CONGLOMERATE
- = SKARN
- = ORE ZONE
- = QUARTZ EPIDOTE FACIES

5 cm

713309

82-1828 Vol 13/19

McINTYRE MINES (AUST.) PTY. LTD.

KARA TUNGSTEN PROJECT — TASMANIA

GEOLOGICAL CROSS SECTIONS MAIN ORE ZONES

DRAWN: C.H.W.	SCALE: 1:2500 HOR + VERT.
TRACED: T.G.D.S.	DATE: July 1982

PLAN E.

007

7200 E. 7400 E. 7600 E. 7800 E.

6580 N. 6540 N. 6500 N. 6460 N. 6420 N. 6400 N. 6380 N. 6340 N. 6300 N. 6260 N. 6220 N. 6200 N. 6180 N. 6140 N. 6100 N. 6060 N. 6020 N. 6000 N. 5980 N. 5940 N. 5900 N. 5860 N. 5820 N. 5800 N. 5780 N. 5750 N. 5730 N. 5700 N. 5675 N. 5650 N. 5620 N. 5600 N. 5400 N.

EASTERN RIDGE

WESTERN LIMB

KARA N°1 MAIN ORE ZONE

KARA N°1 SOUTHERN EXTENSION

TASMINEX MAIN PIT

BOB'S BONANZA PIT

East Kara Creek

TAILINGS DAM

CORE SHED

REST ROOM

WORKSHOP

MILL

H.E.C. COMPOUND

MAGNETITE TAILINGS STOCKPILE

BALL MILL REJECT STOCKPILE

SHED

LEGEND

- = McINTYRE MINES DIAMOND DRILL HOLE
- = ANZECO DIAMOND DRILL HOLE
- = TASMINEX N.L. DIAMOND DRILL HOLE
- = ANZECO POWER AUGER HOLE

- = ALLUVIUM
- = TERTIARY BASALT
- = DEVONIAN GRANITE
- = SANDSTONE / QUARTZITE
- = SKARN
- = QUARTZ EPIDOTE UNIT

N

5 cm

20 10 0 20 Metres

SCALE 1:1000

713310

82-1828 Vol 13/19

McINTYRE MINES (AUST.) PTY. LTD.

KARA TUNGSTEN PROJECT TASMANIA

KARA N°1 & EASTERN RIDGE

GEOLOGY AND DRILLING PLAN

DRAWN: C.H.W. | TRACED: T.G.D.S. | SCALE: 1:1000 | DATE: August '82 | PLAN F.

KARA TUNGSTEN PROJECT TASMANIA

KARA NORTH

"266 ZONE" & "MAGNETITE ANOMALY"

GEOLOGY AND DRILLING PLAN

DRAWN: C.H.W	TRACED: T.B.D.S.	SCALE: 1:1000	DATE: August '82	PLAN G

McINTYRE MINES (AUST.) PTY. LTD.

82-1828 Vol 1 fig 9

713311

SCALE 1:1000

20 10 0 20 Metres

5 cm

N

LEGEND

- McINTYRE MINES DIAMOND DRILL HOLE
- ANZECO DIAMOND DRILL HOLE
- TASMINEX NL. DIAMOND DRILL HOLE
- ANZECO POWER AUGER HOLE

- ALLUVIUM
- TERTIARY BASALT
- DEVONIAN GRANITE
- SANDSTONE / QUARTZITE / CONGLOMERATE unit
- SKARN

KARA NORTH "MAGNETITE ANOMALY"

KARA NORTH "266 ZONE"

L 13 LOCATION

COMPANION

RIVER

To Rapid Gate

7800E 7600E 7400E 7200E

6980 N 7000N 7020 N 7060 N 7120 N 7160 N 7200N 7220 N 7260 N 7400N 7600N

82-1828
14/19

713C/82

Report No.
3B/82

713312

REPORT NO. 3B/82

of M	A.O.	C.G.	E.O.	D.S.M.E
				Registrar
Received Answered - 1 OCT 1982				E & IL
DEPT. OF MINES REF. No. 8090A/82				

McINTYRE MINES (AUSTRALIA) PTY. LTD.

GROUND MAGNETIC SURVEY PLANS

EXPLORATION LICENCE 17/68

Period 4th November 1981 - 3rd November 1982

C. H. WHITEHEAD.

September, 1982.

REPORT NO. 3B/82

McINTYRE MINES (AUSTRALIA) PTY. LTD.

GROUND MAGNETIC SURVEY PLANS

EXPLORATION LICENCE 17/68

Period 4th November 1981 To 3rd November, 1982.

During the above period, McIntyre Mines have completed and compiled the results of grid ground magnetic surveys at three prospective areas within Exploration Licence No. 17/68.

The three areas in question are Location L5, Location L1 and the Hampshire Silver Mine area. The compiled plans are contoured, but unfortunately as yet, there are no controlled surveys over the areas. This latter is being compiled at the present date at Location L5, and will be finalised in the near future at the two other areas in question.

The plans attached are as follows:-

Plan A - Ground Magnetic Survey Plan - Location L5 Scale 1:500

Plan B - Ground Magnetic Survey Plan - Location L1 ." 1:500

Plan C - Ground Magnetic Survey Plan - Hampshire Ag Mine " 1:500

C. H. WHITEHEAD.

September 1982.

DDH 326
-70°

KEY

- 62000 - 64000 gammas
- 64000 - 66000
- 66000 - 68000
- 68000 - 70000
- D.D.H. (NOT ACCURATELY SURVEYED)

713314

5 cm

82-1828 Vol 14/19

L/5

GROUND MAGNETICS

SCALE: 1:500 DATE: Aug 1982
(Theoretical grid only)

PLAN A.

82-1828 (14)

PLAN. B.

713315

5 cm

L/1

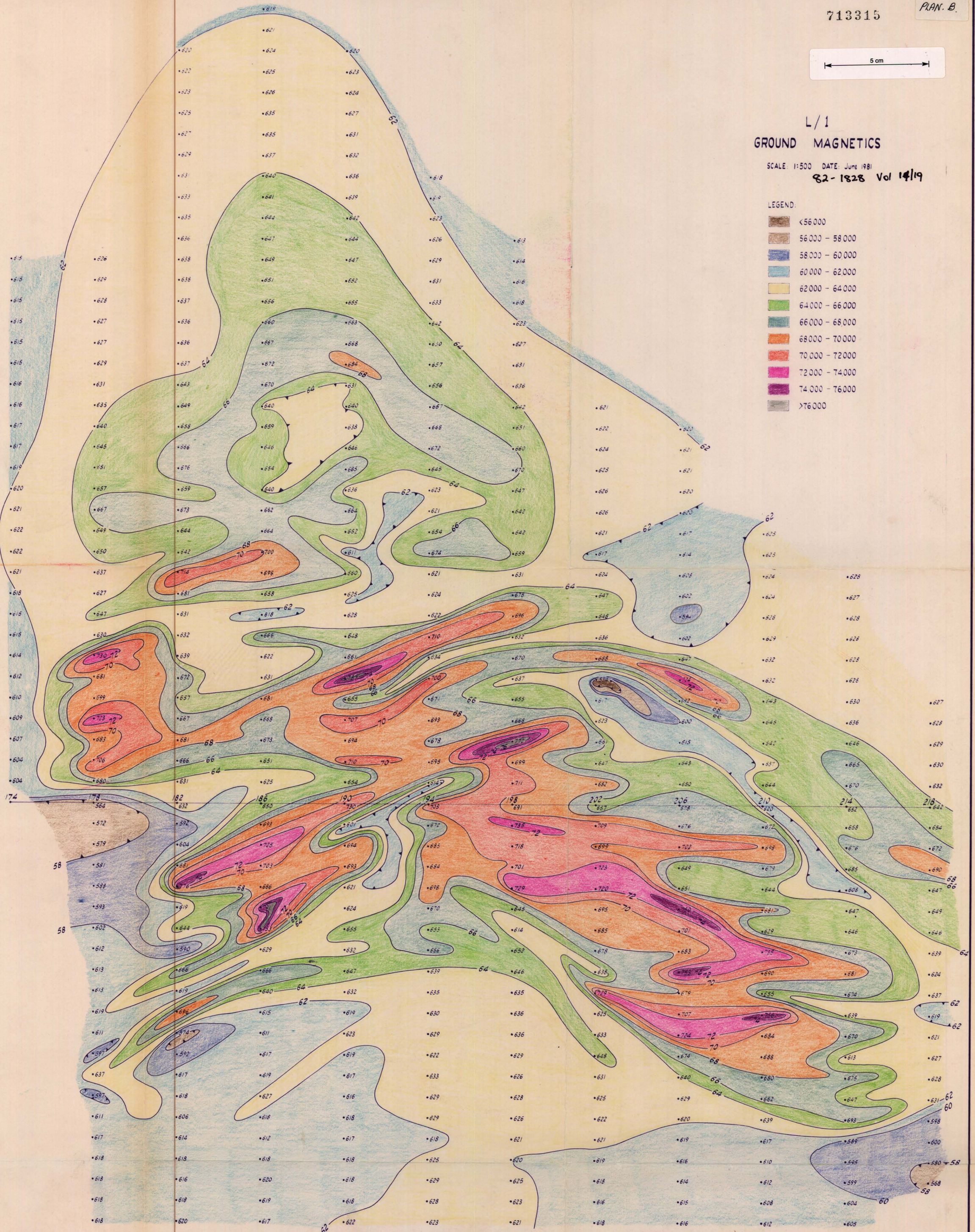
GROUND MAGNETICS

SCALE: 1:500 DATE: June 1981

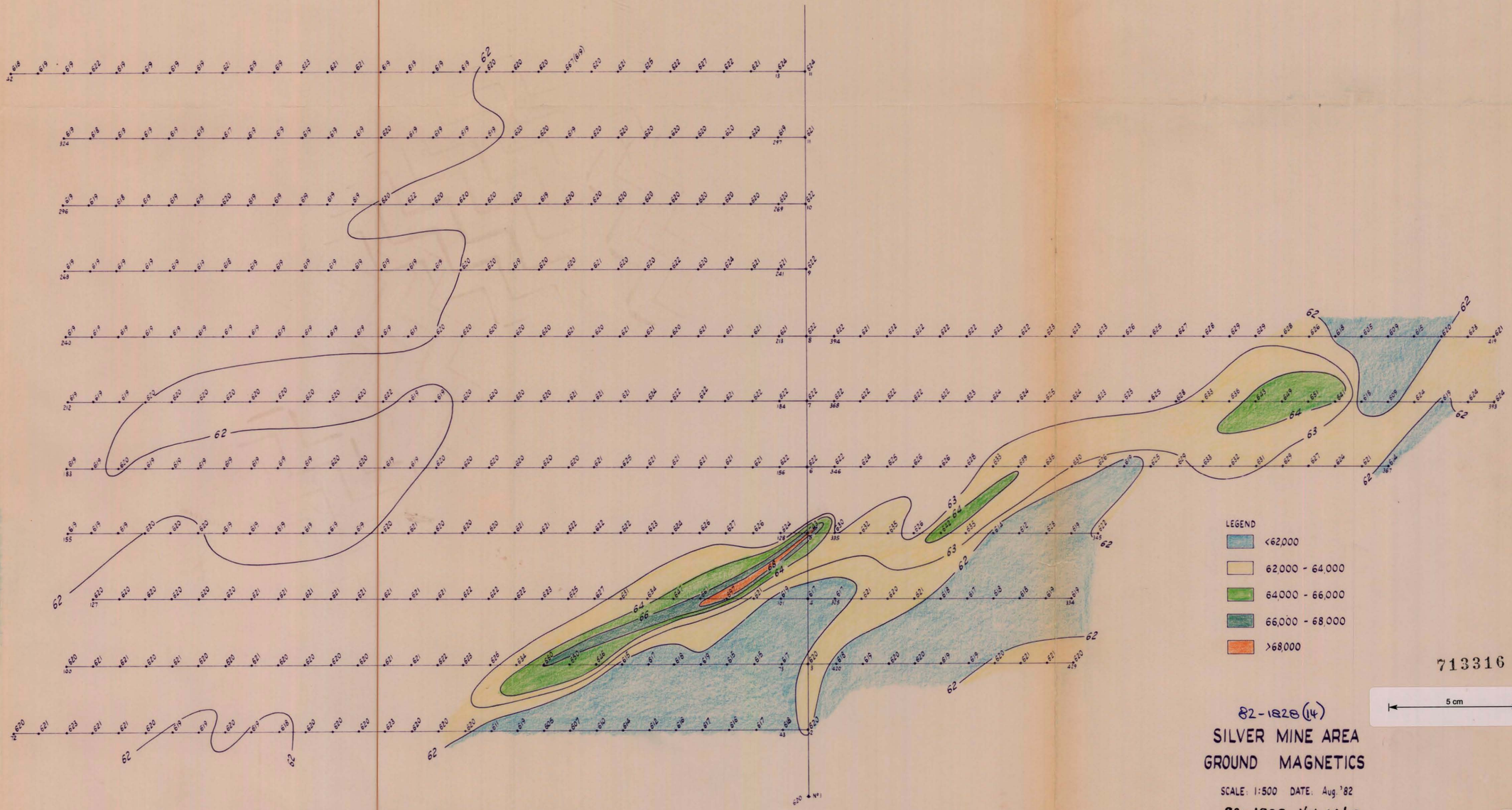
82-1828 Vol 14/19

LEGEND:

- <56000
- 56000 - 58000
- 58000 - 60000
- 60000 - 62000
- 62000 - 64000
- 64000 - 66000
- 66000 - 68000
- 68000 - 70000
- 70000 - 72000
- 72000 - 74000
- 74000 - 76000
- >76000



82-1828 (14)



713316

82-1828 (14)

SILVER MINE AREA
GROUND MAGNETICS

SCALE: 1:500 DATE: Aug '82

82-1828 Vol 14/19

PLAN. C.

Report No.
4A/82

82-1828
15/19

713c1

713317 000

REPORT NO. 4A/82

of M	A.O.	C.G.	E.O.	D.S.M.E
				Registrar
Received / Answered - 1 OCT 1982				E & IL
DEPT. OF MINES REF. No. 80908 82				

McINTYRE MINES (AUSTRALIA) PTY. LTD.

KARA "WEATHERED TUNGSTEN MATERIAL"

CLASSIFICATION & METALLURGICAL TESTS(1981-82)

C.H. WHITEHEAD.

AUGUST 1982.

REPORT NO. 4A/82

KARA "WEATHERED TUNGSTEN MATERIAL"

CLASSIFICATION & METALLURGICAL TEST WORK (1981-82)

Preamble

Approximately 600,000 tonnes of "weathered material" averaging 0.70% WO_3 ~~are~~ present at the Kara No. 1 and Southern Extension deposits. Except for roast - leach methods, previous attempts to find a viable process to treat this material have failed, and because of their low scheelite recoverability, all such tungsten bearing weathered material at the Kara deposits is classified as a resource and excluded from geological reserves.

As part of the McIntyre Mines Pre Development Work, it was considered that further test work on weathered material was justified, as obviously a "breakthrough" in successfully treating this material would immediately enhance the ore reserve picture at Kara.

Although mineralised, a portion of the "weathered material" is completely weathered and contains no visible scheelite. The remainder has a portion of its total tungsten value represented as scheelite - this portion is usually minor, but can sometimes be significant.

It was not known whether the tonnage blocks of"weathered material" containing scheelite were of sufficient size, or contained significant amounts of scheelite, to be considered for future possible mining. Neither was it known whether the scheelite in this type of material, would be amenable to recovery by gravity and/or gravity flotation processes.

Objectives of Study

During the work recently completed, the primary objectives were as follows:-

- to delineate the extent and grades of the completly weathered meterial possessing no scheelite mineralisation.
- To delineate the extent and grades of weathered material containing scheelite mineralisation.
- Attempt an on site classification of weathered meterial containing scheelite. This classification, by using U.V. light estimations, would categorise this material into subgroups according to scheelite content relative to total WO_3 values.
- Collect representative samples of the above subgroups of weathered material containing scheelite, and undertake metallurgical tests to investigate their scheelite recoverability.

Delineation Of Completly "Weathered Material" (W)

This was completed for the Kara No.1 orezone between drill section lines 5620N and 5980N (strike length 400 metres).

All available drill core and surface exposure (mine faces, bulldozed trenches, etc.) were examined in detail. Using a cut-off grade of 0.20% WO_3, all tungsten bearing material showing nil scheelite mineralisation, or an U.V. estimated scheelite content of less than 10% of the total WO_3 content, was classified as completely weathered material (W).

This material was blocked out on drill cross sectional plans, and volumes calculated. Using an S.G. factor of 2.5 tonnes to 1 cubic metre, a total of 300,627 tonnes grading 0.62% WO_3 were calculated.

Tables Nos. 1 and 2 overleaf itemise a section x section and 5 metre bench breakdown of these resources for the Kara No. 1 West and East Zones.

Delineation of "Weathered Material" With Scheelite (X)

A similar tonnage and grade exercise was made for this material, and a total of 328,513 tonnes grading 0.64% WO_3 were calculated.

Tables 3 and 4 itemise a bench and sectional block summary for this "X" material at the Kara No. 1 West and East Zones.

On-Site Classification Of "Weathered Material" With Scheelite (X)

By U.V.fluorescence estimates, an attempt was made to categorise the "X" material into categories according to the proportion of scheelite content versus total tungsten content.

To make this estimation, "standard samples" of crushed core of fresh ore between grades of 0.01% WO_3 and 2.00% WO_3 were collected. In these samples, all the tungsten content was assumed related to scheelite. These "standards" were then compared visually under the U. V. light with crushed core samples of weathered materialcontaining scheelite, and an estimate of WO_3 contents due to scheelite was made. This scheelite value was related to the total WO_3 chemical assay value, and percentage calculated.

N.B. Similar "standards" from split drill core, drill core analytical pulps and sludge samples were also collected, but in practise, they were not considered as reliable in the experiment.

This exercise was initially performed on weathered material at the Kara No. 1 Southern Extension deposit, and the following deductions were made.

- There was no systematic increase in the proportion of fresh scheelite content with depth through a certain portion of the ore zone.
- There was little uniformity or consistency across the orezones, adjacent drill holes showing wide variations in scheelite content.
- Overall at the Southern Extension location, the percentage of scheelite content versus total tungsten assay was estimated to be very low - in the order of 5% to 15%.

Beacuse of this overall low scheelite content, a poor core library, and its wide variations both with depth and across the orezone, it soon became apparent it would be difficult to obtain representative samples of various types of "X" ore from the Southern Extension location.

Consequently, the same exercise was repeated at the Kara No. 1 deposit between Section Lines 5740N and 5800N. In this specific area, there was a greater amount of drill information, more remaining core available, and the proportion of scheelite content in the weathered material was higher and more consistent.

Five bulk samples of this weathered material were built up from existing drill core between Section Lines 5740N and 5820N. Individual samples possessed estimated proportions of scheelite contents versus total tungsten, and were also considered to be representative of potential ore blocks from specific mining levels.

Data relevant to sample location, sample build-up and grade for these five samples - Kara 10, 12, 13, 14 and 15 are shown in Table Nos. 5 to 9.

Metallurgical Test Work

These five samples, each weighing approximately 15 Kgs., were submitted to Warman International Laboratories, Sydney, and subjected to a large variety of detailed metallurgical tests.

Basically the main objective of the tests was to define recoverable scheelite content by gravity and flotation methods, and then compare these values with field estimates of scheelite content.

The nature and results of this test work are shown in the appended report compiled by Warmans (Warman Report No. 81/141048-1).

In summary, test work on the five samples from Kara No. 1 showed low gravity recoveries ranging from 7.1% to 31.5%, and low combined gravity/flotation recoveries in the range 10.2% to 35.7%. Nevertheless, as shown over, there was in fact a reasonably close correlation between the on-site field estimate of scheelite content and the total combined gravity/flotation recoveries.

SAMPLE NO.	ESTIMATED % SCHEELITE CONTENT VERSUS TOTAL WO_3 CONTENT	LABORATORY TESTS GRAVITY RECOVERIES	FLOTATION RECOVERIES	COMBINED RECOVERIES
KARA 10	40.9%	27.9%	2.0%	29.9%
KARA 12	21.5%	10.5%	9.3%	19.8%
KARA 13	18.6%	7.1%	3.1%	10.2%
KARA 14	15.4%	9.9%	10.6%	20.5%
KARA 15	31.4%	31.5%	5.2%	36.7%

C. H. WHITEHEAD.

AUGUST 1982.

[redacted] GEOLOGICAL RESOURCES [redacted] [redacted] [redacted]

[redacted] GEORGIAN [redacted] RESOURCES [redacted] ARE TYPE [redacted] COMPLETELY WEATHERED (W)

KARA. N°1 - MAIN EAST.

BENCH.	5620N		5660N		5700N		5740N		5780N		5820N		5860N		5900N		TOTAL.	
	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3
535																		
530																		
525																		
520																		
515									156	0.21							156	0.21
510									469	0.21							469	0.21
505									469	0.21							469	0.21
500									156	0.21							156	0.21
495													1125	0.37			1125	0.37
490													3376	0.37			3375	0.37
485													3375	0.37			3376	0.37
480.													1125	0.37			1125	0.37
									1250	0.21			9000	0.37.			10250	0.35

7133324 007

TABLE No 2.

GEOLOGICAL RESOURCES.

008

KARA. N° 1 DEPOSIT – WEST ZONE.

ORE TYPE – WEATHERED WITH SCHEELITE (X)

BENCH	5620N		5660N		5700N		5740N		5780N		5820N		5860N		5900N		5940N		5980N		TOTAL.	
	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3
635	109	0·77	2000	0·56	297	0·56															2406	0·57
630	328	0·77	6000	0·56	891	0·56															7219	0·67
625	328	0·77	8469	0·96	8953	0·64	625	0·66													18375	0·79
620	109	0·77	9406	0·96	24484	0·64	1875	0·66													35874	0·72
515			7406	0·46	26694	0·52	10969	0·82	1469	0·60											45438	0·59
510			2469	0·46	12281	0·62	27156	0·82	4406	0·60											46312	0·70
605					4219	0·75	27800	0·68	10219	0·61	1937	0·79									43675	0·68
500					1406	0·75	11400	0·68	18906	0·61	5813	0·79									37625	0·66
495							2578	0·79	17438	0·41	7937	0·82	1218	0·37	376	0·45					29546	0·55
490							869	0·79.	6813	0·41.	8312	0·82	3656	0·37	1125	0·45					19765	0·59
485											6375	0·71	3906	0·51	1688	0·45					11969	0·62
480											2126	0·71.	1968	0·51	2062	0·45					6154	0·57
476													750	0·45	1812	0·45					2562	0·46
470													260	0·45	937	0·45					1187	0·45
465															375	0·29					375	0·29
460															125	0·29.					125	0·29
455																						
450																						
445																						
440.																						
TOTAL.	874	0 77	35,750	0 73	78,125	0 69	82762	0·75	68,261	0 53	32499	0·79	11748	0·47	8499	0·45					308608	

713325

9-65

[redacted] GEOL[redacted]AL [redacted]ES[redacted]ES. [redacted]

009

KARA. N° 1 DEPOSIT - MAIN EAST.

ORE TYPE - WEATHERED [redacted] SCH[redacted]

(X)

BENCH	5620N		5660N		5700N		5740N		5780N		5820N		5860N		5900N		5940N		5980N		TOTAL.	
	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO_3	TONNES	% WO
635																						
630																						
625																						
620																						
615							844	0.54													844	0.54
610							2531	0.54													2631	0.54
605							2656	0.54	312	0.45											2968	0.52
600							1219	0.54	938	0.45											2157	0.50
595							875	0.45	938	0.45	313	0.82	438	0.37							2064	0.49
590							125	0.45	812	0.46	938	0.82	1313	0.37							2689	0.54
585											938	0.82	1313	0.37	468	0.49					2719	0.55
580											313	0.82	438	0.37	1407	0.49					2158	0.51
575															1407	0.49					1407	0.49
570															468	0.49					468	0.49
565																						
560																						
555																						
550																						
545																						
540.																						
TOTAL.							7750	0.53	2500	0.45	2602	0.82	3502	0.37	3750	0.49					20,005	0.53

713326

[redacted] MI[redacted] LU[redacted]AL [redacted]AM[redacted] [redacted] - K[redacted]RA. [redacted] KARA. 10

TYPE OF ORE.	REPRESENTS ORE BLOCK.			CALCULATED GRADE
	SEC. LINE	MINING LEVELS	POTENTIAL TONNAGE.	% WO_3.
X = 43·9%				
Y = 56·1%.	5780N - 5820N	4901.		0·74.

SAMPLE DATA:-

DDH. N° -	ORE TYPE -	INTERVAL (METRES)	LENGTH RUN.	AV. TOTAL WO_3 CONTENT.	ESTIMATED WO_3 AS SCHEELITE.	% SCHEELITE CONTENT VERSUS TOTAL TUNGSTEN.
241	X	21·0 - 22·0	1·0	0·31	0·16.	51·6%.
241	Y	22·0 - 24·0	2·0	0·11	0·03	27·3%
231	X	14·0 - 22·0	2·0	0·47	0·11	23·4%
231	Y	22·0 - 24·0	2·0	0·61	0·35	57·4%
265	X	6·0 - 16·8	7·2	0·82	0·05	6·10%
265	Y	16·8 - 20·0	3·2	1·57	1·10	70·06%
240 (226)	Y	22·2 - 28·0	5·8	0·63.	0·35	55·5%.
			23·2	0·74	0·30	40·9%.

7133271 010

ORE TYPE DISTRIBUTION.

ORE TYPE	% DISTRIBUTION	AV. ASSAY.	EST Sch CONTENT V TOTAL WO_3.
X	43·9%	0·70% WO_3	10%.
Y	56·1%	0·78% WO_3	62·8%.

LABORATORY BENEFICIATION TESTS:-

HEAD ASSAY. = 0·59%

CALC HEAD ASSAY = 0·67%.

CONCENTRATES = 29·9%.

GRAVITY = 27·9%.
FLOTATION = 2·0%.

TAILINGS = 70·1%

GRAVITY = 9·N
FLOAT = 24·9
SLIMES = 28·1
MAGNETICS = 7·8

1HOLE. N-S.

[redacted] KARA 12.

METALLURGICAL SAMPLE. N[redacted] KARA. 12.

TYPE OF ORE.	REPRESENTS ORE BLOCK.			CALCULATED GRADE
	SEC. LINE.	MINING LEVELS.	POTENTIAL TONNAGE.	% WO_3.
W = 51·8% X = 48·2%.	5780N - 5820N.	500L.		0·53%.

SAMPLE DATA.

DDH. N°.	ORE TYPE.	INTERVAL (METRES)	LENGTH RUN (METRES)	AV. TOTAL WO_3 CONTENT.	EST. WO_3 AS. SCHEELITE.	% SCHEELITE CONTENT VERSUS TOTAL TUNGSTEN.
241	W	7·0 - 16·0	9·0	0·55%	0·04%	7·77%.
241	X	16·0 - 21·0	5·0	0·86%	0·36%	39·00%.
242	W	6·0 - 14·0	8·0	0·36%	0·03%	8·00%.
242	X	14·0 - 19·0	5·0	0·45%	0·15%	34·00%.
265	X	2·0 - 3·3	1·3	0·58%	0·12%	20·00%.
249	X	0·0 - 4·5	4·5	0·52%	0·10%	18·87%.
			32·8	0·53%	0·11%	21·50%.

7133328 011

ORE TYPE DISTRIBUTION.

ORE TYPE.	% DISTRIBUTION.	AV TOTAL WO_3	EST SCH V. TOTAL WO_3.
W	51·8	0·46%	8·7%.
X	48·2	0·61%	32·8%.

LABORATORY BENEFICIATION TESTS.

HEAD ASSAY = ?

CALC. HEAD ASSAY = 0·48% WO_3.

CONCENTRATES	=	19·80%
GRAVITY	= 10·5%	
FLOTATION	= 9·3%	
TAILINGS	=	80·20%.
GRAVITY	= 13·0	
FLOTATION	= 16·4	
SLIMES	= 34·7	
MAGNETICS	= 16·1.	

TABLE N°6.

KARA. 13.

METALLURGICAL SAMPLE Nº - KARA. 13.

TYPE OF ORE.	REPRESENTS ORE BLOCK. SEC. LINE.	MINING LEVEL.	POTENTIAL TONNAGE.	CALCULATED GRADE % WO_3.
W = 44·6 % X = 55·4 %.	5780N - 5730N.	500L.		0·59%.

SAMPLE DATA :-

DDH. Nº.	ORE TYPE	INTERVAL (METRES)	LENGTH RUN. (METRES)	AV. TOTAL WO_3 CONTENT.	ESTIMATED WO_3 AS SCHEELITE.	% SCHEELITE CONTENT VERSUS TOTAL TUNGSTEN.
241	W	7·0 - 16·0	9·0m	0·55	0·04	7·77%.
241	X	16·0 - 21·0	5·0m	0·86	0·36	39·00%.
242.	W	6·0 - 14·0	8·0m	0·36.	0·03.	8·00%.
242	X	14·0 - 19·0	5·0m	0·45	0·15	34·00%.
261	X	23·0 - 34·1	11·1m	0·74	0·10	13·51%.
			38·1m	0·59%	0·11%	18·60%.

U.T.C. 713329

ORE TYPE DISTRIBUTION.

ORE TYPE.	% TOTAL DISTRIBUTION	AVERAGE TOTAL WO_3	% SCH CONTENT OF TOTAL WO_3
W -	44·6%	0·46%	8·70%
X -	55·4%	0·70%	34·29%.

LABORATORY BENEFICIATION TESTS.

HEAD ASSAY - 0·53%.

CALC HEAD ASSAY - 0·51%.

CONCENTRATES = 10·2%

GRAVITY = 7·1%

FLOTATION = 3·1%

TAILINGS 89·8%

GRAVITY = 10·8%

FLOTATION = 13·8%

SLIMES = 42·1%

MAGNETICS = 23·1%.

TABLE Nº 7.

[redacted] KARA 14

METALLURGICAL SAMPLE N° - KARA 14.

TYPE OF ORE.	REPRESENTS ORE BLOCK.			CALCULATED GRADE.
	SEC. LINE.	MINING LEVEL.	POTENTIAL TONNAGE.	% WO_3.
W = 60% X = 40%.	5780N - 5730N	510L.		0.78%.

SAMPLE DATA :-

DDH N°.	ORE TYPE.	INTERVAL. (METRES)	LENGTH RUN (METRES)	AV. TOTAL WO_3 CONTENT.	EST. WO_3 AS SCHEELITE.	% SCHEELITE CONTENT VERSUS TOTAL TUNGSTEN
262	W	6.0 - 15.0	9.0	1.10%	0.01%	0.90%.
262.	X	15.0 - 25.0	10.0	0.94%	0.30%	31.90%.
241.	W.	0.0 - 6.0	6.0	0.72%	0.06%	8.33%.
242.	W.	0.0 - 6.0	6.0	0.27%	0.05%	18.50%.
263.	X	15.0 - 19.0	4.0	0.56%	0.18%	32.14%.
			35.0	0.78%	0.12%	15.38%.

