PRELIMINARY SUMMARY REPORT
OF
MARANBOY TIN PROSPECT

Maranboy, N. T.
Australia.

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by

R. HARE

and

J. L. MORTON

Accompanying Report:

Locality Plan ..... 1 inch = 160 miles

General Plan, showing locations of leases, Area to Prospect and regional geology ..... 1 inch = 1,000 feet

Composite Plan, Longitudinal Projection, cross-sections ..... 1 inch = 200 feet

Graph of Recorded Tin Production, Maranboy, Northern Territory .....

COPY NO. .....

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SUMMARY

A well developed quartz tourmaline hornfels vein at Maranboy has a potential of 500 tons per vertical foot of 2% Sn ore over a strike length of 4,000 feet. Additional tonnage also occurs in extensions and repetitions. The ore is in sporadic shoots and values have been shown, by diamond drilling, to extend to a vertical depth of at least 600 feet.

The only feasible way to effectively test the prospect is by carrying out a critical amount of underground development. Before this is undertaken, one or two drill holes should test for the lode to establish the deep seated character of the vein system.

Total cost of drilling and underground development, including establishment cost, is estimated at £180,000.

INTRODUCTION

Mineral Resources Australia Pty. Ltd. have acquired an Area to Prospect, No. 1093, which covers the Maranboy Tin Field, Maranboy, Northern Territory. They have also successfully negotiated options over Mineral Leases Nos. 78D, 4D, 217, 263 and 28D which cover the most productive zones of the Main Vein. The Stannum King Vein is held under Area to Prospect No. 1071, in the name of William Chisholm, and is not included in M.R.A.'s property. For further details, refer 1000 scale General Plan of Maranboy Tin Prospect.

At the request of M.R.A. a field inspection was carried out by the writers between 28th and 31st August, 1963. A programme of field work was planned and carried out by Mr. A. McGain of the consulting firm of R. Hare & Associates.

The purpose of this report is to summarise all significant data related to the deposit, show potential and outline a course of exploration and development aimed at proving or discounting the economic possibilities. Long tons are used throughout the report.

LOCATION

Maranboy, Northern Territory, 260 miles south of Darwin, 740 miles north of Alice Springs. Please refer Locality Plan.

Maranboy consists of a Post Office/Police Station, Saw Mill owner's residence and three or four prospectors' dwellings. The Government Battery has been stripped of machinery and only buildings and the Manager's residence remain. Beswick Native Reserve is established five miles north of Maranboy and supports a largely transient population of up to several hundred natives under the control of Native Affairs Department.

ACCESS

Maranboy is connected to the Stuart Highway by fourteen miles of all-weather gravel road. The Stuart Highway is a first-class sealed and metalled road, capable of carrying any type of road transport, extending from Darwin to Alice Springs. A gravel road connects Alice Springs to Adelaide, South Australia; these cities are also connected by rail transport. Rail transport extends from Darwin to Birdum, connecting to Katherine, 44 miles by road from Maranboy. Katherine Airport is capable of servicing all domestic airliners, and a regular air service connects all Australian capital cities. Refer Locality Plan.

OWNERS

Area to Prospect No. 1073	Mineral Resources Australia Pty. Ltd. 100 Collins Street, Melbourne, Victoria
Mineral Lease No. 78D	Mr. R. Thompson,
No. 4D	Maranboy, Northern Territory.
Mineral Lease No. 217	Mr. G. Fisher, Maranboy, Northern Territory.
Mineral Lease No. 263	Mr. G. Lynas, Maranboy, Northern Territory.
Mineral Lease No. 28D	I.W., R.S., M.B. and J.C. Shepherd, Maranboy, Northern Territory.

Area to Prospect No. 1071, held in the name of William Chisholm, is not included in the ground held or optioned by M.R.A. Refer to 1000 Scale General Plan of Maranboy Tin Prospect.

TOPOGRAPHY, VEGETATION, CLIMATE

The area under review is extremely flat with an overall gentle slope and drainage to the south via Battery and Maranboy creeks.

Wollybutts, Bloodwoods and Stringybarks grow sparsely over the area and lush sorghun grasses grow during the wet season. A saw mill is established in Maranboy processing Cypress from forests about 90 miles to the east. Annual rainfall of 30 to 40 inches falls mostly during the 'wet' season from November till March. Winters are dry and pleasant.

