

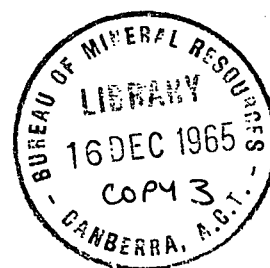
RESTRICTED

COMMONWEALTH OF AUSTRALIA

**DEPARTMENT OF NATIONAL DEVELOPMENT
BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS**

RECORDS:

1965/89



**SPECIAL MINERAL SURVEY PROGRAMME - NORTHERN TERRITORY
SUMMARY OF GEOLOGICAL BRANCH CONTRIBUTION**

by

J.F. Ivanac

The information contained in this report has been obtained by the Department of National Development, as part of the policy of the Commonwealth Government, to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

SPECIAL MINERAL SURVEY PROGRAMME - NORTHERN TERRITORY
SUMMARY OF GEOLOGICAL BRANCH CONTRIBUTION.

by

J.F. Ivanac

RECORDS 1965/89.

<u>CONTENTS</u>	<u>Page</u>
SUMMARY	1
INTRODUCTION	2
UNION REEFS AREA	3
Introduction	3
Geological Mapping	3
Selection of Diamond Drilling Targets	4
Diamond Drilling	4
Waggon Drilling	5
Conclusions	5
BROCKS CREEK AREA	6
Rising Tide Gold-Copper Prospect	6
McARTHUR RIVER AREA	6
Introduction	6
Auger Drilling Geochemical Sampling Results	7
Teena Area	7
Boko Area	7
Homestead Area	7
Mitchell Yard	7
Conclusions	7
RUM JUNGLE AREA	8
MOUNT FITCH COPPER ANOMALY	8
Introduction	8
Auger Drilling	8
Geological Mapping	9
Discussion	9
Diamond and Rotary-Percussion Drilling Results	9
Conclusions and Recommendations	10
AREA 55 COPPER ANOMALY	11
Introduction	11
Diamond Drilling	11
Conclusions	12
PHOSPHATE SEARCH	13
Introduction	13
Geology	13
Rotary Percussion Drilling	13
Diamond Drilling	14
Conclusions	14
REFERENCES	16
TABLE 1: Drilling recommended at Area 55.	12
TABLE 2: Rotary-Percussion Drilling - Main Phosphate Intersections in known deposits.	15

The information contained in this report has been obtained by the Department of National Development, as part of the policy of the Commonwealth Government, to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

Contents
(ii)

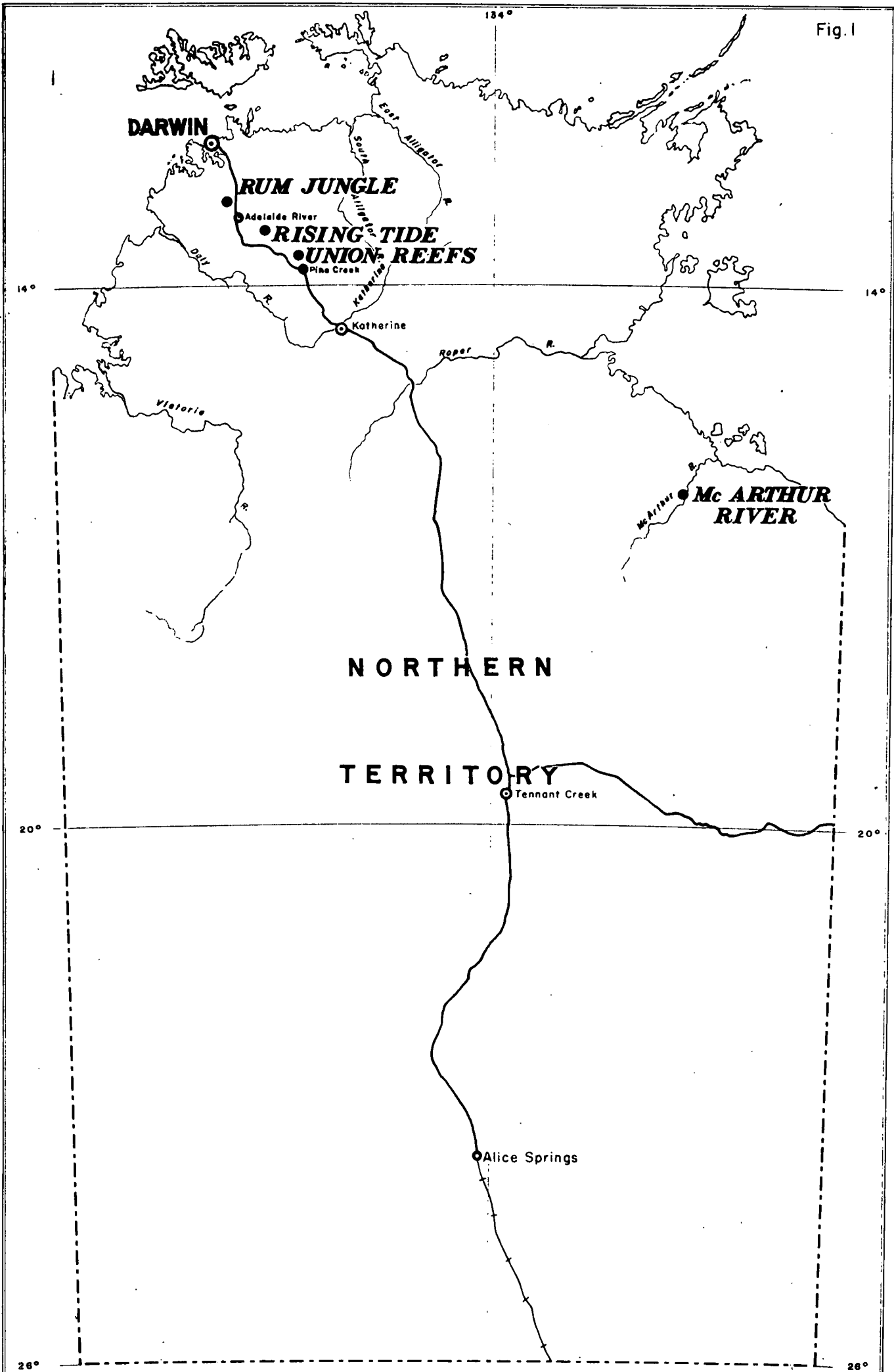
APPENDICES:

1. Union Reefs - Summary of Waggon Drilling and Diamond Drilling Results, Union Reefs, N.T.
2. Mount Fitch - Assay Results of Cuttings - Air Blast Rotary-Percussion Holes.
3. Mount Fitch - Summary of Diamond Drilling Results.
4. Phosphate Search - Summary of Diamond Drilling Results.

ILLUSTRATIONS

Figure 1. Locality Map.

- | | | | | |
|-------|-----|--|---|---|
| Plate | 1. | Locality Map - Union Reefs Area | | |
| " | 2. | Cross Course Lodes - Union Reefs | | |
| " | 3. | Prospecting Claim Lode - Union Reefs. | | |
| " | 4. | Millar's Lode - Union Reefs. | | |
| " | 5. | McArthur River Area, N.T. | | |
| " | 6. | Rum Jungle Area, Locality Map. | | |
| " | 7. | Mount Fitch Prospect. | | |
| " | 8. | Rum Jungle Survey 1963 - Area 55. | | |
| " | 9. | Geology and Topography - Rum Jungle Phosphate Survey, 1962-63. | | |
| " | 10. | " | " | " |
| " | 11. | " | " | " |
| " | 12. | " | " | " |



LOCALITY MAP

0 100 200 MILES

SPECIAL MINERAL SURVEY PROGRAMME - NORTHERN TERRITORY
SUMMARY OF GEOLOGICAL BRANCH CONTRIBUTION.

by

J.F. Ivanac

RECORD 1965/89

SUMMARY

During 1962 and 1963 the Bureau of Mineral Resources planned and executed geological, geochemical and geophysical surveys of selected mineral prospects in the Northern Territory. Funds for these surveys were provided by the Department of Territories.

Results of geological mapping, diamond drilling and waggon drilling at the Union Reefs Area suggest that large continuous gold-bearing lodes are unlikely to be found. Specific recommendations are made for future investigations of the area.

Drilling at the Rising Tide Gold-Copper Prospect in the Brocks Creek Area intersected disseminated pyrite which is interpreted as the cause of the electromagnetic anomaly.

Geochemical sampling using auger drilling was carried out in the McArthur River Area ~~of local base mineralisation and extensions~~ ^{extensions} of the Barney Creek Shale Member were located.

Geological mapping, auger drilling and geochemical sampling, electromagnetic and I.P. surveys and diamond drilling were carried out at Mount Fitch to test a Copper Anomaly. A small secondary copper deposit, with inferred reserves of 47,000 tons of 1.9% copper was identified. Specific recommendations are made for further testing of this deposit and for the investigation of other copper anomalies in this area.

Diamond drilling of the Area 55 Copper Anomaly showed that further testing is warranted.

Rotary-percussion drilling and diamond drilling of the previously discovered phosphate deposits in the Rum Jungle Area has revealed inferred reserves of 5,000,000 tons of fluorapatite averaging 10% P₂O₅. The rock is unsuitable for the manufacture of superphosphate by present methods.

The results ^{are} summarised in this Record will be treated in detail in separate reports to be issued during 1965.

INTRODUCTION

At the request of the Commonwealth Department of Territories the Bureau of Mineral Resources planned a special mineral survey programme in the Northern Territory during the financial years 1962/63 and 1963/64. To carry out this request the sum of £150,000 was provided - £50,000 in 1962/63 and the balance during 1963/64.

The purpose of this survey was to examine and prospect selected mineral deposits and mineralised areas with the object of obtaining sufficient information to induce a company or companies to continue the work and thus assist in the development of Northern Australia.

Auger drilling, diamond drilling and rotary-percussion drilling were carried out by contractors supervised by the Geological Branch. Detailed geological mapping and logging and sampling of drill cores and cutting were carried out by Bureau geologists. Contract geophysical surveys were supervised by officers of the Geophysical Branch of the Bureau.

The following contract programme was decided upon:

Rum Jungle Area

Mount Fitch Copper Anomaly.	Auger drilling-geochemical sampling; diamond drilling.
-----------------------------	---

Area 55 Copper Anomaly.	Diamond drilling.
-------------------------	-------------------

Phosphate Search	Rotary-percussion drilling; diamond drilling.
------------------	--

Union Reefs Area

Diamond drilling. Electromagnetic and potential ratio geophysical surveys (Geophysical Branch).

Brocks Creek Area

Diamond drilling.

Mount Bunday Iron Ore Prospect

Aeromagnetic Survey (Geophysical Branch).

McArthur River Lead-Zinc Area

Auger drilling- geochemical sampling.
Electromagnetic and aeromagnetic surveys
(Geophysical Branch)

Samples were analysed in the Bureau Laboratories in Canberra and at Australian Mineral Development Laboratories in Adelaide.

Mr P. Pritchard supervised the programme at Rum Jungle, J. Shields at Rising Tide and Union Reefs, G. Marlow (Carpentaria Exploration) at McArthur River.

The Geophysical programme was planned and supervised by the Geophysical Branch and will be compiled as a separate report. This report provides a brief summary of the results of the programme.

Further separate detailed reports on each project are being compiled by the Geological Branch and will be issued during 1965 to supplement this brief progress report. The plates used in this record have been prepared by the various geologists engaged in the special mineral survey programme.

UNION REEFS AREA (Plates, 1, 2, 3 and 4.)

Introduction

Union Reefs Area is situated alongside the Darwin-Birdum railway line 149 miles south of Darwin. It is 5 miles by road east of the Stuart Highway from a point 143 miles by road from Darwin.

Gold-bearing quartz reefs occur in two roughly parallel zones on the crests and flanks of steep-sided hills. Large quantities of gold are claimed to have been won prior to 1881, but records are unavailable. Some records were kept from 1884 onwards but it is very doubtful whether these tell the full story, largely because of inadequate reporting of gold recovered by the many Chinese who dollied veins to win gold, or washed gold from alluvial deposits.

Records kept show that 58,232 tons of ore yielded 48,931 ounces of gold; ~~only~~ only 474 tons of tailings were cyanided. The yield would certainly have been higher if all had been cyanided.

Gold has been mined on the area from approximately 1600 pits forming two sub-parallel lines each about 10,000 feet long. No recent attempt has been made to prospect the field, although several companies have inspected it. The oxidised zone of the ore deposits appears to have been completely worked out and little attempt has been made to prospect the sulphide zone. Therefore it was considered that the field provided interesting targets and that promising results from scout drilling the sulphide zone of the deposits might encourage further work by an exploration company.

The programme included:

1. geological mapping at a scale of 40 feet to 1 inch with the object of elucidating the geology and structural control of the deposits. Messrs D.A. White and J. Shields carried out this work;
2. electromagnetic and potential ratio surveys to establish the continuity of the lodes in depth, to identify the more favourable zones and to prospect for new ones. The Geophysical Branch was responsible for this part of the programme which was carried out by contract;
3. diamond drilling under contract to be supervised by the Geological Branch;
4. waggon drilling carried out in co-operation with United Uranium N.L. to test the usefulness of the method as a shallow exploration tool.

Geological Mapping

Gold at Union Reefs occurs in pyrite-arsenopyrite-galena-quartz veins localised along two major fracture zones known as the Lady Alice and Union Lines. Host rocks are highly folded and cleaved, fine to medium grained greywacke and shale which form an embayment in the Cullen Granite. Narrow dolerite dykes intrude the sediments and contain accessory pyrite, chalcopyrite, chalcocite and magnetite.

The quartz veins are lenticular but in places form irregular stockworks and replacement bodies. They range in width from less than $\frac{1}{4}$ inch to 30 feet; stockworks and zones of parallel stringers may be up to 40 feet wide and may form "haloes" around massive blocky quartz veins. Accessory minerals include pyrite, marcasite, arsenopyrite, chalcopyrite, galena, sphalerite, ilmenite and magnetite, as well as dolomite veinlets and bRbs.

The Lady Alice Line trends north and minor changes in strike give a broad flattened Z pattern to the distribution of quartz veins. At the northern end there is a well-defined "horse-tail" structure with zones of quartz veins striking north-east.

The Union Line trends north in the southern part, but in the central part the line of lode swings north-north-east to the Cross Course area and pinches out where a series of left-hand echelon shears become prominent. Immediately north of this area the north-south shear pattern redevelops on the Union Line and the first major lode on this continuation is the Prospecting Lode.

The sediments appear to have been isoclinally folded and overturned to the east. Fracture cleavage is strongly developed and is sub-parallel to the fold axes which trend approximately 352° magnetic. The average dip of the ~~Stacy Alice~~ line is approximately 85 degrees to the west and the Union line 85 degrees to the east.

Shear zones and their associated gold quartz veins can be expected to continue to considerable depth. The veins have probably been derived from granites, the nearest outcrop of which is about half a mile east of the lodes.

Selection of Diamond Drilling Targets

Detailed geological mapping showed the areas of main interest to be the Cross Course, Millars, and Prospecting areas. Additional holes in other areas would have been desirable but the footage available limited the programme to the most accessible areas.

Diamond Drilling

The successful tenderer was Associated Diamond Drillers Pty Ltd and the contract was for an estimated 3200 feet of drilling. This was supplemented by 2500 feet transferred from the phosphate diamond drilling programme at Rum Jungle. Included in the original 3200 feet was 300 feet drilled at Rising Tide in the Brocks Creek Mineral Field. Total footage drilled was 6204 feet.

A summary of the results of diamond and waggon drilling is shown in Appendix 1.

Drilling in the Cross Course Area was the most successful and D.D.H. No.9 from 304 feet to 314 feet assayed as follows:-

304 feet to 306.5 feet	3.0 dwts/ton Au	40 dwts/ton Ag.
306.5 feet to 309 feet	186.0 dwts/ton Au	74.0 dwts/ton Ag. (1)
<u>Check Assay</u>	122.9 dwts/ton Au	37.4 dwts/ton Ag. (2)
309 feet to 311.5 feet	0.4 dwts/ton Au	2.0 dwts
311.5 feet to 314 feet	0.5	5.0

The host rock is quartz with minor pyrite and arsenopyrite, grading into greywacke with blobs of pyrite and arsenopyrite. It is either the same vein worked at the surface or a parallel lens.

D.D.H. No.1 intersected the same vein and assayed 16.1 dwts/ton Au and 1.6 dwts/ton silver over 2.5 feet from 184 to 186.5 feet. The spread of values was higher in this hole and from 184 feet to 193 feet assays averaged 6.8 dwts/ton Au and 6.5 dwt/ton Ag.