013

ORE TYPE DISTRIBUTION.

ORE TYPE	% DISTRIB	AV TOTAL WO_3	EST SCHEELITE VERSUS TOTAL WO_3
W -	60%	0.75%	4%
X -	40%.	0.83%	32.5%.

LABORATORY BENEFICIATION TESTS.

HEAD ASSAY = 0.93% WO_3
CALC. HEAD ASSAY = 0.76% WO_3.

CONCENTRATES = 20.5%
GRAVITY - 9.9%
FLOTATION - 10.6%

TAILINGS = 79.5%
GRAVITY - 19.1
FLOTATION - 12.6
SLIMES - 30.2
MAGNETICS - 17.6.

7133330

TABLE N°8

METALLURGICAL SAMPLE N° - KARA. 15.

TYPE OF ORE.	REPRESENTS ORE BLOCK. SEC. LINE.	MINE LEVELS.	POTENTIAL TONNAGE.	CALCULATED GRADE. % WO_3
W = 16·6 % X = 27·6 % Y = 55·8 %.	5730N - 6780N.	500 - 610 LEVELS	W = X = Y =	0·86 %.

SAMPLE DATA:-

DDH N°.	ORE TYPE.	INTERVAL (METRES)	LENGTH RUN (METRES)	AV. TOTAL WO_3 CONTENT.	ESTIMATED WO_3 AS SCHEELITE.	% SCHEELITE CONTENT VERSUS TOTAL TUNGSTEN.
244	X	22·8 - 30·0	7·2	0·68	0·05	7·35 %.
244	Y	30·0 - 37·0	7·0	0·67	0·48	71·64 %.
243	X	16·0 - 20·0	4·0	1·09	0·08	7·34 %.
243	Y	20·0 - 26·0	6·0	1·74	1·20	70·00 %.
261	X	23·0 - 34·1	11·1	0·74	0·10	13·51 %.
239	X	26·0 - 30·0	4·0	0·93	0·02	2·15 %.
240	W	7·2 - 15·0	7·8	0·49	0·04	8·16 %.
			47·1.	0·86.	0·27	31·4 %.

014 1133

ORE TYPE DISTRIBUTION

ORE TYPE.	% TOTAL DISTRIBUTION.	EST SCHEELITE CONTENT VERSUS TOTAL WO_3
W	16·6 %	8·16 %.
X	27·6 %	9·16 %.
Y	55·8 %	70·90 %.
	100·0 %.	

LABORATORY BENEFICIATION TESTS.

HEAD ASSAY = 0·89 % WO_3

CALC HEAD ASSAY = 0·74 % WO_3

CONCENTRATES = 36·7 %

GRAVITY = 31·5 %

FLOTATION = 5·2 %.

TAILINGS = 68·3 %.

GRAVITY = 9·0

FLOAT = 12·9

SLIMES = 22·0

MAGNETICS = 19·4

TABLE N° 7

WARMAN INTERNATIONAL LTD.

(INCORPORATED IN QLD.)

TELEGRAMS & CABLES:
"WARMANCO" SYDNEY
PHONE 439 2000 (10 LINES)
439 8311 (6 LINES)
TELEX: AA20711

POSTAL ADDRESS:
P.O. BOX 51
ARTARMON
N.S.W. 2064
AUSTRALIA

LABORATORIES
18-26 DICKSON AVENUE
ARTARMON
SYDNEY
NEW SOUTH WALES

AIB:sh
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RESEARCH & DEVELOPMENT DIVISION

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Metallurgical Testing of Kara Tungsten Ore Samples

for

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SUMMARY

* Seven Kara samples of approximately 15 kg each were submitted for metallurgical tests to assess the likely recovery of tungsten in a commercial operation.

* The samples assayed between 0.48 and 1.33% WO_3.

* Only one of the seven samples responded in a manner typical of scheelite ore concentration. This sample showed 71% tungsten recovery as gravity and rougher flotation concentrate. The other seven samples showed recoveries of 59%, 37%, 30%, 21%, 20% and 10%. The results of two of the samples are subject to further verification.

* An attempt was made to correlate gravity-plus-flotation with ore specific gravity, ore colour, and pH of the ore slurry. The results showed that very little, if any, correlation existed.

* A reasonably definite correlation was shown to exist between gravity-plus-flotation recovery and magnetic plus slimes loss. This could be used to assess further samples.

1. INTRODUCTION

Over the last 10 years, there has been a substantial test effort directed at the Kara tungsten deposit by several mineral testing laboratories. Despite the large amount of work done, no overall satisfactory metallurgical process has been developed for the total resource. The reason for this is that the tungsten mineralisation is variable between two extremes. On the one hand there are the non-oxidised ores where the tungsten occurs almost exclusively as scheelite and which respond to conventional magnetic, gravity, and flotation concentration in a predictable manner giving high recoveries and generally satisfactory grades. On the other hand, there are the oxidised ores where in the extreme case, most of the scheelite has been subjected to weathering and the tungsten values exist as various non-scheelite minerals which do not respond in a satisfactory manner to either gravity or flotation concentration. At the present time, it is accepted that this non-scheelite tungsten is not economically recoverable. Between these two extreme ore types, there is a full spectrum of partly oxidised ores with indicated tungsten recoveries ranging from 80% to less than 10%.

Since the economic evaluation of the deposit is dependent on *recoverable* tungsten, the geologist must assign recovery values to the ore types and ore blocks within the resource; but for Kara there is no simple way of putting reliable recovery figures on the various ore samples. Previous testwork has shown that it is not possible to differentiate between scheelite tungsten and non-scheelite tungsten, other than by a complete mineral beneficiation exercise aimed at recovering scheelite. This is time-consuming and costly but no satisfactory alternative approach has been found.

During 1979, the Warman Laboratory (in Report 79/110997-3) undertook the testing of eleven Kara ore samples which were said to be representative

of successive years of a proposed mining plan. Each sample of 10 kg was tested through a sequence of grinding, magnetic separation, gravity concentration and flotation. The samples showed gravity-plus-flotation recoveries ranging from the high eighties to 10%. While gravity concentration was reasonably straight forward and adequately recovered the coarse scheelite in all samples, flotation of the fine scheelite became increasingly difficult in the more oxidised samples and would probably be not viable in the extreme cases.

The testwork featured in the present report is a similar exercise to that which was done in 1979. In the present case, seven samples have been tested wherein the primary objective was to determine the percentage recoverable tungsten. Secondary objectives were to determine whether there was any correlation between tungsten recovery and a number of physical and chemical parameters. Whereas the 1979 exercise had been based on 10 kg samples, the present exercise was based on 5 kg samples.

2. MATERIAL EXAMINED

Seven samples, each of approximately 15 kg were received at the Warman Laboratory on November 20, 1981. The samples were designated KARA-10 to KARA-19 as listed in Table 1.

Several nominally 10 mm pieces were selected from each sample for specific gravity determination. Each bulk sample was then screened on 3 mm and the oversize passed through a jaw crusher and a rolls crusher to reduce it to all minus 3 mm. The sample was then air dried. After riffle mixing, the sample was rotary riffled into 1.0 kg test lots. One of these was reduced to 250 g and pulverised as the head sample and assayed for tungsten.

A quantity of -3 mm material from each sample was examined under ultra violet light as described in Section 4.2 to assess the relative scheelite content. Table 1 shows the assay results and the scheelite assessments. In the scheelite assessment, the relative content is designated 1 to 7 where 1 is the sample showing the most scheelite.

TABLE 1

Samples examined

Designation	weight as-received kg	Assay % WO_3	Scheelite assessment	
			relative content	relative grain size
Kara-10	13.5	0.59	3	medium
Kara-12	13.0	1.33 *	6	fine
Kara-13	14.9	0.53	5	med/fine
Kara-14	16.0	0.93	7	fine
Kara-15	15.1	0.89	2	med/fine
Kara-18	18.8	1.32	1	coarse
Kara-19	14.4	0.48 *	4	coarse/med

* subject to checking

3. SCOPE OF THE TESTWORK

Each of the seven samples was submitted to the following:

(a) A beneficiation test involving grinding, magnetic separation and gravity and flotation concentration of the non-magnetics.

(b) A sodium carbonate leaching test in which the ground sample is autoclaved with sodium carbonate solution at 200°C.

(c) An ultra-violet estimation of the scheelite content of the head sample.

(d) The determination of the specific gravity of selected ore particles.

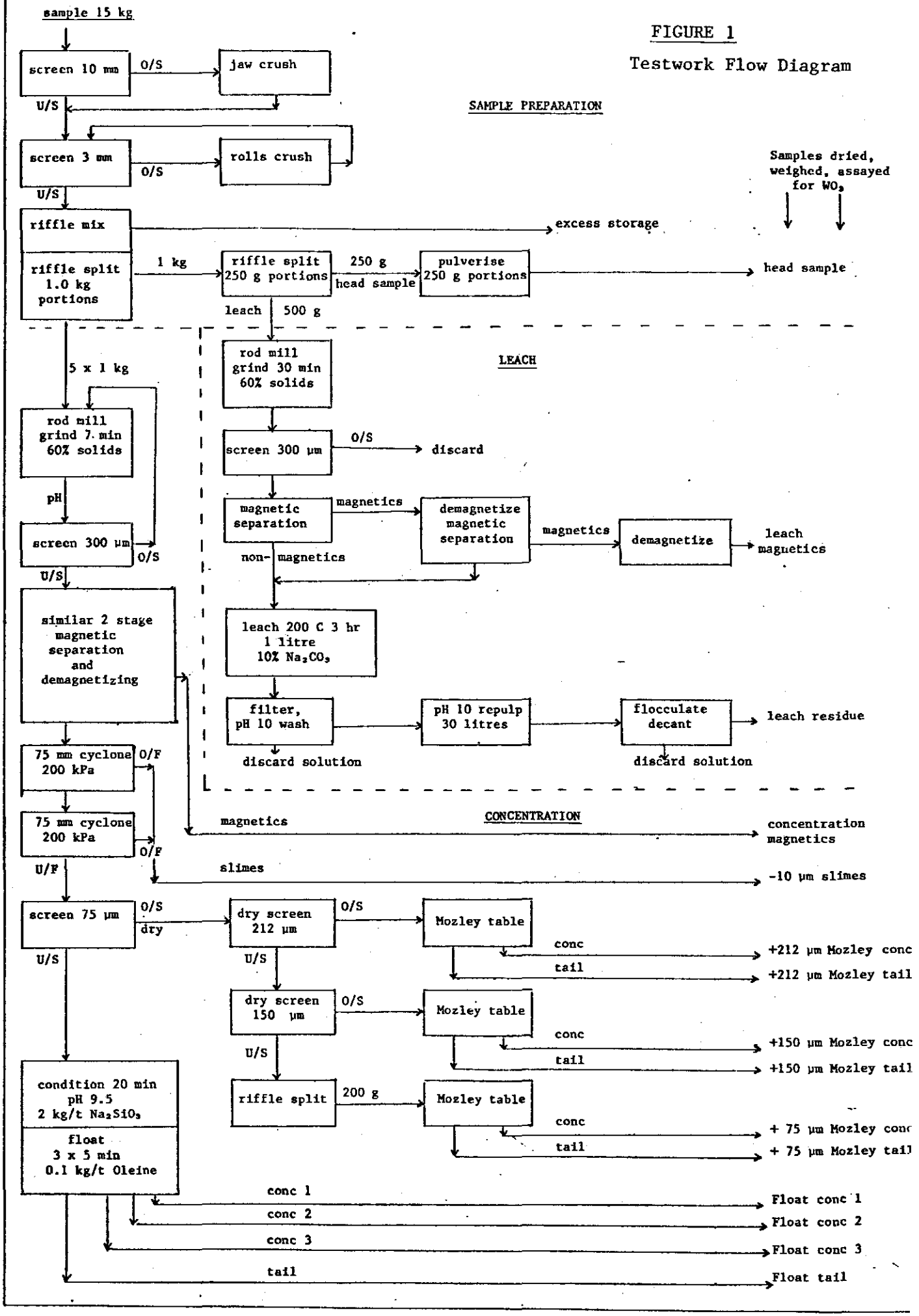
(e) The determination of the pH of a suspension of ground ore in water.

(f) An assessment of the colour of the ground ore relative to a standard colour chart.

Figure 1 is a flow diagram summarising the scope of the testwork and the test procedure.

FIGURE 1

Testwork Flow Diagram



4. PROCEDURES

4.1 Beneficiation Test

4.1.1 Grinding

For each sample five 1.0 kg batches of ore were ground for 7 minutes at 60% solids in the laboratory ball mill. The pH was measured before the slurry was screened at 300 µm.

The accumulated oversize was weighed then reground. The final oversize was ground by mortar and pestle. Excess water was decanted from the combined slurry.

4.1.2 Magnetic Separation

The Sala laboratory wet drum magnetic separator was set to give 15 mm of drum submergence, a 25 mm gap between the drum and trough, and a drum speed of 50 rpm. Water was added to give a slight overflow of the bath level weir whilst operating. A peristaltic pump was used to feed about 20 l of ground slurry to the magnetic separator in 20 to 25 minutes. The magnetic fraction was demagnetised and repassed in a similar manner. The second stage magnetics were demagnetised, dried, weighed and sampled.

The non-magnetics were only repassed if an upset occurred (the drum jammed with magnetics twice). They were collected and deslimed without needing to be demagnetised.

4.1.3 Desliming and Size Classification

To improve its flotation behaviour, the non-magnetic material was deslimed in a 75 mm cyclone operated at 200 kPa. For all samples, except Kara 18, the underflow was cycloned a second time to give two stages of desliming. Alum and flocculant were added to the cyclone overflow to settle the slimes. Excess water was decanted and the

thickened slurry collected, dried, weighed and assayed.

The deslimed material was wet screened on 75 µm mesh to provide -75 µm material for flotation and +75 µm material for gravity separation.

The +75 µm material was dried and weighed, then dry screened on 212 µm, 150 µm and 75 µm mesh. This -75 µm material was weighed as an index of wet screening efficiency, then recombined with the -150 µm +75 µm fraction. All screen fractions were weighed and bagged. The Kara 18 sample was wet screened rather than dry screened.

4.1.4 Flotation

The flotation tests were conducted in a laboratory Wemco float cell, operated at 1100 rpm. Reagent additions were based on the estimated solids weight. Three to four kg/t of N42 sodium silicate was added as a 10% solution, 10% sodium carbonate solution was then added to bring the pH to 9.5 and conditioning continued for 20 minutes. The flotation was carried out in three 10 minute stages. Olein collector was added to the three stages at 0.04 kg/t, 0.03 kg/t and 0.03 kg/t respectively. Approximately 1 ml of 5% causticized wood resin frother was added as required.

The froth layer was only 10 mm in most cases, so water was added till the level allowed the froth to flow out. In the tests, on Kara-14, -15 and -19, less water was present initially and the froth was deeper, 25 to 45 mm.

4.1.5 Gravity Concentration

A laboratory Mozley table was used for gravity concentration tests on the three screen fractions described above:

-300 +212 µm
-212 +150 µm
-150 + 75 µm

With the two coarser fractions, their quantities were small enough to be able to treat the total fraction but in the case of the finest fraction, a 200 gram portion only was tabled.

The table was adjusted to a stroke of 62 mm at 92 strokes/minute and 10 mm knock. For each batch, approximately 50 grams of feed material was tabled to a concentrate and a tailing; the objective being to make a concentrate of better than 30% WO_3, and a tailing with no free scheelite.

The concentrates were dried, weighed and examined under the microscope with both ultra-violet and white light illumination, then pulverised and assayed. The tailing were dried, weighed and divided into one portion for microscopic examination and one portion for assay.

4.2 Sodium Carbonate Leaching Test

The 500 g split for the leaching test on each sample was ground in the laboratory ball mill for 30 minutes then screened on 75 µm and the small amount of oversize pulverised.

The slurry was then magnetically separated using the Sala laboratory wet drum separator in a two stage procedure with the first stage magnetics being demagnetised and separated a second time. The final magnetics were dried, weighed and assayed and the combined non-magnetics thickened for leaching.

Leaching was conducted in a Parr Laboratory autoclave at 195°C for 3 hours, with the non-magnetic slurry being adjusted to 1000 g of water before 100 g of sodium carbonate was added to give a 10% leach solution. The leached solids were filtered and washed free of soluble tungsten, then dried, weighed and assayed. The leach liquors were discarded.

4.3 Ultra Violet Estimation of Scheelite

For the head samples, the material was crushed to -3 mm for examination.

The scheelite content was classed as coarse, medium or fine grained and the different samples arranged in order of estimated scheelite content. The different grain sizes made it difficult to assign an absolute value to the scheelite content. Two standards used for comparison, 0.5% and 1% WO_3, were prepared by blending -300 µm scheelite with -3 mm crushed granite, but they could not be applied to the head samples with any degree of reliability.

Pulverised head samples were also examined, but though the difference between 0.5% and 1.0% WO_3 (as scheelite) could be distinguished in the pulverised standards, the fine particles tended to mask the fluorescence and it was decided the scheelite estimates on pulverised material was not practicable. The slimes were not examined for this reason.

Standards for comparison to the gravity and flotation concentrates were prepared from pure scheelite and a -150 µm +75 µm gravity tailing assaying 0.5% WO_3 to give 5, 10, 20 and 40% WO_3. Anything richer was estimated from the percentage of non-glowing gangue.

Gravity concentrates and tailings were examined for the type of entrained gangue and presence of composites respectively. In the gravity concentration products, the individual scheelite particles could be identified as composites by alternating the white and U-V light.

Flotation tailing was too fine to associate any individual particle in white light with a particular glow. The flotation tailings were sorted into an order of increasing fluorescence, then compared to 0.5% and 1.0% standards of -300 µm scheelite in -500 µm barren material. The flotation concentrates were compared amongst themselves as well as to the standards. They also were too fine to search for composite particles.

4.4 Specific Gravity Determination

A range of +10 mm pieces of each sample was collected during sample preparation for specific gravity determination, individually and as a group from each ore body. The top size of Kara-15 was 3 mm, so -3 mm crushed ore was used.

The samples were weighed in air, soaked in water for 10 minutes to fill any voids, and weighed again after surface water was sponged off. The samples were then weighed in water. The volume of water displaced by the sample *including its voids* as if they were sealed is obtained from the weight difference between the saturated and submerged sample. The specific gravity of the rock pieces is then the dry weight divided by this volume. The specific gravity of the rock material is obtained from the (volume) difference between the dry and submerged weights, if all the voids have been filled.

$$\% \text{ voids} = 1 - \frac{\text{wt of water displaced by rock}}{\text{wt of water displaced by rock and voids}}$$

4.5 pH Measurement of Ground Ore

The pH of the ground ore was measured at 20% solids and ambient temperature (25°C) directly after grinding. See Section 4.1.1.

4.6 Colour Assessment

Colours were designated to the various pulverised ore samples using the Munsell system. A Geological Society of America Munsell system rock colour chart was purchased to compare the ore and standard colours.

The Munsell system uses three properties to define a colour: its Hue; its lightness (Value); and its intensity (Chroma). This can be represented by a colour sphere surrounding the neutral gray axis. On this axis the VALUE grades from white (9) at the top, through various grays to black (1) at the bottom. Around the circumference of the sphere are the 10 major HUES (red, red-yellow, yellow, etc.), each having 10 subdivisions, with 5 being the centre of the hue. The CHROMA (intensity or degree of saturation) increases from 0 on the neutral gray axis to 10 on the colour sphere surface.

Using this system the ore can be assigned a definite colour, with the numerical classification allowing some interpolation between colours on the chart.

5. RESULTS AND DISCUSSION

5.1 Beneficiation Tests

Table 2 summarises the results of the beneficiation tests on all samples. Detailed material balance tables for each sample are shown in the Appendix (Tables A1 to A7), and the individual stage recoveries for the gravity and flotation concentration of each sample are shown in Appendix Tables A8 to A11. Tables 3 and 4 show the estimated scheelite-tungsten contents of the gravity concentrates and tailings, and the flotation concentrates and tailing. These estimates are based on the observed fluorescence of the samples compared with prepared standards, as described in Section 4.3.

The test results were satisfactory for five of the seven samples in that the calculated head assays gave reasonable agreement with the head sample assay. For two samples (Kara-12 and -19) the agreement was not satisfactory and the assays are being checked to determine where the discrepancy lies.

From a mineral processing point of view, only one sample, Kara-18, responded in an acceptable manner. For this sample, the gravity-plus-flotation recovery was 71.1% at which level it is reasonably comparable with the recovery to be expected from a commercial scheelite ore. Even though the recovery was reasonable for Kara-18, the tailing assays for gravity and flotation, (0.63 and 0.49% WO_3 respectively) were both higher than would normally be tolerated in a commercial mill where these assays run at 0.1% WO_3 or less. The U-V examination showed that perhaps one-third of the gravity tailing tungsten was scheelite and probably most of the flotation tailing tungsten was scheelite (Table 4). Thus a recovery of 71% for Kara-18 is conservative and improved techniques could raise this a few percent.

The other samples gave relatively poor gravity-plus-flotation recoveries in the range 58.6% to 10.2%. Again, tailing assays were higher than a

commercial mill would tolerate but our ultra-violet assessment showed that some of the values were attributable to non-scheelite mineralisation, and that marginally higher absolute recoveries could be expected.

When developing the procedure for tabling, Kara-18 fractions were done consecutively. Subsequent samples were concentrated on the Mozley table in batches of the same size fraction.

During the tabling operation it was quite noticeable that some samples had different coloured light gangue and that the quantity of the middlings varied, as did the ease of making a rich concentrate. Obtaining a rich concentrate was not dependent on a rich feed, but the concentrate from *some* samples could not be cleaned, without losing excessive scheelite to tailings. Scheelite could be observed with the U-V lamp in small quantities in *all* tailings.

In respect to flotation concentration, previous testwork has shown that a satisfactory float can only be obtained from samples wherein a high proportion of the tungsten is in the form of scheelite. Of the seven samples examined only Kara-18 and Kara-19 gave what might be described as a useful response with acceptable grades and recoveries in the rougher float. With the more oxidised samples, while it is apparent that most of the scheelite tungsten is floated, the gangue minerals also respond to flotation to the extent that there is very little up-grading of the tungsten values. The problems of floatable gangue minerals are characteristic of the deposit generally. With the less oxidised ore they are a factor in flotation cleaning and the problems can probably be resolved; but with the more oxidised ore the floatable gangue reports in such quantity with the scheelite that it is difficult to see flotation being a viable concentration process in such situations. Samples Kara-10, -12, -13, -14 and -15 are probably in this category.

Summary of grades and distributions of beneficiation test products

TABLE 2

	KARA-10		KARA-12		KARA-13		KARA-14	
	grade % WO_3	dist %	grade % WO_3	dist %	grade % WO_3	dist %	grade % WO_3	dist %
Concentrates								
gravity	33.0	27.9	24.4	10.5	17.2	7.1	15.9	9.9
flotation	1.6	2.0	1.8	9.3	1.6	3.1	1.43	10.6
(sub total)		29.9		19.8		10.2		20.5
Tailings								
gravity	0.33	9.4	0.49	13.0	0.56	10.8	1.23	19.1
float	0.90	24.9	0.55	16.4	0.63	13.8	0.88	12.6
slimes	1.95	28.1	1.10	34.7	1.67	42.1	1.82	30.2
magnetics	0.10	7.8	0.14	16.1	0.18	23.1	0.23	17.6
(sub total)		70.1		80.2		2.8		79.5
Calc. head	0.67		0.48		0.51		0.76	
assay head	0.59		1.33		0.53		0.93	

	KARA-15		KARA-18		KARA-19	
	grade % WO_3	dist %	grade % WO_3	dist %	grade % WO_3	dist %
Concentrates						
gravity	48.3	31.5	66.2	53.4	23.0	22.2
flotation	1.7	5.2	12.0	17.7	4.1	36.4
(sub total)		36.7		71.1		58.6
Tailings						
gravity	0.79	9.0	0.63	13.0	0.27	7.2
float	0.93	12.9	0.49	5.0	0.32	8.6
slimes	1.57	22.0	1.51	8.5	0.79	18.0
magnetics	0.21	19.4	0.08	2.5	0.16	7.7
(sub total)		63.3		19.0		41.5
calc. head	0.74		1.44		0.75	
assay head	0.89		1.32		0.48	

TABLE 3

Scheelite-tungsten estimates on gravity concentrates and tailing

Sample	concentrates					
	-300 +212 µm		-212 +150 µm		-150 +75 µm	
	scheelite estimate % WO_3	assay % WO_3	scheelite estimate % WO_3	assay % WO_3	scheelite estimate % WO_3	assay % WO_3
KARA-10	30+	2.87	40-50	5.11	30+	19.87
KARA-12	15	16.5	30-40	33.9	30-40	23.5
KARA-13	12	28.3	12-16	33.3	12-16	12.8
KARA-14	5-10	61.5	5-10	13.4	10	14.8
KARA-15	50-55	52.8	50-55	52.1	50-55	46.0
KARA-18	70	53.3	70-75	63.8	75-80	69.1
KARA-19	15-30	22.1	15-30	18.8	20-50	(25.0)

Sample	tailings					
	-300 +212 µm		-212 +150 µm		-150 +75 µm	
	scheelite estimate % WO_3	assay % WO_3	scheelite estimate % WO_3	assay % WO_3	scheelite estimate % WO_3	assay % WO_3
KARA-10	<0.2	1.02	0.2	2.44	<0.5	5.97
KARA-12	<0.1	0.495	<0.10	0.48	<0.1	0.50
KARA-13	<0.05	0.53	<0.05	0.54	<0.1	0.57
KARA-14	<0.05	1.03	<0.05	1.07	<0.1	1.13
KARA-15	<0.1	0.77	0.2	0.79	0.2	0.79
KARA-18	0.1	0.73	0.25	0.52	0.1	0.66
KARA-19	<0.05	0.295	0.2	0.27	0.1	0.27

< : less than

Sample	concentrate 1		concentrate 2		concentrate 3		tailing	
	scheelite estimate % WO_3	assay % WO_3	scheelite estimate % WO_3	assay % WO_3	scheelite estimate % WO_3	assay % WO_3	scheelite estimate % WO_3	assay % WO_3
KARA-10	1	2.1	2	0.96	2	1.83	1	0.90
KARA-12	2	1.98	2	1.37	2	2.20	0.5	0.55
KARA-13	5-10	1.07	5-10	2.52	5-10	0.96	<0.2	0.63
KARA-14	0.5	1.36	0.5	1.39	1	2.07	<0.2	0.88
KARA-15	10	1.71	10	2.52	10	1.08	1	0.93
KARA-18	25-30	12.0	25-30	15.8	10-15	12.2	1	0.49
KARA-19	8-15	6.1	4-8	1.2	0.5	6.4	<0.1 *	0.32

* <0.1 = no significant scheelite observed

Scheelite-tungsten estimates on flotation concentrates and tailing

TABLE 4

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5.2 Sodium Carbonate Leaching Tests

Table 5 gives the results of the carbonate leaching tests on each sample. The results show that the percentage of tungsten dissolved by carbonate solution ranged from 88% to 47%. Sample Kara-18 showing 88% tungsten dissolved, is the sample which gave highest gravity and flotation recovery; in general the samples which showed the poorest gravity and flotation characteristics gave the lowest tungsten solubilities. Note that the results for Kara-12 are subject to revision.

The use of the sodium carbonate leaching test as an indicator of recoverable tungsten was established in 1979 when thirteen samples were examined. It was noted that for 12 of the samples, the gravity-plus-flotation recovery was 80 to 90% of the soluble tungsten given by the autoclave leaching test. The thirteenth sample which was extremely weathered gave 47% soluble tungsten but recovered only 10% by gravity and flotation. The fact that the carbonate solubility figure is not as reliable an indicator as first thought, was confirmed when two further samples were examined in 1980 (Warman Report 80/127518). These two samples gave 94% and 60% soluble tungsten, but gravity recoveries of only 15.6% and 5.8% respectively, flotation was not attempted.

These seven current samples are further confirmation that sodium carbonate solubility is not a reliable indicator of gravity and flotation recovery; only in the case of Kara-18 is the original ratio of around 80% maintained. Table 6 summarises the sodium carbonate solubility figure and the gravity-plus-flotation recovery for all samples received since 1978 for which such data is available.

TABLE 5

Sodium carbonate leaching test results

Sample Kara		10	12 Note	13	14	15	18	19
weights								
ore	g	500	500	500	500	500	500	500
magnetics	g	259	239	309	253	318	221	128
non-magnetics	g *	241	261	191	247	182	279	372
leach residue	g	245	267	207	253	188	273	364
assays								
ore	% WO_3	0.59	1.33	0.53	0.93	0.89	1.32	0.48
magnetics	% WO_3	0.225	0.105	0.195	0.245	0.20	0.05	0.14
non-magnetics	% WO_3 *	0.98	2.45	1.07	1.63	2.10	2.94	0.60
leach residue	% WO_3	0.36	0.28	0.27	0.37	0.46	0.25	0.30
tungsten dist %								
magnetics		19.8	3.8	22.7	13.3	14.3	1.7	7.5
leach residue		29.9	11.2	21.1	20.1	19.4	10.3	45.5
soluble tungsten		50.3	85.0	56.2	66.6	66.3	88.0	47.0
gravity + flotation recovery		29.9	19.8	10.2	20.5	36.6	71.0	58.6
ratio: gravity + float / soluble tungsten		0.59	0.23	0.18	0.31	0.55	0.80	1.24

* denotes calculated weights and assays

Note: Kara-12 head assay and distributions are subject to revision

TABLE 6

Summary of sodium carbonate soluble tungsten figures and gravity-plus-flotation recovery for Kara samples received since 1978.

Sample	Received	gravity + float recovery % "A"	soluble tungsten % "B"	ratio A/B
Kara-1	1978	47.5	64.9	0.73
Kara-5	1978	75.6	95.9	0.79
KOPY-1	1979	56.1	76.9	0.73
KOPY-3	1979	83.9	91.6	0.91
KOPY-5	1979	73.9	85.6	0.86
KOPY-5F	1979	85.2	91.0	0.94
KERUG-1	1979	89.1	94.1	0.95
KNOP-1	1979	88.8	98.7	0.90
KOP-7529Y	1979	79.6	81.8	0.97
KOP-5729W	1979	10.4	47.4	0.22
KOP-5778Y	1979	53.1	68.1	0.78
KOP-5818Y	1979	87.0	92.2	0.94
Pit trench	1980	5.8 *	59.9	0.10
Dam trench	1980	15.6 *	94.2	0.17
Kara-10	1981	29.9	50.3	0.59
Kara-12	1981	19.8	(85.0)	(0.23)
Kara-13	1981	10.2	56.2	0.18
Kara-14	1981	20.5	66.6	0.31
Kara-15	1981	36.6	66.3	0.55
Kara-18	1981	71.0	71.1	0.80
Kara-19	1981	58.6	58.6	(1.24)

* gravity recovery only

5.3 Specific Gravity, pH and Colour Comparisons

Table 7 gives the results of the specific gravity, pH and colour comparisons for each of the samples submitted. Also shown in the table is the gravity-plus-flotation recovery.