POWER

None available.

WATER

Past operators have relied on two sources of water during the dry seasons. The main one of these is a large billabong on Beswick Creek, about four miles north of the property, which is thought to be fed from water accumulated in the alluvial flats extending for more than five miles to the north. Local lore has it that the billabong has "never been known to go dry;" however, whether this supply would produce enough water to support a major mining operation with attendant domestic requirements amounting to possibly 30,000 gallons per day is doubtful. The other supply comes from a spring in Battery Creek about two miles from the property.

Department of Water Resources, Darwin, advises that a permanent and adequate supply of water can be produced from the Lower Cambrian Douglas Limestones at Mt. Bracewell, between 7 and 10 miles west of Maranboy.

HISTORY

Economic tin mineralisation was discovered at Maranboy by Richardson and Sharber in 1913. Due to the easily recognisable nature of the lode, most of the mineable sections were taken up by 1915, by individual miners or small groups. A Government stamp battery was erected and began crushing in 1916.

Tin has continued to be produced at Maranboy since that date, the bulk of production coming from small operators, although no less than four attempts have been made to establish mining operations at company level. Failures of large scale mining operations by previous companies were brought about by various causes, but can all be attributed to the same reason: the desire to establish a mining operation before proving up ore reserves on which it should be based. The results of this type of approach are reflected in development of the property. Refer 200 Scale Longitudinal Projection. This shows workings on the Main Vein extending over a strike length of 4,500 feet, all of these worked as open cuts from the surface, the most realistic exploration being the shaft and drive carried out by United Uranium N.L., which was curtailed before any real test of the vein could be said to have been accomplished.

Walpole (BMR Bulletin No. 37) states: "The history since that (1916) date has been governed by two main factors: the price of tin and the milling facilities available. Lack of ore has never been an important consideration. In fact, the comparative ease with which ore has been won, and inadequate milling facilities, have resulted in haphazard and uneconomic development. The leaseholders have been content to mine sufficient ore to fulfil their limited milling quotas by haphazard open-cutting, sinking, and benching. None had sufficient capital to undertake reasonable development, nor have facilities been available for any of them to win much capital by their own labour. Consequently, the position in the field at the end of 1952 was little different from that during the preceding 35 years."

PRODUCTION

Between 1915 and 1955 recorded production from the Maranboy field amounts to 50,485 tons of ore treated for a recovery of 826 tons of metallic tin, an average recovery grade of 1.64% metallic tin. Refer Graph of Recorded Tin Production, Maranboy. Most optimistic estimates on tin recovery from the Government Battery indicate a maximum recovery of 60% of the total tin. Grade of total ore mined

would therefore be in the order of 2.7% metallic tin. Walpole estimates from surveys of openings and weighted averages of all available assays and production records that production from the Main Zone between 6000E and 10,000E amounts to 31,577 tons grading 2.07% metallic tin. Refer BMR Bulletin No. 37, and attached 200 Scale Plan and Longitudinal Projection. An additional amount treated since his report brings this tonnage fo 32,700. An additional 1,548 tons grading 1.56% metallic tin is estimated to have been produced from the remainder of the Main Vein to the east.

REGIONAL GEOLOGY

Major productive zones of Maranboy, Main and Stannum King veins occur on the northerly limb of an anticline plunging southeasterly at 30°. The rocks are intercalated sandstones, shales and tuffs of Lower Proterozoic age. The area is about two miles northeasterly by three miles southeasterly, bounded on the west and south by volcanics and porphyries, on the north and east by flat lying sandstones of Lower Cretaceous age. Cassiterite-bearing quartz-mica greisen outcrop four miles north of the area and the nearest known occurrence of granite is at Yeuralba, 18 miles north of Maranboy.

MINE GEOLOGY

Cassiterite bearing quartz-tourmaline hornfels veins of the Main Lode strike east (mine grid) over a length of 6,000 feet and dip north at 80°. Widths range from less than one foot to greater than 25 feet. Although vein material is virtually continuous, ore shoots are small and sporadic, but generally coincide with wide sections in the lode. Nothing is known of the pitch of the ore zones.