Estimates based on these two drill hole intersections give inferred reserves of 23,300 tons averaging 21.7 dwts/ton Au and 9.9 dwts/ton Ag.

At Prospecting Lode, D.D.H. No.5 intersected 22.5 dwts/ton Au and 10.1 dwts/ton Ag from 184 to 186.5 feet. These assays were obtained from the central section of a large quartz lens intersected from 174 to 200.5 feet. Pyrite, arsenopyrite, galena and chlorite were present. In DDH No.10,

(1) Australian Mineral Development Laboratories

(2) Government Assayer Tennant Creek.

drilled into the same lode, core recovered from 345.5 feet to 348 feet assayed 13.3 dwts/ton Au and 13.0 dwts/ton Ag. These intersections and the range of values through the quartz lens suggest that a mineable orebody is present. Quartz lenses were also intersected in DDH. No.7 from 412 to 428 feet and from 602 feet to 614 feet. The highest assay result was 8.1 dwt/ton Au from 412 to 414.5 feet.

At Millars Lode several drill holes showed that the quartz lens extends to 700 feet below the surface. Although the lens is well defined, assay results were low.

Waggon Drilling

United Uranium N.L. co-operated with the Bureau in an experimental waggon drilling programme and provided, at nominal cost, drill crews, a Gardner Denver Airtrac waggon drill, a 900 c.f.m. compressor and a cyclone dust collector.

Seven waggon drill holes ranging in depth from 115 to 185 feet were drilled at Prospecting and Cross Course lodes. The main object was to test the waggon drilling at Union Reefs in the hope that it would provide a cheap method of prospecting many of the numerous quartz lenses and veins that have been mined at the surface. Where possible, holes were drilled alongside and parallel to diamond drill holes to provide a check on the previous results.

The most significant waggon drill results are as follows:-

WD	Depression	Length	Interval	Dwt Au/ton
	60°	185'	110' - 115'	6.7
2	60°	175'	165' - 170'	3.3
			170' - 175'	4.2
3	60°	115'	70' - 75'	8.6
			85' - 90'	13.6
4	50°	180'	-	-
5	50°	108'	105' - 108'	0.3
6	60°	195'	160' - 165'	0.3
7	55°	155'	150' - 155'	0.5

The project showed that most of the lodes have been worked out to water table level. Above that level adequate samples can be collected and in hole No.3 this proved successful. Below water level the cuttings slurry and pack the sides of the hole; consequently adequate return of cuttings is impossible.

Conclusions

The results of drilling suggest that large continuous gold-bearing lodes are unlikely to be found at Union Reefs. Outcropping lodes extend in depth and will probably maintain their lenticular habit.

The distribution of the gold is erratic and calculations of grade should be based on large samples. The results of diamond drilling give only a broad indication.

The old Government Shaft at Cross Course should be reopened and deepened to check the diamond drill intersections and to determine if mining is warranted. Subsequent development programmes can be based on the results of this exploration, e.g. driving north along the lode to check other diamond drill hole intersections and east to prospect under the Lady Alice Line. Facilities for rapid gold assay determinations should be available to assist underground exploration in an area where gold values are erratically distributed through the host rock. This is a project suitable for a syndicate or small company and should be subsidised.

The gold-bearing sections in Prospecting Lode and the intersection assaying 13.6 dwts/ton Au in Waggon Drill Hole No.7 should be explored by shaft-sinking and by underground development.

Two or three holes should be drilled to 1000 feet beneath the Cross Course lode to explore its potential at greater depth. It has been suggested that the Lady Alice and Union lodes may meet in depth, although the evidence for this is very slender.

The Golden Dyke Formation is thought to pitch under the Burrell Creek Formation, host to the gold bearing lodes, and may be found in depth. Detailed geological mapping along what appears to be a major structural feature - from Pine Creek through Burrundie - may give some indication of the depth to the Golden Dyke Formation which is host to mineral deposits in the Brooks Creek and Rum Jungle Areas.

BROOKS CREEK AREA

Rising Tide Gold-Copper Prospect

The Rising Tide gold-copper prospect is situated on the Waggaman Goldfield, $1\frac{1}{2}$ miles north of Brooks Creek Railway Siding. The rocks include Lower Proterozoic graphite slate, sandy slate with chert nodules, quartz lenses, quartz breccia and concordant amphibolite, all dipping from 28 to 74 degrees south-east.

The prospect was of interest because of a well-defined electromagnetic anomaly, not previously tested. A copper geochemical anomaly possibly related to the source of the anomaly was outlined on the surface during a previous BMR geochemical survey.

One drill hole was planned and was completed at 300 feet. The target estimated at 240 feet below the collar of the hole, was intersected and consisted of minor disseminated pyrite which has been interpreted as the cause of the electromagnetic anomaly. The copper geochemical anomaly is due probably to minor disseminated chalcopyrite in the country rock.

A summary of the diamond drilling intersections is as follows:

0	- 91'6"	Siltstone and carbonaceous shale
91'6"	- 102'	Amphibolite, weathered
102'	- 117'	Shale - black, micaceous
117'	- 300'	Amphibolite - medium grained
	205' - 208':	1% pyrite in joints

McARTHUR RIVER AREA (Plate 5.)

Introduction

The McArthur River mineral field is situated 350 miles south-east of Darwin; it is 30 miles by road from Boroloola.

Prospects in the area lie within the Middle Proterozoic Amelia Dolomite. As far as is known primary mineralization is confined to the Barney Creek Member, which consists of dolomitic pyritic shale, fine-grained tuff, dolomitic breccia, and flaggy dolomite. Sphalerite and galena are confined to the pyritic shale. Large parts of the area of interest are covered by alluvium and residual soil.

The Bureau of Mineral Resources and Carpentaria Exploration Pty Ltd had carried out geochemical prospecting by hand-auger and power-auger in the H.Y.C., Teena, W-Fold, and Mitchell Yard areas, and between Barney's Hill and W-Fold, during 1962, and the results were considered to be sufficiently encouraging to warrant continuation of the testing in selected localities during

1963. Apart from providing further information about the distribution of lead and zinc in weathered bedrock, it was expected that the drilling would also serve to trace the Barney Creek Member beneath the thick (up to 80 feet) cover of alluvium and residual soil.

Auger Drilling Geochemical Sampling

A contract to auger drill a maximum of 45,000 feet was awarded to Geotechnical and Engineering Services of Adelaide but this contract was terminated at 9616 feet due to the inefficiency of the contractor and his failure to do the work to the satisfaction of the Bureau.

The remainder of the programme, approximately 22,000 feet, was completed by the Bureau's own Gemcodrill.

Supervision of the drilling, packaging of auger cuttings and geological mapping were carried out by a geologist of Carpentaria Exploration Pty Ltd. Geophysical surveys over the area auger-drilled were supervised by officers of the Geophysical Branch of the Bureau and will be discussed in a separate report.

Teena Area

The results obtained show anomalous values for lead and zinc. The lead anomaly is located over pyritic shale and dolomite; the zinc anomaly is confined to the area adjacent to the pyritic shale outcrop.

The association of lead and zinc in anomalous quantities is indicative of the Barney Creek shale. Anomalous lead over dolomite is indicative of minor galena lenses similar to many unimportant deposits in the district.

Boko Area

Associated lead and zinc anomalies discovered in this area are indicative of a narrow pyritic shale member, although auger cuttings were mainly dolomite.

Homestead Area

This area of approximately 1½ square miles lies to the south of the H.Y.C. locality on the eastern bank of the McArthur River. It is extensively covered by deep river alluvium. A total of 385 auger holes were drilled to an average depth of 40 ft.

The results obtained for zinc and lead were extremely low except for one small area showing a minor lead/zinc anomaly. Because of the nature of the ground, well defined anomalies such as were found at Teena and Boko would not be anticipated, so that small anomalies in this area would have more significance than in areas of shallow residual soil cover.

On this basis the anomaly in the Homestead area would warrant at least sufficient investigation to determine the nature of the underlying rock and its trace element content.

Mitchell Yard

Forty auger holes were drilled to an average depth of 48 feet through recent McArthur River alluvium. No anomalous metal values were recorded. This area does not warrant any further investigation.

Conclusions

The auger drilling geochemical sampling programme was successful in tracing the Barney's Creek shale member. A geochemical anomaly in the Homestead area warrants further study.

RUM JUNGLE AREA (Plate 6.)

MOUNT FITCH COPPER ANOMALY (Plate 7.)

Introduction

The Mount Fitch Copper Anomaly, outlined in 1958 by a B.M.R. reconnaissance geochemical survey, lies 8½ miles north-west of Batchelor Township and 5 miles west-north-west of the Rum Jungle treatment plant.

The anomaly is tear-drop in plan, and has a long axis of 2600 feet (inside the 1000 part per million copper contour). It lies mainly over Coomalie Dolomite but spreads in places across the contact of the overlying Golden Dyke Formation. Assays of copper from soil samples gave a maximum of 0.7%.

This copper anomaly was considered to be a worthwhile target for exploration, and the following programme was planned:-

- i. detailed geological mapping
- ii. auger drilling and geochemical sampling
- iii. electromagnetic (Slingram) and experimental I.P. Surveys
- iv. diamond drilling.

Geological mapping, geophysical surveys, and analysis of geochemical samples were carried out by the Bureau, and auger drilling and diamond drilling by contractors. P.W. Pritchard, A.L. Mather and D. French of B.M.R., participated in the survey. Geophysical surveys were carried out by geophysicists of the Darwin Uranium Group.

Auger Drilling

Tenders were invited for a maximum of 22,000 feet of auger drilling. Geotechnical and Engineering Services of Adelaide submitted the successful tender. However, shortly after commencement of the contract their services were cancelled because of their failure to carry out the programme in a manner satisfactory to the Bureau.

In an effort to maintain programme schedules and overcome the slow rate and inefficient drilling of Geotechnical Services the Bureau brought in its own Gemcodrill; however only 2877 feet were drilled before this rig had to be moved to complete other planned commitments.

Subsequently the contract was awarded to Atlantic Drillers, of Brookvale, New South Wales. Atlantic Drillers began drilling on 20th August using a Gemco rig, and completed 22,209 feet by 23rd November. The area drilled extended from Mount Fitch North to Mount Burton Open Cut, a distance of about three miles.

Auger holes on 200 foot centres were drilled within the anomalous area, and its possible extensions north and south. The aim was to provide more detailed information about the distribution of anomalous copper and about the geology of the area, which is largely covered by soil, sand and rubble, so that diamond drilling targets could be more accurately located.

Where anomalously high copper values were found, auger holes were subsequently drilled on 50 and, in some places, on 25 foot centres.

Soil samples were analysed spectrographically for copper, lead, vanadium, molybdenum, nickel and cobalt and all holes were probed radio-metrically. The results were statistically analysed, plotted on maps of scale 400 feet to 1 inch and contoured to show the significant anomalies.

Geochemical sampling has confirmed the copper anomaly obtained in 1958, outlined it in more detail and revealed two smaller anomalies to the west. In

the largest anomaly the copper, nickel and cobalt ratios are similar to those obtained during an orientation study at Browns Copper Orebody near Rum Jungle. Although the order of the anomaly at Mount Fitch was much lower and is mostly confined to Coomalie Dolomite - whereas at Brown's the orebody lies in Golden Dyke Formation - the similarity of the types of mineralization is significant. At Mount Fitch the 1000 ppm. Cu isograd encloses copper values in the range of 1000 to 1200 ppm. and covers an area 2600 feet long with an average width of 240 feet. High copper values are largely coincident with anomalous nickel (100-2000 ppm.) and cobalt (100-1500 ppm).

Geological Mapping

Detailed geological mapping showed that the most impressive copper anomaly is confined to Coomalie Dolomite and it is associated with outcrops of ferruginous gossan-like material. The smaller anomalies west of the major anomalies are over the Golden Dyke Formation.

Malachite was found on the surface in four places - in a jasper lens near the contact of Coomalie Dolomite and Crater Formation, and in dolomite and dolomitic shales in Coomalie Dolomite. Samples of chalcopryrite-pyrite-bearing dolomite which crops out near Tamblyn's Shaft assayed 1 per cent copper over a width of 15 inches. Numerous malachite nodules lie on the surface near Tamblyn's Shaft.

Discussion

The investigation pointed up two possibilities for mineral discovery:-

1. disseminated chalcopryrite-pyrite lenses in the sulphide zone in Coomalie Dolomite, with cobalt and nickel as accessory elements. The diamond drilling programme was planned to test this possibility.
2. the occurrence of malachite in outcrops of dolomite and the large number of spectrographic analyses of auger and rotary drill cuttings giving 5000 ppm. copper pointed to the possibility of a near-surface secondary copper deposit assaying better than $\frac{1}{2}\%$ copper and containing accessory cobalt, nickel and molybdenum.

Diamond and Rotary-Percussion Drilling Results

Tenders were invited for 4700 feet of diamond drilling and Associated Diamond Drillers won the contract. They began drilling on 15th July 1963 and finished in February 1964. A summary of the diamond drilling and assay results is given in Appendix 3; assay results from rotary-percussion drill cuttings are listed in Appendix 2.

Diamond drilling identified the major rock units, Golden Dyke Formation, Coomalie Dolomite and Crater Formation, and showed that the contacts dip west at moderate angles. Narrow chalcopryrite-pyrite lenses, altered in most places to limonite, native copper, malachite, bornite and chalcocite were intersected. Copper assays of cores were low except 4.2% copper (native copper, chalcocite) from 655-660 feet in DG31; cobalt and nickel were assayed spectrographically, the results being less than 2,000 ppm.

Primary and secondary copper mineralization was found at different depths in the Coomalie Dolomite due to the extremely irregular, and in places deep, weathering profile, and probably also to a lenticular character of the primary lodes. The most favourable host rock for mineralization appears to be a chloritic dolomite near the base of the Coomalie Dolomite.

The true sulphide zone may not have been reached by the drilling and a further deep hole should be considered.

Rotary-percussion drilling and auger drilling has outlined a small

deposit averaging (on available assays) about 1.9% copper. The full dimensions are not known. The intersections are as follows:-

<u>Hole</u>	<u>Grid Reference</u>	<u>Footage</u>	<u>% Cu</u>
Auger	11550E*	10'-40' (30')	1.3
	44500N		
Auger	11600E*	12'-40' (28')	1.3
	44500N		
Auger	11550E	6'-36' (30')	0.9
	44600N		
Auger	11650E	6'-40' (34')	2.0
	44600N		
Rotary Percussion El42		0'-60' (60')	3.1
AVERAGE		36 feet	1.9%

Inferred Reserves assuming weathered
Coomalie Dolomite averages 17 cubic feet per ton = 47,000 tons.

*Bottomed in 1.3 and 1.4% Cu respectively.

Assayed by Bureau of Mineral Resources.

The deposit consists of malachite, bornite, chalcocite and chalcopryrite in weathered dolomite and clay derived from dolomite, and in haematitic siltstone, in the alkaline weathered profile over Coomalie Dolomite. Further testing of this deposit is warranted to determine its full dimensions both laterally and in depth. Prospecting of other copper anomalies in this area should also be carried out.

Conclusions and Recommendations

1. The Tamblyn's Shaft copper deposit contains 47,000 tons of 1.9% copper within the zone outlined by the Bureau of Mineral Resources drilling; mineralization should be prospected initially by vertical drill holes placed on 100 foot centres and drilled to 100 feet depth or greater if copper assays of better than 1% persist. When the edges of the deposit are determined the grade should be evaluated by holes on 50 foot centres, and its cobalt and nickel content should be investigated. This investigation should also be extended to the nearby Mount Fitch uranium-bearing deposit. The variety of minerals identified and the nature of the host rock suggest that lode material will be difficult to treat. Heap leaching is a possibility although this might be hampered by the carbonate gangue.

2. Other copper anomalies could indicate secondary copper orebodies and should be prospected by vertical drill holes.

3. The results of diamond drilling show that the base of the Coomalie Dolomite appears to be the most favourable host rock for chalcopryrite-pyrite bodies. From 655 feet-660 feet in DG31 the core assayed 4.2% copper (chalcocite). Oxidation is deep and irregular and has led to pinnacle-type weathering; caves are common in the dolomite. Because of the great depth of weathering a true picture of the sulphide zone was not obtained.

4. Test drilling should be extended to the clearing around B.M.R. No.2 Shaft, where malachite is disseminated in a shale horizon in Coomalie Dolomite.