The object of doing these tests was to show whether any of these parameters could be correlated with gravity-plus-flotation recovery to the extent that they could be used as an indicator of recovery.

The results showed that the specific gravity of the rock material had no useful correlation with recovery. Furthermore, the variation in specific gravity of the individual pieces within each sample was obviously too high for this parameter to be useful. There was some suggestion, however, that the percentage voids could be correlated with recovery to the extent that high percentage voids are indicative of low recovery.

Low pH values (say less than 5.5) also appear to be indicative of low recoveries, but high pH values are not indicative of high recoveries.

The colour assessments also seemed of limited value as a correlating factor. There was some suggestion that samples with a yellow component gave higher recoveries but this would need to be proven with a large number of samples.

Sample	specific gravity determinations			pH ground slurry	colour assessment		grav + float recovery %
	rock pieces	rock material	% voids		description	numerical designation	
Kara-10	2.43	2.82	14	6.4	pale brown	5 YR 5/2	29.9
Kara-12	2.82	3.35	16	5.3	moderate brown	5 YR 3.5/4	19.8
Kara-13	2.88	3.55	19	5.4	moderate brown	5 YR 3/4	10.2
Kara-14	3.23	3.35	7	5.0	moderate brown	5 YR 4/4	20.9
Kara-15	2.10	4.0	50 *	6.3	dark yellowish brown	8 YR 4/2	36.6
Kara-18	3.34	3.62	8	6.5	dark yellowish brown	10 YR 4/2	71.0
Kara-19	3.24	3.54	9	5.9	moderate yellowish brown	10 YR 5/4	58.6

* anomalous because of fine nature of sample

TABLE 7

Specific gravity, pH, and colour comparisons

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5.4 Magnetic and Slimes Loss as a Correlation Parameter

The loss of tungsten in the magnetic fraction and in the slimes fraction are a basic characteristic of each ore sample. The more weathered samples carry a larger portion of slimes and both the slimes and magnetics are relatively higher in tungsten than the less oxidised ores. It was thus reasoned that if the tungsten in the slimes and magnetics are an indicator of the degree of oxidation and if gravity-plus-flotation recovery are dependent on the degree of oxidation, then there should be a correlation between gravity-plus-float recovery and magnetic-plus-slimes loss.

A survey was made of all available data for previous samples as well as the seven currently being studied, and Table 8 showing gravity-plus-float recovery and magnetic-plus-slimes loss was prepared. These quantities were graphed in Figure 2 which shows there is a reasonably useful correlation between the two variables. Figure 3 is a similar plot showing gravity recovery only against magnetic-plus-slime loss.

It seems that either Figure 2 or Figure 3 could be applied to the assessment of field samples. In practice, this could be done by taking say 750 g of crushed core, grinding it to -300 μm and doing a magnetic separation and a slimes separation. The three fractions would be recovered, dried and weighed and assayed for tungsten to determine the magnetic-plus-slimes loss and then, from the graph, the estimated recovery. This would be a much quicker and less costly exercise than gravity and flotation testing.

TABLE 8

Comparison of gravity-plus-float recovery with magnetic and slime losses. For Kara samples received since 1978

Point No	Sample Designation	gravity + flotation recovery %			magnetics + slimes losses %		
		grav	float	total	mags	slimes	total
1	KOPY-1	45.5	10.6	56.1	17.6	12.1	29.7
2	" -3	69.0	14.9	83.9	5.3	4.8	10.1
3	" -5	63.2	10.7	73.9	9.1	7.8	16.9
4	" -5F	65.4	19.8	85.2	3.0	4.5	7.5
5	KERUG-1	70.4	18.7	89.1	1.5	3.6	5.1
6	KNOP-1	66.1	22.7	88.8	2.2	4.4	6.6
7	KOP-7529Y	64.2	15.4	79.6	7.3	6.7	14.0
8	KOP-5729W	9.4	1.0	10.4	24.1	31.1	55.2
9	KOP-5778Y	43.3	9.8	53.1	10.9	16.8	27.7
10	KOP-5818Y	75.6	11.4	87.0	2.4	5.8	8.2
11	KARA-10	27.9	2.0	29.9	7.8	28.1	35.9
12	" -12	10.5	9.3	19.8	16.1	34.7	50.8
13	" -13	7.1	3.1	10.2	23.1	42.1	65.2
14	" -14	9.9	10.6	20.5	17.6	30.2	47.8
15	" -15	31.5	5.1	36.6	19.4	22.0	41.4
16	" -18	53.4	17.6	71.0	2.5	8.5	11.0
17	" -19	22.2	36.4	58.6	7.7	18.0	25.7
18	PIT TRENCH	5.8			21.6	37.0	58.6
19	DAM TRENCH	15.6			2.5	35.7	38.2
20	KARA-1	42	5.5	47.5	12.4	16.6	29.0
21	KARA-5	70	5.6	75.6	7.5	5.0	12.5

FIGURE 2

Graph showing correlation between gravity-plus-float recovery of tungsten and magnetic-plus-slimes loss

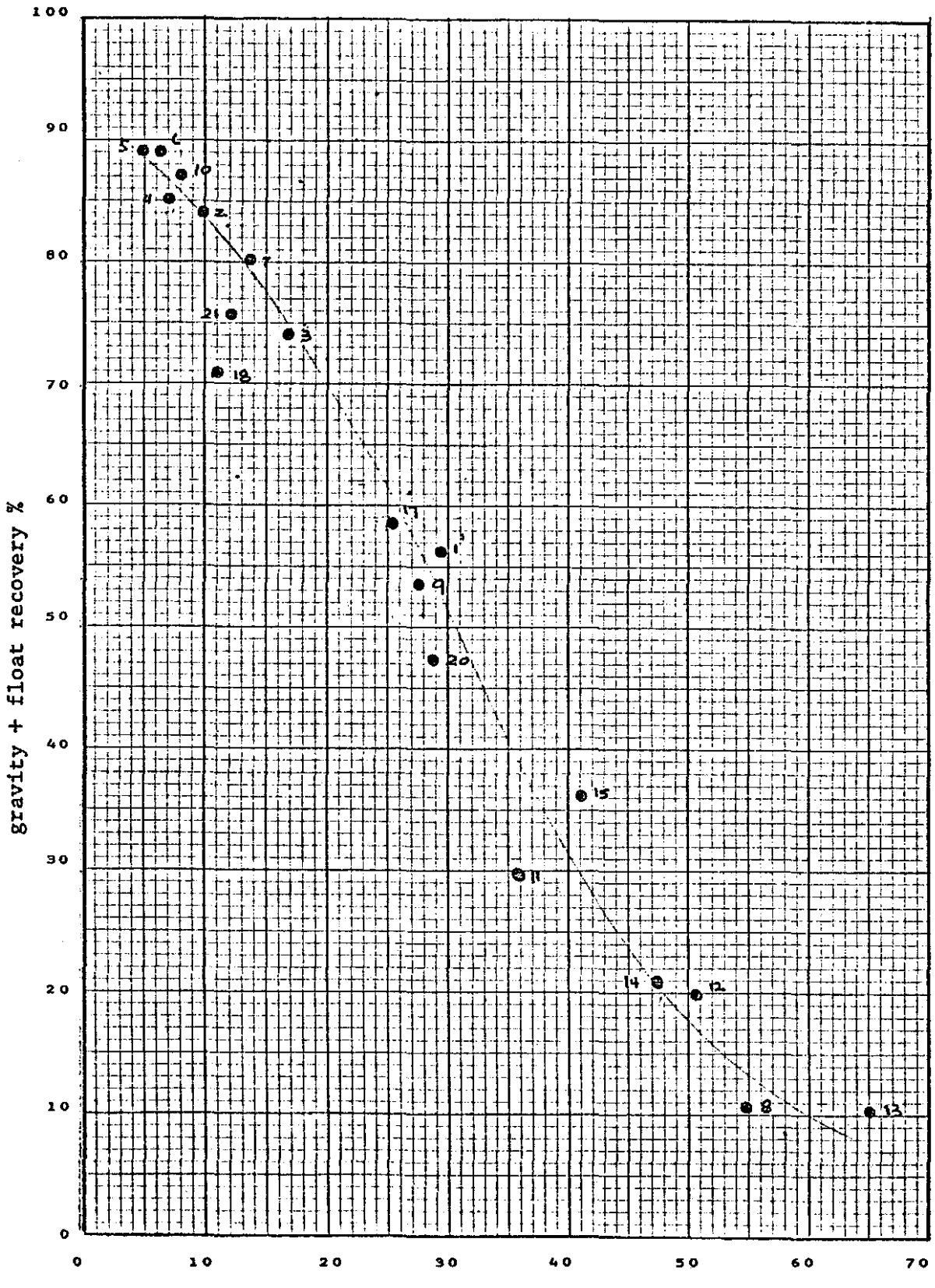
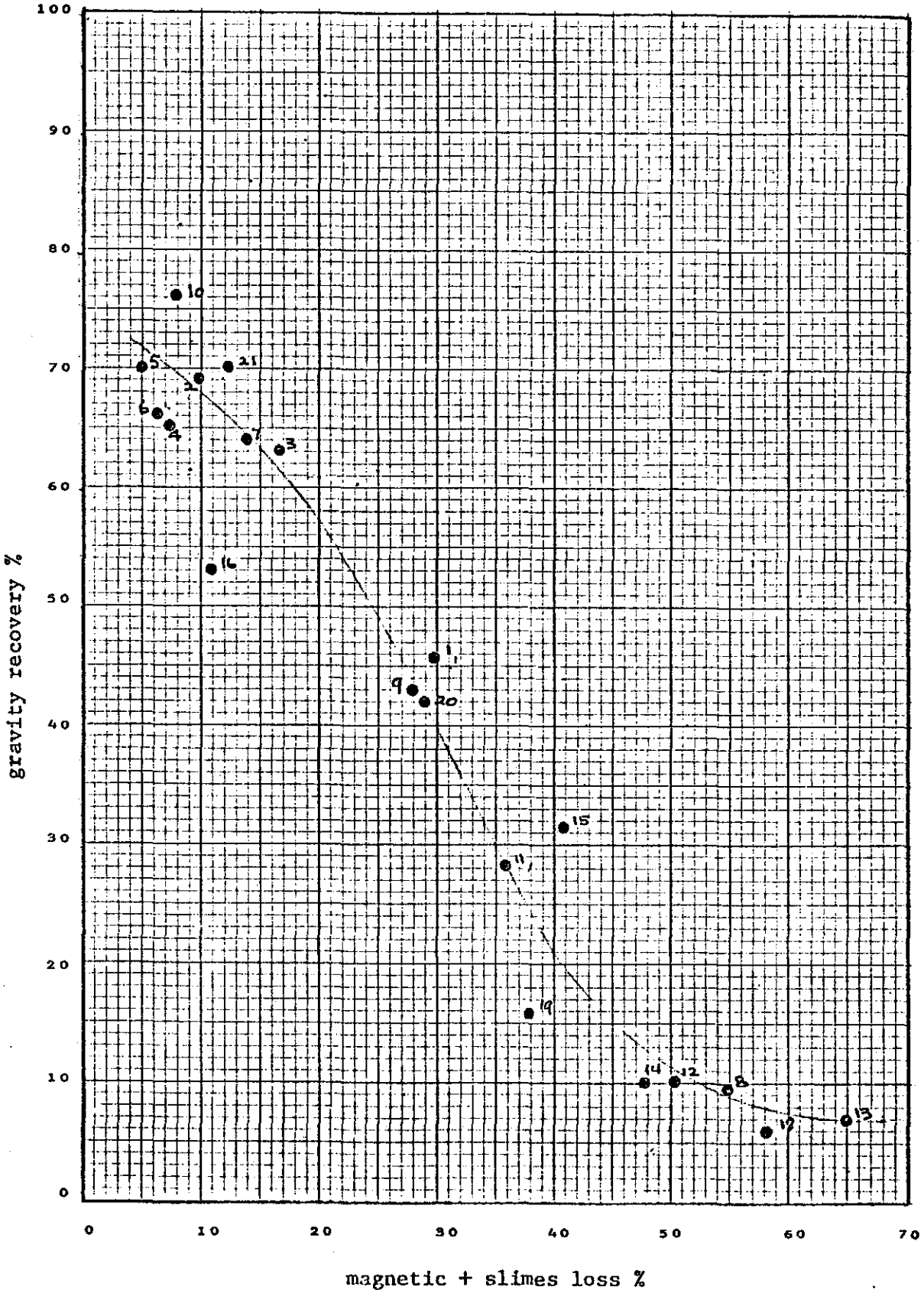


FIGURE 3

Graph showing correlation between gravity recovery of tungsten and magnetic-plus-slimes loss



APPENDIX

Detailed result sheets

TABLE A1

Sample Kara 10
Concentration Test Materials Balance

	weight g	weight %	assay % WO_3	g-units WO_3	tungsten dist %
Starting material					
gross	5000				
net dry	4875		0.59	2876.3	
Test Fractions					
Flotation					
concentrate (1)	12.6	0.26	2.10	26.5	0.82
" (2)	16.3	0.34	0.96	15.6	0.48
" (3)	11.9	0.25	1.83	21.8	0.67
tailing	895	18.44	0.90	805.5	24.92
Flotation sub-total (feed)	936	19.3	(0.93)	869.4	26.90
Gravity Separation					
Mozley table concentrates					
+212 µm	1.56	0.03	59.4	92.7	2.87
+150 µm	2.88	0.06	57.4	165.3	5.11
+ 75 µm	22.86	0.47	28.1	642.4	19.87
sub-total	27.30	0.56	(33.0)	900.4	27.86
Mozley table tailings					
+212 µm	81.7	1.68	0.405	33.1	1.02
+150 µm	243	5.01	0.325	79.0	2.44
+ 75 µm	594	12.24	0.325	193.1	5.97
sub-total	918.7	18.92	(0.33)	305.1	9.44
gravity separation sub-total	946	19.49	1.27	1205.5	37.30
magnetic tailing	2508	51.66	0.10	250.8	7.76
-10 µm slime tailing	465	9.58	1.95	906.8	28.05
test fraction total	4855	100	0.67	3232	100
balance weight	(-)20		+0.08		
%		(-)0.41			

TABLE A2

Sample Kara 12
Concentration Test Materials Balance

	weight g	weight %	assay % WO_3	g-units WO_3	tungsten dist %
Starting material					
gross	5000				
net dry	4932		1.33	6559.6	
Test Fractions					
Flotation					
concentrate (1)	28.3	0.57	1.98	56.0	2.37
" (2)	58.6	1.19	1.37	80.3	3.40
" (3)	37.7	0.76	2.20	82.9	3.51
tailing	706	14.32	0.55	388.3	16.43
Flotation sub-total (feed)	831	16.8	(0.73)	607.6	25.71
Gravity Separation					
Mozley table concentrates					
+212 µm	1.30	0.03	16.5	21.45	0.91
+150 µm	1.75	0.04	33.9	59.3	2.51
+ 75 µm	7.15	0.15	23.5	168.0	7.11
sub-total	10.20	0.21	(24.4)	248.75	10.53
Mozley table tailings					
+212 µm	60.0	1.22	0.495	29.7	1.26
+150 µm	157.0	3.19	0.48	75.4	3.19
+ 75 µm	402	8.16	0.50	201.0	8.51
sub-total	619	12.56	(0.49)	306.1	12.95
gravity separation sub-total	629.2	12.76	0.88	554.85	23.48
magnetic tailing	2724	55.27	0.14	381.4	16.14
-10 µm slime tailing	745	15.12	1.10	819.5	34.68
test fraction total	4929	100	0.48	2363	100
balance weight	(-)3				
%		(-)0.06	-0.85		

TABLE A3

Sample Kara 13
Concentration Test Materials Balance

	weight g	weight %	assay % WO_3	g-units WO_3	tungsten dist %
Starting material					
gross	5000				
net dry	4938		0.53	2617.1	
Test Fractions					
Flotation					
concentrate (1)	5.4	0.11	1.07	5.8	0.23
" (2)	20.1	0.41	2.52	50.7	2.02
" (3)	22.2	0.45	0.96	21.3	0.85
tailing	548	11.11	0.63	345.2	13.79
Flotation sub-total (feed)	596	12.2	(0.71)	423.0	16.90
Gravity Separation					
Mozley table concentrates					
+212 µm	1.20	0.02	28.3	34.0	1.36
+150 µm	1.30	0.03	33.3	43.3	1.73
+ 75 µm	7.92	0.16	12.8	101.4	4.05
sub-total	10.42	0.21	(17.2)	178.7	7.14
Mozley table tailings					
+212 µm	68.4	1.39	0.53	36.3	1.45
+150 µm	135.7	2.75	0.54	73.3	2.93
+ 75 µm	281	5.70	0.57	160.2	6.40
sub-total	485.1	9.83	(0.56)	269.8	10.78
gravity separation sub-total	495.5	10.04	0.91	448.5	17.92
magnetic tailing	3210	65.08	0.18	577.8	23.09
-10 µm slime tailing	631	12.80	1.67	1053.8	42.10
test fraction total	4932	100	0.51	2503	100
balance weight	(-) 6				
%		(-)0.02	-0.02		

TABLE A4

Sample Kara 14
Concentration Test Materials Balance

	weight g	weight %	assay % WO_3	g-units WO_3	tungsten dist %
Starting material					
gross	5000				
net dry	4990		0.93	4640.7	
Test Fractions					
Flotation					
concentrate (1)	133.25	2.67	1.36	181.2	4.86
" (2)	123.3	2.47	1.39	171.4	4.59
" (3)	23.9	0.48	2.07	49.5	1.33
tailing	545	10.94	0.88	479.6	12.85
Flotation sub-total (feed)	826	16.6	(1.07)	881.7	23.63
Gravity Separation					
Mozley table concentrates					
+212 µm	0.70	0.01	61.5	43.1	1.15
+150 µm	4.50	0.09	13.4	60.3	1.62
+ 75 µm	18.38	0.37	14.8	272.0	7.29
sub-total	23.58	0.47	(15.9)	375.4	10.06
Mozley table tailings					
+212 µm	31.68	0.64	1.03	32.63	0.87
+150 µm	137.0	2.75	1.07	146.6	3.93
+ 75 µm	421	8.45	1.13	475.7	12.75
sub-total	589.68	11.83	(1.11)	654.53	17.55
gravity separation sub-total	613.26	12.31	1.68	1030.3	27.61
magnetic tailing	2912	58.44	0.23	669.8	17.95
-10 µm slime tailing	632	12.68	1.82	1150.2	30.82
test fraction total	4983	100	0.75	3732	100
balance weight	(-) 7				
%		(-)0.14	-0.18		

TABLE A5

Sample Kara 15
Concentration Test Materials Balance

	weight g	weight %	assay % WO_3	g-units WO_3	tungsten dist %
Starting material					
gross	5000				
net dry	4925		0.89	4383.3	
Test Fractions					
Flotation					
concentrate (1)	33.6	0.68	1.71	57.5	1.58
" (2)	33.7	0.68	2.52	84.9	2.33
" (3)	42.0	0.85	1.08	45.4	1.25
tailing	505	10.25	0.93	469.7	12.90
Flotation sub-total (feed)	614	12.47	(1.07)	657.4	18.06
Gravity Separation					
Mozley table concentrates					
+212 µm	1.48	0.03	52.8	78.1	2.15
+150 µm	4.75	0.10	52.1	247.5	6.80
+ 75 µm	17.54	0.36	46.9	822.6	22.60
sub-total	23.77	0.48	(48.3)	1148.2	31.54
Mozley table tailings					
+212 µm	33.4	0.68	0.77	25.7	0.71
+150 µm	125.3	2.54	0.79	99.0	2.72
+ 75 µm	258	5.24	0.79	203.8	5.60
sub-total	416.7	8.46	(0.79)	328.5	9.02
gravity separation sub-total	440.47	8.94	3.35	1476.7	40.56
magnetic tailing	3361	68.23	0.21	705.8	19.39
-10 µm slime tailing	510	10.35	1.57	800.7	21.99
test fraction total	4925	100	0.74	3641	100
balance weight %			-0.15		

TABLE A6

Sample Kara 18
Concentration Test Materials Balance

	weight g	weight %	assay % WO_3	g-units WO_3	tungsten dist %
Starting material					
gross	5000				
net dry	4488		1.32	5924.2	
Test Fractions					
Flotation					
concentrate (1)	62.84	1.40	12.0	754.1	11.68
" (2)	4.47	0.10	15.8	70.6	1.09
" (3)	25.88	0.58	12.2	315.7	4.89
tailing	653.7	14.57	0.49	320.3	4.96
Flotation sub-total (feed)	747	16.64	(1.96)	1460.7	22.63
Gravity Separation					
Mozley table concentrates					
+212 µm	4.88	0.11	53.3	260.1	4.03
+150 µm	13.97	0.31	63.8	891.3	13.81
+ 75 µm	33.25	0.75	69.1	2297.6	35.60
sub-total	52.10	1.16	(66.2)	3449.0	53.44
Mozley table tailings					
+212 µm	133.1	2.97	0.73	97.2	1.51
+150 µm	361.4	8.05	0.52	187.9	2.91
+ 75 µm	836.4	18.64	0.66	552.0	8.55
sub-total	1330.9	29.65	(0.63)	837.1	12.97
gravity separation sub-total	1383	30.82	3.10	4286.1	66.40
magnetic tailing	1995	44.45	0.08	159.6	2.47
-10 µm slime tailing	363	8.08	1.51	548.1	8.49
test fraction total	4488	100	1.44	6455	100
balance weight %			+0.12		

TABLE A7

Sample Kara 19
Concentration Test Materials Balance

	weight g	weight %	assay % WO_3	g-units WO_3	tungsten dist %
Starting material					
gross	500				
net dry	4890		0.48	2347.2	
Test Fractions					
Flotation					
concentrate (1)	78.3	1.65	6.1	477.6	13.44
" (2)	133.8	2.81	1.2	160.6	4.52
" (3)	102.4	2.15	6.4	655.4	18.44
tailing	956	20.10	0.32	305.9	8.61
Flotation sub-total (feed)	1271	26.7	(1.26)	1599.5	45.02
Gravity Separation					
Mozley table concentrates					
+212 µm	1.83	0.04	22.1	40.4	1.14
+150 µm	10.40	0.22	18.8	195.5	5.50
+ 75 µm	22.04	0.46	(25.0)+	551	15.51
sub-total	34.27	0.73	(23.0)	786.9	22.15
Mozley table tailings					
+212 µm	29.55	0.62	0.295	8.7	0.25
+150 µm	202.24	4.25	0.27	54.6	1.54
+ 75 µm	709	14.91	0.27	191.4	5.39
sub-total	940.8	19.78	(0.27)	254.7	7.18
gravity separation sub-total	975	20.50	1.07	1041.6	29.32
magnetic tailing	1700	35.75	0.16	272.0	7.66
-10 µm slime tailing	810	17.03	0.79	639.9	18.01
test fraction total	4756	100	0.75	3553	100
balance weight	(-)134		+0.27		
%		(-)0.27			

+ estimated grade

TABLE A8

Individual stage recoveries

Mozley concentration of size fractions
flotation tests

Sample	Kara 10			Kara 12		
	weight %	assay % WO_3	dist % WO_3	weight %	assay % WO_3	dist % WO_3
Mozley concentration						
+212 µm fraction						
feed *	100	1.5	100	100	0.83	100
concentrate	1.9	59.4	73.7	2.1	16.5	41.9
tail	98.1	0.405	26.3	97.9	0.495	58.1
+150 µm fraction						
feed *	100	0.99	100	100	0.85	100
concentrate	1.2	57.4	67.7	1.1	33.9	44.0
tail	98.8	0.325	32.3	98.9	0.48	56.0
+ 75 µm fraction						
feed *	100	1.35	100	100	0.90	100
concentrate	3.7	28.1	76.9	1.7	23.5	45.5
tail	96.3	0.325	23.1	98.3	0.50	54.5
Mozley concentration combined results *						
feed *	100	1.27	100	100	0.88	100
concentrate *	2.9	33.0	74.8	1.6	24.4	45.1
tail *	97.1	0.33	25.2	98.4	0.49	54.9
Flotation Test						
feed *	100	(0.93)	100	100	(0.73)	100
concentrate 1	1.3	2.1	3.04	3.4	1.98	9.22
" 2	1.7	0.96	1.80	7.1	1.37	13.21
" 3	1.3	1.83	2.50	4.5	2.20	13.65
combined concentrate *	4.4	(1.55)	(7.3)	15.0	(1.76)	(36.1)
tail	95.6	0.90	92.7	85.0	0.55	63.9

* calculated assays

TABLE A9

Individual stage recoveries

Mozley concentration of size fractions
flotation tests

Sample	Kara 13			Kara 14		
	weight %	assay % WO_3	dist % WO_3	weight %	assay % WO_3	dist % WO_3
Mozley concentration						
+212 µm fraction						
feed*	100	1.01	100	100	2.34	100
concentrate	1.7	28.3	48.4	2.2	61.5	56.9
tail	98.3	0.53	51.6	97.8	1.03	43.1
+150 µm fraction						
feed*	100	0.85	100	100	1.46	100
concentrate	0.9	33.3	37.1	3.2	13.4	29.1
tail	99.1	0.54	62.9	96.8	1.07	70.9
+ 75 µm fraction						
feed *	100	0.91	100	100	1.70	100
concentrate	2.7	12.8	38.8	4.2	14.8	36.4
tail	97.3	0.57	61.2	95.8	1.13	63.6
Mozley concentration combined results *						
feed *	100	0.91	100	100	1.68	100
concentrate*	2.1	17.2	39.8	3.8	15.9	36.4
tail*	97.9	0.56	60.2	96.2	1.11	63.6
Flotation Test						
feed*	100	(0.71)	100	100	(1.07)	100
concentrate 1	0.9	1.07	1.37	16.1	1.36	20.55
" 2	3.4	2.52	11.98	14.9	1.39	19.44
" 3	3.7	0.96	5.02	2.9	2.07	5.61
combined concentrate*	8.0	(1.63)	(18.36)	34.0	(1.43)	(45.6)
tail	92.0	0.63	81.64	66.0	0.88	54.40

* calculated assays

TABLE A10

Individual stage recoveries

Mozley concentration of size fractions
flotation tests

Sample	Kara 15			Kara 18		
	weight %	assay % WO_3	dist % WO_3	weight %	assay % WO_3	dist % WO_3
Mozley concentration						
+212 µm fraction						
feed*	100	2.98	100	100	2.6	100
concentrate	4.2	52.8	75.2	3.5	53.3	72.8
tail	95.8	0.77	24.8	96.5	0.73	27.2
+150 µm fraction						
feed*	100	2.66	100	100	2.9	100
concentrate	3.7	52.1	71.4	3.7	63.8	82.6
tail	96.3	0.79	28.6	96.3	0.52	17.4
+ 75 µm fraction						
feed*	100	3.73	100	100	3.3	100
concentrate	6.4	46.9	80.1	3.8	69.1	80.6
tail	93.6	0.79	19.9	96.2	0.66	19.4
Mozley concentration combined results *						
feed*	100	3.35	100	100	3.1	100
concentrate*	5.4	48.3	77.7	3.8	66.2	80.6
tail*	94.6	0.79	22.3	96.2	0.63	19.4
Flotation Test						
feed*	100	(1.07)	100	100	1.96	100
concentrate 1	5.5	1.71	8.74	8.4	12.0	51.6
" 2	5.5	2.52	12.92	0.6	15.8	4.8
" 3	6.8	1.08	6.90	3.5	12.2	21.6
combined concentrate*	17.8	(1.72)	28.56	12.5	12.2	78.1
tail	82.2	0.93	71.44	87.5	0.49	21.9

* calculated assays

TABLE A11

Individual stage recoveries

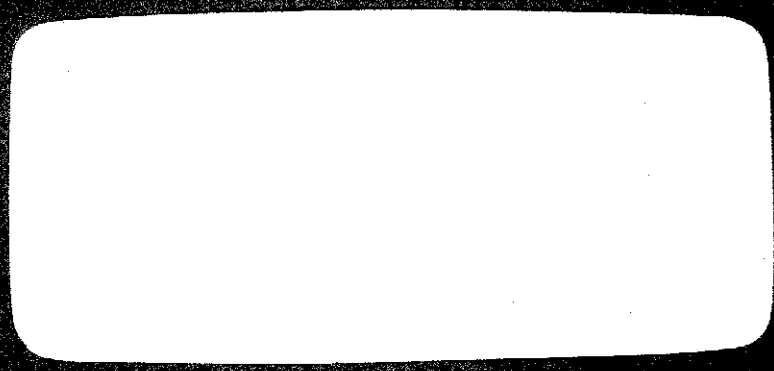
Mozley concentration of size fractions
flotation tests

Sample	Kara 19			Kara		
	weight %	assay % WO_3	dist % WO_3	weight %	assay % WO_3	dist % WO_3
Mozley concentration						
+212 µm fraction						
feed *	100	1.57	100			
concentrate	5.8	22.1	82.3			
tail	94.2	0.295	17.7			
+150 µm fraction						
feed *	100	1.18	100			
concentrate	4.9	18.8	78.2			
tail	95.1	0.27	21.8			
+ 75 µm fraction						
feed *	100	1.02	100			
concentrate	3.0	25.0+	74.2			
tail	97.0	0.27	25.6			
Mozley concentration combined results *						
feed *	100	1.07	100			
concentrate *	3.5	23.0	75.6			
tail *	96.5	0.27	24.4			
Flotation Test						
feed *	100	1.26	100			
concentrate 1	6.2	6.1	29.9			
" 2	10.5	1.2	10.0			
" 3	8.1	6.4	41.0			
combined concentrate *	24.8	4.1	80.9			
tail	75.2	0.32	19.1			

* calculated assays

\+ estimated assays

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4B/82

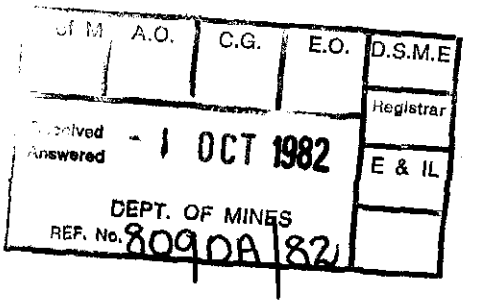


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REPORT NO. 4B/82



WARMAN INTERNATIONAL LTD.

REPORT NO. 82/141050

FLOTATION TESTS ON KARA TUNGSTEN ORE

(1982)

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RESEARCH & DEVELOPMENT DIVISION

Report 82/141050

Flotation Tests on Kara Tungsten Ore

for

McIntyre Mines (Aust) Pty Ltd

A.I. Bellingham
M. Lanyon

August 13, 1982

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SUMMARY

* 244 kg of ore sample KARA 21 was submitted for flotation tests. The sample assayed 0.52% WO_3.