The vein system is essentially a siliceous type of replacement of well defined fissures which transgress the bedding. The country rock is essentially a sandstone-shale-tuff sequence, which has a local strike of approximately 140° (mine grid) and dips between 30° and 60° northerly in the mine area. Freshly exposed rock in the vicinity of the ore zone is dense, dark and featureless, making it difficult to establish the attitude of bedding.

The Main Vein which dips steeply to the north is suspected to be a replacement of a thrust zone. This Main Vein system is in turn displaced by several faults running at right angles to its strike. The main one of these faults is known as the Ray fault and has caused a major displacement of the Main Vein and also the Stannum King vein.

A number of less prominent faults run obliquely across the strike of the Main Vein. It is suspected that these faults are tension breaks produced by a left hand rotational movement on the Main Vein. It is possible that these oblique faults are an important factor in localising the ore, as

they are prominent in the vicinity of the Osman and Anaconda workings.

All the faults seen in the field have been healed with siliceous gangue material, and it is thought that the pattern of faulting was established during and before the mineralisation. There is no evidence of post-mineralisation faulting.

It is quite clear from the distinct pattern of ore shoots alternating with barren sections of vein that the tin mineralisation is controlled by some set of structural conditions. It is possible that the interplay of bedding, cross-faulting and regional cleavage are important factors in this respect. There is no evidence to suggest that the ore shoots will not repeat sporadically at depth, and there is certainly no suggestion that the shoots at the surface are controlled by any flat, near surface structure.

DRILLING RESULTS

The Bureau of Mineral Resources drilled eleven holes, with encouraging results. This drilling has shown that the main vein below Anaconda carries tin to at least 600 feet below the surface. Drill hole intersections showing widths and values are plotted on the accompanying Longitudinal Projection.

Considering the "blind spot" risk, these results are entirely in line with what could be expected from the drilling of this type of deposit. The important point established by the drilling is the presence of tin ore to at least 600 feet below the surface.

MINERALOGY OF THE ORE

Cassiterite is the only economic mineral occuring in the ore. It is mainly associated with quartz as veinlets, miniature stockworks and in vugs within the vein. Crystals are mostly fine, amber to brown in colour. Chalcopyrite, Pyrrhotite, Bismite, Haematite and Mica occur in minute quantity. Quartz and tourmaline are the chief gangue minerals. Fine grain size and dense hard character of lode material, with consequent necessity for fine grinding to release tin, accentuate the tendency to slime and pose a serious treatment problem. Tests carried out by the C. S. I. R. O. show that approximately 8% of tin is withheld until ground to 100 mesh.

TREATMENT AND RECOVERY

Preliminary Laboratory scale tests for treatment and recovery of tin oxide from Maranboy ores have been carried out by two independent concerns. These were by (1) C. S. I. R. O. and Melbourne University; (2) King Island Scheelite (1947) Ltd.

The point is stressed that samples for these tests came from different localities on the field.

Results are summarised as follows:-

	CSIRO & Melbourne University (Report#358)				K.I. SCHEELITE	
	Stannum King Ore		Ray Ore		Osman Ore	
	% of Total	Assaying % Sn	% of Total	Assaying % Sn	% of Total	Assaying % Sn
Head Value	100.0	3.29	100.0	2.00	100.00	2.13
Conc. Total:	58.3	48.20	55.5	49.30	59.28	35.90
Conc. Recoverable:	58.3		55.5		59.28	
Midd. Total:	9.3	4.79	11.8	5.45	8.67	4.00
Midd. Recov:	1.5(?)		2.6(?)		4.33(?)	
Ultra Slime Total:	10.0	1.83	8.1	1.12	3.13	
Ultra Slime Recov:	2.0(?)		2.0(?)		-	
Tail. Total:	15.8	0.92	24.6	0.65	28.92	0.73
Tail. Recov:	-		-		-	
TOTAL RECOVERY	61.80	48.00	60.10	49.00	63.00	36.00

From results of these preliminary tests, a recovery figure of 60% can be adopted. However, it is noted that these tests do not furnish sufficient data for plant design. Further tests for this purpose would be necessary, with ore provided from various sources to approximate an average sample of ore to be treated in the future.

POTENTIAL

The Main Vein from Star of the West to Eureka has produced approximately 35,000 tons of ore grading 2% Sn to an average depth of about 70 feet. This 4,000 foot interval of the Main Vein then has a potential in the order of 500 tons per vertical foot, assuming the ore shoots occur with the same frequency at depth.