5. Further work on the structural control of copper mineralization should be done.

6. The results of this programme show that the Coomalie Dolomite is a potential host for ore and should be prospected in other parts of the Rum Jungle area. A broadly spaced grid with traverse lines at 2400 feet centres should be adequate during initial prospecting. Surface or shallow mattock hole sampling is adequate to outline potential areas of mineralization over this formation and auger drilling is only required in areas of transported soil, where a surface anomaly has been detected or where subsurface information is required.

7. The 1000 ppm. copper isograd parallels, in part, north-east striking fractures which are known to displace the Rum Jungle Complex. A diamond drill hole at right angles to this strike should be put down. An attempt was made in 1964 to do this but the hole was abandoned because of numerous caves in the dolomite.

AREA 55 COPPER ANOMALY (Plate 8.)

Introduction

Area 55 (Pritchard 1964) lies 4 miles south-west of the Rum Jungle uranium and copper treatment plant and has been investigated for uranium and base metals ores by the Commonwealth, and a private company. In 1959 Haldane and Debnam outlined copper, lead and cobalt geochemical anomalies in the course of a soil sampling programme. In 1962 and 1963 further detailed geochemical sampling was completed and the results of this survey combined with previous diamond and churn drilling information suggested that a further hole should be drilled.

Accordingly, D.G.17 was planned and was drilled vertically by Associated Diamond Drillers to a depth of 304.5 feet. P.W. Pritchard and S. Yeaman of BMR participated in the survey.

Copper, lead, cobalt and nickel mineralization is present in carbonaceous schist, chert and chlorite schist of the Golden Dyke Formation and copper, cobalt and nickel mineralization is found in underlying Coomalie Dolomite. Pritchard (1964) suggests that mineralization occurs where these meta-sediments are cylindroidally folded into two main anticlines plunging 40° to 60° north-west.

Diamond Drilling

The results of diamond drill hole DG.17 are as follows:

<u>From</u>	<u>To</u>	<u>Lithology and Assay Results</u>
0	87'9"	clay after chlorite schist, sericitic in part.
87'9"	103'	schist, grey, with pyrite, sericite and chalcocite
	88'0" - 91'	4.2% Cu
	91' - 95'6"	4.2% Cu
	95'6" - 100'	7.4% Cu
	100' - 103'	10.0% Cu
103'	127'	chert, grey, with bands of sulphide boxworks
127'	202'	chert, grey; clay-filled fractures, limonite on joints, galena in blebs and stringers
202'	221'6"	mudstone, dark grey, siliceous
221'6"	225'7"	chert, grey and white, with clay on fractures
225'7"	260'	schist, dark grey, carbonaceous
260'	304'6"	chert, grey, with clay bands

From 88' to 103' (15') copper assays averaged 6.3 percent and from 41 to 91 feet lead (as carbonate) assayed 6.9%.

Conclusions

The assay results show that further testing for copper ores is warranted. Cobalt and nickel could be an important by-product if a suitable treatment process is available to recover the small quantities present.

A summary of the recommended programme of diamond drilling is shown in Table 1.

TABLE 1

DRILLING RECOMMENDED AT AREA 55

(Pritchard, Records 1964/150)

Hole	Coordinates	Depth (feet)	Priority	Comments
A.	1330W 200S	350	1	1. To test the most intense electromagnetic anomaly almost down the plunge of the oreulation lineation from the peak of the geochemical copper anomaly at 1200 W, 400S
B.	1440W 445S	600	2	1. To test the suspected extension of the mineralization in the syncline between anticlines 1 and 2 within the electromagnetic anomaly, downplunge from the geochemical anomaly. 2. To be continued into limestone even if lead mineralization is encountered in the upper part of the chlorite schist unit.
C.	1440W 610S	850	3	1. To test the suspected extension of the mineralization within the electromagnetic anomaly. 2. To test the downplunge extension of any mineralization intersected in DDE or DDF.
D.	1440W 900S	550	3	1. To test the extension of the mineralization within the electromagnetic anomaly downplunge from the peak of the lead anomaly. 2. To test the suspected shear zone on the southern limb of anticline 2.
E.	1100W 500S	550	5	1. To test the mineralized shear zone downplunge from the peak of the copper <u>orebody</u> in the vicinity of the 10' of 1.4% copper encountered in DDA 3. 2. To test the Coomalie Dolomite near the shear zone.

Hole	Co-ordinates		Depth (feet)	Priority	Comments
	Easting	Northing			
F.	1100W	645S	500	2	1. Follow up from DDE. 2. To probe for an extension of the inferred major shear zone intersected in DD701 and DD 708.
G.	550%	300S	350	6	1. To test the tail of the geochemical anomaly. 2. To test the down dip extension of the mineralized zone. 3. To probe for muscovite schist and examine its contact with the overlying limestone.
H.	657W	900S	200	4	1. To examine the number 2 geo-physical anomaly.

PHOSPHATE SEARCH (Plates 9, 11, 11 & 12.)

Introduction

The preliminary phosphate search in the Rum Jungle area in 1962 was expanded in 1963 to evaluate known phosphate-bearing areas and to prospect outcrop areas of hematitic quartz breccia, hematitic sandstone and hematitic mudstone for new deposits.

The project included 5,000 feet of diamond drilling and 30,000 feet of pattern rotary-percussion drilling. Associated Diamond Drillers won the diamond drilling contract and Geophysical Services International of Perth won the rotary percussion contract.

P.W. Pritchard and D. Maggs of BMR participated in the programme.

Geology

Sixteen deposits of phosphate rock are known and all are associated with bodies of hematitic quartz breccia, hematitic sandstone and hematitic siltstone, whose origin is the subject of much controversy. The phosphate deposits and associated hematitic rocks are thought to be either part of a very folded and shattered Lower Proterozoic phosphorite sequence lying between the Coomalie Dolomite and the Golden Dyke Formation, or to be formed by long and intense weathering of the Coomalie Dolomite. Whatever their origin, the phosphatic rocks occur as lenses which appear to have been enriched either by weathering or metasomatism.

Rotary-Percussion Drilling

Geophysical Services International began drilling at Castlemaine Hill on 15th July using two Mayhew 1000 drills; 14,988 feet (155 holes) of drilling was completed on 21st November. The contract was originally for 30,000 feet but was reduced to 15,000 feet when it was realised the company could not complete the programme before the onset of the wet season and that in general the holes drilled gave sufficient data to assess the prospects.

Fifty five holes were used to prospect the Castlemaine Hill area and the remainder were used to obtain further information on Easticks, Area 3 Castlemaine, Rum Jungle Creek South, Zeta, Buckshee, Whites and Dyson's phosphate occurrences.

Two holes drilled outside the known phosphate occurrences gave promising intersections of phosphate rock. These were R59 and R62 on the north eastern side of Castlemaine Hill. These intersections may be in the one deposit.

See Table 2.. Page 15.

Diamond Drilling

A diamond drilling contract let to Associated Diamond Drillers was reduced from 5,000 to 2,500 feet due to bad ground and slow drilling. The balance of the contract was transferred to Union Reefs.

Appendix 5 summarises the drilling results.

Conclusions

The rotary-percussion drilling and diamond drilling showed that inferred reserves of 5,000,000 tons of fluorapatite averaging 10 per cent P_2O_5 are present in the Rum Jungle area. Of this amount, possibly only 1,000,000 tons contain 20% or more P_2O_5 .

Apart from the inadequacy of known reserves, the large amount of finely divided hematite in the Rum Jungle phosphate rock makes it unsuitable for the manufacture of superphosphate by present day methods.

The only foreseeable use for the Rum Jungle material is as ground rock fertiliser. C.S.I.R.O. is testing its value for this purpose and is having encouraging results using calcined material.

Two holes drilled outside the known phosphate occurrences gave promising intersections of phosphate rock. These were R59 and R62 on the north eastern side of Castlemaine Hill. These intersections may be in the one deposit.

TABLE 2
ROTARY-PERCUSSION DRILLING - MAIN PHOSPHATE INTERSECTIONS IN
KNOWN DEPOSITS

<u>Deposit</u>	<u>Hole No.</u>	<u>Co-ordinates</u>		<u>Intersections</u>	
				Width	Percent P_2O_5
<u>Easticks</u>	R73	9E 19N	0-115'	115'	8.7
	R76	8E 16N	40-106'	66'	19.1
	R77	12.3E18N	95-140'	45'	13*
	R79		100-120'	20'	4.5*
	R81	13E 18N	40-105'	65'	8.4*
<u>Area 3</u>	R43	38E 24N	35- 65'	30'	15.3
<u>Zeta</u>	R66	34W 16N	5- 20'	15'	13.7
	R93	34W 17N	20- 60'	40'	6.2
<u>Area 4</u>	R101	124E 13N	30- 40'	10'	12.5
	R103	118.5E15N	10- 65'	55'	9.3
			75-115	40'	15.7
<u>Castlemaine</u>	R109	106E 17N	60-145	85'	12.9
	R114	98.25E 13N	0- 60'	60'	18.1
<u>Whites-</u> <u>Dysons</u>	R120	2.9N 42.8E	0-100'	100'	7.5
	R126	42.25E13.25N	35- 65	30'	9.3
	R131B	43.15E13.55N	35- 55	20'	18*
	R153	39.5E 97.5N	5- 50'	45'	7.7
	R157	28.8E 00.15N	0- 60'	60'	21.3
	R163	29 E 93.8N	0- 10'	10'	13
<u>Buckshee</u>	R123	2W 3S	30- 45'	15'	9.3
	R131a	3.5W 3S	0- 95'	95'	11.5
<u>Stapleton</u>	R137	5.21W 3S	0- 15'	15'	14*
<u>North</u>					
<u>Other</u>	R59	26W 17N	75- 95'	20'	9.7
	R62	18W 22.5N	15- 80'	65'	9.6

* = semi-quantitative analysis.

REFERENCES

- HALDANE, A.D., 1965 - Geochemical Prospecting McArthur River 1963
(in preparation)
- PRITCHARD, P.W. & FRENCH D.J., 1965 - The Mount Burton-North Mount Fitch
Prospect Area.
Bur.Min.Resour.Aust.Records 1965/6 (unpubl.).
- PRITCHARD, P.W., 1965 - Rum Jungle Survey - 1963 - Area 55 Prospect
Bur.Min.Resour.Aust.Record 1964/150 (unpubl.).
- PRITCHARD, P.W., 1965 - The Phosphate Deposits of the Rum Jungle Area.
(in preparation)
- SHIELDS J. WHITE D.A., & IVANAC, J.F., 1965 - The Geology of the Gold Prospects
at Union Reefs, N.T. (in preparation)

APPENDIX
SUMMARY-WAGGON DRILLING AND DIAMOND DRILLING RESULTS
UNION REEFS, NORTHERN TERRITORY.

<u>Hole</u>	<u>Direction</u> <u>Angle From</u> <u>Horizontal</u> <u>Depth (Ft)</u>	<u>Footage</u>		<u>Assays Results</u>	
		<u>from</u>	<u>to</u>	<u>Au dwt/ton</u>	<u>Ag dwt/ton</u>
WDH1 (Cross Course)	72°	100	105	0.2	Tr
	-60°	105	110	0.2	Tr
	185	110	115	6.7	Tr
		115	120	1.7	Tr
		140	145	0.2	Tr
		150	155	0.2	Tr
		155	160	1.8	Tr
		160	165	0.4	Tr
		180	185	0.8	Nil
WDH2 (Cross Course)	245°	130	135	0.4	Nil
	-60°	135	140	0.9	Tr
	175	140	145	1.3	Tr
		145	150	0.4	Nil
		150	155	1.2	Tr
		155	160	1.3	Tr
		160	165	0.4	Tr
		165	170	3.3	Tr
		170	175	4.2	Tr
WDH3 (Near DDH No. 7)	240°	60	65	0.2	Nil
	-60°	65	70	Tr	Tr
	115	70	75	8.6	Tr
		75	80	1.4	Tr
		80	85	4.0	Tr
		85	90	13.6	Tr
		90	95	1.3	Tr
					Quartz in fracture zone in greywacke and slate, galena, gold, chalcoppyrite, (?), chlorite, arsenoppyrite.
WDH4 (Prospecting Claim)	243°	155	160	Tr	Nil
	-50°	160	165	Tr	Nil
	180	175	180	Tr	Nil
WDH5 (Prospecting Claim)	255°	0	5	Tr	Nil
	-50°	55	60	0.3	Nil
	108	60	65	Tr	Nil
		65	70	Tr	Nil
		70	75	Tr	Nil
		75	80	Tr	Nil
		105	108	0.3	Nil
WD6 (Prospecting Claim)	82°	125	130	Tr	Nil
	-60°	130	135	Tr	Nil
	195		140	Tr	Nil
			145	Tr	Nil
			150	Tr	Nil
			155	Tr	Nil
			160	Tr	Nil
			165	0.3	Tr
			170	Tr	Tr
			175	Nil	Tr
			180	Nil	Tr
			185	Nil	Tr
			190	Nil	Tr
			195	Nil	Tr
					Quartz greywacke and slate fragments, minor arsenoppyrite.

Note: old working at 108 feet

Hole	Direction	Footage		Assays Results	
	Angle From Horizontal Depth (ft)	from	to	Au dwt/ton	Ag dwt/ton
WD7 (Prospecting claim)	85°	130	135	Nil	Tr
	-55°		145	Nil	Tr
	155		150	Tr	Tr
			155	0.5	Tr
					Quartz, haema- tite, galena, arsenopyrite, slate and grey- wacke fragments.

APPENDIX II

Diamond Drill Hole No. 1

Purpose: To test mineralization in sulphide zone below Cross Course open cut.

Direction: 069° magnetic Depression: Surface 56°

Average Recovery: 85%.

Summary and Assay Results.

Footage	% Recovery	Lithology	Au dwts/ton	Ag dwts/ton
0' - 55'		Greywacke.		
55' - 75'		Red shale and greywacke.		
75' - 88'6"		Greywacke.		
88'6"-120'		Shale and siltstone, red and grey.		
120' -122'9"	33	Quartz - vuggy fractured, haematite and limonite.		
			0.2	1.0
		120' - 126' ... (Sludge)	2.0	2.0
122'9"-167'6"		Greywacke and shale		
167'6"-168'	15	Shear, quartz stringers, limonite, and haematite.	5.9	2.0
168' -174'		Greywacke, shale bands.		
174' -193'		Lode, quartz stringers and veins, stockworks in slate, pyrite, chalcopyrite.		
	100	174' -176'6"	0.6	Tr
	93	176'6"-179'	3.3	2.5
	93	179' -181'6"	1.8	1.4
	65	181'6"-184'	0.4	0.4
	65	184' -186'6"	16.6	16.0
	55	186'6"-189'	5.2	1.
	55	189' -191'6"	4.7	2.7
	55	191'6"-193'	0.5	0.9
		191'6" - 193' 2.7% Copper.		
193' -223'		Shale and greywacke.		
223' -246'9"		Slate and siltstone.		
246'9"-264'		Greywacke with thin slate beds.		

Diamond Drill Hole No. 2 - Cross Course

Purpose: To test northern extension of Cross Course lode.

Direction: 069° magnetic. Depression: Surface 62°

Average Recovery: 88%.

Summary and Assay Results:

<u>Footage</u>	<u>% Recovery</u>	<u>Lithology</u>	<u>Au dwts/ton</u>	<u>Ag dwts/ton</u>
0 - 3'6"		Greywacke.		
3'6" - 7'		Quartz, milky, vuggy, limonite and haematite.	0.3	2.3
7' - 8'		Greywacke.		
8' - 9'		Siltstone red.		
9' - 173'		Greywacke, red to grey, thin beds slate and siltstones; minor shears and quartz stringers.		
	65	159'6"-162'3" quartz stringers.	0.1	Tr
	65	162'3"-165' quartz stringers.	0.2	0.2
	95	170'6"-172' quartz stringers.	0.3	Tr
173' - 205'		Greywacke and slate in equal proportions.		
	100	185'-186' quartz vein.	0.5	Tr
205' - 222'		Shale and siltstone red.		
222' - 229'		Shale and siltstone black and green-black.		
229' - 241'2"		Shale and greywacke.		
241'2" - 245'3"		Quartz with pyrite, arsenopyrite shale and greywacke.		
		241'2" - 243'6"	1.0	4.7
		243'6" - 245'3"	0.5	2.0
245'3" - 262'		Greywacke.		
262' - 351'		Shale and greywacke.		
		335' - 335'6"	0.9	2.8

Diamond Drill Hole No. 4 - Prospecting Claim

Purpose: Test Prospecting lode.