* The objectives of the testwork were to determine whether a flotation concentrate of 60% WO_3 could be made at realistic recoveries and whether there were any likely alternatives to a 'standard' oleic acid/sodium silicate float system.

* 9 rougher flotation tests and 13 rougher-cleaner tests were made.

* The maximum grade produced in the testwork was 47% WO_3. For an 80% overall recovery, the maximum grade would be around 40% WO_3.

* The major contaminant mineral preventing higher grades is fluorite, but no testwork with specific fluorite depressants was done.

* In a limited examination there was no reagent combination better than oleic acid/sodium silicate.

1. INTRODUCTION

Previous detailed flotation testing of Kara ore samples in Report 78/90721-2 showed that there was a variable response depending on the degree of oxidation, the more extremely oxidised ores showing no useful selectivity of scheelite over gangue. With the less oxidised ores, the rougher flotation gave reasonable selectivity, but the rougher concentrate could not be cleaned to better than 30% WO_3. The testwork in that exercise was limited and it was recognised that the subject was still open.

The primary objective of the testwork reported herein was to examine further the problems of flotation concentrate cleaning and determine whether a flotation concentrate of 60% WO_3 could be made at useful recoveries. A secondary objective of the work was to examine several reagent systems as possible alternatives to the 'standard' oleic acid system.

2. MATERIAL EXAMINED

A 250 kg sample of ore designated Kara 20 was received November 20, 1981 (register No R3108). It was crushed to pass 3 mm, mixed and a head sample taken. This assayed 0.31% WO_3.

An assay of 0.7% was desired for the flotation test feed material.

A new sample, 244 kg of ore designated Kara 21 arrived December 29, 1981 (register No R3142). This was all crushed to pass 3 mm, mixed and cut into 8 x 30 kg parcels. One of these was then mixed and cut into 1 kg portions, with a 250 g head sample taken from one portion after further size reduction. The pulverised head sample assayed 0.52% WO_3. This grade was considered sufficient for the flotation tests to proceed.

3. SCOPE OF THE TESTWORK

To determine the best base conditions in the oleic acid/sodium silicate system, a series of nine rougher tests were done at two pH conditions and various sodium silicate concentrations, where the collector was added in stages to find the optimum addition rate. Tests 1 to 4 and test 9 examined sodium silicate concentrations between 0.7 and 1.5 kg/t at pH 9.5. Tests 5 to 8 repeated these at pH 10.

Tests 10 to 16 were then conducted with various stages of concentrate cleaning, mostly at the same pH and sodium silicate concentrations as the rougher float. Tests 10, 11 and 12 were at higher initial sodium silicate levels, with none added to the cleaning stages of 10 and 11. Test 15 examined conditioning at pH 10 and reducing to pH 7.5 prior to flotation.

Alternative reagents and concentrate cleaning were then tried for tests 17A to 19B:

Test 17A	-	Akypomine, a fatty acid derivative instead of oleic acid.
Tests 17B & 18A	-	Sulphosuccinate (CA 540) with depressant DA 811.
Test 18B	-	Oleic acid/sodium silicate system with conditioning at pH 10 and floating at pH 7.5.
Test 19A	-	Oleic acid with alkyl sulphate S72.
Test 19B	-	Standard oleic acid float system.

4. PROCEDURES

Flotation samples were prepared by grinding, desliming then magnetic separation of ground ore.

4.1 Grinding

Test parcels of 1 kg of -3 mm ore were ground for 20 minutes at 60% solids in the laboratory rod mill, then screened at 300 μm to give a ground product of 90% passing 75 μm.

4.2 Desliming

To improve its flotation behaviour, the ground sample was then deslimed in a 75 mm cyclone operated at 200 kPa, with the underflow cycloned a second time. The overflow was settled with alum and flocculant, and decanted. The thickened slimes were collected, mixed, an assay sample taken, and the rest dried and weighed.

4.3 Magnetic Separation

The Sala Laboratory wet drum magnetic separator was set to give 15 mm of drum submergence, a 25 mm gap between the drum and trough, and a drum speed of 50 rpm. Additional water was used to maintain the slurry depth. A peristaltic pump was used to feed about 5 litres of deslimed cyclone underflow in 5 to 10 minutes. The magnetic fraction was demagnetised and repassed. The second stage magnetics were demagnetised, dried, weighed and sampled. The deslimed non-magnetics were collected for flotation after decanting excess water.

4.4 Flotation Tests

A Wemco-Fagergren laboratory cell with 3 litre bowl was used for conditioning and for all flotation tests, including cleaning; 1800 rpm was the speed used for both conditioning and flotation. Nominal conditioning density was 31% solids and nominal flotation density was 27% solids.

4.5 Conditioning

The feed was agitated without air and the volume made up to 2 litres. The pH was measured before and after the addition of the measured volume of 10% sodium silicate solution, then a 5% sodium carbonate solution was added to adjust the pH to the desired value. Conditioning continued for 20 minutes.

4.6 Rougher Flotation (Tests 1-9)

Refer to Figure 1. For each rougher flotation test, three kilograms of ore were ground to yield approximately 850 grams of deslimed, non-magnetic float feed. After conditioning with sodium silicate and sodium carbonate as above, the sample was floated by making successive additions of 0.03 kg/t of oleic acid and floating for five minutes after each addition. The concentrates were visually assessed by ultra-violet microscopic examination and combined into rougher and scavenger concentrates for assay.

Causticised wood resin was used as frother as required.

4.7 Rougher-Cleaner Flotation

For each rougher-cleaner test, six kilograms of ore were ground to yield approximately 1700 grams of deslimed, non-magnetic float feed which was floated in two rougher batches and the concentrates combined for cleaning. The pulp density during cleaning was necessarily low because of the small concentrate weights.

4.8 Reagents

The oleic acid used for these tests was prepared from commercial Kitolene Oil from J. Kitchen and Sons with 2% Teric 16A16 added, emulsified in water. Causticised wood resin was the main frother used,

with MIBC used in some tests.

The alternative collectors were -

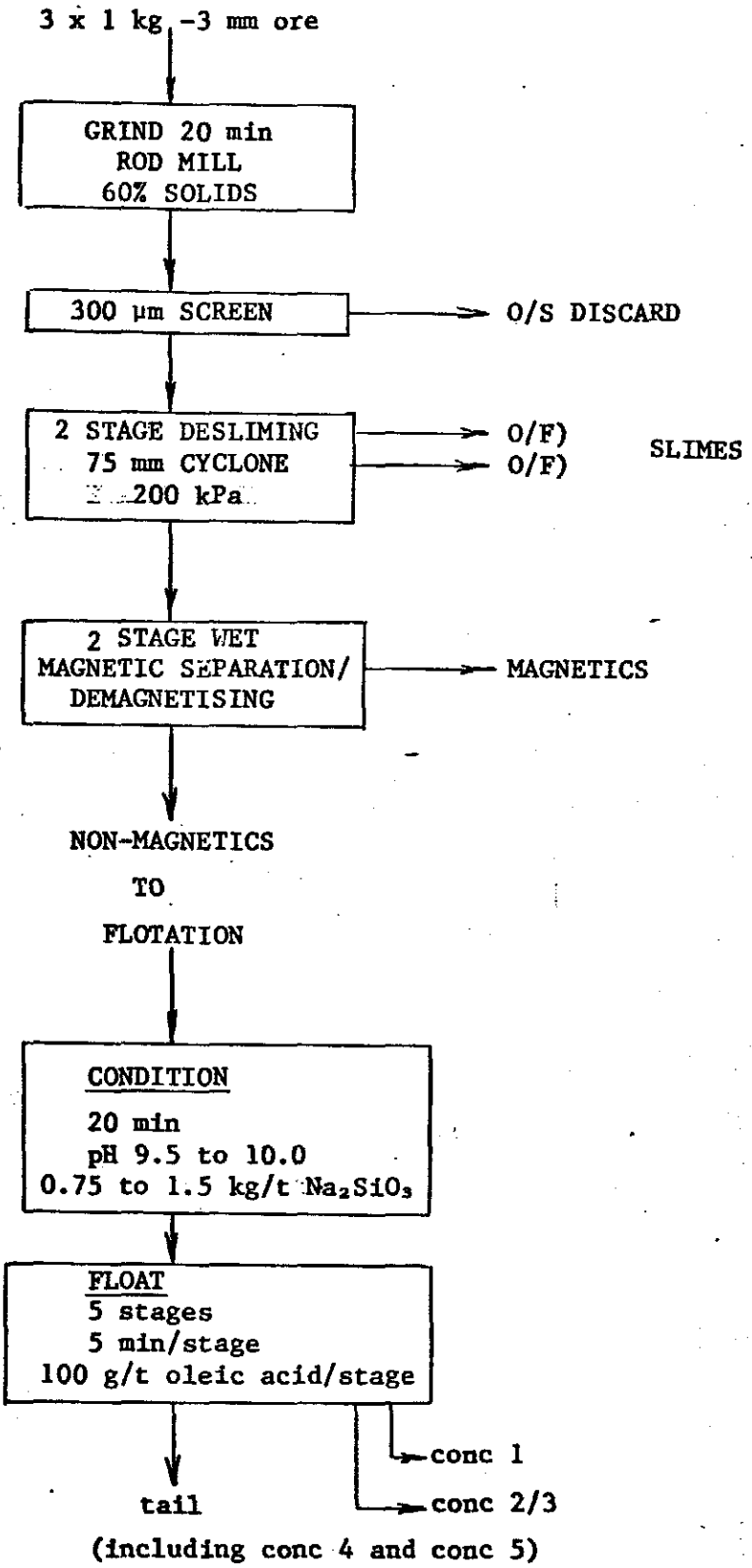
Procol CA 540 (Tests 17B, 18A), a sulphosuccinate derivate marketed by Allied Colloids and recommended for cassiterite flotation.

Akypomine AL (Test 17A), a fatty acid derivative marketed by Chem-Y, Holland.

Flotinor S-72 (Test 19A) an alkyl sulphate manufactured by Hoechst and used at the Mittersil scheelite mine with oleic acid.

Procol DA 811, a selective gangue depressant marketed by Allied Colloids Ltd, used with CA 540 in Tests 17B and 18A.

Kara 21 Flotation Test Flowsheet



Note: concentrates combined after U/V microscopic examination

5. RESULTS AND DISCUSSION

The flotation feed, after desliming and magnetic separation comprised 29.5% of the weight of the ground ore, containing 80.5% of the tungsten at a grade of 1.3% WO_3.

The magnetic fraction comprised 57% of the weight, containing 3% of the tungsten at a grade of 0.03% WO_3.

The slimes fraction comprised the remaining 13.5% of the weight, containing 16.5% of the tungsten at a grade of 0.57% WO_3.

All further results are reported as recoveries compared to flotation feed material, rather than ore.

Table 1 gives a summary of the flotation conditions and Table 2 summarises the flotation test results. Result sheets for each individual test are given in the Appendix.

5.1 Rougher Flotation

In Tests 1 to 9 the collector addition, pH and sodium silicate level were varied to find the optimum levels. For each concentrate the oleic acid was added in 3 x 0.03 g/t increments at 5 minute intervals to observe the quantity of scheelite recovered by the extra collector. Up to 5 concentrates were collected per test, and their grade examined under U.V. light. Most of the latter concentrates were extremely poor grade, so these were blended back into the tails. The others were grouped to give a rougher concentrate at 0.09 kg/t oleic acid, and a scavenger concentrate from an additional 0.18 kg/t. Frother was only added to a couple of tests. Not much improvement was observed up to a critical range, and above this the frothing was excessive, so its use was discontinued.

TABLE 1

Summary of flotation test conditions

Test	condition			float			cleaning		
	pH	sod sil kg/t	sod carb kg/t	pH	rougher oleic acid kg/t	scav oleic acid kg/t	sod sil kg/t	sod carb kg/t	oleic acid
1	9.5	0.93	2.08	9.5	0.087x2	0.17	-	-	-
2	"	1.16	3.49	"	0.087	"	-	-	-
3	"	1.46	3.04	"	"	"	-	-	-
4	"	0.69	3.44	"	"	"	-	-	-
5	10	0.74	5.65	10	0.09	0.18	-	-	-
6	"	0.95	6.21	"	"	"	-	-	-
7	"	1.15	6.88	"	"	"	-	-	-
8	"	1.39	6.09	"	"	"	-	-	-
9	9.5	0.87	1.36	9.5	"	0.16	-	-	-
10	10	1.8	4.9	10	0.11	0.18	-	0.42	0.01
11	"	1.9	4.5	"	0.09	0.20	-	0.3,0.5	-
12	"	1.8	2.4	9.5	0.12	0.18	0.8	0.5	-
13	"	1.4	4.2	10	0.09	0.18	0.7	0.45	-
14	"	1.4	1.7	10	0.09	0.17	0.7	0.3	-
15	"	1.4	2.6	7.5	0.09	0.09	-	-	-
16	"	1.4	3.9	10	0.09	0.18	0.7	0.9	-
17A	10	1.1	1.5	7.5	A.0.21	-	-	-	-
17B	6.5	-	-	6.5	C.0.21 D.0.21	-	-	-	-
18A	6.5	-	-	6.5	C.0.22 D.0.22	-	-	-	-
18B	10	1.4	1.7	7.5	L.0.27	-	-	-	-
19A	10	1.1	1.2	7.5	L.0.11 F.0.11	-	-	-	-
19B	10	1.1	2.1	10	L.0.23	-	1.1	-	

Key: A - Akypomine; C - CA 540; D - DA 811; L - oleic acid; F - Flotinor S72

TABLE 2

Summary of concentrate grade and recoveries

(A) Test	rougher conc		scav conc		tails	
	grade % WO_3	recovery %	grade % WO_3	recovery %	grade % WO_3	loss %
1	a) 23.1	32.1				
	b) 14.7	57.7	1.2	5.5	0.078	4.7
2	20.9	92.2	0.53	3.7	0.06	4.1
3	19.7	59.9	7.85	30.7	0.13	9.5
4	14.5	65.1	1.92	29.6	0.096	5.3
5	10.9	85.5	0.53	9.9	0.10	4.6
6	21.2	82.7	1.12	12.8	0.076	4.5
7	10.9	81.1	0.53	12.5	0.10	6.4
8	28.6	78.9	6.3	13.9	0.10	7.2
9	12.2	92.7	0.19	3.0	0.078	4.3

Note: a) 1st rougher concentrate
b) combined rougher concentrate

(B) Test	cleaned conc		scav conc (cleaned)		rougher/scav tails	
	grade % WO_3	recovery %	grade % WO_3	recovery %	grade % WO_3	loss %
10	36.1	88.1	-	-	0.14	10.7
11	31.9	85.7	4.3	3.1	0.12	8.2
12	42.9	41.3	-	-	0.27	19.7
13^1	43.6	70.8				
13^2	47.1	35.3	-	-	0.28	21.3
14	41.7	17.2	39.5	14.4	0.68	48.4
15	27.8	25.6	17.5	50.1	0.27	20.2
16	39.6	1.9	42.9	13.1	0.63	40.8
17A	10.7	59.3	2.0	6.7	0.26	8.8
17B	6.5	27.1	-	-	0.15	6.7
18A	5.2	0.64	5.3	2.5	0.28	14.5
18B	18.0	27.8	1.77	0.6	0.11	5.9
19A	34.1	63.6	11.5	10.1	0.25	16.0
19B	36.9	48.6	4.0	1.0	0.15	10.8

Note: [1] 1st clea... [2] ...

The effect of the sodium silicate is to depress the gangue by coating it and preventing adsorption of the oleic acid and hence increasing the concentrate grade. At high sodium silicate levels the scheelite also starts to be depressed. On the other hand, if the sodium silicate level is too low, the oleic acid will be absorbed on gangue also, and scheelite recovery will be reduced because of a scarcity of collector.

The results of Tests 5 to 8 at pH 10 show a general increase in concentrate grade from 11% WO_3 to 28% WO_3 (except for Test 7) with recovery decreasing marginally from 85% to 80% as the sodium silicate level increased from 0.7 to 1.4 kg/t. At pH 9.5, over the same sodium silicate range (Tests 1-4), the grade reached a peak of only 20% WO_3 with 90% recovery at 1.15 kg/t, above which the grade decreased slightly and the recovery dropped to only 60%.

The best result was taken to be 1.4 kg/t oleic acid at pH 10, adding 0.09 kg/t oleic acid to the rougher and 0.18 kg/t to the scavenger with 15 minutes flotation for each stage (Test 8).

5.2 Rougher-Cleaner Flotation

The multiple stage cleaning tests were aimed at up-grading the concentrate to better than 60% WO_3.

Concentrates of 36% WO_3 were produced with 88% recovery, (Test 10); and concentrates of 43% and 47% WO_3 were only obtained at the expense of recovery in the cleaning circuit decreasing to give overall recoveries of 71% and 35% respectively.

The more successful cleaning exercises were characterised by a high grade in the rougher concentrate (more than 15% WO_3) and a concentration ratio of around 2:1 in the first cleaner (e.g. Test 12). Low grade rougher concentrate did not respond well to cleaning; that is, once large amounts of gangue had been floated, it could not then be

selectively depressed. The first two cleaning tests, 10 and 11, up-graded the concentrate at the same pH as the rougher float. To prevent the oleic acid desorbing and coating gangue, this was revised to the same sodium silicate concentration and pH as the rougher float. From the results of Tests 10 to 16, those tests which used sodium silicate during cleaning (Tests 12, 13, 14, 16) showed better concentrate grades and lower scheelite recoveries than Tests 10 and 11 which used a higher initial dose of sodium silicate (1.8 kg/t cf 1.4 kg/t) but none during cleaning. Hence sodium silicate during cleaning is a necessary part of the system.

Recleaning exercises with sodium silicate (Tests 13 and 18) were generally not effective for although they increased grade by several percent, around half the tungsten went to the recleaner tailing. The recleaner concentrates from Tests 19A and 19B which contained respectively 34 and 37% WO_3 were submitted to Central Mineralogical Services for a mineralogical examination. The report (See Appendix 2) showed that the major contaminant was fluorite which accounted for 50 to 65% of the grains. Thus for the concentrate recleaning to be effective, a selective fluorite depressant is required. Flotation literature lists aluminium salts, barium chloride and citric acid as fluorite depressants, but we have not done any testwork on this point. At this stage, our conclusion is that the maximum grade that can be made in a cleaning circuit with a realistic recovery (say 80%) is 40% WO_3.

The scavenger concentrate was cleaned separately in a number of tests because it was felt that its grade would be too low for it to be included in the rougher concentrate; and, because it could conceivably be more difficult to up-grade than the rougher concentrate. The tests, however, did not show this to be the case; the scavenger concentrate up-graded similarly to the rougher concentrate when the grade was sufficiently high.

5.3 Alternative Reagents

Two cleaning stages were conducted with all the alternative reagents tested: Akypomine (Test 17A), Sulphosuccinate (CA 540, Test 17B and 18A) and Alkyl sulphate (S72, Test 19A) as well as two tests on the oleic acid/sodium silicate system floating at reduced pH (7.5) after conditioning at pH 10 (Tests 15 and 18B).

None of these systems performed as well as the standard oleic acid/sodium silicate float. The best of these was the alkyl sulphate (S72) used with oleic acid and sodium silicate which in Test 19A, produced a 34% WO_3 concentrate at 63% recovery. By comparison, Test 18B under the same conditions and using oleic acid only as the collector, only produced an 18% WO_3 concentrate with 28% recovery. Test 19B similarly using oleic acid with the float at pH 10 (cf pH 7.5) produced a 37% WO_3 concentrate with 48% recovery.

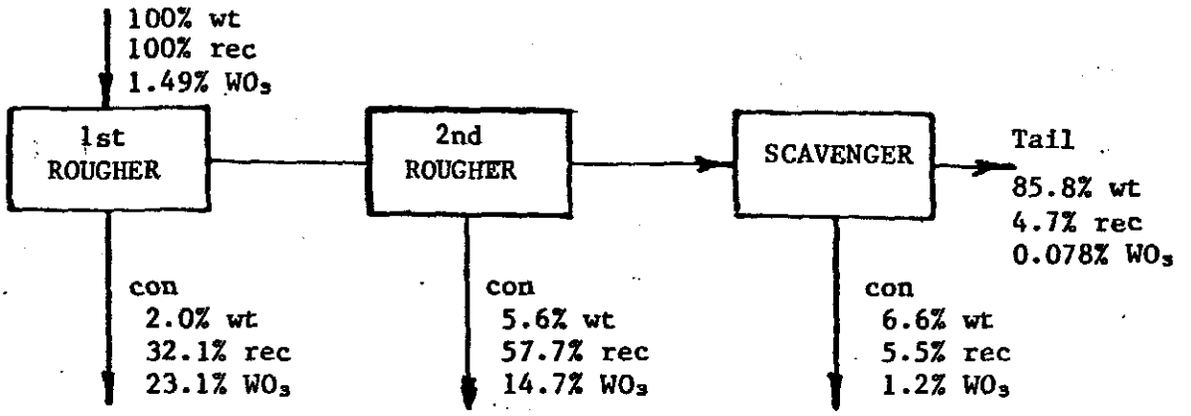
These results were not as good as those of the 'standard' tests 10 and 11 which used more oleic acid and more sodium silicate.

APPENDIX 1

Flotation test result sheets

Oleine float at 0.9 kg/t sod silicate
pH 9.5

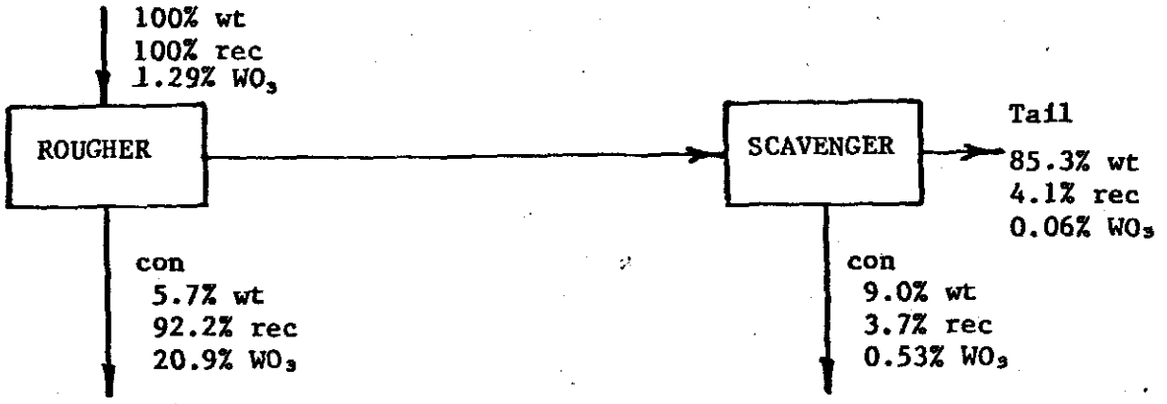
TEST 1



Stage	Reagents (kg/t)		pH	time
condition	sod silicate sod carbonate	0.93 2.08	9.5	20 min
1st rougher	oleine	0.087	9.5	15 min
2nd rougher	oleine frother	0.087 0.06	9.5	30 min
scavenger	oleine	0.17	9.5	30 min

Comments: Successful float in obtaining 95% recovery.
Grade of concentrate could be improved.

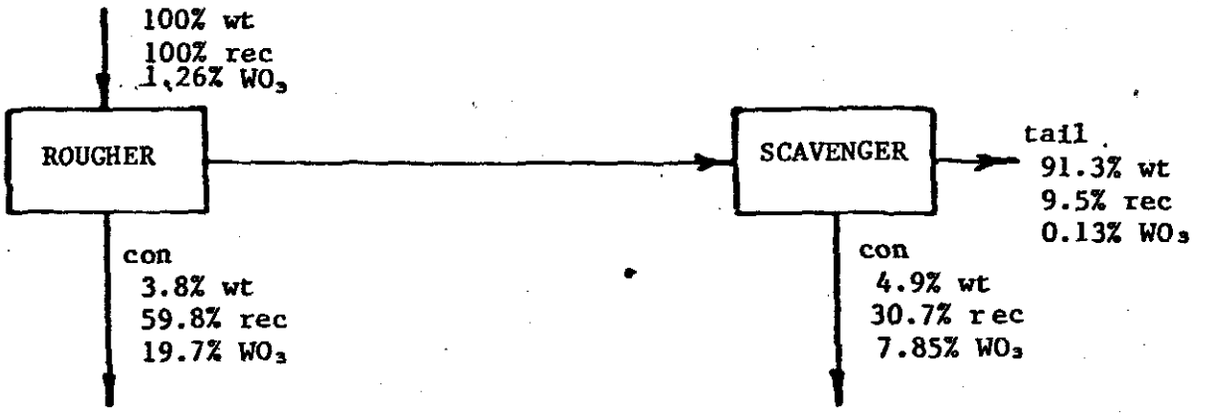
Oleine float at 1.2 kg/t sod silicate, pH 9.5 TEST 2



Stage	Reagents (kg/t)		pH	time
condition	sod silicate sod carbonate	1.16 3.49	9.5	20 min
rougher	oleine	0.087	9.5	15 min
scavenger	oleine	0.175	9.5	30 min

Comments: Float successful in recovering 96% of scheelite.
Concentrate grade could be improved, better than Test 1
as same recovery in single roughing stage.

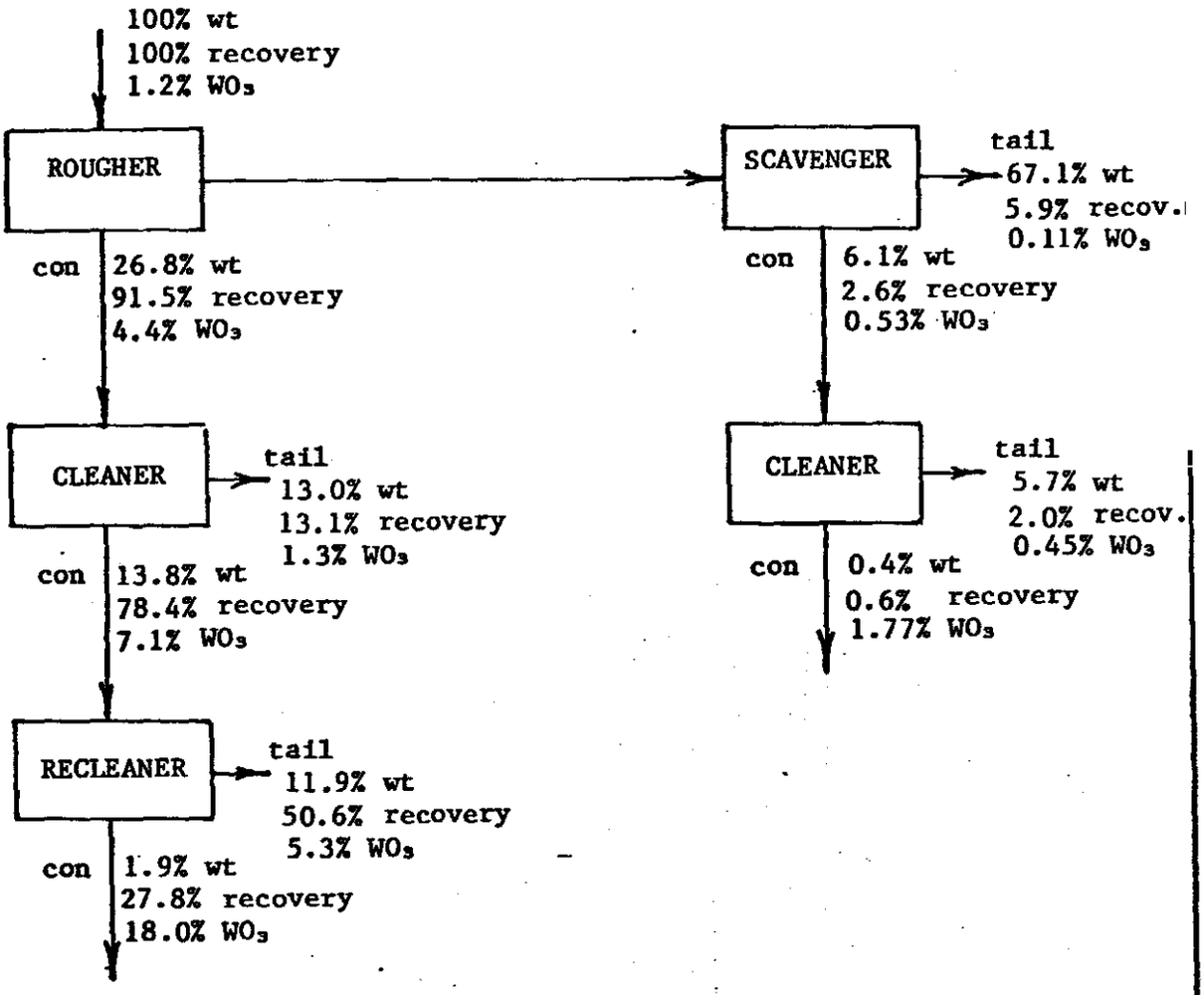
Oleine float at 1.5 kg/t sod silicate pH 9.5 TEST 3



Stage	Reagents (kg/t)		pH	time
condition	sod silicate sod carbonate	1.46 3.04	9.5	20 min
rougher	oleine frother	0.091 0.073	9.5	15 min
scavenger	oleine	0.18	9.5	30 min

Comments: Excessive sodium silicate has lowered recovery by depressing scheelite. Using frother has lowered concentrate grade.