Drilling carried out by the Bureau of Mineral Resources has proved that values occur to a depth of 600 feet below Anaconda workings and there appears to be no reason why the Main Vein, carrying shoots of payable ore, should not continue to much greater depths.

Basing calculations on 230/- per unit contained Sn, and 60% recovery from ore grading 2% Sn, it is possible to evaluate potential of the 4000 feet of Main Vein as follows:

	Tons Ore	Value per ton at 1.2% Sn recovered	Total Value
500 tons per vertical foot to 1,000 feet -	500,000	£13.16. 0	£6,900,000

In addition, further ore has been disclosed to the east of this section and mill feed would be further supplemented by ore from Stannum King.

PRELIMINARY ECONOMIC APPRAISAL

Based on a reserve of 500,000 tons mined out over a five year period.

Gross value based on 500,000 tons of ore at a recovery grade of 1.2% tin, at 230/- per long ton unit - 500,000 tons @ £13.14. 0	£6,900,000
Less operating costs @ £8	4,000,000
Gross Profit	2,900,000
Less redemption of equity capital estimated at £1,000,000.	1,000,000
	1,900,000
Less tax on 80% at 8/- in the pound, say	600,000
Net Profit after tax and return of capital	£1,300,000
Average return over five years	£ 260,000
Earning rate on equity capital	26%

At this stage the above figures are used only to demonstrate the economic feasibility of the project on the assumption that ore of suitable grade and of sufficient tonnage will be available for extraction.

PROPOSED EXPLORATION

It is considered that the first stage in the exploration should consist of one or two diamond drill holes to intersect the lode 1,000 feet or more below the surface. Purpose of this drilling would be to test for the presence of the lode at depth and establish the deep seated nature of the deposit. Providing the lode, regardless of values, persists to 1,000 feet or more, it is considered that the deposit would warrant testing by underground development openings.

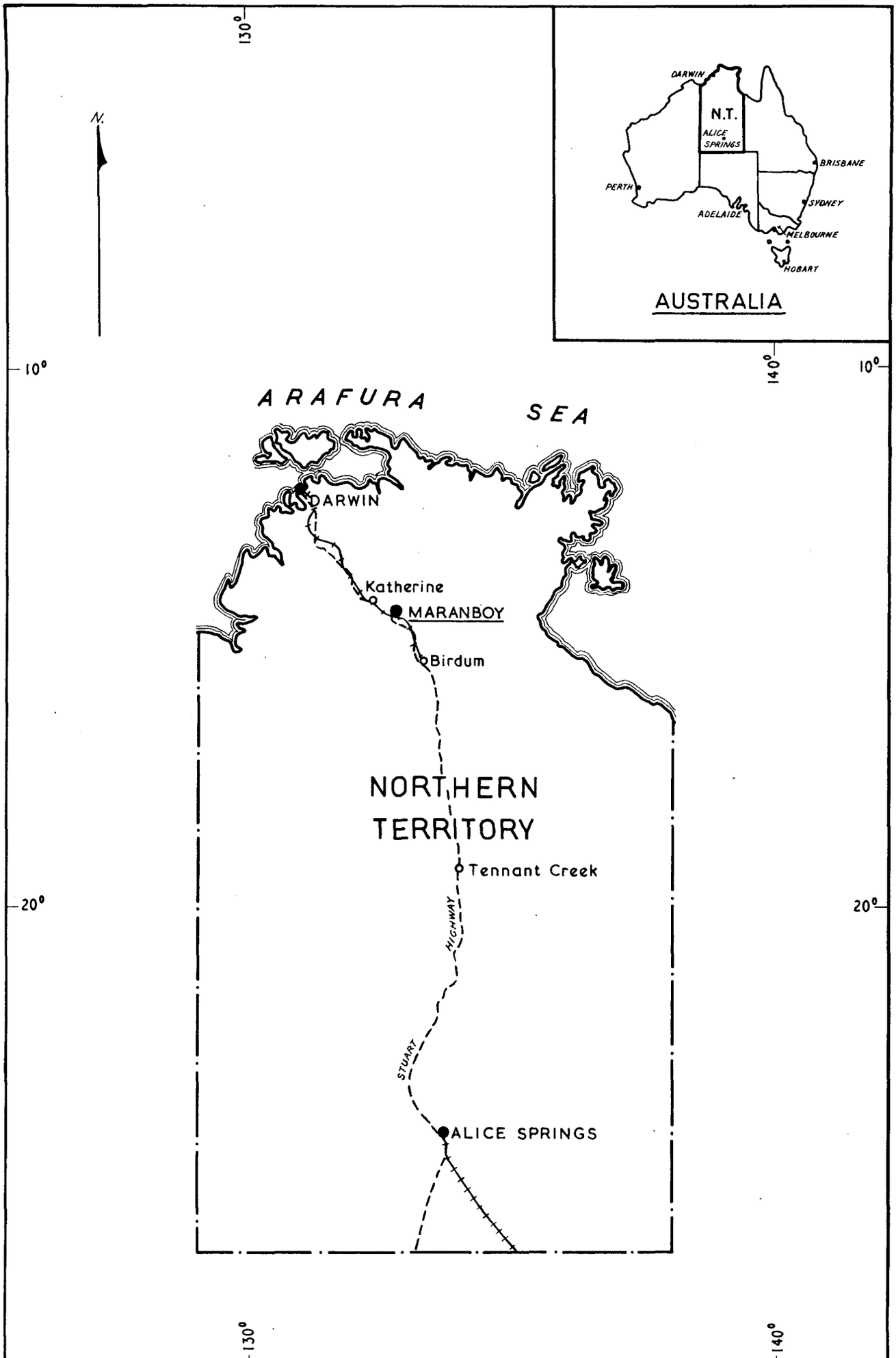
To outline the potential 500 tons per vertical foot below the existing workings, development will ultimately need to extend over a length of 4,000 feet. Providing the same ratio of ore to barren lode formation is encountered as is present at the surface, only 1,000 feet of the drive can be expected to disclose ore, with some 3,000 feet in barren lode or low grade material. It is therefore essential that a critical length of driving must be done to avoid the chance of the property being condemned through initial development running into a barren interval. The project should not be undertaken unless provision is made to thoroughly test the lode over a horizontal length of 2,000 feet with underground development.