Direction: 082 magnetic. Depression: Surface 57°.

~~Average Recovery:~~

Summary and Assay Results:

<u>Footage</u>	<u>% Recovery</u>	<u>Lithology</u>	<u>Au dwt/ton</u>	<u>Ag dwt/ton</u>
0 - 12'		Greywacke		
12' - 20'		Slate and greywacke.		
20' - 45'		Greywacke.		
45' - 58'		Slate and greywacke.		
58' - 92'3"		Siltstone and slate.		
		73'3" - 74'8" quartz milky.		

Diamond Drill Hole No. 4 (cont.)

<u>Footage</u>	<u>% Recovery</u>	<u>Lithology</u>	<u>Au</u> <u>dwt/ton</u>	<u>Ag</u> <u>dwt/ton</u>
92'3" - 126'		Slate and greywacke. 120'-121' sheer, chlorite. 121'-126' shear; chlorite.		
126' - 129'		Greywacke, fractured, minor quartz stringers.		
129' - 137'		Slate.		
137' - 142'3"		Quartz, broken in fractured slate.		
	87	137' - 139'6"	0.1	1.7
	93	139'6" - 142'3"	1.0	0.2
142'3" - 158'3"		Slate, red brown.		
158'3" - 218'		Lode, quartz veins and stringers in chloritic slate, pyrite, arsenopyrite, vuggy.		
	80	158'3" - 161'	0.3	1.3
	87	161' - 163'6"	2.0	1.3
	93	163'6" - 166'	2.9	2.8
	98	166' - 168'6"	0.1	1.2
	90	168'6" - 171'	0.6	2.3
	90	171' - 173'5"	0.6	6.1
	90	173'5" - 180'		cavity
	72	180' - 182'6"	0.3	5.6
	52	182'6" - 185'	1.0	1.7
	95	185' - 187'6"	1.0	1.0
	97	187'6" - 190'	0.7	1.0
	97	190' - 192'6"	0.5	6.9
	97	192'6" - 195'	8.0	4.0
	97	195' - 197'6"	3.7	1.6
	97	197'6" - 200'	0.6	0.4
	95	200' - 202'6"	1.0	1.5
	96	202'6" - 205'	0.5	0.7
	97	205' - 207'6"	0.2	0.3
	90	207'6" - 210'	0.1	0.1
	85	210' - 212'6"	0.9	Tr
	80	212'6" - 215'3"	0.8	1.1
	95	215'3" - 218'	0.8	1.7
218' - 240'		Slate. minor greywacke.		
240' - 256'		Greywacke and slate minor pyrite.		

Diamond Drill Hole No. 5 - Prospecting Lode

Purpose: To check possibility of a northerly pitch.
Direction: 084° magnetic. Depression: Surface 55°.
Average Recovery: 92%.
Summary and Assay Results.

<u>Footage</u>	<u>% Recovery</u>	<u>Lithology</u>	<u>Au</u> <u>dwt/ton</u>	<u>Ag</u> <u>dwt/ton</u>
0' - 174'		Greywacke and slate.		
174' - 200'6"	98	Quartz veins, dissemination, blebs, pyrite, arsenopyrite, galena, chlorite, milky quartz yielded high assay results.		

Diamond Drill Hole No. 5 (cont.)

<u>Footage</u>	<u>% Recovery</u>	<u>Lithology</u>	<u>Au dwt/ton</u>	<u>Ag dwt/ton</u>
		174' -176'6"	0.3	Tr
		176'6"-179'	0.4	Tr
		179' -181'6"	2.1	Tr
		181'6"-184'	0.9	Tr
		184' -186'6"	22.5	10.1
		186'6"-189'	0.3	Tr
		189' -191'6"	0.9	0.9
		191'6"-194'	1.6	Tr
		194' -196'6"	1.2	Tr
		196'6"-198'6"	0.9	1.2
		198'6"-200'6"	1.4	Tr
200'6" - 215'		Slate.		
215'6" - 217'9"	100	Shale, numerous parallel quartz veins pyrite arsenopyrite.	Tr	Tr
217'9" - 229'		Slate.		
229' - 231'2"	98	Quartz veins, vuggy, pyrite in vugs minor galena.		
231'2" - 240'	40	Shear zone, slate.		
240' - 244'		Greywacke and slate.		
244' - 248'7"	87	Quartz veins in slate, pyrite, galena chlorite.		
		244' -246'3"	0.2	Tr
		246'3"-248'7"	0.1	Tr
248'7" - 259'10"		Greywacke and slate.		
259'10"- 262'	80	Slate, quartz stringers.	Tr	Nil
262' - 267'10"		Slate and greywacke, chlorite, shears.		
267'10"- 269'9"	90		Tr	Nil
269'9" - 307'		Greywacke and slate.		

Diamond Drill Hole No. 6

Purpose: To prospect for extensions of Millar's Lode in depth.

Direction: 060° magnetic. Depression: Surface 66°.

Average Recovery: 93%

Summary and Assay Results.

<u>Footage</u>	<u>% Recovery</u>	<u>Lithology</u>	<u>Au dwt/ton</u>	<u>Ag dwt/ton</u>
0' - 102'		Greywacke and slate.		
102' - 120'		Greywacke.		
120' - 250'		Greywacke and slate. 150' approx. base weathering.		
250' - 252'		Quartz stringers in greywacke and slate.		
252' - 312'		Greywacke.		
312' - 333'		Greywacke with slate bands.		
333' - 350'6"		Lode-greywacke, brecciated in part with quartz stringers veins, pyrite blebs, arsenopyrite.		

Diamond Drill Hole No. 6 (cont.)

<u>Footage</u>	<u>% Recovery</u>	<u>Lithology</u>	<u>Au dwt/ton</u>	<u>Ag dwt/ton</u>
	86	333' -355'6"	Tr	-
	98	355'6"-338'	2.2	-
	96	338' -340'6"	4.4	6.4
	92	340'6"-343'	0.3	0.4
	86	343' -345'6"	0.2	Tr
	98	345'6"-348'	1.5	-
	67	348' -350'6"	0.2	-
350'6" - 400'		Greywacke.		
400' - 413'		Lode-quartz veins and stringers in slate and greywacke.		
	86	400' -402'6"	4.6	5.3
	87	402'6"-405'	0.2	-
	86	405' -407'6"	Tr	17.5
	86	407'6"-410'	Tr	-
	87	410' -413'	Tr	-
413' - 467'		Slate rare narrow pyrite quartz stringers.		
467' - 482'6"		Slate sheared with pyrite quartz veins, serpentine?		
	83	467' -469'6"	Tr	-
	83	469'6"-472'	Tr	-
	97	472' -474'6"	Tr	-
	99	474'6"-477'	Tr	-
	99	477' -479'6"	Tr	-
	86	479'6"-482'6"	-	-
482'6" - 635'		Greywacke and slate.		
635' - 657'		Greywacke.		
657' - 669'		Greywacke and slate.		

Diamond Drill Hole No. 7

Purpose: To test a broad zone of fracturing 100 to 500 feet west of Cross Course open cut.

Direction: 060° magnetic. Depression: Surface 54°; 250 ft 54°; 500 feet 46°; 640 ft. 42°.

Average Recovery: 86%

Summary and Assay Results.

<u>Footage</u>	<u>% Recovery</u>	<u>Lithology</u>	<u>Au dwt/ton</u>	<u>Ag dwt/ton</u>
0' - 168'9"		Slate and greywacke.		
168'9" - 171'	68	Quartz, $\frac{1}{4}$ inch blebs pyrite.	0.7	Tr
171' - 215'7"		Base of weathering 200 feet; slate and greywacke.		
215'7" - 217'4"	100	Quartz - milky, included greywacke and slate, 1% pyrite.	0.8	Tr
217'4" - 367'		Greywacke and slate.		
		294'-314'3" minor quartz stringers.		
367' - 385'		Slate.		
385' - 412'		Greywacke.		
412' - 428'	80	Quartz veins in greywacke and slate; pyrite arsenopyrite.		

Diamond Drill Hole No. 7 (cont.)

<u>Footage</u>	<u>% Recovery</u>	<u>Lithology</u>	<u>Au</u> dwt/ton	<u>Ag</u> dwt/ton
		412' -414'6"	8.1	Tr
		414'6"-417'	2.0	Tr
		417' -419'6"	1.0	Tr
		419'6"-422'	1.6	Tr
		422' -425'	0.2	Tr
		425' -428'	0.7	Tr
428' - 457'		Greywacke and slate.		
457' - 490'6"		Greywacke.		
		464'-464'8" quartz, solid milky.	Tr	Tr
490'6" - 546'		Greywacke and slate.		
		490'8"-491'4" quartz, 10% pyrite.	Tr	-
		521'-521'10" quartz pyrite.	0.5	-
546' - 640'6"		Greywacke, rare thin slate bands, carbonate veins, pyrite-carbonate quartz veins.		
634'6" - 636'	98	602' -604'6"	1.3	Tr
	98	604'6"-607'	3.2	Tr
	98	607' -610'6"	0.3	Tr
	98	610'6"-614'	1.4	Tr

Diamond Drill Hole No. 8

Purpose: Prospect Millar's lode in depth.

Direction: 060° magnetic. Depression: Surface 66°.

Summary and Assay Results.

<u>Footage</u>	<u>% Recovery</u>	<u>Lithology</u>	<u>Au</u> dwt/ton	<u>Ag</u> dwt/ton
0' - 310'		Greywacke and slate; base of weathering. 120 feet; 120'-140' shears parallel to bedding 80°W; 300'-310' shear zone with quartz stringers.		
310' - 523'		Greywacke. rare slate.		
(523' - 553')	96	382'-384'10"	1.3	4.0
523' - 525'6"	95	Ramifying quartz veins and lenses in sheared chloritic	-	1.0
525'6" - 528'	95	slate and fractured grey-	-	1.0
528' - 530'6"	95	wacke. Pyrite, Carbonate	-	2.0
530'6" - 533'	80	veins.	-	1.0
533' - 535'6"	90		0.6	2.0
535'6" - 538'	90		4.0	3.0
538' - 540'6"	90		0.8	2.0
540'6" - 543'	50		-	3.0
543' - 545'6"	50		-	2.0
545'6" - 548'	90		-	3.0
548' - 550'6"	95		0.3	5.0
550'6" - 553'	95		1.2	4.0
553' - 560'		Greywacke and slate.		
560' - 600'		Quartz veins in sheared greywacke and slate.		

Diamond Drill Hole No. 8 (cont.)

<u>Footage</u>	<u>% Recovery</u>	<u>Lithology</u>	<u>Au dwt/ton</u>	<u>Ag dwt/ton</u>
	97	574'2"-577'6"	0.2	4.0
	100	584' -585'	-	1.0
	100	590' -591'	-	3.0
	100	595' -597'6"	-	2.0
	100	597'6"-600'	0.2	3.0
600' - 626'6"	92	Slate, black to green, rare shear zones.		

Diamond Drill Hole No. 9

Purpose: To continue down pitch exploration of Cross Course.

Direction: 057° magnetic. Depression: Surface 64°, 200 feet 60°; 395 feet 50°.

Average Recovery:

Summary and Assay Results.

<u>Footage</u>	<u>% Recovery</u>	<u>Lithology</u>	<u>Au dwt/ton</u>	<u>Ag dwt/ton</u>
0' - 11'6"		Greywacke, red to brown.		
11'6" - 20'		Greywacke, minor $\frac{1}{8}$ " wide quartz veins.		
20' - 154'		Greywacke, red brown, medium grained, thin slate beds.		
154' - 156'2"	100	Quartz, vuggy, pyrite, Fe staining.	3.0	5.0
156'2" - 252'3"		Interbedded greywacke and slate. 193'-199' cavity - no core ? old. working.		
252'3" - 254'7 $\frac{1}{2}$ "	100	(Quartz, solid milky arseno- pyrite.	1.0	2.0
254'7 $\frac{1}{2}$ " - 257'	100	(Quartz - arsenopyrite (2%)	4.2	3.0
257' - 350'		Greywacke, rare slate beds.		
304' - 314'	100	Quartz vein with pyrite, arsenopyrite grading to greywacke with blebs pyrite arsenopyrite.		
		304' -306'6"	2.0	4.0
		306'6"-309'	186.0	74.0
		309' -311'6"	0.4	2.0
		311'6"-314'	0.5	4.0
314' - 350'		Greywacke, medium grained rare slate beds.		
350' - 401'		Greywacke and slate. Rare quartz and dolomite veins.		
		369'-369'10" quartz,dolomite pyrite.	7.8	5.0

Diamond Drill Hole No. 10 - Prospecting Claim

Purpose: To test Prospecting Lode in depth.

Direction: 074° magnetic. Depression: Surface 59°. 500 feet 42°.

Average Recovery:

(cont.)

Summary and Assay Results

<u>Footage</u>	<u>% Recovery</u>	<u>Lithology</u>	<u>Au dwt/ton</u>	<u>Ag dwt/ton</u>
0' - 95'		Interbedded greywacke and slate.		
95' - 215'		Greywacke, medium grained rare slate bands; base of weathering 195'; 184'-193'9" cavity;		
215' - 225'		Greywacke medium to coarse grained.		
225' - 270'9"		Greywacke medium to fine grained.		
270'9" - 277'3"	98	Quartz, minor galena, sheared. Slate, calcite.		
		270'9"-274'	-	-
		274' -277'3"	0.1	4.0
277'3" - 286'9"		Greywacke.		
286'9" - 287'4"		Quartz.		
287'4" - 325'		Slate. Minor quartz stringers. 295'2" to 304'7".		
325' - 345'6"		Interbedded greywacke and slate.		
345'6" - 356'	97	Quartz, minor galena, arsenopyrite. Pyrite, slate, greywacke, dolomite.		
		345'6"-348'	13.3	13.0
		348' -350'6"	0.2	2.0
		350'6"-353'	0.6	2.0
		353' -356'	3.0	3.0
356' - 518'6"		Slate and very fine grained greywacke.		

Diamond Drill Hole No. 11 - Millar's

Purpose: To check southern limits of Millar's Lode.

Direction: 060° magnetic. Depression: 68°; 620'feet 35°.

Average Recovery:

Summary and Assay Results.

<u>Footage</u>	<u>% Recovery</u>	<u>Lithology</u>	<u>Au dwt/ton</u>	<u>Ag dwt/ton</u>
0' - 137'		Greywacke and slate.		
137' - 210'		Slate and greywacke. 197' pyrite and pyrrhotite.		
210' - 243'		Slate with narrow layers of greywacke; 233' calcite veinlets.		
243' - 275'		Greywacke with minor slate beds.		
275' - 302'		Slate with thin beds of greywacke.		
302' - 365'		Greywacke with minor bands of slate; minor pyrite, pyrrhotite and chalcopyrite (?) at 320', 344', 352'.		
365' - 406'		Interbedded greywacke and slate.		
406' - 477'		Slate with narrow partings of greywacke. 464'-466' quartz veinlets in sheared slate.	0.6	1.0
477' - 520'	96	Greywacke - minor slate. 493'-495'6" quartz veins up to 7" maximum thickness. 504'-506'8" quartz vein minor pyrite.	-	1.0
			0.2	4.0

Diamond Drill Hole No. 11 (cont.)

<u>Footage</u>	<u>% Recovery</u>	<u>Lithology</u>	<u>Au dwt/ton</u>	<u>Ag dwt/ton</u>
520' - 559'	96	Greywacke and slate.		
		532'-534'6 mottled quartz veins, pyrite.	0.2	2.0
559' - 581'		Slate with narrow beds of greywacke.		
581' - 643'		Greywacke with rare slate bands.		

Diamond Drill Hole No. 12 - Prospecting Lode.

Purpose: To check down pitch continuation of the oreshoot.

Direction: 074° magnetic. Depression: Surface 59°; 500 feet 36°.

Average Recovery:

Summary and Assay Results

<u>Footage</u>	<u>% Recovery</u>	<u>Lithology</u>	<u>Au dwt/ton</u>	<u>Ag dwt/ton</u>
0' - 220'		Interbedded greywacke and slate.		
220' - 241'		Slate.		
241' - 307'		Interbedded greywacke and slate.		
307' - 322'		Greywacke.		
322' - 334'6"	98	Quartz, sheared slate, arsenopyrite galena, chalcopyrite, dolomite, pyrite.		
		322' - 324'6"	3.2	8.0
		324'6"-327'	0.8	12.0
		327' - 329'6"	1.4	6.0
		329'6"-332'	0.1	2.0
		332' - 334'6"	3.0	4.0
334'6" - 464'		Interbedded greywacke and slate.		
464' - 503'		Greywacke, medium grained.		