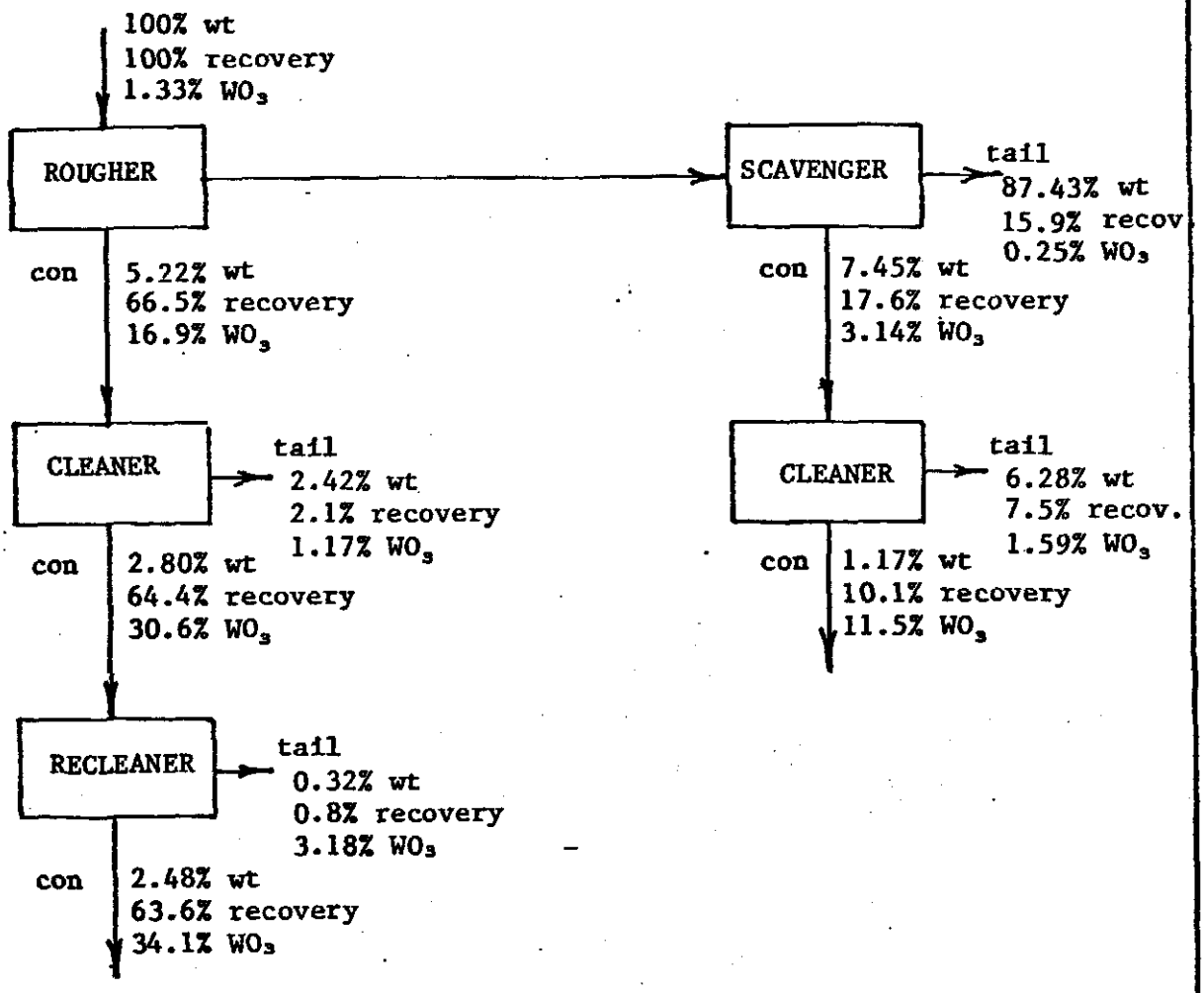
Oleic acid float (0.3 kg/t), pH 7.4 TEST 18B



Stage	Reagents (kg/t)			pH	time
condition	sod silicate sod carbonate	1.4 1.7		10	20 min
rougher	oleine frother	0.27 0.13	sulphuric acid 0.77	7.5	5 min
scavenger	frother	0.13	sulphuric acid 0.16	7.5	5 min
sc-cleaner	no further reagents			7.5	5 min
ro-cleaner	no further reagents			7.5	5 min
recleaner	no further reagents			7.5	5 min

Comments: A very high recovery float but poor selectivity and poor cleaning characteristics. This is probably due to too much oleic acid, and more likely not enough silicate.

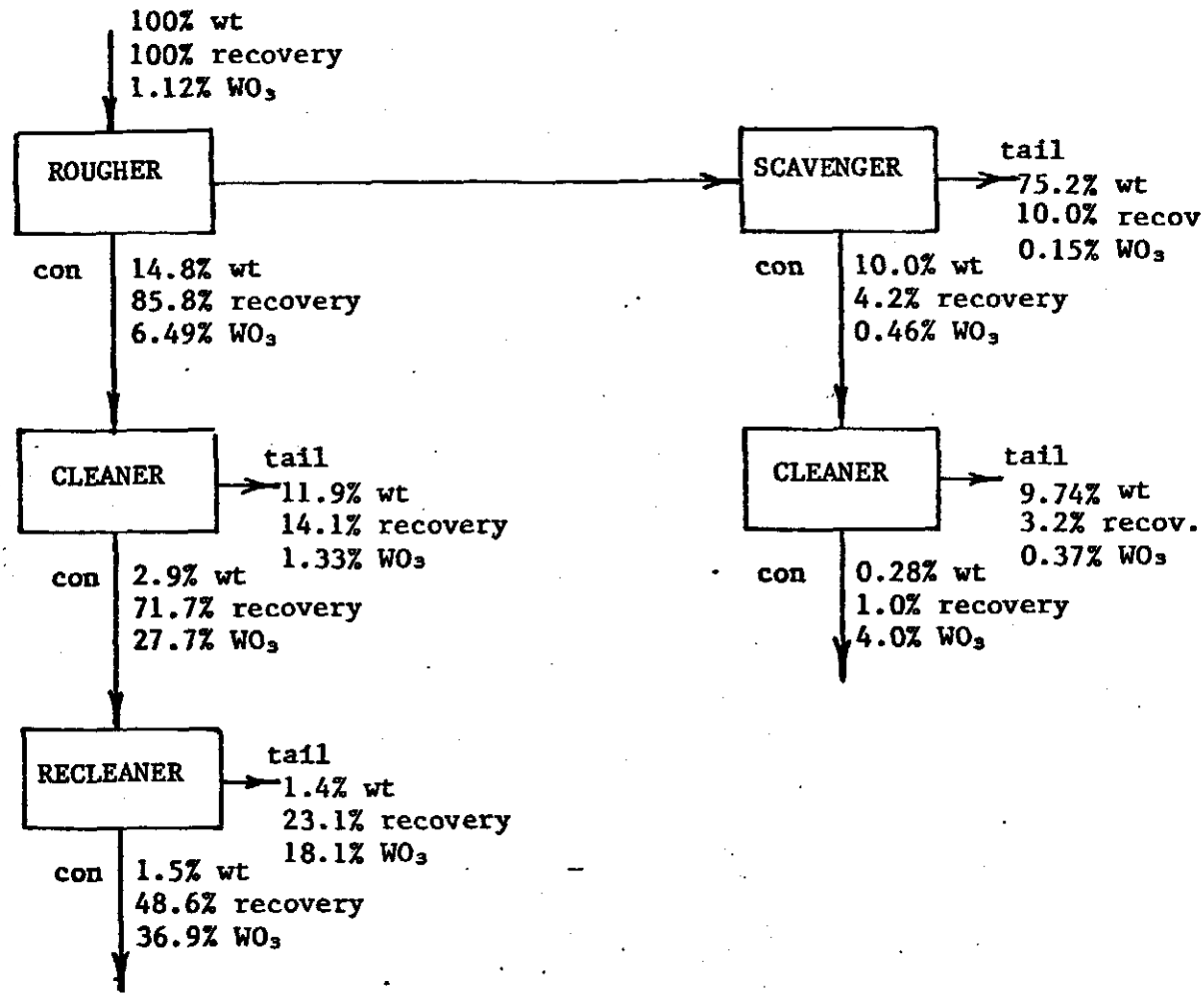
Flotinor/oleic acid float, pH 7.5 — TEST 19A



Stage	Reagents (kg/t)			pH	time
condition	sod silicate sod carbonate	1.1 1.2		10	26 min
rougher	sulphuric acid oleine flotinor S72	0.7 0.11 0.11	frother 0.10	7.5	5 min
scavenger	frother	0.10	no further reagents	7.5	5 min
sc-cleaner	no further reagents			7.5	5 min
ro-cleaner	no further reagents			7.5	5 min
recleaner	no further reagents			7.5	5 min

Comments: A good selective float, easily cleaned to better than 30% WO_3, but lacking a bit on rougher recovery.

Oleic acid float (0.2 kg/t), pH 10 TEST 19B



Stage	Reagents (kg/t)			pH	time
condition	sod silicate sod carbonate	1.1 2.1	27% solids	10	20 min
rougher	oleine frother	0.23 0.10		10	5 min
scavenger	frother	0.10	no further reagents	10	5 min
sc-cleaner	sod silicate	1.1	no further reagents	10	5 min
ro-cleaner	sod silicate	1.1	no further reagents	10	5 min
recleaner	sod silicate	1.1	no further reagents	10	5 min

Comments: A high recovery float but difficult to reclean. Rougher stage lacks selectivity and gives too much weight in the cleaner tailing. Not enough silicate on the basis of earlier tests.

APPENDIX 2

Central Mineralogical Services Report

CMS 82/6/41

Central Mineralogical Services

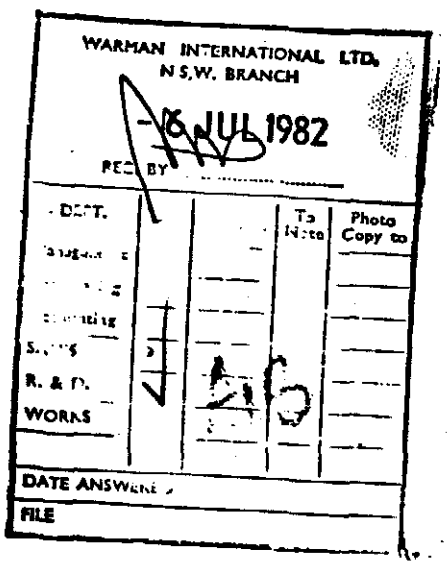
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P.O. Box 51
ARTARMON / N.S.W. 2064

1st July, 1982

REPORT CMS 82/6/41

YOUR REFERENCE:	Order No. SY 94770
DATE RECEIVED:	30th June, 1982
SAMPLE NOS.:	Kara 21 Float Test 19A, 19B
SUBMITTED BY:	M. Lanyon
WORK REQUESTED:	Mineralogy



H.W. Fander, M. Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 1st July, 1982

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
Test 19A, 19B
Scheelite Concentrates

Job No. CMS 82/6/41 Date Received: 30.6.1982

Reference Order No. SY 94770

Sample No. Test 19A, 19B - Kara 21

Nature of Sample: Scheelite Flotation Concentrates

DESCRIPTION **SECTION No.**

a. Hand Specimen:

b. Microscopic:

Float Test 19A A portion of the sample was examined as a grain-mount and the following minerals were detected: fluorite (about 50 %) as splinters 10-240 μ, scheelite (about 30 %) as grains 10-120 μ, carbonate (15 %) in the 10-100 μ range, apatite (2-4 %) as 50-100 μ grains, with traces of sulphides, hematite and ?wolframite. All the components are free and clean. The fluorite is almost all colourless except for a few purple grains, hence all the major minerals are more or less colourless.

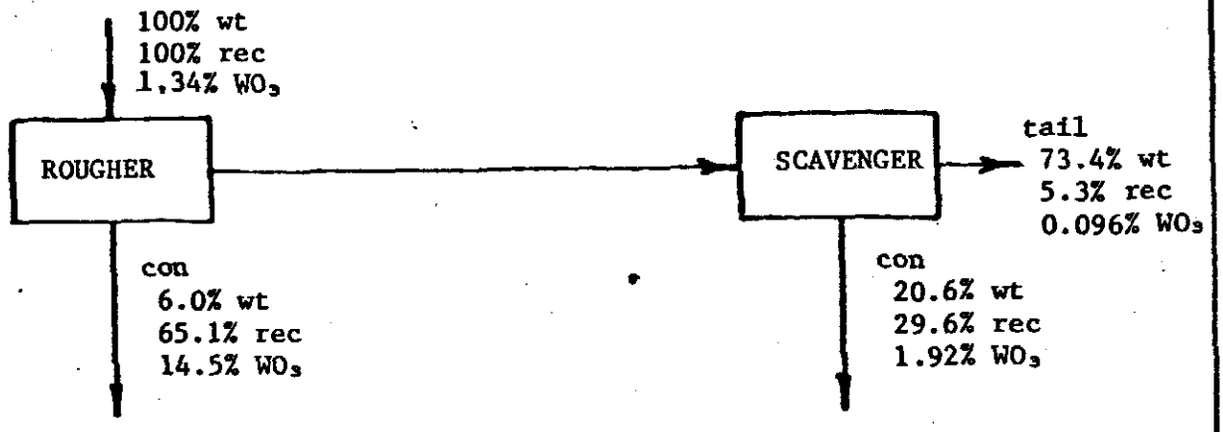
Float Test 19B This sample consists very largely of fluorite and scheelite, with much less carbonate. Fluorite comprises 60-65 % of the sample, scheelite 25-30 %, carbonate about 5 %, with 1-2 % apatite, traces of garnet (grossularite), sulphides, hematite and ?wolframite.

All the components are free, and grainsize ranges are similar to 19A.

It would seem that further upgrading would be achieved by gravity methods, though this would probably need to be preceded by sizing.

H.W. Fander, M. Sc.

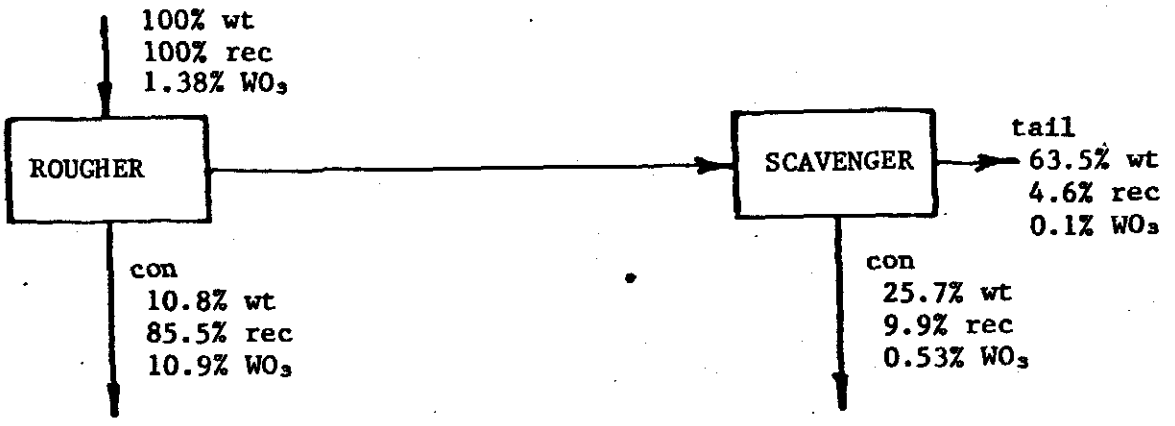
Oleine float at 0.7 kg/t sod silicate, pH 9.5 TEST 4



Stage	Reagents (kg/t)		pH	time
Condition	sod silicate sod carbonate	0.69 3.44	9.5	20 min
rougher	oleine	0.086	9.5	15 min
scavenger	oleine	0.172	9.5	30 min

Comments: Low grade of concentrate due to insufficient sodium silicate, which also causes a reduced availability of oleine for scheelite, by oleine absorption on gangue, giving low recovery of scheelite.

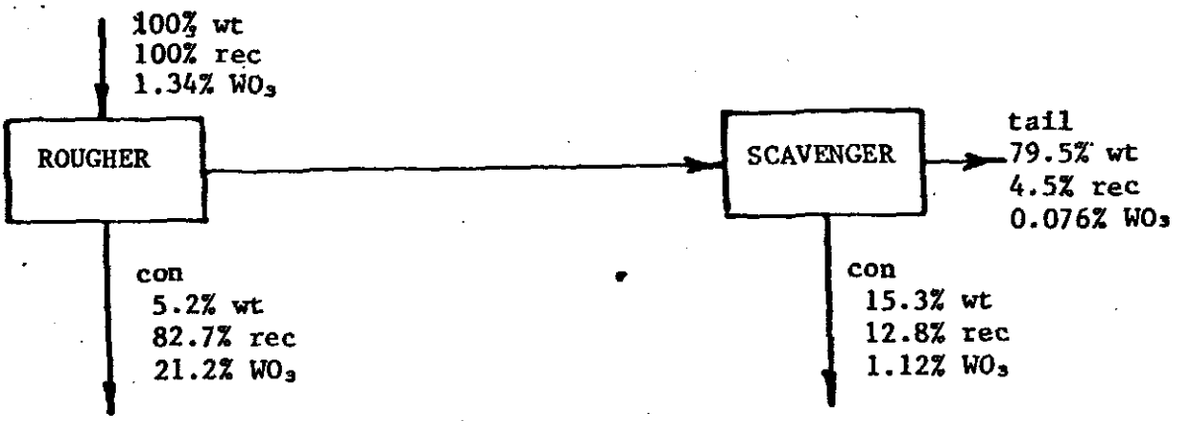
Oleine float at 0.75 kg/t sod silicate, pH 10 TEST 5



Stage	Reagents (kg/t)		pH	time
conditions	sod silicate sod carbonate	0.74 5.65	10	20 min
rougher	oleine	0.092	10	15 min
scavenger	oleine	0.184	10	30 min

Comments: Good recovery. Concentrate grade poor due to insufficient sodium silicate.

Oleine float at 1.0 kg/t sod silicate, pH 10 TEST 6

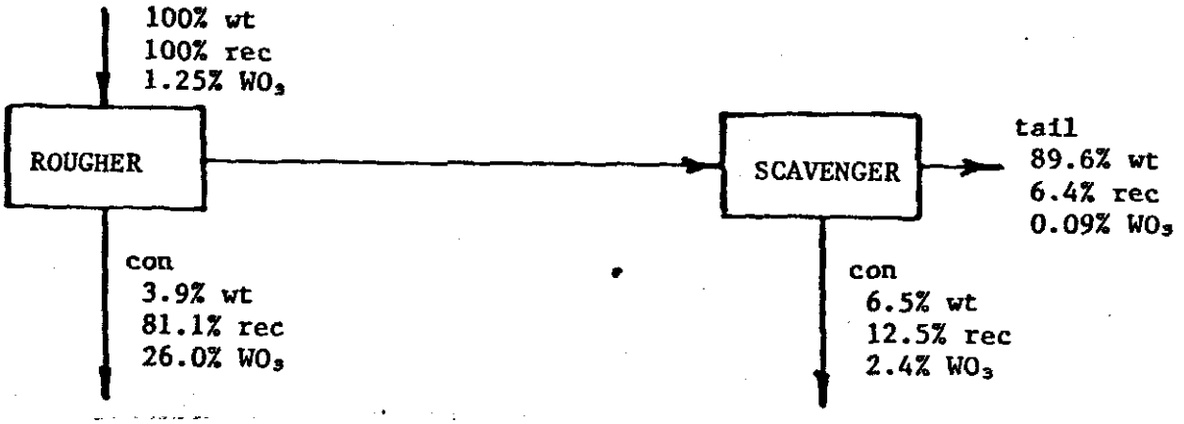


Stage	Reagents (kg/t)		pH	time
condition	sod silicate sod carbonate	0.95 6.21	10	20 min
rougher	oleine	0.089	10	15 min
scavenger	oleine	0.177	10	30 min

Comments: Good recovery.

Grade could be improved.

Oleine float at 1.2 kg/t sod silicate, pH 10 TEST 7

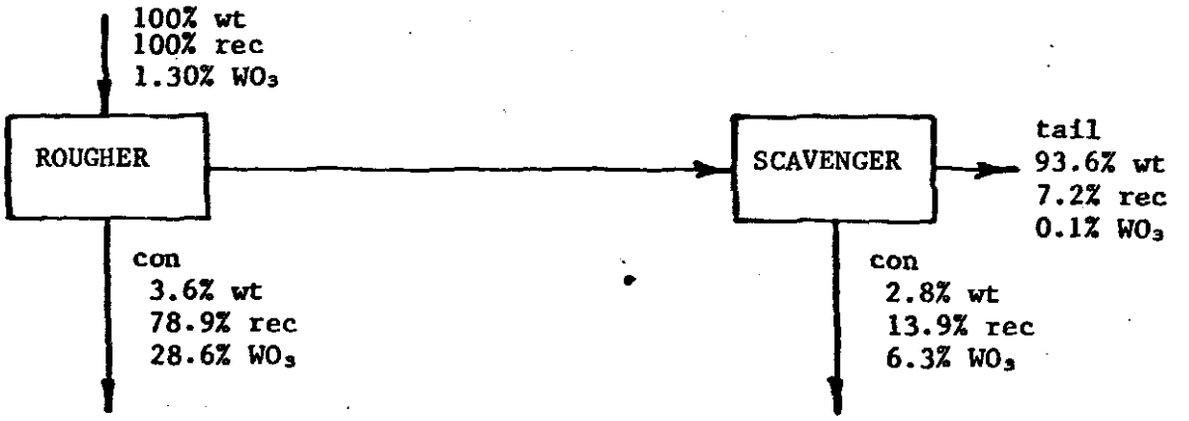


Stage	Reagents (kg/t)		pH	time
condition	sod silicate sod carbonate	1.15 6.88	10	20 min
rougher	oleine	0.086	10	15 min
scavenger	oleine	0.172	10	15 min

Comments: Good recovery

Grade poor

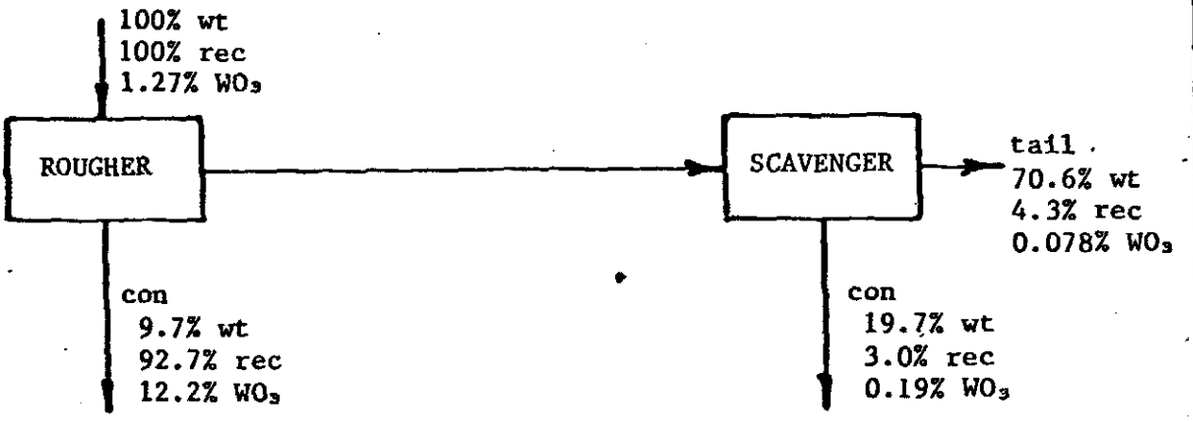
Oleine float at 1.4 kg/t sod silicate, pH 10 TEST 8



Stage	Reagents (kg/t)		pH	time
condition	sod silicate sod carbonate	1.39 6.09	10	20 min
rougher	oleine	0.087	10	15 min
scavenger	oleine	0.174	10	30 min

Comments: Best grade of concentrate, due to sod silicate.
Recovery decreased a little, high scavenger recovery.

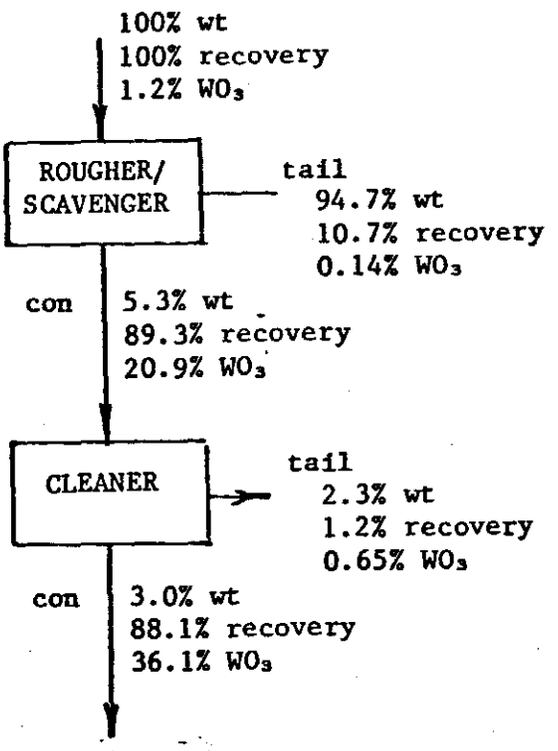
Oleine float at 0.9 kg/t sod silicate, pH 9.5 TEST 9



Stage	Reagents (kg/t)		pH	time
condition	sod silicate sod carbonate	0.87 1.36	9.5	20 min
rougher	oleine	0.082	9.5	15 min
scavenger	oleine	0.163	9.5	30 min

Comments: Recovery good.
Grade poor due to insufficient sod silicate.

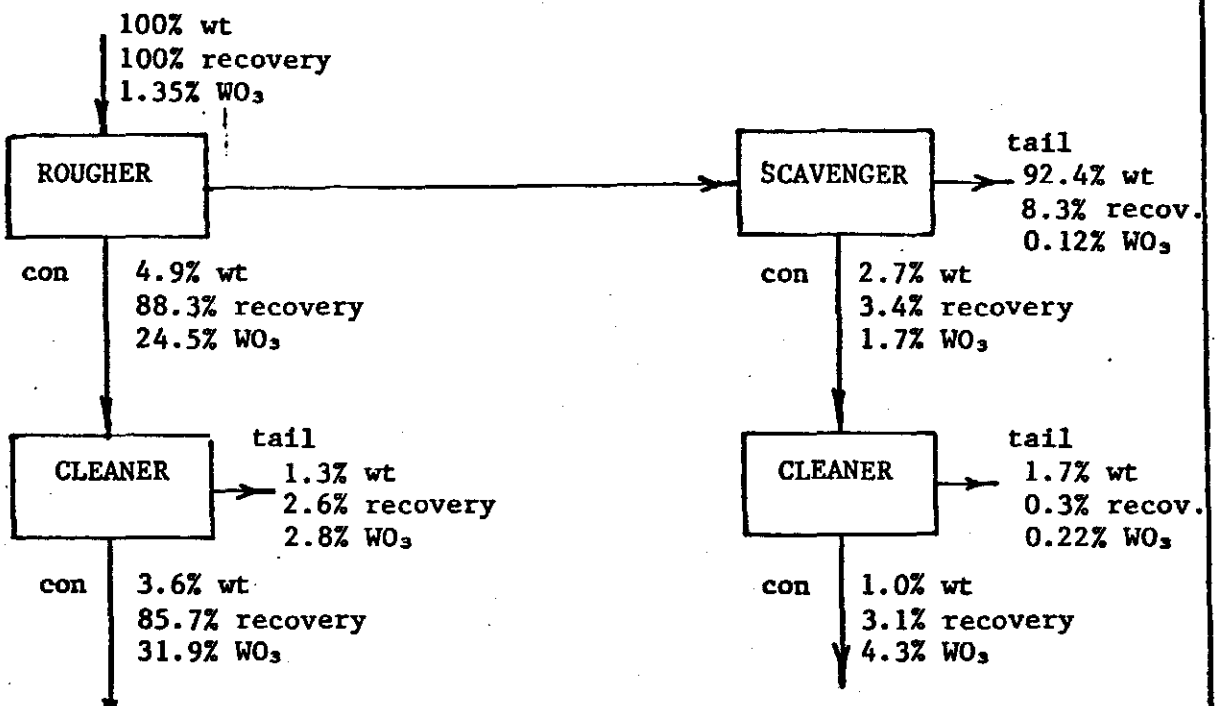
Oleic acid float, pH 10 TEST 10



stage	Reagents (kg/t)		pH	time
condition	sod silicate sod carbonate	1.8 4.9	10	20 min
rougher	oleine	0.11	10	15 min
scavenger	oleine	0.18	10	20 min
cleaner	sod carbonate oleine	0.42 0.01	10	5 min

Comments: A very good rougher float with high recovery and good cleaning characteristics

oleic acid float, pH 10 TEST 11

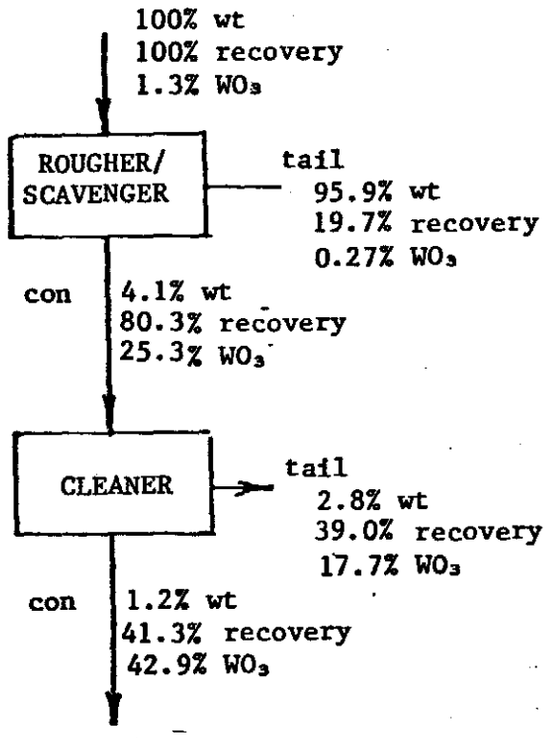


Stage	Reagents (kg/t)			pH	time
condition	sod silicate sod carbonate	1.9 4.5	27% solids	10	20 min
rougher	oleine frother	0.09 0.23		10	15 min
scavenger	oleine frother	0.20 0.23		10	20 min
sc-cleaner	sod carbonate	0.3		10	5 min
ro-cleaner	sod carbonate	0.5		10	5 min

Comments: A very good rougher float: high grade and high recovery

Oleic acid float, pH 10

TEST 12

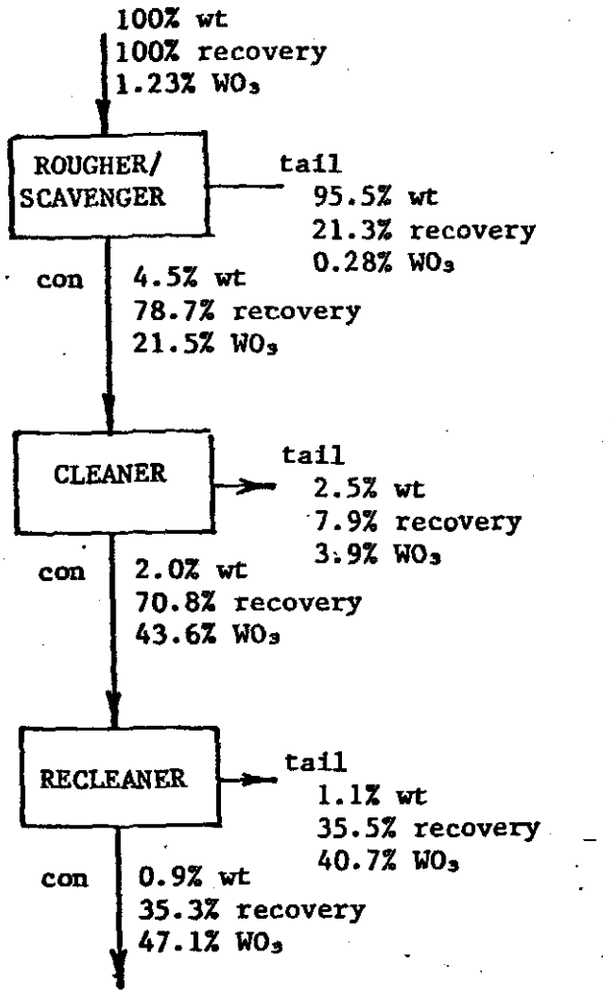


stage	Reagents (kg/t)			pH	time
condition	sod silicate sod carbonate	1.8 2.4	27% solids	10	20 min
rougher	oleine	0.12		9.5	15 min
scavenger	oleine	0.18		9.5	15 min
cleaner	sod silicate sod carbonate	0.8 0.5		10	5 min

Comments: A selective rougher float with high ratio of concentration, probably lacking a little in recovery. Too much depression of scheelite in cleaner.