By utilizing the work already carried out it should be possible to effectively test a 2,000 foot length of the Main Vein on the 250 foot level with about 2,000 feet of development. Refer 200 scale Longitudinal Projection and Section at 7800E. Overall cost of the drilling and development, including establishment costs, is estimated at £180,000 spent over a two year period.

If successful, the initial development should prove up 50,000 tons of 2% Sn ore and this would establish the warranty for driving along the remaining 2,000 foot section of the Main Vein. At the conclusion of this exploratory stage, sufficient data would be available to make a proper decision on the operating phase, and if this was undertaken, one production level would be completed, an ore reserve established, and much valuable information obtained on the ore occurrence and metallurgical and mining problems. In this respect, underground development is to be preferred to an intensive drilling programme.

R. Hare J. L. Morton

Melbourne,
12th February, 1964.



MINERAL RESOURCES AUSTRALIA PTY. LTD.

MARANBOY TIN PROJECT

LOCALITY PLAN

SCALE IN MILES

100 0 100 200

R. HARE & ASSOCIATES

00 E

5000 E

10,000 E

5000 N

00 N

Area covered by 200' plan

ML78D

ML4D

ML217

MAIN

ML263

VEIN

ML28D

Dillons member

Ibis member

AP1071

Axial Plane of Anticline plunging S.E. at 30°

STANNUM KING VEIN

FAULT

Government Battery

WESTERN BOUNDARY

AP1093

Ibis member

Dillons member

Battery Creek

Maranboy Creek

MAG N TRUE N

MAG N

LEGEND

- Sandstones
- Volcanics
- Porphyry
- Dillons member
- Ibis member

SCALE OF FEET

1000 0 1000

INSET

AP1093

MAIN VEIN

STANNUM KING VEIN

AP1071

Government Battery

MAG N TRUE N

MAG N

SCALE OF MILES

2 1 0 2

Road

To Katherine (25 miles)

Maranboy Siding

RAILWAY

HIGHWAY

Airstrip

STUART

MINERAL RESOURCES AUSTRALIA PTY. LTD.