Diamond Drill Hole No.13 - Millar's

Purpose:- To check continuation of Millar's Lode ~~in~~ depth.

Direction:- 060° magnetic. Depression 75°, 450 feet 60°, 600 feet 59° 750 feet, 50°.

Summary and Assay Results

<u>Footage</u>	<u>% Recovery</u>	<u>Lithology</u>	<u>Au dwt/ton</u>	<u>Ag dwt/ton</u>
0 - 550		Interbedded greywacke and slate		
	95	376' 2" - 379' Pyrite quartz veinlets.	Nil	Nil
		385' - 387'6" " in greywacke and	Nil	Nil
		387'6" - 390' " in slate, minor	Nil	2.0
		402' - 403'3" chalcopyrite.	Nil	2.0
		405 - 410' "	Nil	0.5
		410' - 415'	Nil	2.5
		415' - 417' 6".	Nil	3.0

<u>Footage</u>	<u>%Recovery</u>	<u>Lithology</u>	<u>Au</u> <u>dwt/ton</u>	<u>Ag</u> <u>dwt/ton</u>
550 - 568		Slate, sheared, chloritic.		
568 - 594		Greywacke, rare quartz veinlets.		
594 - 621		Slate, sheared minor quartz calcite minor chalcopyrite.		
621 - 675		Greywacke, minor slate, quartz calcite; 670-674' 4" minor chalcopyrite and pyrite.		
675 - 728		Interbedded greywacke and slate.		
728 - 731' 9"	98	Quartz, minor slate and chlorite.	Nil	3.0
731' 9" - 745' 6"		Greywacke, minor quartz veins		
745' 6" - 747' 9"	95	Quartz, chlorite, calcite in greywacke and slate.	Nil	7.0
747' 9" - 750'	95	Quartz (35%), calcite, pyrite, arsenopyrite.	Nil	2.0
750 - 771		Interbedded greywacke and slate.		
771 - 777' 6"		Greywacke, minor slate.		
777' 6" - 819' 2"	92	Lode ramifying quartz veins in greywacke and slate; pyrite arsenopyrite, sphalerite, chlorite, calcite.		
		776' - 778' 10"	Nil	1.0
		778' 10" - 779' 10"	0.2	1.0
		779' 10" - 781' 4"	Nil	1.0
		781' 4" - 786' - 1"	Nil	Nil
		786' 1" - 788' - 1"	0.2	2.0
		791' 4" - 791' - 4"	4.5	3.0
		791' 4" - 797' - 5"	4.8	1.0
		797' 5" - 798' - 4"	Nil	2.0
		798' 4" - 801' 3"	0.3	1.0
		801' 3" - 804' 3"	Nil	1.0
		811' 5" - 813' 11"	Nil	Nil
		813' 11" - 816' 5"	Nil	3.0
		816' 5" - 819' 2"	Nil	1.0
819' 2" - 860'		Greywacke, minor thin quartz veinlets, traces of pyrite.		

APPENDIX 2

ASSAY RESULTS OF ROTARY DRILL HOLE CUTTINGS - MT. FITCH PROSPECT

% Cu									
Footings	R130	R132	R134	R136	R138	R140	R142	R165	R167
0- 5	-	0.4	-	0.7	0.7	0.5	1.2	-	0.3
5- 10	-	0.4	-	0.4	0.7	0.6	1.9	-	0.5
10- 15	-	0.5	-	0.6	-	0.9	2.1	-	0.4
15- 20	-	0.4	-	-	0.7	0.9	1.8	-	0.3
20- 25	-	0.5	1.6	0.7	0.7	0.5	2.0	-	0.3
25- 30	-	0.5	0.5	0.6	0.5	0.5	3.3	-	0.2
30- 35	-	0.5	0.2	0.5	0.7	0.4	2.8	-	0.7
35- 40	-	0.5	0.5	0.7	0.7	0.9	4.7	-	0.2
40- 45	-	0.2	0.4	0.6	0.7	-	2.3	-	0.5
45- 50	-	0.2	0.3	0.5	-	1.1	5.9	-	0.4
50- 55	-	-	0.4	0.5	-	0.9	4.9	-	1.0
55- 60	-	0.2	0.2	0.5	-	0.4	4.0	-	1.0
60- 65	-	-	0.2	0.8	-	0.3	1.4	-	0.5
65- 70	-	-	0.2	0.7	-	0.2	-	-	0.2
70- 75	Water	-	0.4	0.7	-	0.8	-	-	1.3
75- 80	-	Cavity	0.2	0.5	-	0.6	-	0.3	0.2
80- 85	-	-	0.1	-	-	0.6	-	0.3	0.2
85- 90	-	-	0.1	-	-	0.3	-	-	0.7
90- 95	-	-	0.5	0.5	-	0.4	-	0.4	0.2
95-100	-	-	0.5	0.5	-	2.4	-	0.7	0.3
100-105	-	-	1.8	-	-	0.9	0.3	-	-
105-110	-	-	-	-	-	0.6	0.6	0.9	-
110-115	-	-	0.8	-	-	0.6	0.2	0.4	-
115-120	-	-	-	-	-	0.6	-	-	-
120-125	-	-	Water	-	-	0.5	0.5	-	-
125-130	-	-	-	-	-	-	-	-	-
130-135	-	-	-	-	-	-	0.5	-	Cavity
135-140	-	-	-	-	-	-	0.5	-	-
140-145	-	-	-	-	-	-	0.6	-	-
145-150	-	-	-	Water	Hard	-	-	-	-
150-155	-	-	-	-	-	-	-	-	-
155-160	-	-	-	-	-	Cavity	-	-	-
160-165	-	-	-	-	-	-	-	-	-
165-170	-	-	-	-	-	-	-	-	-
170-175	-	-	-	-	-	-	-	-	-
175-180	-	-	-	-	-	-	-	-	-
180-185	-	-	-	-	-	-	-	-	-
185-190	-	-	-	-	-	-	-	-	-
190-195	-	-	-	-	-	-	0.9	-	-
195-200	-	-	-	-	-	-	-	-	-
200-205	-	-	-	-	-	-	-	-	-
205-210	-	-	-	-	-	-	Hard	-	-
210-215	-	-	-	-	-	-	-	-	-
215-220	-	-	-	-	-	-	-	-	-

* Cuttings from each 5 foot interval were analysed spectrographically by A.D. Haldane; Copper analyses 5000 p.p.m. or better were assayed by R. Beevers, Bureau of Mineral Resources.

APPENDIX 3

SUMMARY OF DIAMOND DRILLING RESULTS - MOUNT FITCH PROSPECT

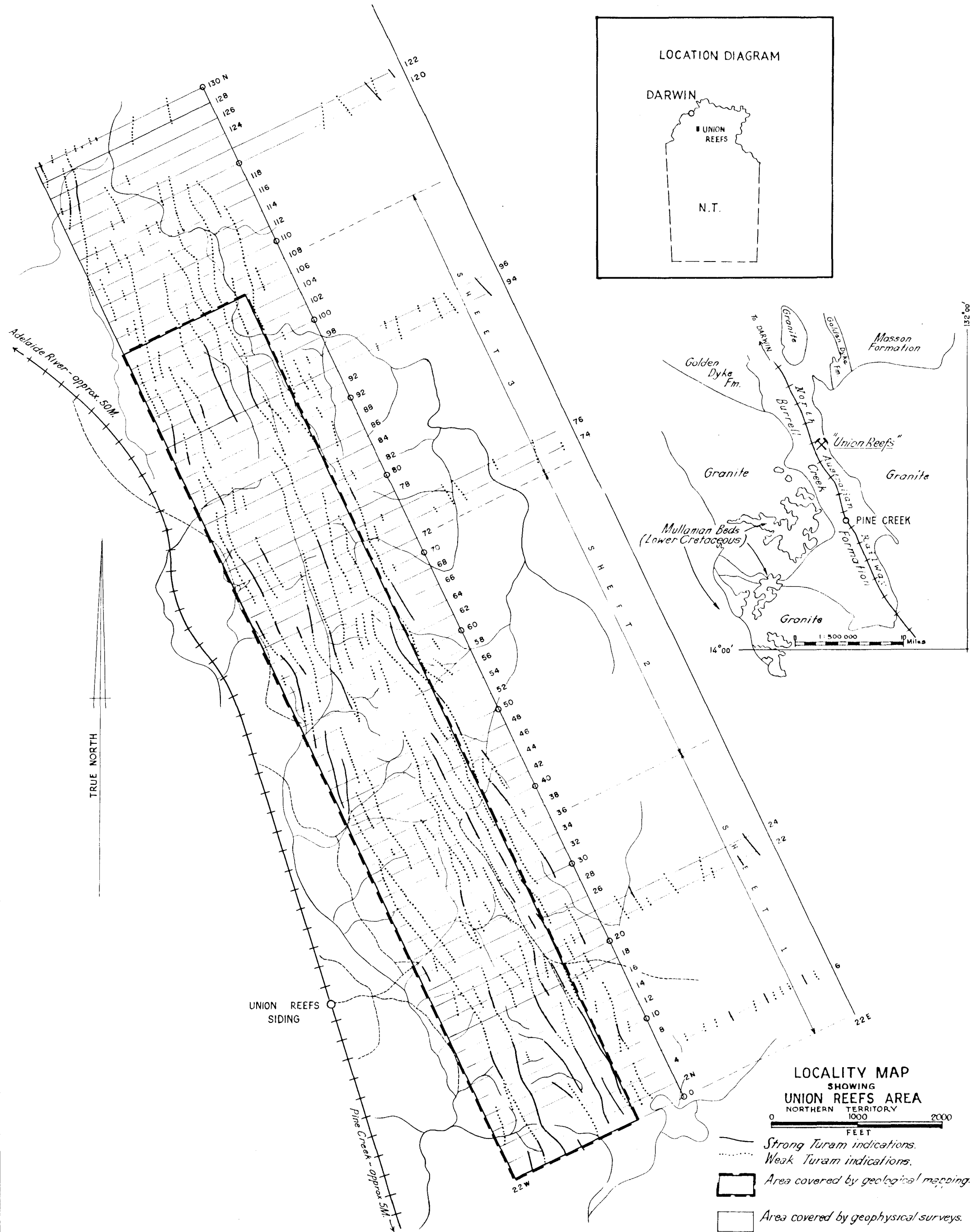
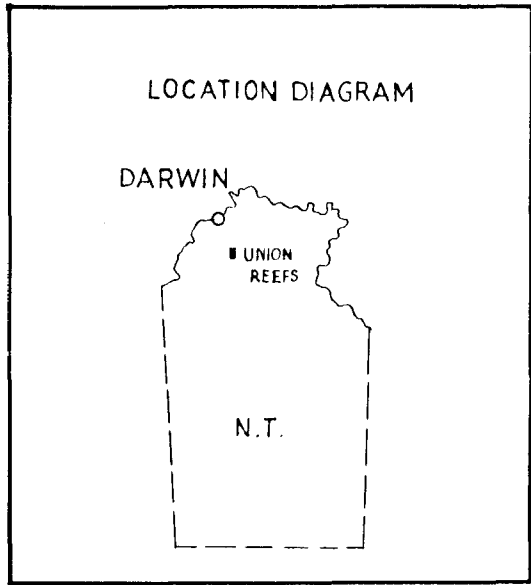
Hole No.	Location (Grid Reference)	Direction (Surface)	Depression	Length	Intersections
DG22 To test the peak of the Cu anomaly	11200E 44500N	093° Mag.	55.5°	248'6"	<div> <div>0' - 63'</div> <div>63' - 174'6"</div> <div>174'6" - 190'6"</div> <div>190'6" - 248'6"</div> </div> Clay Dolomite, minor pyrite, chalcopyrite. 109'6"-113'6" 2.3% Cu, elsewhere 0.3% Cu. Clay Quartz-feldspar schist.
DG23 As for DG22 on the same section but at a deeper level	11225E 44185N	086° Mag.	56°	408'	<div> <div>0' - 102'5"</div> <div>102'5" - 331'</div> <div>220'4" - 242'</div> <div>331' - 399'</div> <div>399' - 408'</div> </div> Quartz-sericite schist, carbonaceous schist, chlorite schist, schist breccia, pyrite. Dolomite Traces chalcopyrite and native copper. Spectrographic results show 0.3% Cu. Talcose schist and clay. Quartz-feldspar schist.
DG24 To prospect below the central peak of the Copper anomaly.	11475E 43030N	054° Mag.	57°	430'	<div> <div>0' - 15'</div> <div>15' - 30'</div> <div>30' - 78'6"</div> <div>78'6" - 150'</div> <div>150' - 245'</div> <div>245' - 404'6"</div> </div> Not cored. Siliceous haematite. Clay, mottled 73'-78'6" boxworks. Clay and silt, chocolate and yellow. Siliceous dolomite, clay. 217'8"-221'6" pailomelane, 0.6% Cu 223'4"-235' boxworks after calcite 210'-211'6" 0.1% Cu. Dolomite, silicified bands. Cavities at 266'-271', 273'-330', 301'-348'7", 374'-375', 382'404'6". % Recovery 72 250'11"-255' Chalcopyrite and chalcocite 1.9% Cu. 71 348'7"-350' 0.5% Cu. 44 350' -355' 1.4% Cu. 60 355' -360' 2.5% Cu. 64 361' -374' 0.4% Cu. 13 404' -409'6" 0.3% Cu. 66 409'6"-415' 0.2% Cu.
DG25 To examine the southern end of the Cu anomaly	12067E 42600N	060° Mag.	54°	282'6"	<div> <div>404'6" - 430'</div> <div>0' - 20'</div> <div>20' - 92'</div> <div>92' - 98'6"</div> <div>98'6" - 117'4"</div> <div>117'4" - 130'</div> <div>130' - 205'</div> <div>205' - 202'6"</div> </div> Chlorite schist, brown. Not cored. Clay, ferruginous, weathered. % Cu 36'3"-37' .2 37' -39'4" .2 mottled black 39'4"-41' .12 chocolate and pink 41' -42'5" .35 clay 42'5"-43' .3 43' -44'6" .15 44'6"-47'4" .1 65'6"-70' .7 Clay, purple and cream, talcose. Schist, chloritic, with purple Haematite rock from 106'2"-109'10". Dolomite, tremolitic, weathered. Clay, cream. 141'-144'. 0.25% Cu. Talc Schist and quartzite with narrow quartz-tourmaline veins.