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Oleic acid float, pH 10 — TEST 13

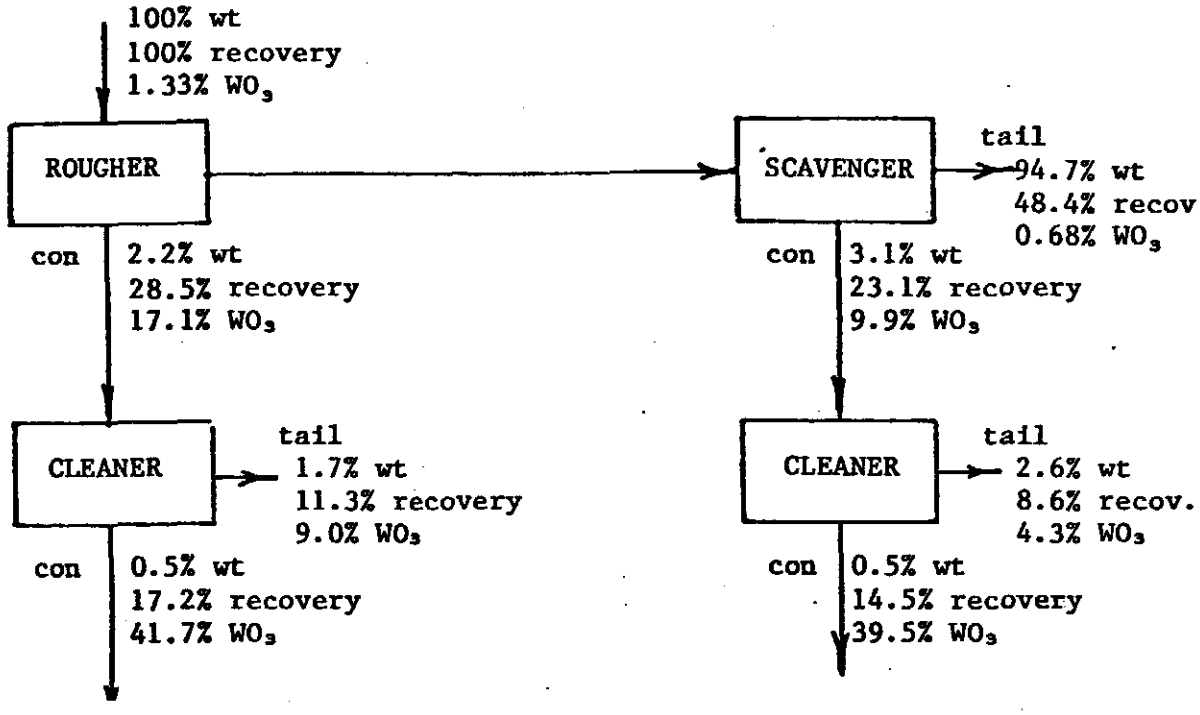


Stage	Reagents (kg/t)			pH	time
condition	sod silicate sod carbonate	1.4 4.2	27% solids	10	20 min
rougher	oleine	0.09		10	15 min
scavenger	oleine	0.18		10	15 min
cleaner	sod silicate sod carbonate	0.7 0.45		10	5 min
recleaner	sod silicate sod carbonate	0.7 0.45		10	5 min

Comments: A satisfactory result for a "standard" oleic acid float.

Recleaning is not effective.

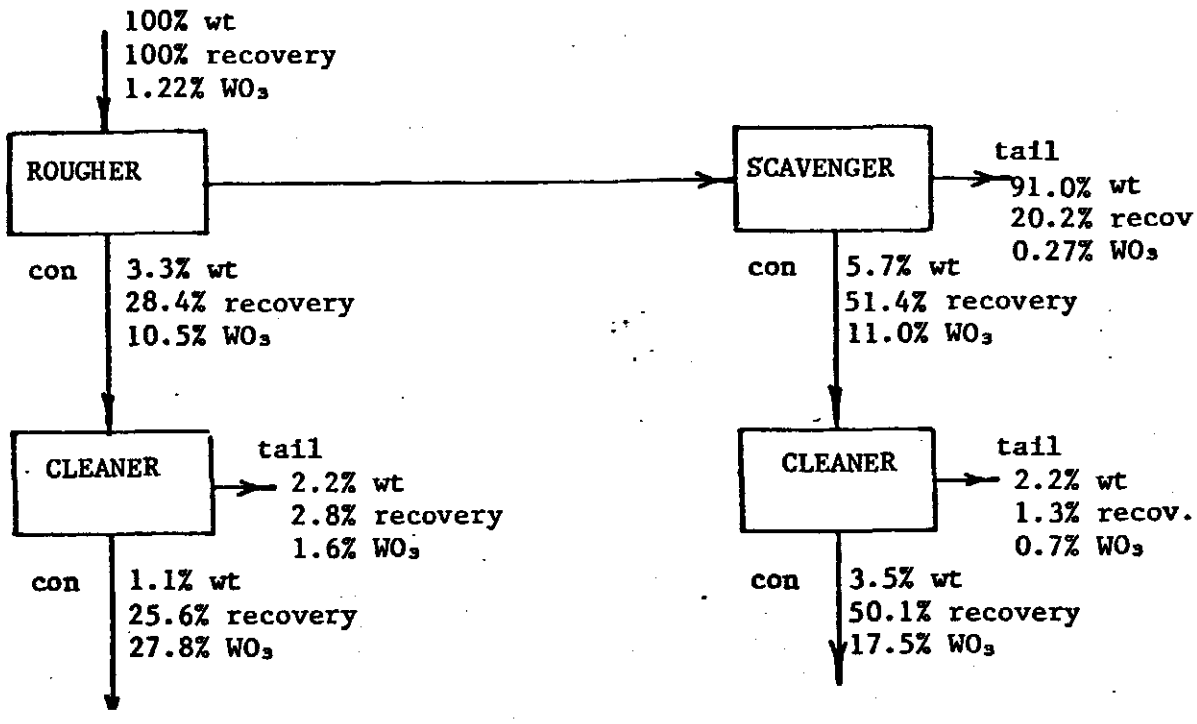
Oleic acid float, pH 10 — TEST 14



Stage	Reagents (kg/t)		pH	time
condition	sod silicate sod carbonate	1.4 1.7	10	20 min
rougher	oleine	0.09	10	15 min
scavenger	oleine	0.17	10	15 min
sc-cleaner	sod silicate sod carbonate	0.7 0.3	10	5 min
ro-cleaner	sod silicate	0.7	10	5 min

Comments: A reasonably selective float but poor recovery compared with tests 10, 11, 12.

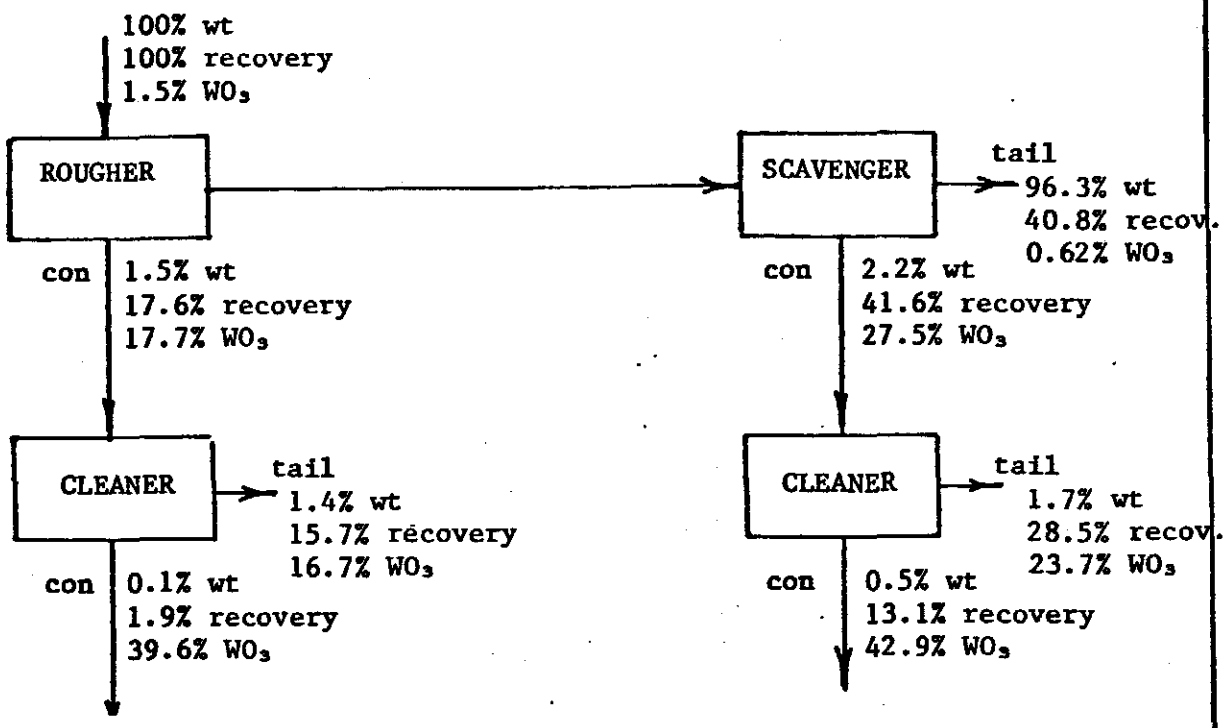
Oleic acid float (0.09 kg/t), pH 7.5 — TEST 15



Stage	Reagents (kg/t)			pH	time
condition	sod silicate sod carbonate	1.4 2.6	27% solids	10	20 min
rougher	oleine sulphuric	0.09 1.64, frother 0.02		7.5	15 min
scavenger	oleine sulphuric	0.09 (no frother)		7.5	15 min
ro-cleaner	no reagents			7.3	5 min
sc-cleaner	no reagents			7.8	5 min

Comments: A less selective float and a bit low on recovery. Would probably have benefited from another stage addition of oleic. Cleaning was fairly satisfactory. Nothing special to recommend the lower pH

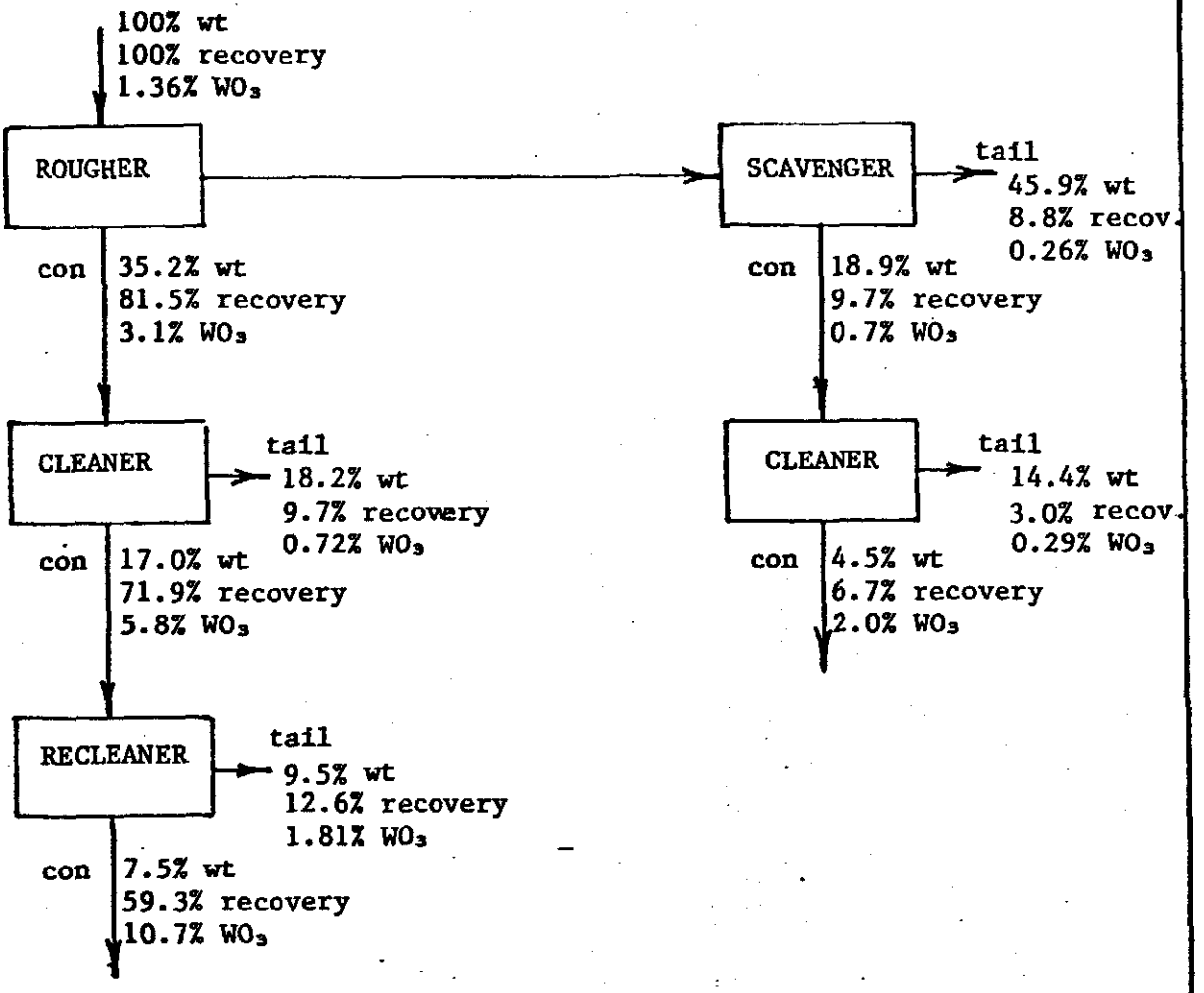
Oleic acid float, pH 10 — TEST 16



Stage	Reagents (kg/t)			pH	time
condition	sod silicate sod carbonate	1.4 3.9	27% solids	10	20 min
rougher	oleic acid	0.09		10	15 min
scavenger	oleic acid	0.18		10	15 min
sc-cleaner	sod silicate sod carbonate	0.7 0.9		10	5 min
ro-cleaner	sod silicate sod carbonate	0.7 0.6		10	5 min

Comments: Selective float in both stages but no useful recovery.
Cleaning not effective.

Akypomine float (0.2 kg/t), pH 7.5 — TEST 17A

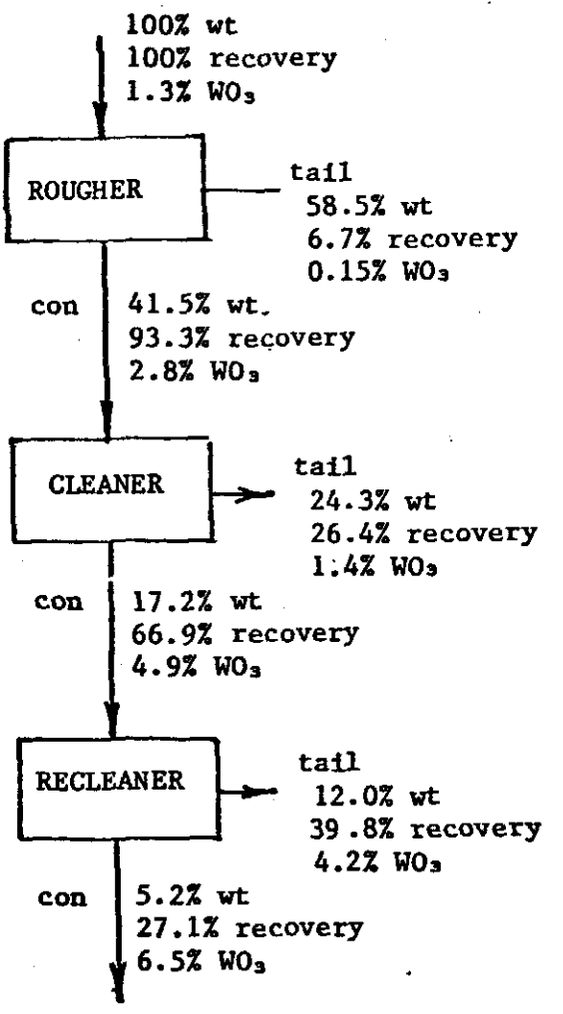


Stage	Reagents (kg/t)			pH	time
condition	sod silicate sod carbonate	1.1 1.5	27% solids	10	20 min
rougher	akypomine sulphuric	0.21 1.2	frother 0.10	7.5	5 min
scavenger	sulphuric to pH 7.5 no additional reagent		frother 0.10	7.5	5 min
ro-cleaner	no further reagents			7.9	5 min
sc-cleaner	no further reagents			8.2	5 min
recleaner	no further reagents			7.8	5 min

Comments: High recovery, non-selective float with poor cleaning characteristics.

Sulphosuccinate reagent with DA 811
as a depressant, pH 6.5

TEST 17B



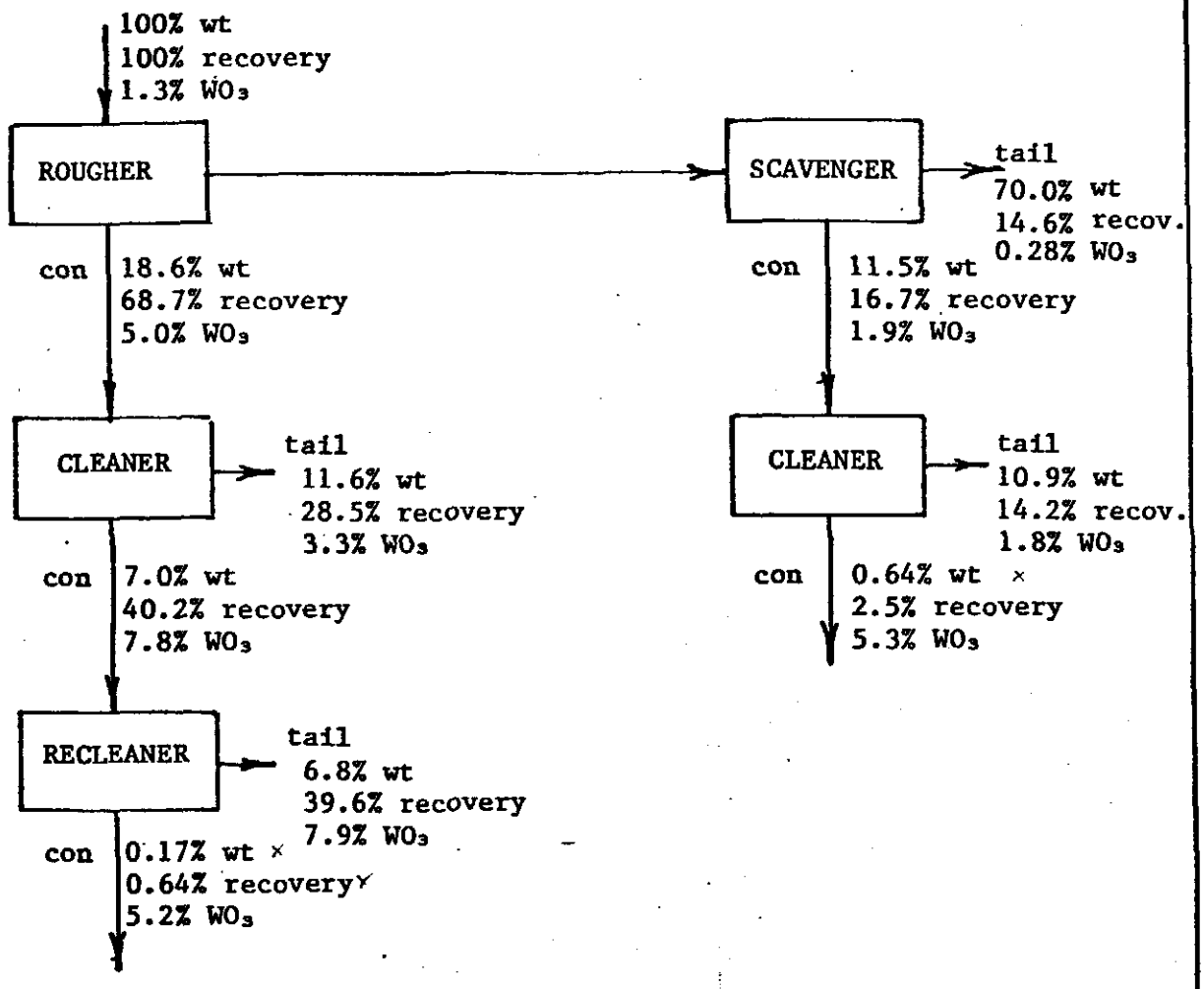
Stage	Reagents (kg/t)			pH	time
condition	sulphuric acid CA 540 DA 811	0.06 0.21 0.21	28% solids	6.5	9 min
rougher	MIBC	0.02	no further reagents	6.5	5 min
cleaner	sulphuric	0.11	no further reagents	6.5	5 min
recleaner	sulphuric	0.11	no further reagents	6.5	5 min

Comments: Non-selective float, too much froth, due to

(i) too much collector
(ii) not enough depressant
(iii) too much frother

Sulphosuccinate reagent with DA 811
as a depressant (repeat Test 17B) pH 6.5

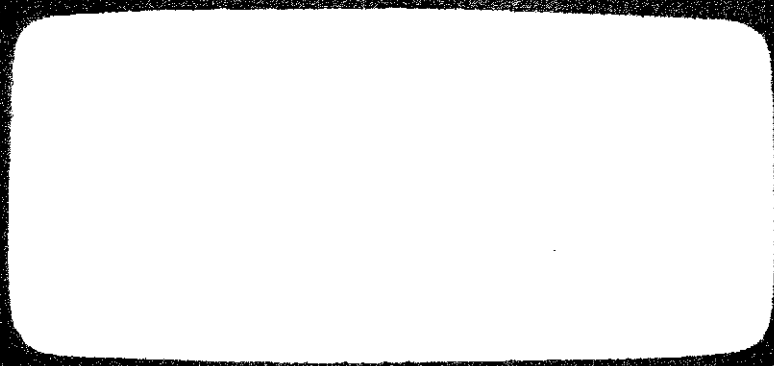
TEST 18A



Stage	Reagents (kg/t)			pH	time
condition	sulphuric acid CA 540 DA 811	0.30 0.22 0.22	27% solids	6.5	9 min
rougher	sulphuric MIBC	to pH 6.5 0.006 g/t	no other reagents	6.5	5 min
scavenger	sulphuric MIBC	to pH 6.5 0.006 g/t	no other reagents	6.5	5 min
sc-cleaner	sulphuric	to pH 6.5	no other reagents	6.5	5 min
ro-cleaner	sulphuric	to pH 6.5	no other reagents	6.5	5 min
recleaner	sulphuric	to pH 6.5	no other reagents	6.5	5 min

Comments: Non-selective float, too much froth. Cleaning not effective - probably need some reagent in the cleaners. Too much collector, not enough depressant.

Report No.
4C/82



82-1828
11/17

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REPORT NO. 4C/82

of M. | A.O. | C.G. | E.O. | D.S.M.L
Registra
Received - 1 OCT 1982
Answered
E & IL
DEPT. OF MINES
REF. No. 8090A 82

REVIEW OF McINTYRE MINES

METALLURGICAL TEST WORK COMPLETED

BY WARMANS INT. LTD. - 1978 - 1982.

McINTYRE MINES (AUSTRALIA) PTY. LTD.,
BURNIE.

C. H. WHITEHEAD

JUNE, 1982.

REVIEW OF McINTYRE MINES METALLURGICAL TEST WORK (1978 - 1982)

McIntyre Mines have at various periods since 1978 contracted Warman International Limited of Sydney to undertake laboratory scale metallurgical tests on bulk samples of material considered representative of the various ore types found at Kara.

Results of a portion of this work will be utilised by Golder Associates in their feasibility study of the main Kara deposits. The data will form the basis of gravity scheelite recovery estimations on a commercial scale, and be incorporated in their proposed flowsheet.

As can be expected documentation of McIntyres sampling and Warmans metallurgical work is somewhat voluminous in nature. The samples themselves were submitted over a wide range of time; they were collected for a multitude of reasons and the actual test work carried out on individual samples appears to be varied and non-standardised. To complicate the issue, neither the actual sample locations nor the nature of the samples under present day ore type nomenclature are readily apparent.

Prior to the Golder Associates study it was therefore considered appropiate to review all the past Warman reports and attempt to assess which samples and test results are applicable to their current evaluations.

In brief, the present review included the following steps:-

- Determine the actual location and/or locations of the individual samples, and build up drill section plans showing these locations.
- Classify the actual nature of the samples, in particular, categorise according to present day terminology of ore-types. If the sample was found to consist of a combination of ore-types, the varying proportions were calculated.
- Review the format of the Warmans test work, especially to see if their investigations were fairly standard, and resultant data realistically comparable. If so, the results of estimated scheelite gravity and flotation recoveries were documented.

TABLE NO. 1 , of the report, itemises details of all samples which have been submitted to Warmans - total, twenty five in number. The table shows the skarn location from which the sample was collected, the particular ore-zone it represents, and more specifically, from which drill section and mining level. An ore type classification of the sample is tabulated, ie., whether fresh (F), partially weathered (Y), weathered with scheelite (X) or completely weathered (W).

On reference to this table it will be seen that a large proportion of the samples consist of a combination of ore types, rather than one specific type. Equally disturbing, it is also shown that some samples have been collected from different and widely separated ore zones of a particular deposit.

Bearing in mind that Golder Associates in their present work are solely involved in a study of the reserves of fresh and partially weathered ore from the potential open-pit deposits at Kara No. 1 and the Kara North 266 Zone, TABLE NO. 2 itemises only those samples representative of these two ore types, and where possible, of those two deposits. Eleven such samples can be classified.

TABLE NO. 3, likewise itemises details of nine samples considered representative of "weathered material" ie., wither "X" or "W" types.

The remaining balance of samples not tabulated in either Tables 2 or 3 (five in number) are ones where either the metallurgical work is insufficient or the actual breakdown of collected sample is too varied and complicated to be of any particular value.

Samples of fresh (F) and partially weathered(Y) ore.

Three samples, KNOP 1, KARA 5, and KERUG 1, would definetely be classified as representative of fresh ore.

It is of course somewhat unfortunate to have available such a small number of samples for which to base recoveries for this ore type. In addition, sample KNOP 1 was taken from the highest grade portion of the Kara N. 266 Zone deposit (head assay 1.80% WO_3) and could not be stated as truly representative of this ore zone. KARA 5, a surface sample from the Tasminex N.L. Main Pit area is also higher grade than average, and from available documentation it is not readily apparent if the sample included a proportion of partially weathered material.

Sample KERUG 1, is actually taken from the Eastern Ridge deposit, but on re-examination of the drill core, it could be considered as representative of fresh ore from the Kara deposits.

The above three samples of fresh ore have an average WO_3 grade of 1.13% WO_3, and show average gravity recoveries of 68.96% and total gravity plus flotation recoveries of 84.63%.

Four samples, namely KARA 18, KOP 5818Y, KOP 5729Y and KOP 5778Y, could be classified as being entirely representative of partially weathered ore. These samples show an average grade of 0.91% WO_3, a gravity recovery of 59.58% and gravity plus flotation recovery of 73.22%.

Four samples are mixtures of both fresh and partially weathered ore. The proportions of these two ore types have been calculated and shown in Table 2. The WO_3 grades of these samples are more representative of Kara ore (average 0.63% WO_3) and show gravity recoveries of 60.24%.

For the total 11 samples of fresh and partially weathered ore submitted to Warmans, the following averaged statistics are available:-

- average grade 0.87% WO_3
- average gravity recovery 62.40%
- average gravity/flotation recoveries 75.83%

Of the samples tested by Warmans, the review has shown it would be extremely difficult to nominate specific samples which could be classified as representative of specific delineated ore zones (eg. Kara No. 1 Main Zone East, or Kara No.1 Southern Extension, etc. etc.).

C. H. Whitehead,
15th June, 1982.

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McINTYRE MINES SAMPLES SUBMITTED TO WARMAN INTERNATIONAL LTD

713421

TABLE. N°1.

McINTYRE MINES. SAMPLE NUMBER.	LOCATION	ORE ZONE.	DRILL SECTIONS.	MINING LEVELS	ORE-TYPE BREAKDOWN.	WARMAN REPORT. N°.
KARA. 1.	KARA. N° 1.	MAIN ZONE + SOUTHERN EXTENSION	5730N - 5980N.	MISCELLANEOUS.	W X Y F	78/99721-2.
KARA. 2.	KARA. N° 1.	MAIN ZONE - WEST.	5780N	500L - 510L.	W	78/99721-2.
KARA. 3.	KARA. N° 1.	MAIN ZONE WEST + WEST LIMB.	6860N - 6140N.	MISCELLANEOUS.	W X Y F	78/99721-3.
KARA. 4.	EASTERN RIDGE	UPPER SKARN ZONE.	6376N - 6420N.	440L - 470L.	X Y	78/99721-2.
KARA. 5.	KARA. N° 1.	MAIN ZONE - EAST.	TASMINEX MAIN PIT.	—	Y F	78/99721-2.
KOPY. 1.	KARA. N° 1.	MAIN ZONE - EAST.	5900N - 5980N	460L - 490L.	Y F	79/110997-3.
KOPY. 3.	KARA. N° 1.	MAIN ZONE EAST + WEST	5860N - 5900N	450L - 470L.	Y F	79/110997-3.
KOPY. 5.	KARA. N° 1.	MAIN ZONE EAST + WEST	5890N - 5860N	460L - 490L.	X Y F	79/110997-3.
KOPY. 5F.	KARA. N° 1.	MAIN ZONE EAST + WEST.	5820N - 5860N	460L - 480L.	Y F	79/110997-3.
KERUG. 1.	EASTERN RIDGE.	UPPER SKARN ZONE	MISCELLANEOUS.	MISCELLANEOUS.	F	79/110997-3.
KNOP. 1	KARA. NORTH.	266 ZONE.	7120N - 7220N.	410L - 420L.	F	79/110997-3.
KOP - 5729 Y.	KARA. N° 1.	SOUTHERN EXTENSION	5730N.	490L - 500L.	Y	79/110997-3.
KOP - 5729 W	KARA. N° 1	SOUTHERN EXTENSION	5730N	500L - 510L.	W X	79/110997-3.
KOP - 5778 Y.	KARA. N° 1.	MAIN ZONE - WEST.	5780N.	490L - 500L.	Y	79/110997-3.
KOP - 5818 Y.	KARA. N° 1.	MAIN ZONE - WEST.	5820N.	480L - 490L.	Y	79/110997-3.
7380 W.V.	KARA. N° 1.	MAIN ZONE WEST + SOUTHERN EXT.	6730N - 5820N.	490L - 510L.	X	79/110997-3
PIT. TRENCH.	KARA. N° 1.	MAIN ZONE WEST.	5820N.	500L.	W X	80/127518.
DAM TRENCH.	KARA. N° 1.	WEST LIMB.	6060N.	490L.	W X	80/127518
KARA. 10.	KARA. N° 1.	MAIN ZONE - WEST.	5780N - 5820N.	490L.	W X Y	81/140448/1
KARA. 12.	KARA. N° 1.	MAIN ZONE - WEST	5780N - 5820N	500L.	W X	81/140448/1
KARA. 13.	KARA. N° 1.	MAIN ZONE + S.EXT - WEST.	5780N - 5780N	500L.	W X	81/140448/1.
KARA. 14.	KARA. N° 1.	MAIN ZONE - WEST + S EXT.	5780N - 5780N.	510L.	W X	81/140448/1
KARA. 15	KARA. N° 1.	MAIN ZONE WEST + SOUTH EXT	5730N - 5780N	500 - 510L	W X Y	81/140448/1
KARA. 18.	EASTERN RIDGE.	UPPER SKARN UNIT.	6280N	475L.	Y	81/140448/1
KARA. 19.	KARA. NORTH.	266 ZONE.	7160N.	450L.	X Y.	81/140448/1

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KARA PROJECT. 713422 METALLURGICAL SAMPLES. FRESH + PARTIALLY WEATHERED ORE. TABLE. N°2.