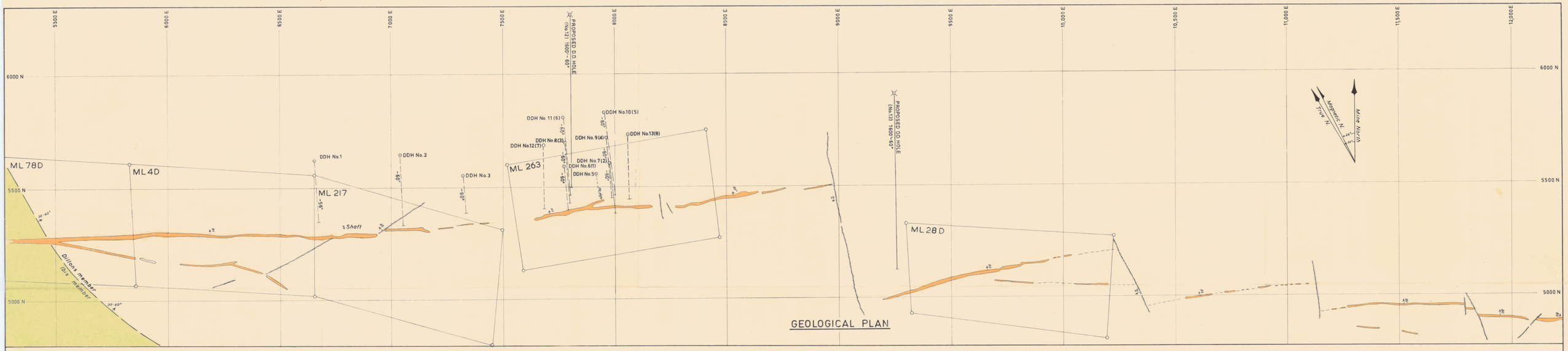
MARANBOY TIN PROJECT

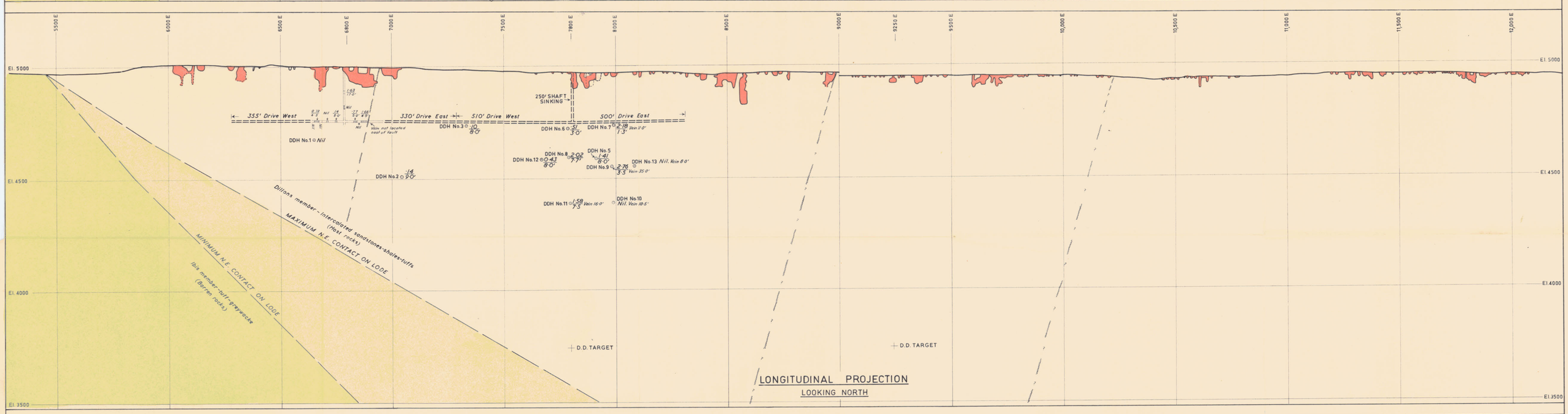
MARANBOY. N.T.