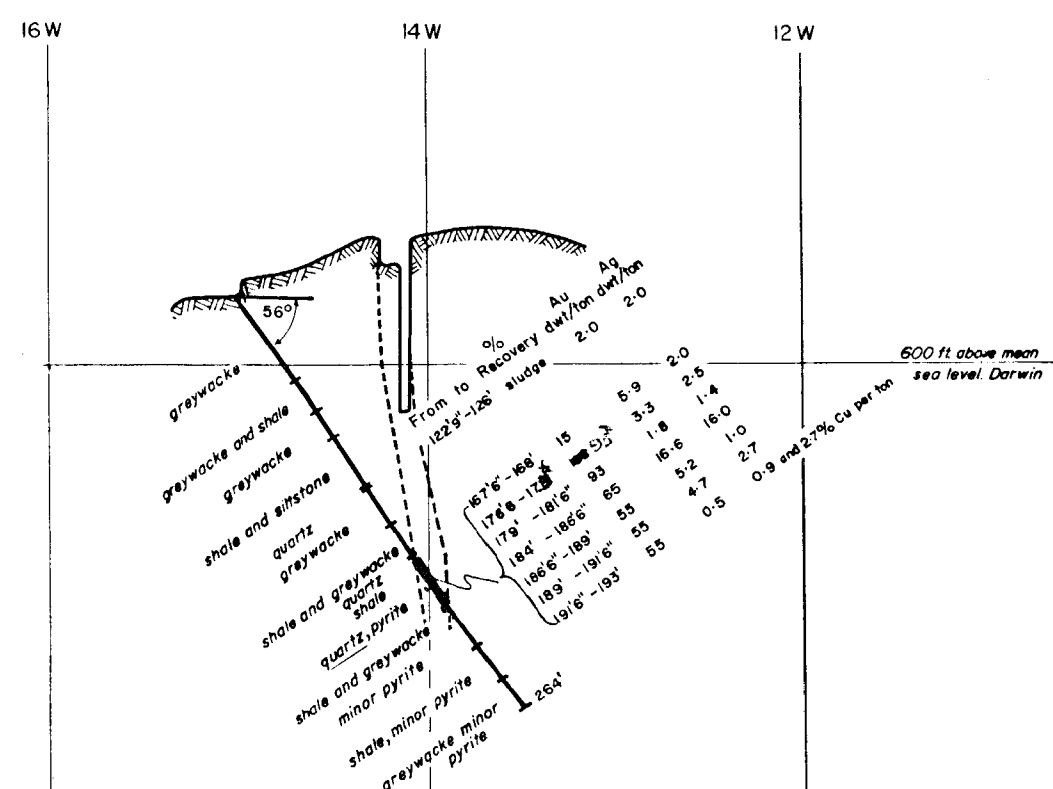
Hole No.	Location (Grid Reference)	Direction (Surface)	Depression	Length		Intersections
DG26 To test the southern end of the Cu anomaly (See also DG25)	11870E 42515N	060° Mag.	55°	439'	0' - 20' 20' - 148'1" 148'1" - 325'8" 325'8" - 439'.	Not cored. Dolomite, weathered, siltstone beds. Dolomite, crystalline with minor stringers of chlorite and fragments of grey schist. 239'-270'6" mottled schist with dolomite beds, in part phosphatic. Cavities - 192'-204', 223'-227'. Schist, green, siliceous, pyritic.
DG27 To prospect the central peak of the Cu anomaly (See also DG24, DG28)	11810E 43110N	054° Mag.	55°	163'6"	0' - 30' 30' - 151' 161' - 163'6"	Not cored. Clay and siliceous siltstone after dolomite. 85'-92'6" 0.5% Cu - siliceous siltstone 122'6"-128'6" .13% Cu chalcocite, malachite. Arkosic schist.
DG28 To test downdip extension of mineralization in DG24 and DG27	11475E 43030N	Vertical		556'9"	0' - 30' 30' - 537'3" 537'3" - 556'9"	Not cored. Clay and dolomite, grading to dolomite at 303'6". Green talc after sheered chlorite schist.
DG30 To test IP anomaly extension	11400E 42760N	Vertical		682'	0' - 20' 20' - 63' 63' - 83'9" 83'9" - 109'6" 109'6" - 249'6" 249'6" - 682'	Not cored. Schist, carbonaceous and chloritic Interbedded chloritic schist and quartz- ite, finely disseminated pyrite. Chert, minor pyrite, chalcopyrite. 75' - 80' 0.7% Cu 80' - 85' 0.9% Cu Schist, dark grey, chloritic, seritic, carbonaceous. Dolomite, vuggy, crystalline. Talc vein- lets 320'-325'3", minor pyrite. 590'-595' 1.3% Cu manganiferous lime- stone. Cavity 591'-593'6". 595'-600' 0.9% Cu, malachite in limestone. 600'-625' Traces malachite, chalcocite, chalcopyrite; up to 1/2% Cu.
DG31 To test IP anomaly	11250E 43200N	Vertical		733'6"	0' - 6' 6' - 90'6" 90'6" - 733'6"	Not cored. Sericite and chlorite schist with chert bands. 75'-80' 0.4% Cu, pyrite, chalcopyrite. 80'-85' 0.6% Cu, pyrite, chalcopyrite. 85'-90' Grey graphitic schist. Dolomite, silicified, minor pyrite, some cavities. 590'-600' 1.5% Cu 655'-660' 4.2% Cu 720'-733'6" leached yellow limestone with minor native copper.
DG36 To test below Tamblym's shaft, Mount. Fitch	11420E 44530N	090°	54°	268'	0' - 6' 6' - 268'	Not cored. Cavernous limestone; chlorite, minor pyrite and chalcopyrite.

SUMMARY - PHOSPHATE SEARCH - DIAMOND DRILLING RESULTS ~~SECRET~~

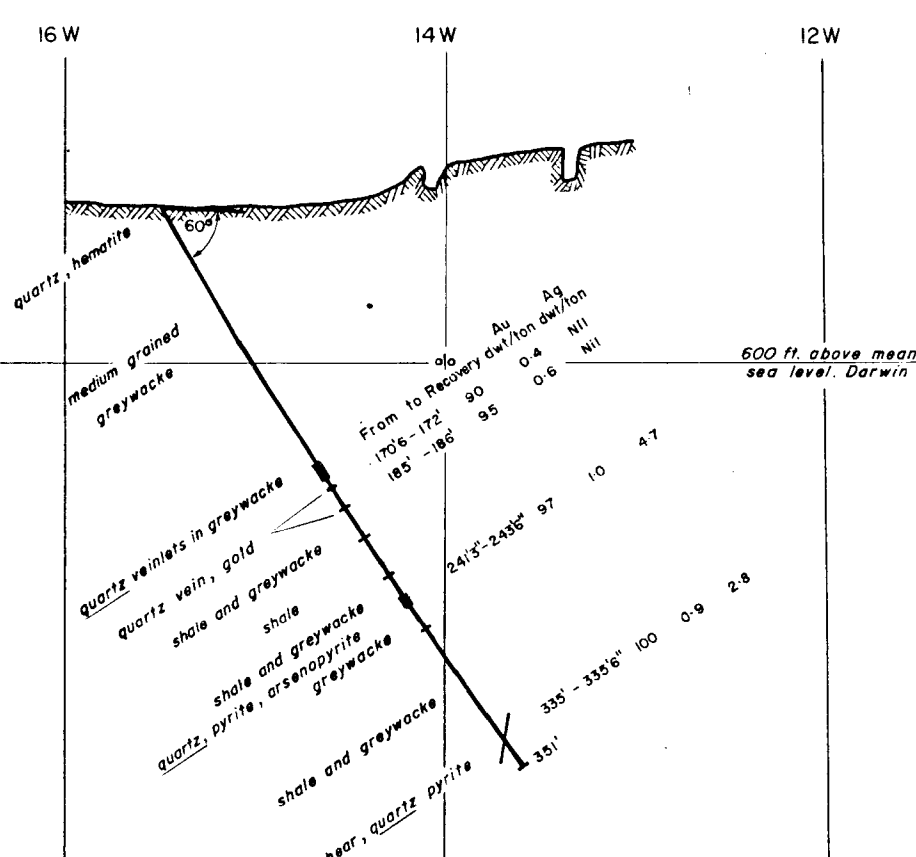
X. Semi-quantitative.

DG33	Dysons					
To test phosphatic zone north of Dyson's Open Cut	13.5N 43E	45° M	55°	174		0-85 Hematitic siltstone. Less than 5, P ₂ O ₅ . 85-174 dolomite.
DG34	Whites	090°	55	308		0-42 Chlorite schist. 42-243 Pyritic carbonaceous schist. 243-308 Hematitic siltstone.
To test for phosphate along strike from DG35	33,35CE 30,400N					
DG35	Whites	200° Mag	55	487'		0-151 Carbonaceous schist. 151-360 Hematitic dolomite breccia, hematitic siltstone, chloritic schist. 360-478 Blue and white dolomite. 478-487' Carbonaceous dolomite and schist.
To examine the phosphatic lens east of Whites open cut.	32,700E 30,200N					