SAMPLE NUMBER.	ORE TYPE.	SAMPLE LOCATION (ORE - ZONE)	ORE TYPE DISTRIBUTION + ASSAY.						CALC. % WO_3 GRADE (CORE SAMPLE)	HEAD ASSAY % WO_3	GRAVITY RECOVERIES.			FLOT REC. %	TOTAL REC. (GRAVITY + FLOT)
			FRESH (F)		PARTIALLY WEATHERED (Y)		WEATHERED (X)				CONC %	MIDD %	TOTAL %		
			% WT. DIST	% WO_3	% WT. DIST	% WO_3	% WT. DIST.	% WO_3							
KNOP 1	FRESH	KARA NORTH - 266 ZONE.	100%	1.66	NIL		NIL		1.66	1.80	66.06	0.39	66.45	22.74	89.19
KARA. 5.	FRESH	KARA 1 - MAIN ZONE EAST.	100%		NIL		NIL.			1.20			70.00	5.60	75.60
KERUG. 1.	FRESH.	EASTERN RIDGE.	100%	0.55.	NIL		NIL.		0.55	0.40	68.73	1.67	70.40	18.7	89.10
	FRESH.						AVERAGE.			1.13.			68.96.		84.63.
KOPY. 3.	FRESH + PART WTHED.	KARA. 1. MAIN ZONE - EAST + WEST. 450 - 470L.	88.6%	0.43	11.4%	0.45	NIL		0.44	0.39.	66.30	2.67	68.98	14.85.	83.83
KOPY. 5F.	FRESH + PART WTHED	KARA. 1. MAIN ZONE - EAST + WEST. 460 - 480L.	70.3%	0.90	29.7%	0.47.	NIL.		0.77	0.79	62.13	1.09	63.22	10.80	74.02
KOPY. 1.	FRESH + PART WTHED	KARA. 1. MAIN ZONE - EAST. 460 - 490.L.	57.1%	0.63	42.9%	0.57.	NIL.		0.55	0.57	43.50	2.04	45.54	10.47.	56.01
KOPY. 5.	FRESH + PART WTHED.	KARA. 1. MAIN ZONE - EAST + WEST. 460 - 490.L.	46.65%	0.92.	41.40%	0.63	12.06%	0.69.	0.77.	0.75	62.13.	1.09	63.22	10.80.	74.02
	PARTIALLY WEATHERED + FRESH.						AVERAGE.			0.63.			60.24		71.97
KARA. 18.	PART WTHED	EASTERN RIDGE.	NIL.		100%		NIL.			1.32	—	—	63.40	17.10	71.10
KOP. 5818Y	PART WTHED.	KARA. N° 1. MAIN ZONE. - WEST. SEC. 5820N.	NIL		100%	1.05.	NIL.		1.05	0.94	73.3	2.3	75.60	11.40	87.00
KOP. 5729Y	PART. WTHED.	KARA. N° 1. SOUTHERN EXTENSION SEC. 5730N	NIL.		100%	1.01.	NIL		1.01.	0.79	63.47	0.75	64.22	15.46.	79.68
KOP-5778Y.	PART. WTHED.	KARA. N° 1. MAIN ZONE - WEST. SEC. 5780N.	NIL.		100%	0.71	NIL.		0.71	0.60	25.4	7.9	45.30	9.80	55.10
	PARTIALLY WEATHERED.						AVERAGE.			0.91			59.58		73.22
AVERAGE ELEVEN SAMPLES - FRESH + PARTIALLY WEATHERED ORE.										0.87.			62.40.		75.88

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713423

TABLE. N°3.

KARA PROJECT. METALLURGICAL. SAMPLES. "WEATHERED ORE"

SAMPLE NUMBER.	ORE TYPE.	SAMPLE LOCATION. (ORE - ZONE).	ORE TYPE DISTRIBUTION + ASSAY.						CALC % WO_3 GRADE (CORE SAMPLE)	HEAD ASSAY % WO_3	RECOVERIES.		
			WEATHERED (NO SCHEELITE)		WEATHERED (SOME SCHEELITE)		PARTIALLY WEATHERED				GRAVITY	FLOTATION	TOTAL.
			% WT. DIST. W	% WO_3	% WT DIST. X	% WO_3.	% WT DIST. Y	% WO_3					
KOP. 5729W	W + X	KARA. N° 1 – SOUTH EXT. SEC. LINE. 5730.N.	22.4.	1.42%	77.6	1.09%	NIL		1.17%	1.06%	9.43	1.07	10.40
KARA. 10	X + Y	KARA. N°1 - SEC. 5780 - 6820N 490. LEVEL.	NIL	—	43.9	0.70%	56.1%	0.78%	0.74%	0.59%	27.90	2.00	29.90.
KARA. 12	W + X.	KARA. N°1 SEC 5780 - 6820N 600 LEVEL.	51.8	0.46%	48.2	0.61%	NIL		0.53%	?	10.5	9.3	19.80
KARA. 13.	W + X.	KARA. N°1. SEC 5780 - 5730N 600L.	44.6	0.46%	55.4%	0.70%	NIL		0.59%	0.53%	7.1	3.1	10.20
KARA. 14	W + X.	KARA. N°1. SEC. 5780 - 5730N. 510L.	60.0	0.78%	40.0%	0.83%	NIL		0.78%	0.93%	9.9	10.6	20.50
KARA. 15.	W + X + Y.	KARA. N°1. SEC. 5780 - 5730N 500 - 510L.	16.0	0.49%	27.6%	0.81%	55.8%	1.16%	0.86	0.89	31.5	5.2	26.70
KARA. 19.	X + Y	KARA. NORTH - 266 ZONE	NIL	—	EST. 60%	—	EST. 60%	—		0.48	22.2	36.4	58.60
PIT. TRENCH	W + X	KARA 1 – WEST. LIMB.	EST 60%		EST. 40%	—	NIL	—		1.40	5.80	?	?
DAM TRENCH	W + X	KARA 1 – SEC. 5820N	EST. 90%		EST 10%	—	NIL	—		0.68	15.60	?	?

ATTACHMENTS

TABLE NO. 1 - McIntyre Mines samples submitted to Warman International Ltd.

TABLE NO. 2 - Metallurgical samples - fresh and partially weathered ore.

TABLE NO. 3 - Metallurgical samples - weathered ore.

APPENDIX

Sample No.	Details Of Sample	Drill Section Plan
KNOP 1	X	X
KERUG 1	X	X
KOPY 3	X	X
KOPY 5F	X	X
KOPY 1	X	X
KOPY 5	X	X
KOP 5818Y	X	X
KOP 5729Y	X	X
KOP 5778Y	X	X

SAMPLE N° - KNOP 1.

SAMPLE LOCATION. — KARA NORTH - 266 ZONE.

ORE TYPE. — FRESH (100%)

CALCULATED % WO_3 GRADE. — 1.66.

WARMAN REPORT. — 79/110 997-3.

SAMPLE BREAKDOWN :-

DDH N°.	SEC. N°.	SAMPLE NUMBER.	DRILL INTERVAL. (METRES)	LENGTH RUN (m)	GRADE % WO_3	ORE TYPE.	GRAMS SAMPLED.
290	7120N	290727	40·4 - 41·4	1	0·18	F	604.
		8	41·4 - 42·4	1	0·62	F	504
		9	42·4 - 43·4	1	3·46	F	604.
		30	43·4 - 44·4	1	1·05	F	604.
		1	44·4 - 45·4	1.	0·86	F	604.
266.	7160N	266023	37·0 - 38·0	1.	0·75	F	316.
		4	38·0 - 39·0	1.	0·03	F	316.
		5	39·0 - 40·0	1.	1·10	F	315
		6.	40·0 - 41·0	1.	0·25	F	316
		7.	41·0 - 42·0	1.	0·63	F	316.
		8.	42·0 - 43·0	1.	0·08	F	315
		9.	43·0 - 44·0	1.	0·69	F.	315
		20.	44·0 - 45·0	1.	0·07.	F	315
		1.	45·0 - 46·0	1.	1·20	F.	630.
		2.	46·0 - 47·0	1.	1·60	F.	630
		3.	47·0 - 48·0	1.	0·26.	F.	630.
		4.	48·0 - 49·0	1.	2·80.	F.	630
		5.	49·0 - 50·0	1.	4·20	F.	630.
		6.	50·0 - 51·0	1.	6·00	F.	630
		7.	51·0 - 52·0	1.	1·40	F.	630
		8.	52·0 - 53·0	1.	1·30	F.	630.
		9.	53·0 - 54·0	1.	8·60	F.	630
		40.	54·0 - 55·0	1.	3·80	F.	630.
		1.	55·0 - 56·0	1.	6·00	F.	630.
		2.	56·0 - 57·0	1.	0·73	F.	630
		3.	57·0 - 58·0	1.	1·60	F.	630
		4.	58·0 - 59·0	1.	0·68	F.	630.
267.	7220N.	267084.	48·7 - 49·7.	1.	0·28	F	495
		5	49·7 - 50·7	1.	8·50	F.	496.
		6.	50·7 - 51·7	1.	0·96.	F.	495.
		7.	51·7 - 52·7.	1.	0·73.	F.	496.
		8.	52·7 - 53·7	1.	2·10	F.	496
		9.	53·7 - 54·7	1.	1·90	F.	496.
		90	54·7 - 55·7	1.	0·28	F.	495
		1	55·7 - 56·7	1.	1·70	F	495.
		2.	56·7 - 57·7	1.	0·15	F	496.
		3.	57·7 - 58·7	1.	0·30	F	495
		4	58·7 - 59·7	1.	0·58	F	496
		5	59·7 - 60·7	1			

DDH. N°.	SEC. N°.	SAMPLE NUMBER.	DRILL INTERVAL (METRES)	LENGTH RUN (m)	GRADE % NO$_3$.	ORE TYPE.	GRAMS SAMPLED.
259	5900N	22161	55·0-56·0	1·0	0·20	F	1026.
		62	56·0-57·0	1·0	0·22	F	1026.
		63	57·0-58·0	1·0	0·28	F	1026.
		64	58·0-59·0	1·0	0·32	F	1026.
		65	59·0-60·0	1·0	0·58	F	1026.
		66	60·0-61·0	1·0	—	F	1026.
		67	61·0-62·0	1·0	0·02	F	1026.
		68	62·0-63·0	1·0	0·76	F	1026.
205	6900N.	21157	57·0-57·6	0·6	1·70	Y	143
		58	57·6-57·8	0·2	0·33	Y	48
		59	57·8-62·0	0·2	2·58	Y	48
		60	62·0-63·0	1·0	0·58	Y	287.
		61	63·0-64·0	1·0	0·26	Y	287
		62	64·0-65·0	1·0	0·16	Y	287.
		63	56·0-56·0	1·0	0·49	Y	287.
		64	66·0-67·0	1·0	0·07	Y	287.
					0·44 %		20,000 g.

SAMPLE N° - KERUG. 1.

SAMPLE LOCATION. — EASTERN RIDGE.

ORE TYPE. — FRESH (100%)

CALCULATED % WO_3 GRADE. — 0.55

WARMAN REPORT. — 79/110997-3.

SAMPLE BREAKDOWN :-

DDH. N°	SEC. N°	SAMPLE NUMBER.	DRILL INTERVAL (METRES)	LENGTH RUN (m)	GRADE % WO_3	ORE TYPE.	GRAMS SAMPLED.
275	6280N	275340	65.0 - 66.0	1.0	0.86	F	1177.
275	6280N	275341	66.0 - 67.0	1.0	0.30	F	1177
275	6280N	275342	67.0 - 68.0	1.0	0.09	F	1175
275	6280N	275343	68.0 - 69.0	1.0	1.12	F	1177.
271.	6328N.	271213	67.6 - 68.6	1.0	0.48	F	1177.
271.	6328N.	271214	68.6 - 69.6	1.0	0.07	F	1175.
271.	6328N.	271.215	69.6 - 70.6	1.0	0.26	F	1177
271.	6328N	271.216	70.6 - 71.6	1.0	0.90	F	1177.
274	6460 N.	274413	154.3 - 155.3.	1.0	1.02	F	1177.
274	6460 N.	274414	155.3 - 156.3	1.0	0.82	F	1177.
274	6460 N.	274415	156.3 - 157.3	1.0	0.72	F	1177.
274	6460 N.	274416	157.3 - 158.3	1.0	0.03	F	1175.
277.	6500 N.	277376.	173.4 - 174.4	1.0	0.86	F.	1177.
277.	6500 N.	277377	174.4 - 175.4	1.0	0.61	F.	1177.
277.	6500 N.	277378	175.4 - 176.4	1.0	0.34	F	1177.
277.	6500 N.	277379	176.4 - 177.4	1.0	0.04	F	1174.
277.	6500 N.	277380	177.4 - 178.4	1.0	0.96.	F	1177.
					0.56	F	21,000grams.

SAMPLE N° - KOPY 3.

SAMPLE LOCATION - KARA. N°1 - MAIN ZONE E+W - 460-470L.

ORE TYPE - F (88.6%) + Y (11.4%.)

CALCULATED % WO_3 GRADE. - 0.44.

WARMAN REPORT. - 79/110997-3.

SAMPLE BREAKDOWN:-

DDH. N°.	SEC. N°.	SAMPLE NUMBER.	DRILL INTERVAL. (METRES)	LENGTH RUN (m).	GRADE % WO_3	ORE TYPE.	GRAMS SAMPLED
218	5860N.	21661	15.0 - 16.0	1.0	0.36	F	649
		62.	16.0 - 17.0	1.0	0.75	F	649
		63	17.0 - 18.0	1.0	0.65	F	649
		64	18.0 - 18.5	0.5	2.04	F	275
		65	18.5 - 19.0	0.5	0.04	F	275
		21669	22.0 - 23.0	1.0	0.23	F	619
		70	23.0 - 24.0	1.0	0.08	F	650
		71	24.0 - 24.5	0.5	0.21.	F	275.
		72	24.5 - 25.6	1.0	0.01	F	850
		73	25.5 - 26.5	1.0	1.23	F	650.
224	5860N.	22356	8.0 - 9.0	1.0	0.82	Y	215
		57	9.0 - 10.0	1.0	0.44	Y	215
		58	10.0 - 11.0	1.0	0.62	Y	215
		59.	11.0 - 12.0	1.0	0.49	Y	215
		60	12.0 - 13.0	1.0	1.41	F	215
		61.	13.0 - 14.0	1.0	1.08	F	215
		62.	14.0 - 15.0	1.0	1.00	F	215.
		63.	15.0 - 16.0	1.0	0.18	F	215.
		64	16.0 - 17.0	1.0	0.26	F	215
		65	17.0 - 18.0	1.0	0.14	F	215
		66	18.0 - 19.0	1.0	0.16	F	216
		67	19.0 - 20.0	1.0	0.09	F	216.
		68	20.0 - 21.0	1.0	0.78	F	216.
		69	21.0 - 22.0	1.0	0.47	F	216.
		70	22.0 - 23.0	1.0	0.54	F	216.
		71	23.0 - 24.0	1.0	0.74	F	216.
260	5860N	22249	47.0 - 48.0	1.0	0.98	F.	718
		50	48.0 - 49.0	1.0	0.04	F.	718.
226	5860N.	22383	13.0 - 14.0	1.0	0.22	F	407
		84	14.0 - 15.0	1.0	0.19	F	407.

SAMPLE N° - KOPY 5.F.

SAMPLE LOCATION - KARA. N°1 - MAIN ZONE, EAST+ WEST, 460-480L.

ORE TYPE - F (70.3%) - Y -(29.7%)

CALCULATED % WO_3 GRADE - 0.77%.

WARMAN REPORT. - 79/110 997-3.

SAMPLE BREAKDOWN:-

DDH. N°.	SEC. N°.	SAMPLE N°	DRILL INTERVAL. (METRES)	LENGTH RUN(m)	GRADE % WO_3.	ORE TYPE.	GRAMS SAMPLED.
204	5860N.	21101	41.0 - 42.0	1.0	0.32	Y	273
		02	42.0 - 43.0	1.0	0.36	Y	273
		03	43.0 - 44.0	1.0	0.21	Y	274
		04	44.0 - 45.0	1.0	0.32	Y	273
		05	45.0 - 46.0	1.0	0.11	Y	273
		06	46.0 - 47.0	1.0	0.54	Y	273.
		07	47.0 - 48.0	1.0	0.85	Y	274
		08	48.0 - 49.0	1.0	0.21	Y	273.
		09	49.0 - 50.0	1.0	0.41	Y	273.
		10	60.0 - 61.0	1.0	0.37	Y	274.
		11.	61.0 - 62.0	1.0	1.02	Y	273.
		12	62.0 - 63.0	1.0	1.99	F	273.
		13.	53.0 - 54.0	1.0	0.66	F.	274
		21117	57.8 - 58.1	0.3	0.20	F	139
		18	58.1 - 59.0	0.9	0.36	F	416.
		19.	59.0 - 59.6	0.6	1.78	F	277
		20	59.6 - 60.6	1.0	0.86	F	462.
		21	60.6 - 61.6	1.0	1.95	F	462
		22	61.6 - 62.2	0.6	1.74	F.	277
		23	62.2 - 62.75	0.56	0.20	F	264
		24	62.75 - 63.0	0.25	6.78	F	116
		25	63.0 - 64.0	1.0	1.35	F	462
		26	64.0 - 64.5	0.5	3.54	F	231.
		27	64.5 - 64.7	0.2	3.99	F	92
		28	64.7 - 65.0	0.3	0.38	F	139
		29	65.0 - 66.0	1.0	1.36	F	462
		30	66.0 - 67.0	1.0	1.22	F	463
		31	67.0 - 67.3	0.3.	6.27	F	139
		32	67.3 - 68.0	0.7	0.32	F	324
		33	68.0 - 69.0	1.0	0.21	F	462
		34	69.0 - 69.7	0.7	0.09	F	324
		35	69.7 - 69.9	0.2	11.58	F	92
		36	69.9 - 71.0	1.1	0.29	F	509
		37	71.0 - 72.0	1.0	0.61	F	463
		38	72.0 - 73.0	1.0.	0.41	F	462

DDH. N°.	SEC. N°.	SAMPLE N°.	DRILL INTERVAL. (METRES)	LENGTH RUN(m)	GRADE % WO_3.	ORE TYPE.	GRAMS SAMPLED.
260	5860N.	22249	47·0 - 48·0	1·0	0·98	F	1066.
		60	48·0 - 49·0	1·0	0·04	F	1066.
225	5860N.	22383	13·0 - 14·0	1·0	0·22	F	692.
		84	14·0 - 15·0	1·0	0·19	F	692.
224	5860N	22360	12·0 - 13·0	1·0	1·41	F.	70
		61	13·0 - 14·0	1·0	1·03	F	70
		62	14·0 - 15·0	1·0	1·00	F	70
		63	15·0 - 16·0	1·0	0·18	F	70
		64	16·0 - 17·0	1·0	0·25	F	70
218	5860N	21661.	15·0 - 16·0	1·0	0·36	Y.	71
		62	16·0 - 17·0	1·0	0·75	Y	71
		63	17·0 - 18·0	1·0	0·65	Y	71
		64	18·0 - 18·5	0·5	2·04	Y	86.
		65	18·5 - 19·0	0·5	0·04	Y	85
		21669	22·0 - 23·0	1·0	0·23	F	71
		70	23·0 - 24·0	1·0	0·08	F	71
		71	24·0 - 24·5	0·5	0·21	F	85
		72	24·5 - 25·5	1·0	0·01	F	71
		73	25·5 - 26·5	1·0	1·23	F	71
230	5820N	23142	19·0 - 20·0	1·0	1·85	F	193
		43	20·0 - 21·0	1·0	0·68	F	193
		44	21·0 - 22·0	1·0	0·28	F	194
		45	22·0 - 23·0	1·0	0·05	F	193.
		46	23·0 - 24·0	1·0	0·27	F	193
		47	24·0 - 25·0	1·0	0·67	F	194.
		48	25·0 - 26·0	1·0	0·62	F	193.
222	5820N	22309	9·0 - 10·0	1·0	0·82	Y	192
		10	10·0 - 11·0	1·0	1·03	Y.	192
		11	11·0 - 12·0	1·0	0·76	Y.	192
		12	12·0 - 13·0	1·0	0·22	Y	192.
		13	13·0 - 14·0	1·0	0·11	Y.	191.
249.	5820N.	22408	23·0 - 24·0	1·0	0·67	F	254
		09	24·0 - 25·0	1·0	0·03	F	254
265	5820N.	22833	23·0 - 24·0	1·0	0·23	Y	132
		34	24·0 - 25·0	1·0	0·31	Y	131

DDH. N°.	SEC. N°.	SAMPLE N°	DRILL INTERVAL. (METRES)	LENGTH RUN (m)	GRADE % WO_3	ORE TYPE.	GRAMS SAMPLED.
231.	5820N.	22795	29·0 - 30·0	1·0	0·26	F	188
		96	30·0 - 31·0	1·0	0·86	F	188
		97	31·0 - 32·0	1·0	0·43	F	188
		98	32·0 - 33·0	1·0	0·86	F	188
		99	33·0 - 34·0	1·0	0·43	F	188
		800	34·0 - 35·0	1·0	0·51	F	188
		02	35·0 - 36·0	1·0	0·59	F	188
		03	36·0 - 37·0	1·0	0·35	F	188
		04	37·0 - 38·0	1·0	0·88	F	188
		05	38·0 - 39·0	1·0	0·98	F	188
		06	39·0 - 40·0	1·0	0·36	F	188.

SAMPLE N° - KOPY. 1.

SAMPLE LOCATION — KARA 1. MAIN ZONE EAST. 460-490L.

ORE TYPE. — F (57.1%) Y (42.9%).

CALCULATED % WO_3 GRADE. — 0.66%.

WARMAN REPORT. — 79/110997-3.

SAMPLE BREAKDOWN :-

DDH N°.	SEC. N°.	SAMPLE N°.	DRILL INTERVAL. (METRES)	LENGTH RUN (m)	GRADE % WO_3.	ORE TYPE.	GRAMS SAMPLED.
254.	5900N.	22205	0.0 - 1.0	1.0	0.23.	Y.	380
		07	1.0 - 1.5	0.5	0.45	Y	189
		08	1.5 - 2.0	0.5	0.46	Y	189
		09	2.0 - 2.5	0.5	0.11	Y.	189
		10	2.5 - 3.0	0.5	4.06	Y	189
		11	3.0 - 3.5	0.5	2.68	Y	189
		12	3.5 - 4.0	0.5	0.12	Y	189
		13.	4.0 - 4.5	0.5	-	Y	189.
		22226	14.0 - 15.0	1.0	0.26	F	378
		27	15.0 - 16.0	1.0	0.27	F	378
		28	16.0 - 17.0	1.0	0.44	F.	379.
252.	5900N.	22056.	0.0 - 1.9	1.9	0.31	Y	173
		57	1.9 - 3.0	1.1	0.33	Y	100
		58	3.0 - 3.7	0.7	0.06	Y	64
		59	3.7 - 5.05	1.35	0.19	F	123
		60	5.05 - 6.0	0.95	0.28	F	87
		61	6.0 - 7.5	1.5	0.23	F	137
		62	7.5 - 8.0	0.5	0.63	F	46
		63	8.0 - 9.0	1.0	0.74	F	91
		64	9.0 - 9.5	0.5	0.50	F	46.
		65	9.5 - 10.5	1.0	0.14	F	91
		22068	12.0 - 13.0	1.0	0.08	F	91
		69	12.0 - 14.0	1.0	0.20	F	91
		70	14.0 - 15.0	1.0	0.98	F	91
		71	15.0 - 16.0	1.0	0.60	F	92
		72	16.0 - 17.0	1.0	0.44	F	91
		78.	17.0 - 18.0	1.0	0.15.	F.	91.
219.	5900N.	22027.	11.5 - 12.5	1.0	0.97	F	75
		28	12.5 - 13.5	1.0	0.26	F	75
		29	13.5 - 14.5	1.0	0.19	F	75
		30	14.5 - 15.0	0.5	0.14	F	38
		31	15.0 - 16.0	1.0	0.28	F	76
		32	16.0 - 17.0	1.0	0.50	F	75
		33	17.0 - 18.0	1.0	0.11	F	38
		22036	19.0 - 19.8	0.8	0.06	F	60
		37	19.8 - 21.0	1.2.	0.55	F	90
		38	21.0 - 22.0	1.0	0.63	F	75
		39	22.0 - 23.0	1.0	0.21	F	75
		40	23.0 - 23.5	0.5	1.00	F	38

DDH. N°	SEC. N°.	SAMPLE N°.	DRILL INTERVAL (METRES)	LENGTH RUN (m)	GRADE % NO_2.	ORE TYPE.	GRAMS SAMPLED.
216.	5900N.	21817	20·3 - 21·0	0·7.	0·50	F	141
		18	21·0 - 21·8	0·8	0·06	F	162
		19	21·8 - 22·5	0·7.	0·02.	F	141
		20	22·5 - 23·5	1·0	0·37	F	202
		21	23·5 - 24·0	0·5	2·64	F	101
		22	24·0 - 25·0	1·0	0·34	F	202
		23.	25·0 - 26·0	1·0.	0·03.	F.	162.
223.	5900N.	22328	14·0 - 15·0	1·0	0·02	F	132
		39	15·0 - 16·0	1·0	0·28	F	132
		40	16·0 - 17·0	1·0	0·54	F	133
		41	17·0 - 18·0	1·0	0·57	F	133
		42	18·0 - 19·0	1·0	2·33.	F	133
		43	19·0 - 20·0	1·0	0·80	F	133
		44	20·0 - 21·0	1·0	0·25	F	133
		45.	21·0 - 22·0.	1·0.	0·08.	F.	132.
263.	5940N.	22138	0·0 - 1·0	1·0.	0·45	—	2403
251.	5940 N.	22167	2·0 - 3·0	1·0	0·10	—	652
		22168	3·0 - 4·0	1·0	0·13	—	652.
217.	5940N	22107.	2·0 - 3·0	1·0	0·84.	Y	2197.
215	5940 N.	21969	12·6 - 13·4	0·8	0·01	F	254
		70	13·4 - 13·7.	0·3	2·80	F	95
		71	13·7 - 14·7	1·0	0·25	F	317
		72	14·7 - 15·5	0·8	0·07	F	254
		73	15·5 - 16·15	0·65	0·03	F	206
		74	16·15 - 16·80	0·65	3·72	F	206
		75.	16·80 - 18·0	1·20.	0·03	F	381.
		21978	20·0 - 21·0	1·0	0·04	F	317
		79	21·0 - 22·0	1·0	0·26	F	317
		80	22·0 - 23·0	1·0	0·06	F	317
		81	23·0 - 23·8	0·8	0·25	F	254
		82	23·8 - 24·5	0·7	0·83	F	223
		83.	24·5 - 25·2.	0·7	0·19.	F.	222.
214.	5940N.	21940	13·3 - 14·3.	1·0	0·13	F	310
		41	14·3 - 15·1	0·8	0·21	F	248
		42	15·1 - 15·8	0·7	2·68	F	217
		43	15·8 - 16·4	0·6	0·41	F	186
		44	16·4 - 17·3	0·9	0·31	F	279
		45	17·3 - 18·45	1·15	1·64	F	357
		46.	18·45 - 19·5.	1·05.	0·13.	F	325

DDH. N°	SEC. N°	SAMPLE N°	DRILL INTERVAL (METRES)	LENGTH RUN(m)	GRADE. %WO3	ORE TYPE.	GRAMS SAMPLED.
257.	5980N.	23004	15·0 - 16·0	1·0	0·01	F	312
		05	16·0 - 17·0	1·0	1·03	F	313
		06	17·0 - 18·0	1·0	0·33	F	313
		07.	18·0 - 19·0	1·0	0·07.	F.	313.
256.	5980N.	23071	25·0 - 26·0	1·0	0·39	F	329
		72.	26·0 - 27·0	1·0	0·16	F	329.
255.	5980N.	23123	20·6 - 22·1	1·5	0·39	F	133
		24	22·1 - 23·0	0·9	0·09	F	80
		23127	23·0 - 24·0	1·0	0·07	F	89
		28	24·0 - 25·0	1·0	0·43	F	89
		29	25·0 - 26·0	1·0	0·81	F	89
		30	26·0 - 27·0	1·0	1·77	F	89
		31.	27·0 - 28·0.	1·0	0·31.	F.	89.
					0·56		20,000.

SAMPLE N° - KOPY 5.

SAMPLE LOCATION. - KARA. N°1 - MAIN ZONE EAST & WEST 4460-4901.

ORE TYPE - F (46.56%) Y (41.40%) X (12.05%).

CALCULATED % WO_3 GRADE. - 0.77%.

WARMAN REPORT. - 79/110997-3.

SAMPLE BREAKDOWN.