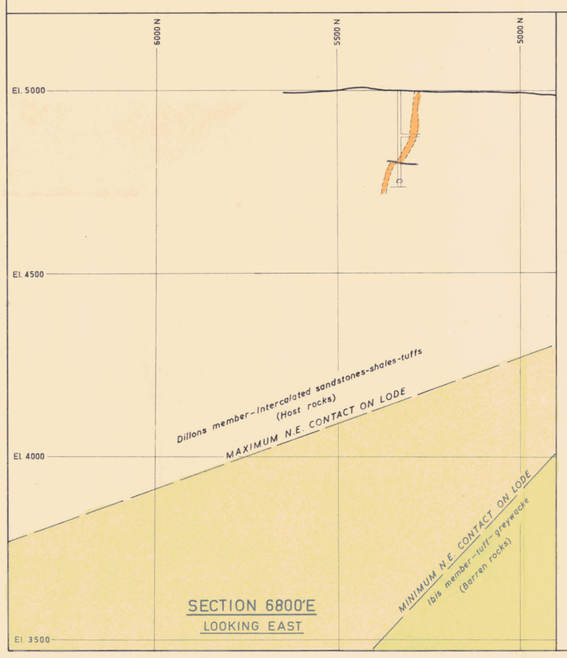
GENERAL PLAN

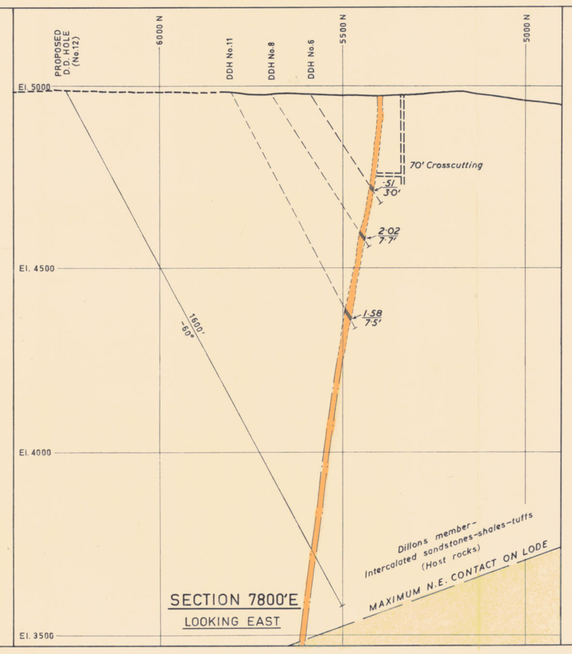
CR 63/10

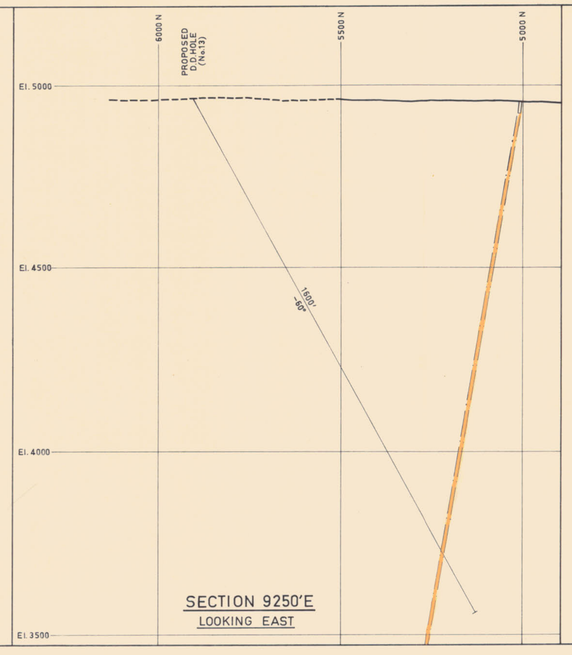
Prepared by J.L. MORTON of R.HARE and ASSOCIATES	SCALES : 1 Inch = 1000' 1 Inch = 2 miles
Drafting by : GEODRAFTING SERVICES	
Drawn : C.J.H.	REVISION
Date : 4 · 10 · 63	DRG. No. MRA/6











LEGEND

- Geological contact projected
- Geological contact assumed
- Geological contact defined
- Fault defined
- Fault projected
- Vein with dip
- Proposed D.D. Hole
- Strike and dip of contact
- 1.58 / 7.5' Assay in % Metallic Tin over Horizontal width in feet
- Mined out ore
- Dillons member-intercalated sandstones-shales-tuffs
- Ibis member-tuff-greywacke