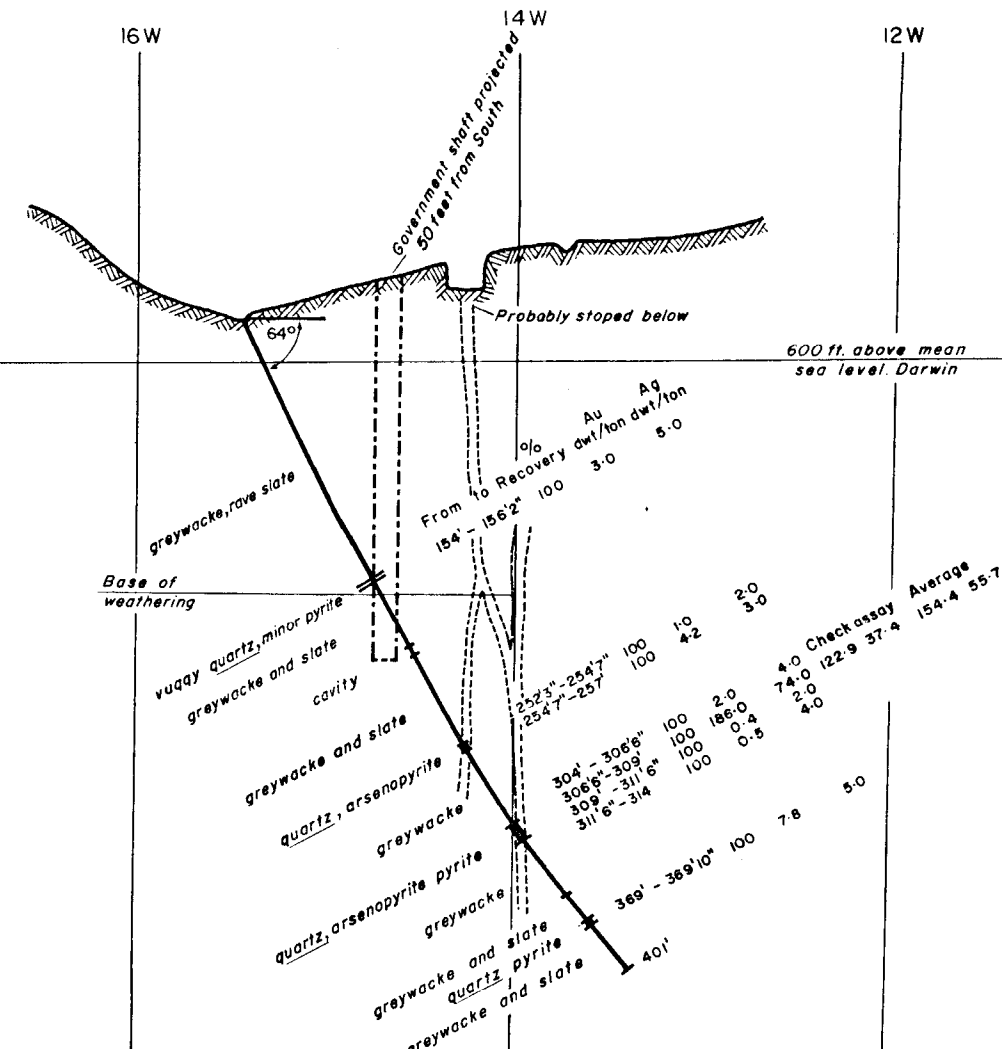




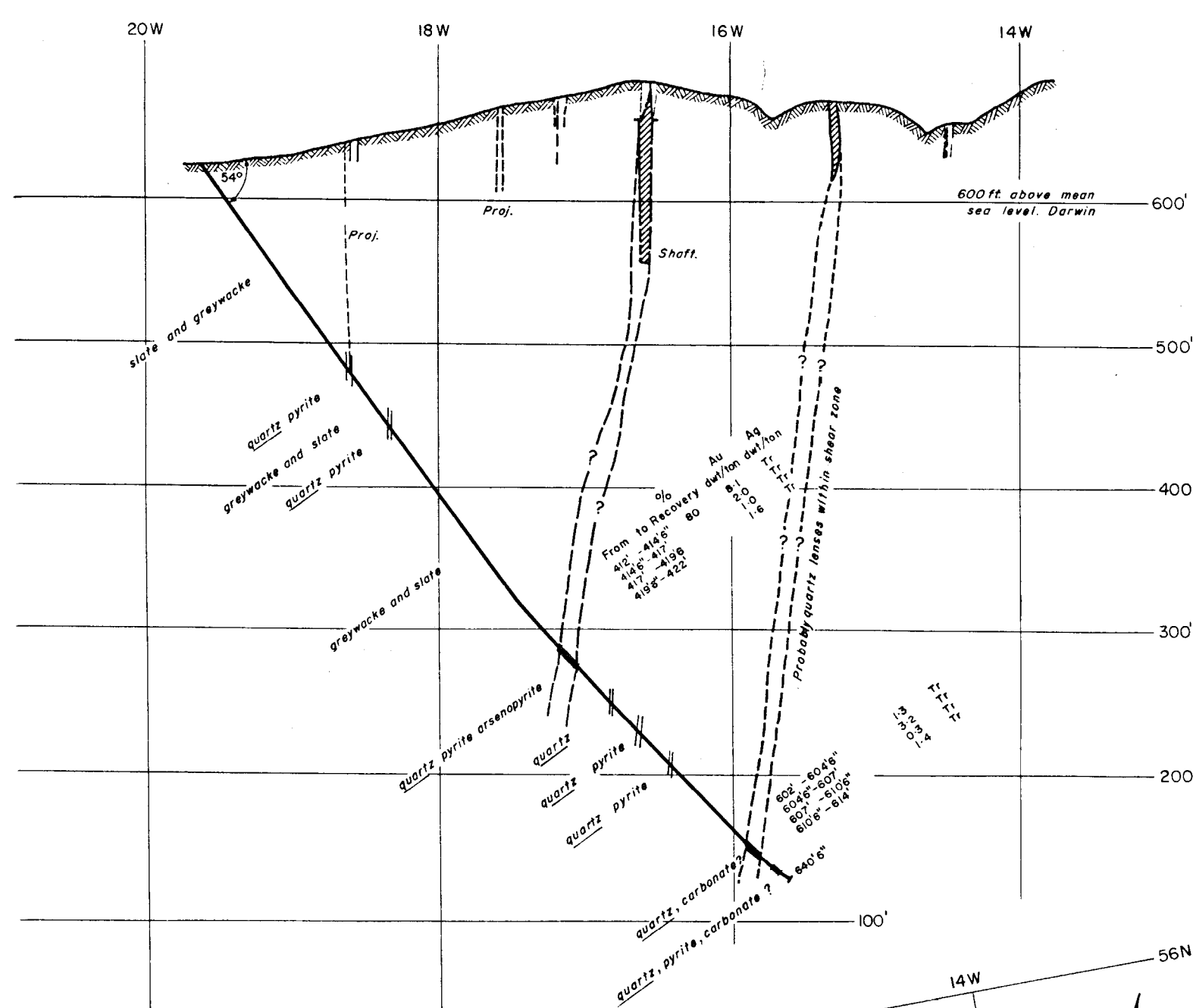
CROSS SECTION
DIAMOND DRILL HOLE No. 2



CROSS SECTION
DIAMOND DRILL HOLE No 9

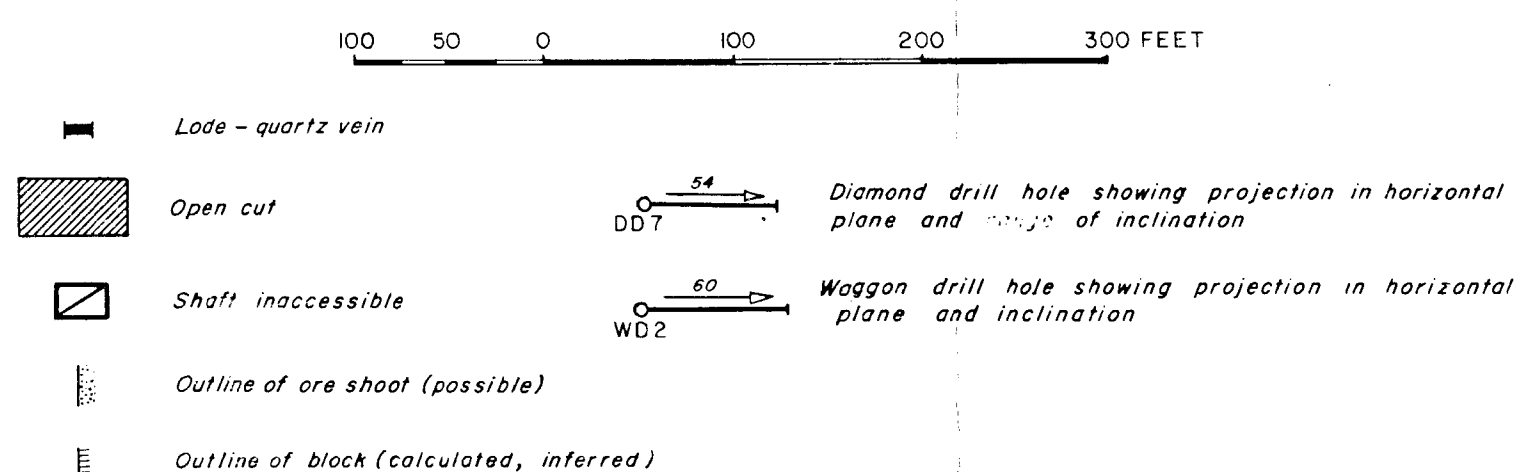


CROSS SECTION
DIAMOND DRILL HOLE No. 7



PLAN SHOWING
DD 7 AND WD 3

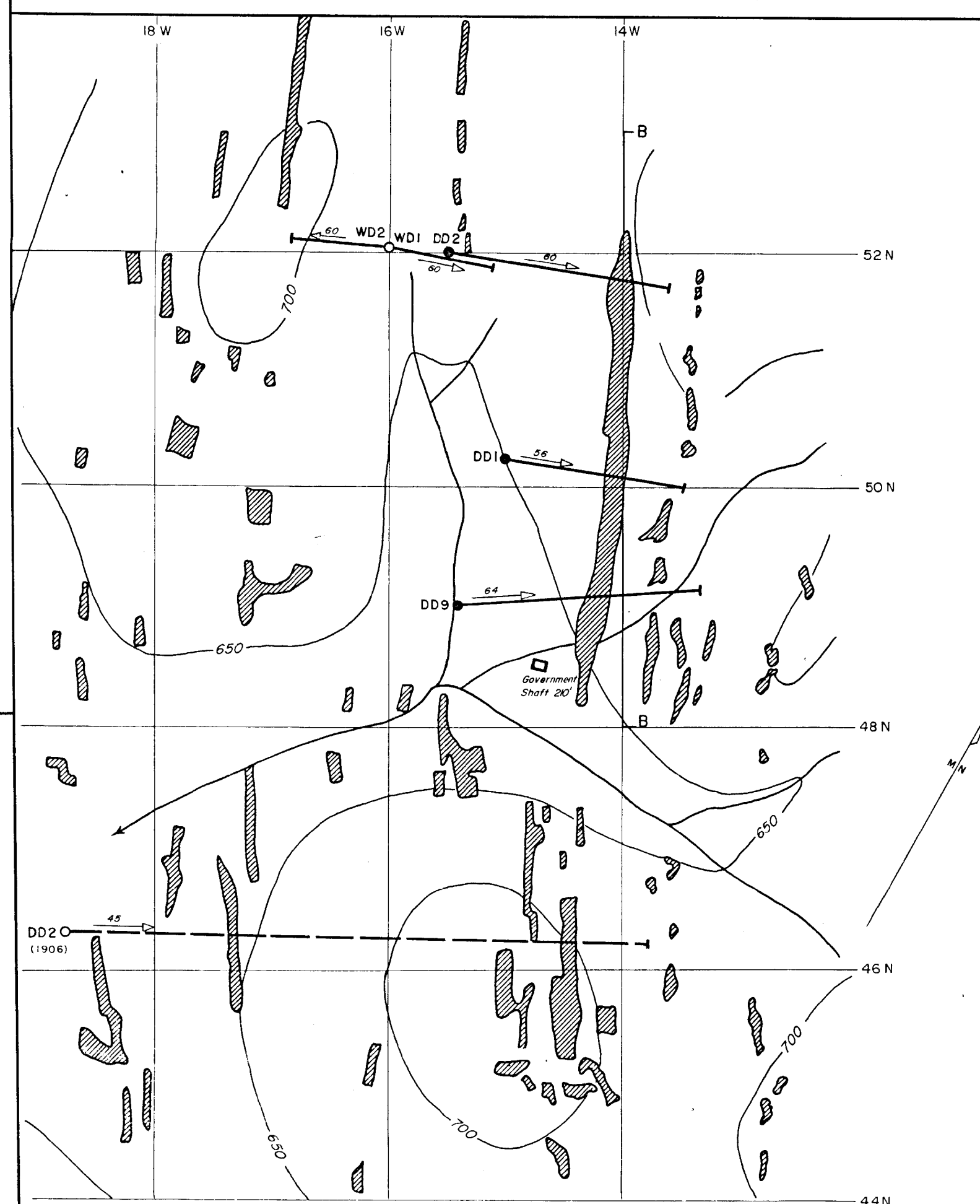
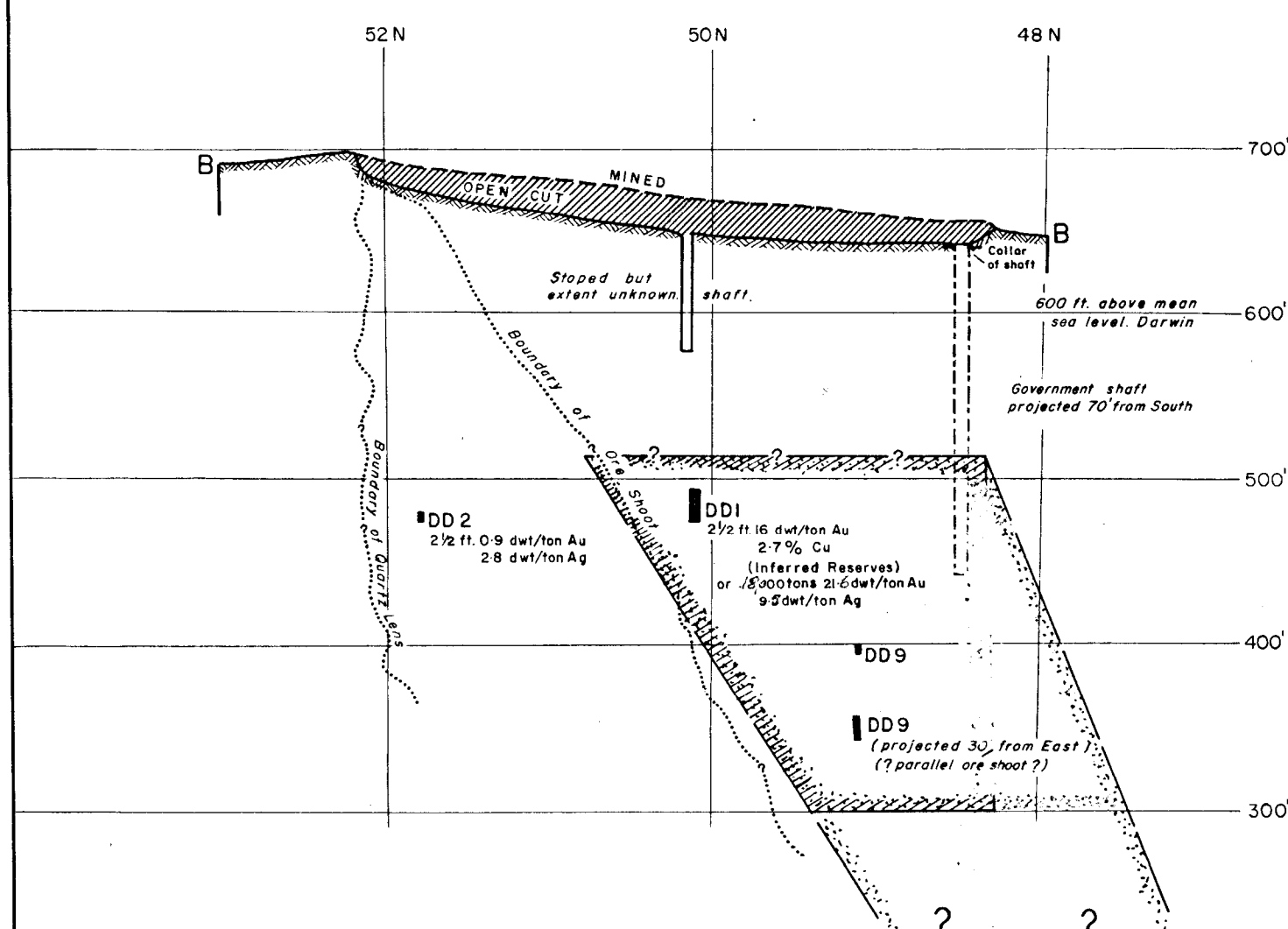
CROSS COURSE LODS, UNION REEFS,
AGICONDI GOLDFIELD, N.T.



(Assays by Government Assayer, Tennant Creek and Australian Mineral Development Laboratories, Adelaide)

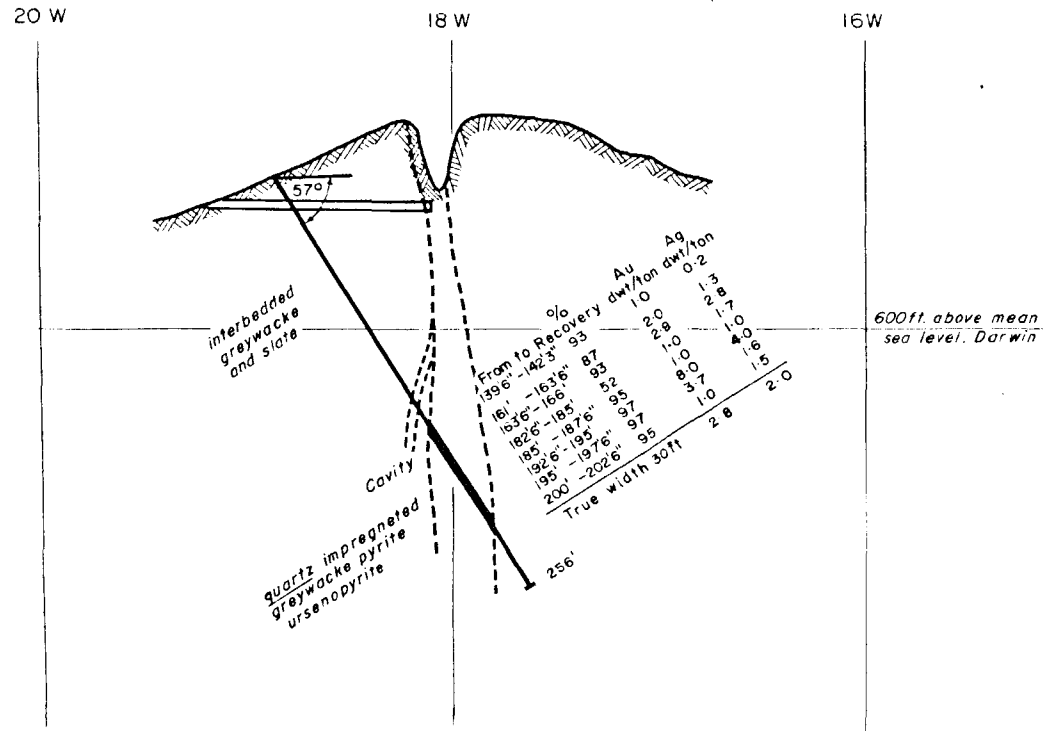
Bureau of Mineral Resources, Geology and Geophysics. August 1964 To accompany Record No 1965/89