DDH. N°.	SEC. N°.	SAMPLE N°.	DRILL INTERVAL. (METRES)	LENGTH RUN (m)	GRADE % WO_3.	ORE TYPE.	GRAMS SAMPLED.
204.	6860N	21101	41.0 - 42.0	1.0	0.32	Y	327
		02	42.0 - 43.0	1.0	0.36	Y	327
		03	43.0 - 44.0	1.0	0.21	Y	327
		04	44.0 - 45.0	1.0	0.32	Y	327
		05	45.0 - 46.0	1.0	0.11	Y	327
		06	46.0 - 47.0	1.0	0.54	Y	327
		07	47.0 - 48.0	1.0	0.86	Y	327.
		08	48.0 - 49.0	1.0	0.31	Y	327
		09	49.0 - 50.0	1.0	0.41	Y	328
		10	50.0 - 51.0	1.0	0.37	Y	327
		11	51.0 - 52.0	1.0	1.02	Y	327
		12	52.0 - 53.0	1.0	1.99	F	327
		13	53.0 - 54.0	1.0	0.56	F	327
		14.	54.0 - 55.0	1.0.	0.10.	F	327.
		21117	57.8 - 58.1	0.3	0.20	F	98
		18	58.1 - 59.0	0.9	0.36	F	294
		19	59.0 - 59.6	0.6	1.78	F	196
		20	59.6 - 60.6	1.0	0.86	F.	327
		21	60.6 - 61.6	1.0	1.95	F.	327
		22	61.6 - 62.2	0.6	1.74	F.	196
		23	62.2 - 62.75	0.55	0.20	F.	180
		24	62.75 - 63.0	0.25	6.78	F.	82
		25	63.0 - 64.0	1.0	1.35	F.	327
		26	64.0 - 64.5	0.5	3.54	F.	164
		27	64.5 - 64.7	0.2	3.99	F.	66
		28	64.7 - 65.0	0.3	0.38	F	98
		29	65.0 - 66.0	1.0	1.36	F.	327
		30	66.0 - 67.0	1.0	1.22	F.	328
		31	67.0 - 67.3	0.3	6.27	F.	98
		32	67.3 - 68.0	0.7	0.32	F.	229
		33	68.0 - 69.0	1.0	0.21	F.	327
		34	69.0 - 69.7	0.7	0.09	F.	229
		35	69.7 - 69.9.	0.2	11.68	F	65
		36	69.9 - 71.0	1.1	0.29	F	360
		37	71.0 - 72.0	1.0	0.61	F	327
		38	72.0 - 73.0	1.0	0.41	F	327
		39.	73.0 - 74.0	1.0	0.06	F.	327.

DDH. N°.	SEC. N°.	SAMPLE N°.	DRILL INTERVAL. (METREES)	LENGTH RUN (m)	GRADE % WO_3.	ORE TYPE.	GRAMS SAMPLED.
260	5860N.	22249	47·0 - 48·0	1·0	0·98	F	444
		50.	48·0 - 49·0	1·0	0·04	F	414.
226.	5860N.	22283	13·0 - 14·0	1·0	0·22	F	284
		84.	14·0 - 15·0	1·0	0·19	F.	285.
218	5860N.	21661	15·0 - 16·0	1·0	0·36	F	57
		62	16·0 - 17·0	1·0	0·75	F	57
		63	17·0 - 18·0	1·0	0·65	F	56
		64	18·0 - 18·5	0·5	2·04	F	29
		65.	18·5 - 19·0	0·5	0·04	F.	28.
		21669	22·0 - 23·0	1·0	0·23	F	56
		70	23·0 - 24·0	1·0	0·08	F	56
		71	24·0 - 24·5	0·5	0·21	F	28
		72	24·5 - 25·5	1·0	0·01	F	57
		73.	25·5 - 26·5.	1·0	1·23	F	57.
224.	5860N.	22365	7·0 - 8·0	1·0	0·14	X	21
		56	8·0 - 9·0	1·0	0·82	X	21
		57	9·0 - 10·0	1·0	0·44	Y	21
		58	10·0 - 11·0	1·0	0·62	Y	21
		59	11·0 - 12·0	1·0	1·49	Y	21
		60	12·0 - 13·0	1·0	1·41	F	21
		61	13·0 - 14·0	1·0	1·03	F	21
		62	14·0 - 15·0	1·0	1·00	F	21
		63	15·0 - 16·0	1·0	0·18	F	20
		64	16·0 - 17·0	1·0	0·25	F	20
		65	17·0 - 18·0	1·0	0·14	F	21
		66	18·0 - 19·0	1·0	0·16	F	21
		67	19·0 - 20·0	1·0	0·09	F	21
		68	20·0 - 21·0	1·0	0·78	F	21
		69	21·0 - 22·0	1·0	0·47	F	21
		70	22·0 - 23·0	1·0	0·54	F	21
		71.	23·0 - 24·0.	1·0.	0·74.	F.	21.
230.	5820N.	23142	19·0 - 20·0	1·0	1·85	F	133
		43	20·0 - 21·0	1·0	0·68	F	134
		44	21·0 - 22·0	1·0	0·28	F	133
		45	22·0 - 23·0	1·0	0·05	F	133
		46	23·0 - 24·0	1·0	0·27	F	134
		47	24·0 - 25·0	1·0	0·67	F	133
		48.	25·0 - 26·0	1·0.	0·02.	F.	133.
222.	5820N.	22309	9·0 - 10·0	1·0	0·31	F	147
		10	10·0 - 11·0	1·0	1·03	F	148
		11	11·0 - 12·0	1·0	0·76	F	147
		12	12·0 - 13·0	1·0	0·22	F	147
		13.	13·0 - 14·0	1·0	0·11.	F.	147.

DDH. N°.	SEC. N°.	SAMPLE. N°.	DRILL INTERVAL. (METRES)	LENGTH RUN (m)	GRADE. % WO_3.	ORE TYPE.	GRAMS SAMPLED.
249.	5820N.	22390	0·0 - 1·5	1·5	0·66	X	25
		91	1·5 - 3·0	1·5	0·46	X	25
		92	3·0 - 4·6	1·5	0·44	X	26
		93	4·5 - 6·0	1·5	0·64	X	24
		94	6·0 - 7·2	1·2	0·80	X	20
		95	7·2 - 8·1	0·9	0·48	X	15
		96.	8·1 - 9·6.	1·5.	0·12.	X	24.
265.	5820N.	22818	2·0 - 3·3	1·3	0·68	X	206
		19	3·7 - 4·6	0·9	0·16	X	143
		20	6·0 - 7·5	1·5	1·08	X	238
		21	7·5 - 9·0	1·5	1·28	X	238
		22	9·0 - 11·1	2·1	0·07	X	333
		23	11·1 - 13·2	2·1.	0·20	X	333
		24	13·2 - 14·4	1·2	0·84	X	190
		25	14·4 - 15·6	1·2.	0·81	X	190
		26	15·6 - 16·8	1·2.	0·81	X	191
		27	16·8 - 18·0	1·2	1·68	X	190
		28	18·0 - 19·0	1·0	1·55	Y	159
		29	19·0 - 20·0	1·0	1·47	Y	159
		30	20·0 - 21·0	1·0	4·13	Y	168
		31	21·0 - 22·0	1·0	1·31	Y	159
		32	22·0 - 23·0	1·0	1·81	Y	159
		33	23·0 - 24·0	1·0	0·23	Y	158
		34	24·0 - 25·0	1·0	0·31	Y	159
		35.	25·0 - 26·0	1·0.	0·07.	Y	158.
231.	6820N.	22785	17·1 - 18·0	0·9	0·06	X	105
		86	18·0 - 19·0	1·0	0·16	Y	117
		87	19·0 - 20·0	1·0	0·62	Y	117
		88	21·0 - 22·0	1·0	0·31	Y	117
		89	22·0 - 23·0	1·0	0·70	Y	117
		90	23·0 - 24·0	1·0	0·53	Y	117
		91	24·0 - 25·3	1·3	0·16	Y	152
		92	25·6 - 26·65	1·05	0·12	Y	122
		93	26·65 - 28·0	1·35	2·16.	Y	158
		94	28·0 - 29·0	1·0	0·58	F	117
		95	29·0 - 30·0	1·0	0·26	F	117
		96	30·0 - 31·0	1·0	0·36	F	117
		97	31·0 - 32·0	1·0	0·43	F	116
		98	32·0 - 33·0	1·0	0·86	F	117
		99	33·0 - 34·0	1·0	0·43	F	117
		800	34·0 - 35·0	1·0	0·51	F	117
		802	35·0 - 36·0	1·0	0·69	F	117
		03	36·0 - 37·0	1·0	0·35	F	116
		04	37·0 - 38·0	1·0	0·88	F	117
		05	38·0 - 39·0	1·0	0·98	F	117
		06	39·0 - 40·0	1·0	0·36	F	117
		07	40·0 - 41·0	1·0	0·13	F	

SAMPLE N° 5818Y.

SAMPLE LOCATION. — KARA. N° 1. - MAIN ZONE - WEST. SEC. 5820N.

ORE TYPE. — PARTIALLY WEATHERED (Y - 100%)

CALCULATED % WO_3 GRADE. — 1.05% WO_3.

WARMAN REPORT — 79/110997-3.

SAMPLE - BREAKDOWN :-

DDH. N°.	SEC. N°.	SAMPLE N°	DRILL INTERVAL (METRES)	LENGTH RUN (m)	GRADE % WO_3.	ORE TYPE.	GRAMS SAWED.
231.	5820N.	22788	21.0 - 22.0	1.0	0.31	Y	EQUAL PROPORTIONS
		89	22.0 - 23.0	1.0	0.70	Y	
		90	23.0 - 24.0	1.0	0.58	Y	
		91	24.0 - 25.3	1.3	0.16	Y	
		92	25.6 - 26.65	1.05	0.12	Y	
		93.	26.65 - 28.0.	1.35	2.16 .	Y.	
265	5820N.	22828	18.0 - 19.0	1.0	1.55	Y	EQUAL PROPORTIONS
		29	19.0 - 20.0	1.0	1.47	Y	
		30	20.0 - 21.0	1.0	4.13.	Y	
		31	21.0 - 22.0	1.0	1.31	Y	
		32	22.0 - 23.0	1.0	1.81	Y	
		33	23.0 - 24.0	1.0	0.23	Y	
		34	24.0 - 25.0	1.0	0.31	Y	
		35.	25.0 - 26.0.	1.0	0.07.	Y	
					1.05% WO_3.		

SAMPLE. N° 6729 Y.

SAMPLE LOCATION — KARA. N°1 - SOUTHERN EXTENSION. SEC. 6730N

ORE TYPE. — PARTIALLY WEATHERED. (100% - Y)

CALCULATED % WO_3 GRADE. — 1.01% WO_3

WARMAN REPORT. — 79/110997-3.

SAMPLE BREAKDOWN :-

DDH. N°.	SEC. N°.	SAMPLE N°.	DRILL INTERVAL. (METRES)	LENGTH RUN (m)	GRADE % WO_3.	ORE TYPE.	GRAMS SAMPLED.
243.	6730N.	22616	20.0 - 21.0	1.0	2.36	Y	EQUAL PROPORTION
		17	21.0 - 22.0	1.0	4.54	Y	
		18	22.0 - 23.0	1.0	0.80	Y	
		19	23.0 - 24.0	1.0	0.95	Y	
		20	24.0 - 25.0	1.0	0.86	Y	
		21	25.0 - 26.0	1.0	0.91	Y	
		22	26.0 - 27.0	1.0	0.62	Y	
		23.	27.0 - 28.0.	1.0	1.46	Y.	
244.	6730N	22652	28.0 - 29.0	1.0	0.56	Y	EQUAL PROPORTIONS
		53	29.0 - 30.0	1.0	0.32	Y	
		54	30.0 - 31.0	1.0	0.38	Y	
		55	31.0 - 32.0	1.0	1.16	Y	
		56	32.0 - 33.0	1.0	0.64	Y	
		57	33.0 - 34.0	1.0	1.65	Y	
		58	34.0 - 35.0	1.0	0.20	Y	
		59	35.0 - 36.0	1.0	0.14	Y	
		60	36.0 - 37.0	1.0	0.43	Y	
		61	37.0 - 38.0	1.0	0.53	Y	
		62.	38.0 - 39.0.	1.0.	0.69	Y	
					1.01% WO_3.		

SAMPLE N° - 5778 Y.

SAMPLE LOCATION — KARA. N°1 - MAIN ZONE - WEST SEC. 5780N.

ORE TYPE. — PARTIALLY WEATHERED (100% Y).

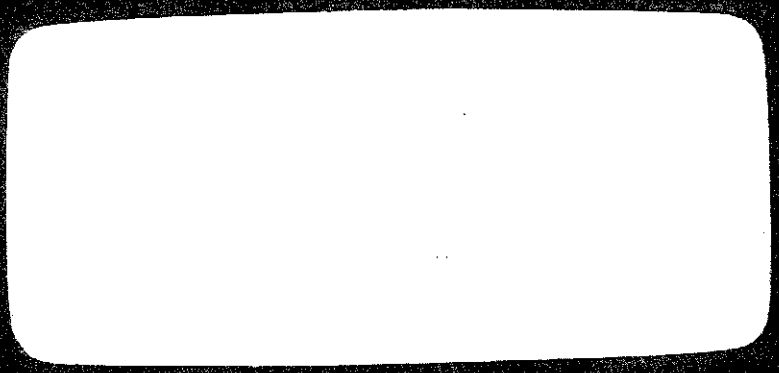
CALCULATED % WO_3 GRADE. — 0.71 % WO_3.

WARMAN REPORT. — 79/110997-3.

SAMPLE BREAKDOWN :-

DDH N°.	SEC. N°	SAMPLE N°	DRILL INTERVAL (METRES)	LENGTH RUN(m)	GRADE % WO_3	ORE TYPE.	GRAMS SAMPLED.
238.	5780N.	22438	21.6 - 22.3	0.7	0.80	Y	EQUAL PROPORTIONS.
		39	22.3 - 23.3	1.0	0.59	Y	
		40	23.3 - 24.3	1.0	0.14	Y	
		22446	24.3 - 25.3	1.0	0.05	Y.	
		46	25.3 - 26.3	1.0	0.04	Y.	
		47.	26.3 - 27.3	1.0	0.06.	Y.	
239	5780N.	22509	45.0 - 46.0	1.0	0.30	Y	EQUAL PROPORTIONS.
		10	46.0 - 46.5	0.5	1.68	Y	
		11	46.5 - 47.5	1.0	1.10	Y	
		12	47.5 - 48.5	1.0	0.56	Y	
		13.	48.5 - 49.2.	0.7.	1.66.	Y	
240.	5780N.	22560	22.2 - 23.0	0.8	0.38	Y	EQUAL PROPORTIONS.
		61	23.0 - 24.0	1.0	0.84	Y.	
		62	24.0 - 25.0	1.0	0.43	Y.	
		63	25.0 - 26.0	1.0	0.16	Y	
		64.	26.0 - 27.0	1.0	1.85	Y	
					0.71 % WO_3.		

Report No.
4D/82



82-1828
18/19

7120/

713441

REPORT NO. 4D/82

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Received - 1 OCT 1982
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REF. No. 8090A 82

WARMAN INTERNATIONAL LTD.

REPORT NO. 81/139604

EXAMINATION OF MAGNETITE TAILING SAMPLE

WARMAN INTERNATIONAL LTD.
RESEARCH & DEVELOPMENT DIVISION

713442 APPENDIX "A"
REPORT 81/139604

Examination of Magnetite Tailing Sample

CLIENT	McIntyre Mines (Australia) Pty. Ltd.,
LABORATORY No.	3051
DATE RECEIVED	October 16, 1981
SAMPLE MARKS	MT 1
QUANTITY AND DESCRIPTION	2 kg. of magnetite tailing
OBJECT OF TESTWORK	Screen analysis, particle specific gravity, chemical analysis and Davis tube fractionation.

RESULTS

1. Screen Analysis

Screen fraction µm		retained wt. %	passing wt.%
	+ 3350	0.0	100.0
-3350	+ 2360	0.5	99.5
-2360	+ 1700	0.5	99.0
-1700	+ 1180	1.1	97.9
-1180	+ 850	1.6	96.3
- 850	+ 600	3.3	93.0
- 600	+ 425	6.0	87.0
- 425	+ 300	10.0	77.0
- 300	+ 212	14.2	62.8
- 212	+ 150	12.4	50.4
- 150	+ 106	13.6	36.8
- 106	+ 75	10.7	26.1
- 75		26.1	-

2. Particle Specific Gravity

By the pycnometer method - - - 4.2

Testwork supervised by:

A. I. Bellingham
J. C. Sarkies

November 13, 1981

Our reference:

AIB/pb
81/5505

3. Chemical Analyses

tungsten (WO_3%)	0.17
ferrous iron (Fe%)	15.5
ferric iron (Fe%)	43.1
titanium (Ti%)	0.09
aluminium (Al%)	1.0
tin (Sn%)	0.02
nickel (Ni%)	0.01
vanadium (V%)	<0.05
silicon (Si%)	4.1
phosphorus (P ppm)	120
sulphur (S ppm)	<500

4. Davis Tube Fractionation

Five tests were made at field strengths of 400, 600, 700, 800, and 1000 gauss. The field strength was measured at a point midway between the poles.

Common test conditions:

weight of sample	22.8 g/test
feed time	5 minutes
wash water flow rate	0.6 l/min
wash time	5 minutes
tube strokes	117/minute
tube slope	25 ^{o}

Preliminary tests showed that the sample was too coarse to be used directly in the Davis tube apparatus so it was first screened on 600 µm with the undersize only being put through the Davis tube. The minus 600 µm fraction was 92.5% of the total sample so the results would be indicative for the total sample.

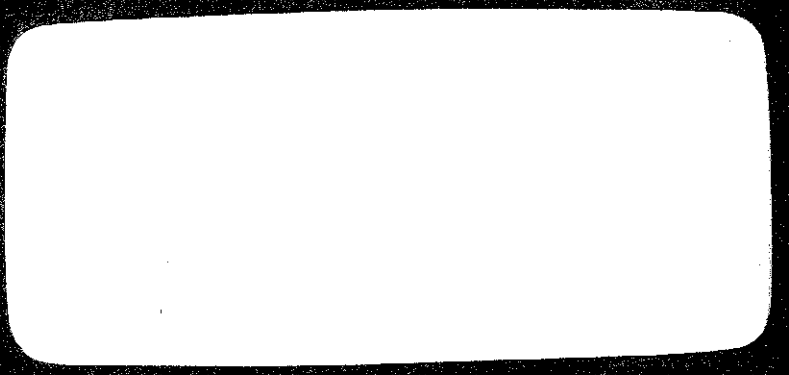
Analyses of the + 600 µm and - 600 µm fractions gave the following results:

fraction µm	wt.%	WO_3 %	ferrous Fe %	ferric Fe %
-3350 +600	7.5	0.10	14.5	42.3
- 600	92.5	0.20	15.2	43.9

The following table gives the results of the Davis tube fractionation and analyses of the fractions:

test no.	field strength gauss	Davis tube fraction	weight %	analyses %		
				WO_3	ferrous Fe	ferric Fe
1	400	magnetic non-magnetic	5.4 94.6			
2	600	magnetic non-magnetic	34.2 65.8	0.04	17.4	56.0
3	700	magnetic non-magnetic	54.3 45.7	0.04	17.5	49.5
4	800	magnetic non-magnetic	77.9 22.1	0.05	17.1	49.5
5	1000	magnetic non-magnetic	86.5 13.5	0.05 0.94	17.2 2.5	48.6 9.6

Report No.
5/82



82-1828
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REPORT NO. 5/82.

Dept. of M. | A.O. | C.G. | E.O. | D.S.M.E. | Registrar | E & IL
Received Answered - 1 OCT 1982
DEPT. OF MINES
REF. No. 8090A 82

McINTYRE MINES (AUSTRALIA) PTY. LTD.

BASELINE ENVIRONMENTAL DATA

WATER SAMPLING

KARA PROPERTIES - E.L. 17/68

C. H. WHITEHEAD.

March, 1982.

REPORT NO.

McINTYRE MINES (AUSTRALIA) PTY. LTD.

BASELINE ENVIRONMENTAL DATA

KARA PROPERTIES - E.L. 17/68

In anticipation of an expanded open cut mining operation at the main Kara tungsten deposits (Kara No. 1 and Kara North), McIntyre Mines attempted to both extract detailed information of the Tasmanian Department of Environment regulations and requirements, plus obtain advice on implementing a baseline environmental orientation study around the Kara properties and existing mining operation..

As a member of the Tasmanian Industry Association for Environmental Control (TIAFEC), McIntyre Mines received consultant advice on both of the above environmental aspects.

In January 1982, working on the advise, and in association with the technical consultant of TIAFEC, McIntyre Mines completed an initial programme of water sampling to gather baseline information on existing water quality around Kara. This first series of tests consisted of collecting a total of twelve samples from the main Old Park-Companion-Emu River drainage system and its major tributaries (refer Table No. 1 and Plan A).

At the Allison Laboratories, Hobart, this first series of water samples were analysed for twenty one elements, plus determinations of suspended solids and pH - for the results, please refer to Table No. 2.

The actual sample locations were sited with the following objectives in mind:-

- to obtain knowledge of "background levels" of the Old Park river upstream from the Kara properties.
- To evaluate the extent and nature of possible contamination of the Old Park, Companion River and Emu River drainage downstream from the Kara properties at present being mined.
- To evaluate possible contamination, and its nature, in local drainage from the present mined area.

- To assess "background levels" of drainage immediately downstream from undisturbed known tungsten bearing magnetite skarns (ie. Eastern Ridge and Kara North).

To summarise the results and findings of the above programme, a report entitled "Comments on water analysis programme - Kara Area"- author J. R. Stephens, TIAFEC, Technical Consultant, is attached.

Overall the results of chemical analysis of the first series of water samples were not catastrophic. They established a broad basis of the nature of contamination, and in the near future, it is the intention to continue with a water sampling programme especially to ascertain seasonal or other time dependent variations.

C. H. Whitehead,
McIntyre Mines Burnie.

March, 1982.

TABLE NO. 1.

KARA PROPERTIES - ENVIRONMENTAL BASELINE WATER SAMPLING PROGRAMME.

SAMPLE LOCATIONS

Sample No.	Sample Location
W.S. 1	Old Park River - south of pump station - upstream Kara Properties.
W.S. 2	Old Park River - north of pump station - immediately upstream discharge from Kara No. 1 mine.
W.S. 3	Old Park River - north of pump station - immediately downstream discharge from Kara No. 1 mine.
W.S. 4	Companion River- Kara N road crossing - downstream Old Park - Companion River junction
W.S. 5	Kara Creek - at junction with Companion River
W.S. 6	East Kara Creek - downstream of the Eastern Ridge Deposit
W.S. 7	Kara Creek - drainage immediately north of Kara No. 1 Main Pit
W.S. 8	Western Limb Creek - discharge downstream from tailings setting ponds.
W.S. 9	Kara North Creek - at junction with Companion River
W.S. 10	Companion River - immediately upstream from Loudwater Creek junction
W.S. 11	Loudwater Creek - immediately upstream from Companion River Junction
W.S. 12	Emu River - at Hampshire water gauge location.

McINTYRE MINES. (AUST) PTY LTD. ANALYSES OF WATER SAMPLES - E.L. 17/68 - KARA PROPERTIES.

SAMPLES SUBMITTED 29. JAN 1982. ALLISON LABORATORIES. REPORT 8793. 25 FEB 1982.

McINTYRE MINES SAMPLE NUMBER	W.S.1.	W.S.2.	W.S.3	W.S.4	W.S.5	W.S.6	W.S.7	W.S.8	W.S.9	W.S.10	W.S.11.	W.S.12.	
ALLISON LAB. LAB REF	27634	27635	27636	27637	27638	27639	27640	27641	27642	27643	27644	27645.	
SUSPENDED SOLIDS.	0·2	0·1	160	170	50	1·7	25	30	8	16	1·2	14.	
Cu	<0·001	0·001	0·682	0·004	0·009	0·002	0·007	0·009	0·001	0·007	0·002	0·004.	
Zn	0·005	0·007	5·1	0·053	0·070	0·004	0·057	0·058	0·007	0·066	0·003	0·044	
Fe	0·30	0·29	2·5	0·90	1·3	0·70	1·70	0·90	1·4	0·84	0·32	0·78	
Mn	0·015	0·013	1·2	0·16	1·4	0·31	3·9	1·1	0·19	0·23	0·015	0·20	
Sb	0·02	0·06	0·08	0·02	0·03	0·03	0·04	0·02	0·02	0·01	0·02	0·03	
Cd.	0·001	0·002	0·004	0·001	0·001	0·001	0·002	0·002	<0·001	<0·001	<0·001	<0·001.	
Pb	0·010	0·004	0·22	0·034	0·078	0·016	0·059	0·075	0·030	0·057	0·070	0·039	
Cr	0·002	0·001	0·003	0·004	0·003	0·001	0·003	0·001	0·002	0·002	0·002	0·001	
F.	0·2	0·2	0·4	0·2	0·5	0·3	0·5	0·6	0·3	0·1	0·1	0·1	
B	0·03	<0·01	0·02	<0·01	0·02	<0·01	0·02	0·05	0·04	<0·01	0·05	<0·01.	
SO_4	0·6	0·6	0·4	0·6	1·8	0·8	1·4	3·2	0·8	0·4	1·0	0·6	
Cl^-	8·6	7·9	6·3	5·0	10·2	7·0	9·2	4·9	7·5	5·5	4·0	5·8	
Ba	0·016	0·010	0·011	0·007	0·007	0·005	0·005	0·007	0·003	0·009	0·005	0·010	
PHENOLICS.	0·16	0·16	0·06	0·10	0·18	0·15	0·14	0·14	0·16	0·10	0·07	0·11	
pH	7·5	7·6	7·6	7·7	7·5	7·5	7·3	7·4	6·5	7·1	7·3	7·3	
As	ALL SAMPLES LESS THAN 0·003												
Ag	ALL SAMPLES LESS THAN 0·002												
Mo	ALL SAMPLES LESS THAN 0·01.												
Se	ALL SAMPLES LESS THAN 0·001.												
Hg	ALL SAMPLES LESS THAN 0·0002												
Sn	ALL SAMPLES LESS THAN 0·2.												

ALL RESULTS (EXCEPT PH AND SUSPENDED SOLIDS) EXPRESSED IN Mgm/L.

COMMENTS ON WATER ANALYSIS PROGRAMME - KARA AREA

Samples 1 and 2 provide "background" levels of the Old Park River, the waters of which are clean and unpolluted. The only "high" value is that for phenolics, reflecting the presence of complex organic materials leached from vegetation, as is common for Tasmanian surface waters.

Sample 3 shows significant contamination of this waterway as a result of the magnetite tailings and possibly leakage from tailing dams. The "indicators" of this pollution are :-

- suspended solids (increased 1000 times)
- zinc (increased 1000 times)
- manganese (increased 100 times)
- lead (increased 30 times)
- copper (increased 30 times)
- iron (increased 10 times)

approximately in that order. At this point, the River water exceeds the statutory maximum limit for industrial discharge in terms of suspended solids, zinc and lead.

Sample 4, from the Companion River downstream of its junction with the Old Park River shows that the Companion River is polluted by the Old Park River - i.e. by the magnetite tailings and leakage from the Tasminex operations. Considerable dilution by the "clean" waters of the Companion River is indicated by all contaminants except suspended solids. The latter exception is curious, and could be caused by one or more of the following:-

- upstream loading of the Companion River with particulates from other sources (unlikely).
- resuspension of solids previously deposited on banks etc.
- a source of suspended solids entering the waterway between points 3 and 4 (e.g. from tailing dams).
- deposition of dissolved metals.

...2/-

Sample 6 represents the "background" levels of a creek flowing through a tungsteniferous skarn, into which flows two Tasminex drainage streams (represented by samples 7 and 8). This water is unpolluted, and is similar to that of other clean waterways except that its manganese content is quite high.

Mine drainage streams 7 and 8 contain relatively high suspended solids, zinc and manganese and some lead and copper. However, all contaminants, with the marginal exception of iron plus manganese, are within the regulatory maxima for industrial discharges. Nevertheless, these discharge streams increase the contaminant loading of the receiving water (the creek, sample 6) in respect of :-

. suspended solids
. zinc
. manganese
. lead
. copper

again approximately in that order.

The effect of this minewater on the Companion River may be assessed by comparing samples 4 and 10. Suspended solids are greatly reduced, indicating that particulates are settling out along this stretch of river. The other "mine pollution" indicators zinc, manganese, lead and copper are only slightly inflated by the ingress of this drainage water.

Comparison of samples 11 and 12 shows the effect of the total mining discharge on the (previously clean) waters of the Emu River. Suspended solids, zinc, manganese and copper are significantly increased. The upstream sample of the Emu River is surprisingly high in the other "indicator" - lead - and thus the concentration of this contaminant is apparently not increased, although by mass balance it would be expected to be about three times the background level.

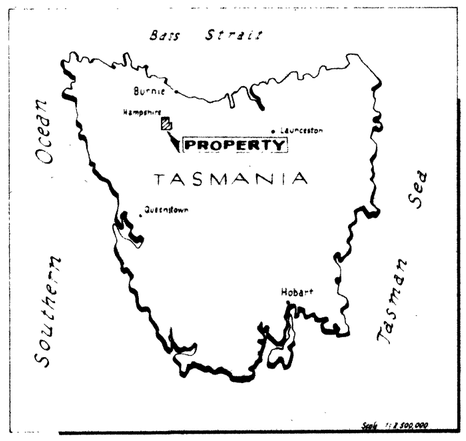
In summary, it is evident that by far the greatest source of contaminant discharge to surface waters is the magnetite tailings spill into the Old Park River, which becomes fouled to the extent that the river water does not even meet the maximum

713452 007

effluent standards. The drainage streams 7 (from the pit) and 8 (from the main dam) are not grossly polluted, and in fact are close to statutory requirements. It is likely that there is a dam discharge to the river somewhere between sample points 3 and 4, to explain the very high suspended solids loading at point 4. A solids concentration far in excess of that in sample 8 would have been expected in the main tailings discharge, as the tailing dams are relatively rudimentary.

J.R. Stephens,
Technical Consultant

30th March, 1982.



82-1828 Vol. 1919

McINTYRE MINES (AUST) PTY. LTD.

E.L. 17/68 - KARA PROPERTIES

WATER SAMPLE LOCATIONS
ENVIRONMENTAL BASE LINE ORIENTATION STUDY

713453

N

SCALE : 10000

5 cm

GEOLOGY

- RECENT: Alluvium
- TERTIARY: Basalt; Conglomerate breccias ?
- DEVONIAN: Granite
- ORDOVICIAN — GORDON LIMESTONE: Limestone
- ORDOVICIAN — TRANSITION BEDS: Sandstone with calcareous members
- ORDOVICIAN — MOINA SANDSTONE: Oc — Sandstone and quartzite
- ORDOVICIAN — OWEN CONGLOMERATE: Oo — Conglomerate and grit
- CAMBRIAN — HORNFELS GROUP: Cb — Hornfels
- CAMBRIAN — ACID VOLCANICS: Cv — Acid volcanics
- Storm zones

REFERENCE

- River
- Creek
- Road
- Track
- Railway
- Trig Beacon
- Geological Boundary
- WS8 = Location N°
- ⊗ = Water Sample

Base Map enlarged from 1:10,000 Heritage N.T.M. Sheet 8016 & Aerial Photographs — July '68