} Lower Proterozoic

SCALE OF FEET
200 0 200 400 800

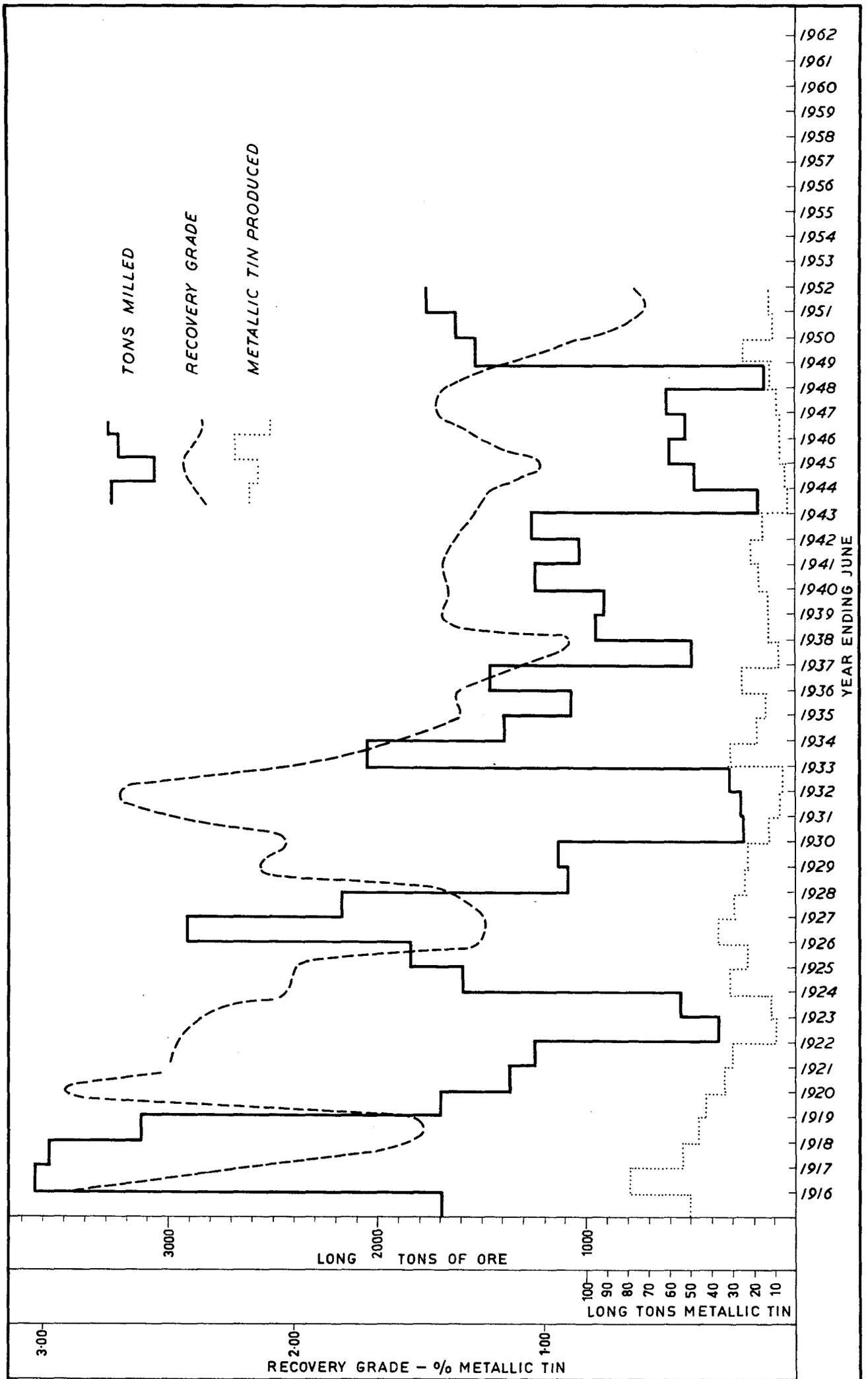
MINERAL RESOURCES AUSTRALIA PTY. LTD.

MARANBOY TIN PROJECT

MARANBOY, N.T.

CR 63/10

Prepared by J.L. MORTON of R. HARE AND ASSOCIATES	SCALE : 1 INCH = 200 FEET
Drafting by : GEODRAFTING SERVICES	
Drawn : C.H. — REVISION	DRG. No. MRA/4
Date : 2-10-63 — 7-11-63	



RECORDED TIN PRODUCTION

MARANBOY. N.T.