LONGITUDINAL PROJECTION B-B

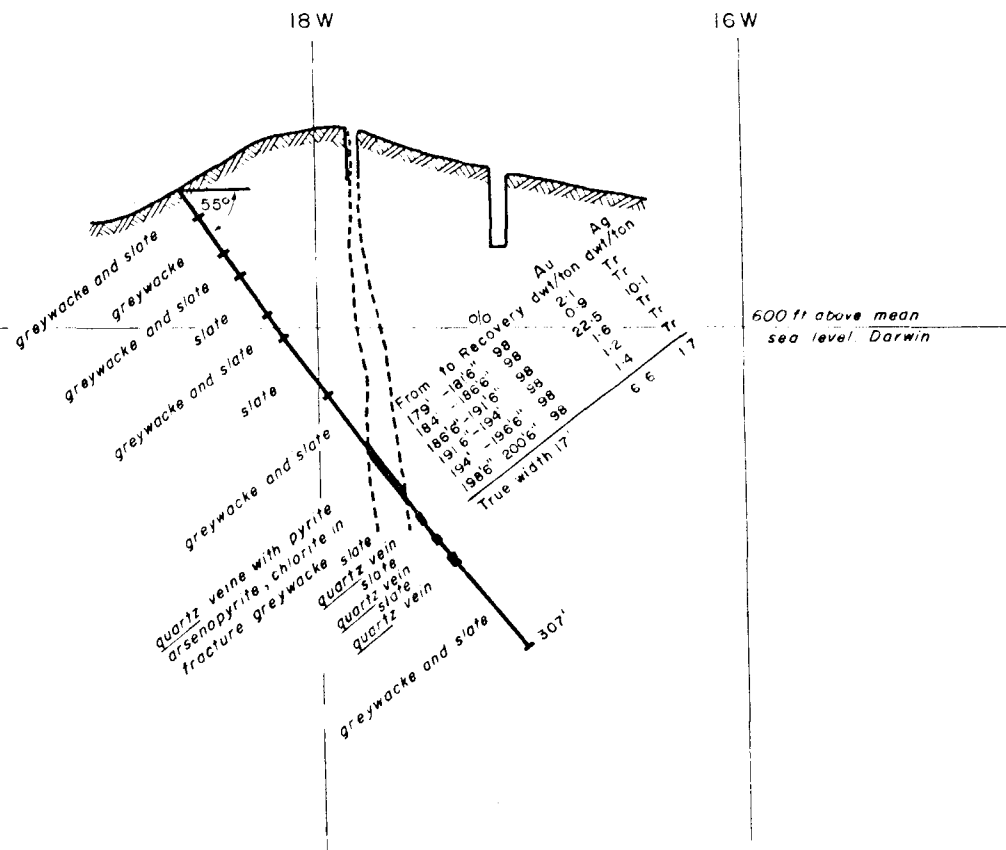


PLAN SHOWING DD 1,2,9 AND WD 1,2

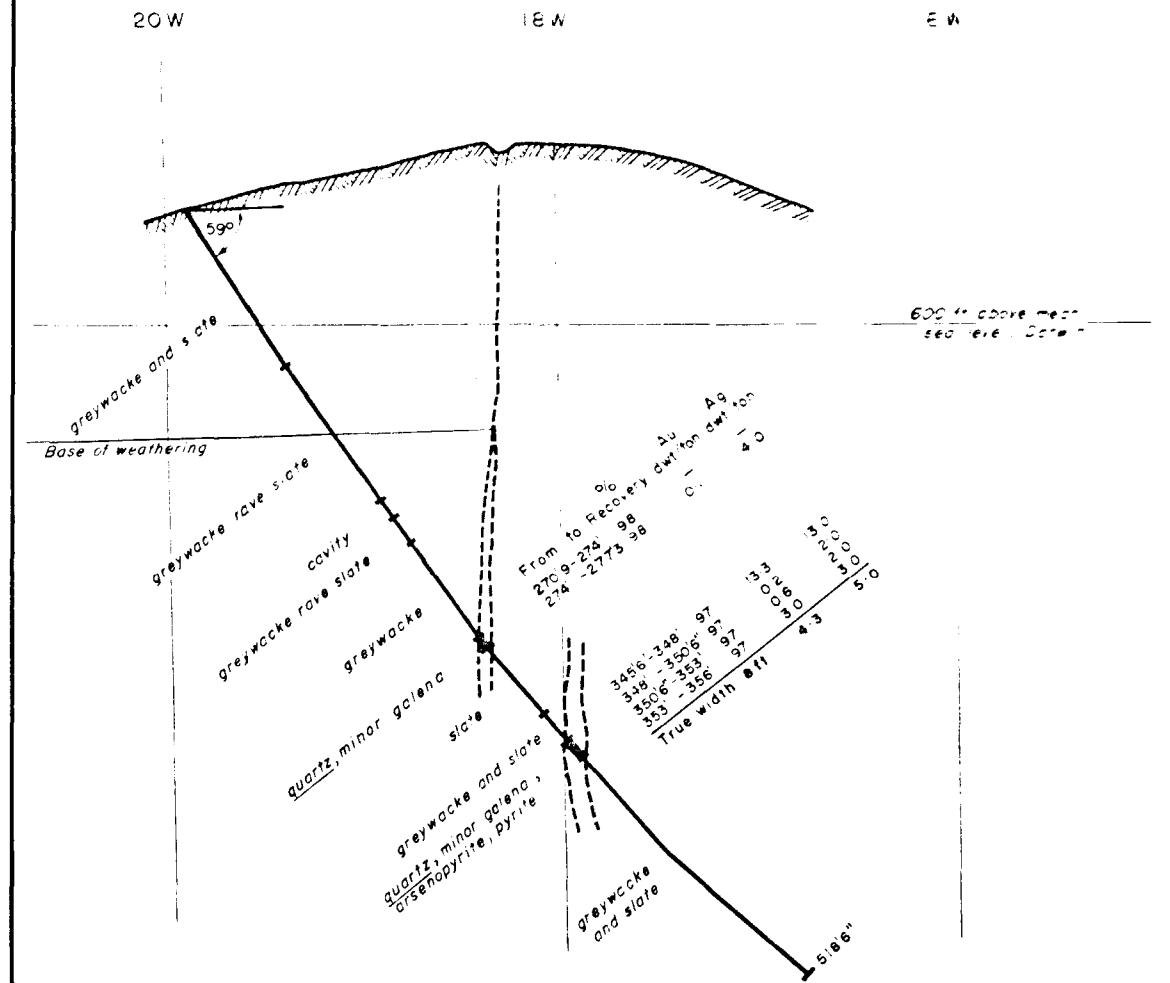
CROSS SECTION
DIAMOND DRILL HOLE No 4



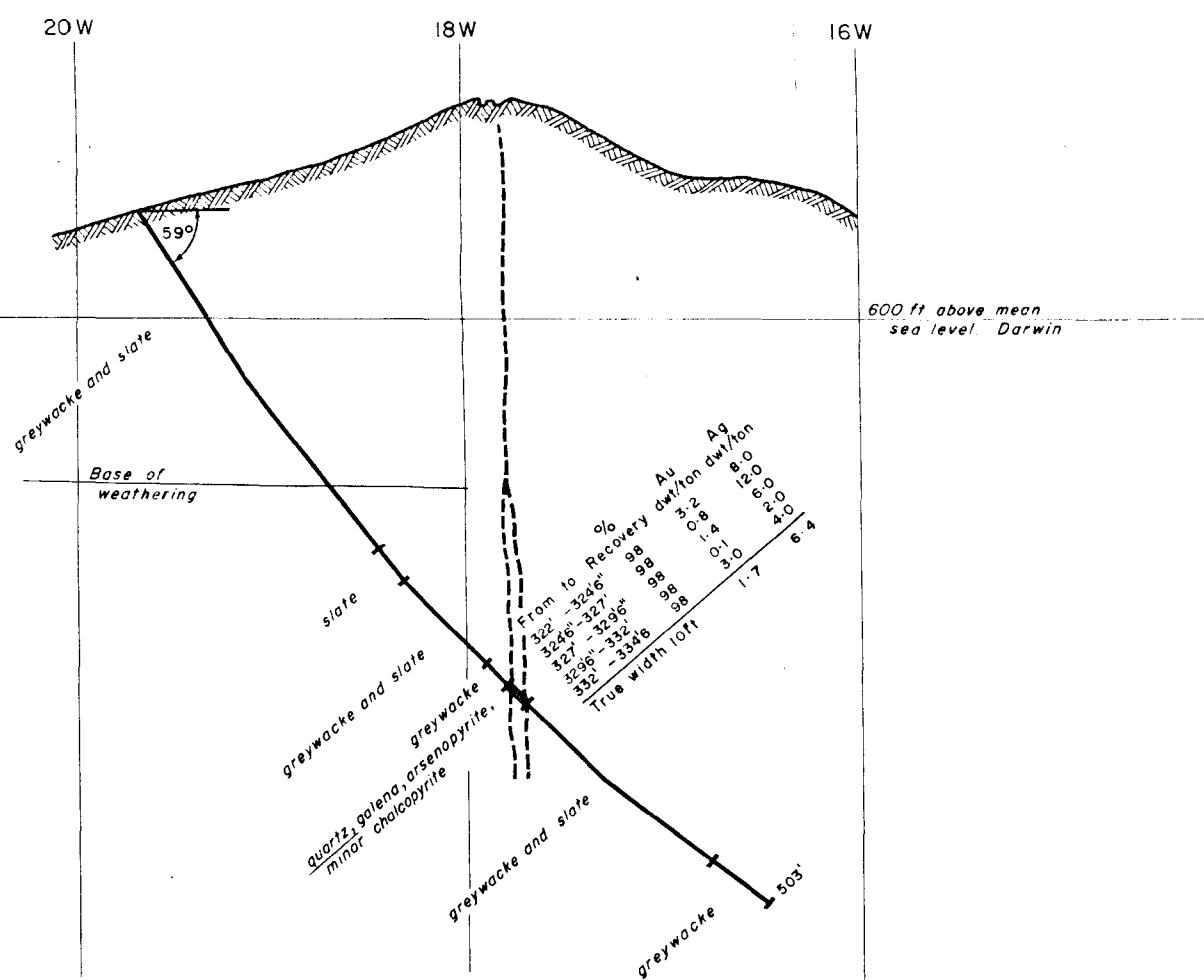
CROSS SECTION
DIAMOND DRILL HOLE No 5



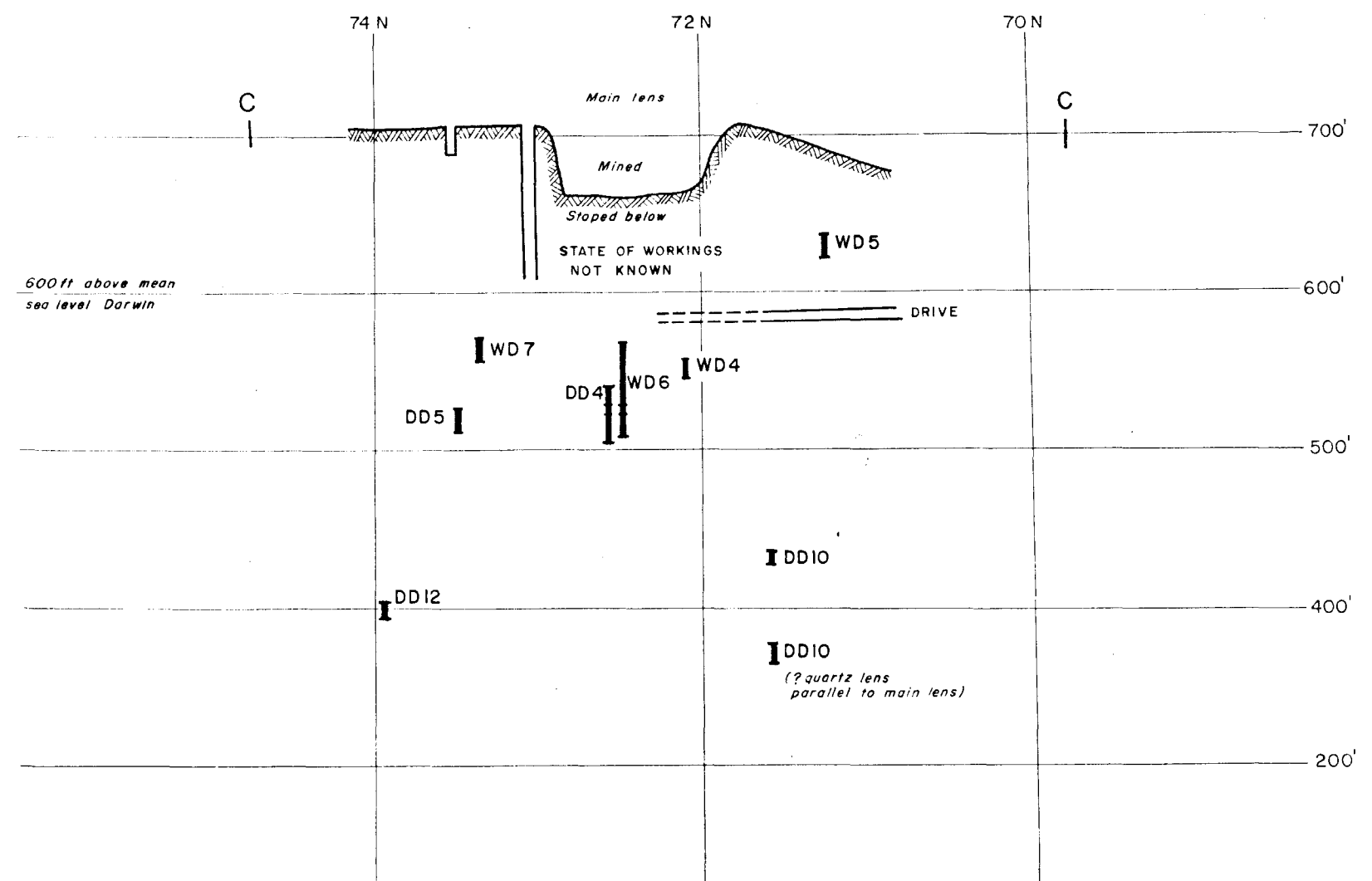
CROSS SECTION
DIAMOND DRILL HOLE No 10



CROSS SECTION
DIAMOND DRILL HOLE No 12



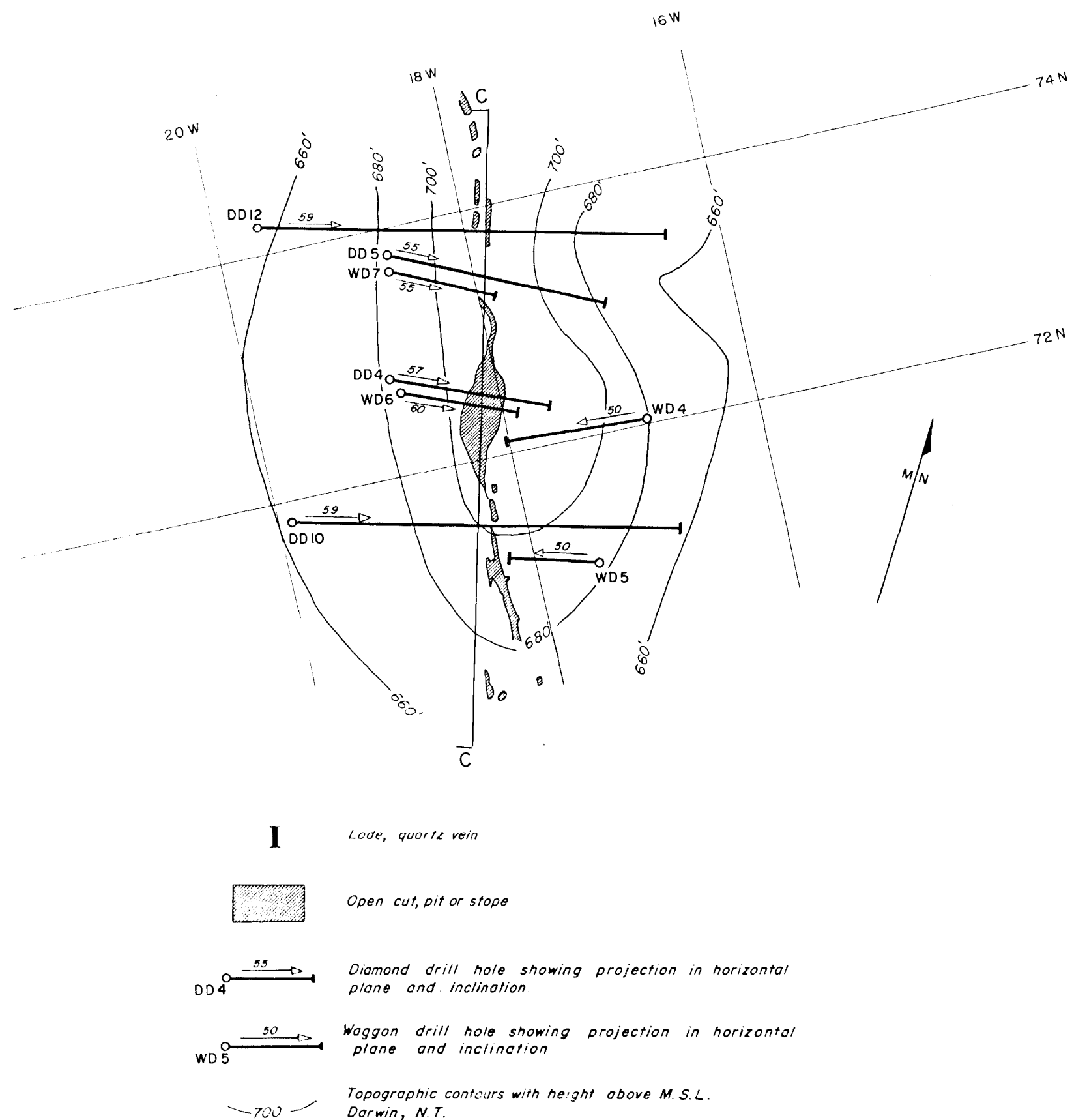
LONGITUDINAL PROJECTION C-C



PROSPECTING CLAIM LODE UNION REEFS, AGICONDI GOLDFIELD, N.T.

100 50 0 100 200 300 FEET

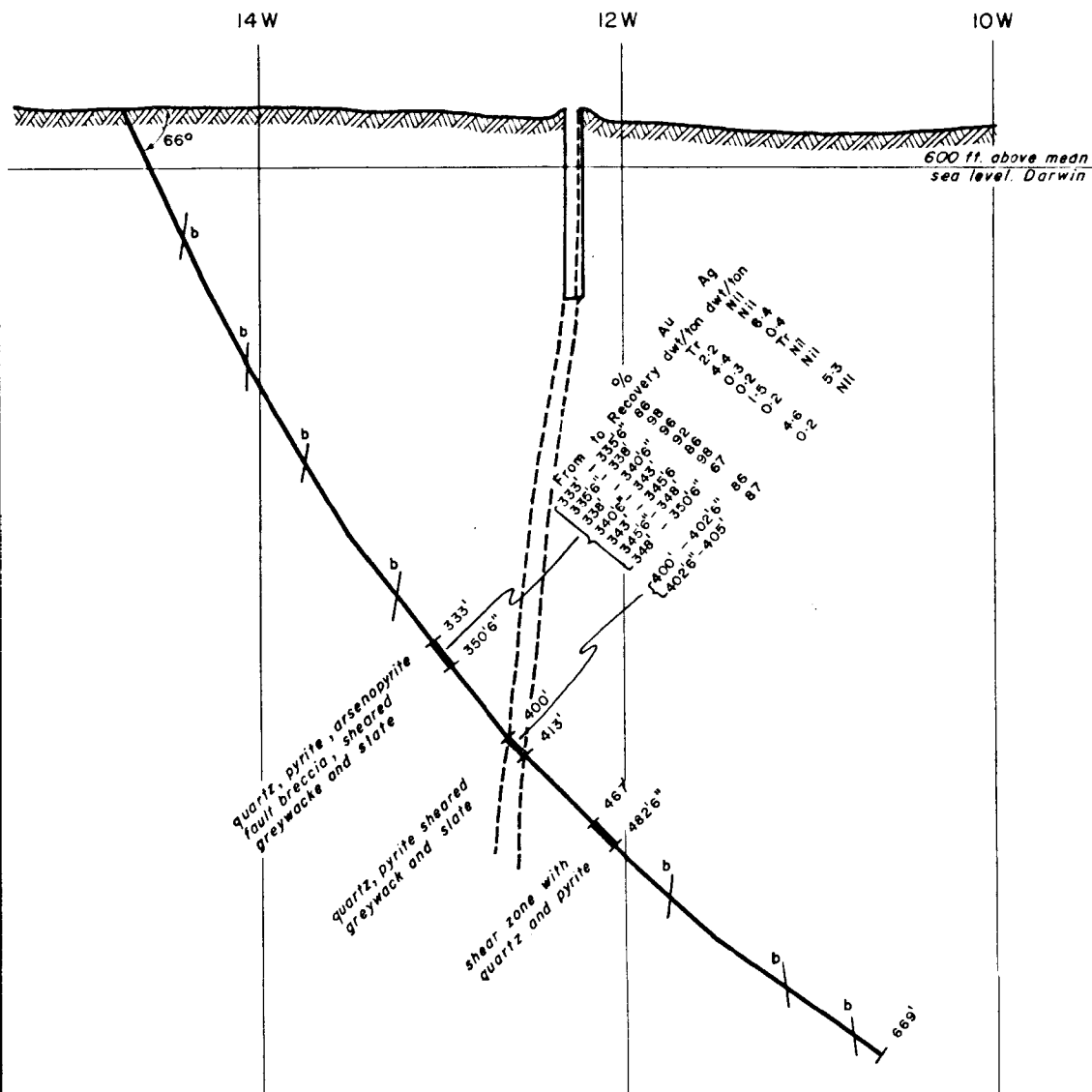
PLAN SHOWING DD 4,5,10,12 AND WD 4,5,6,7



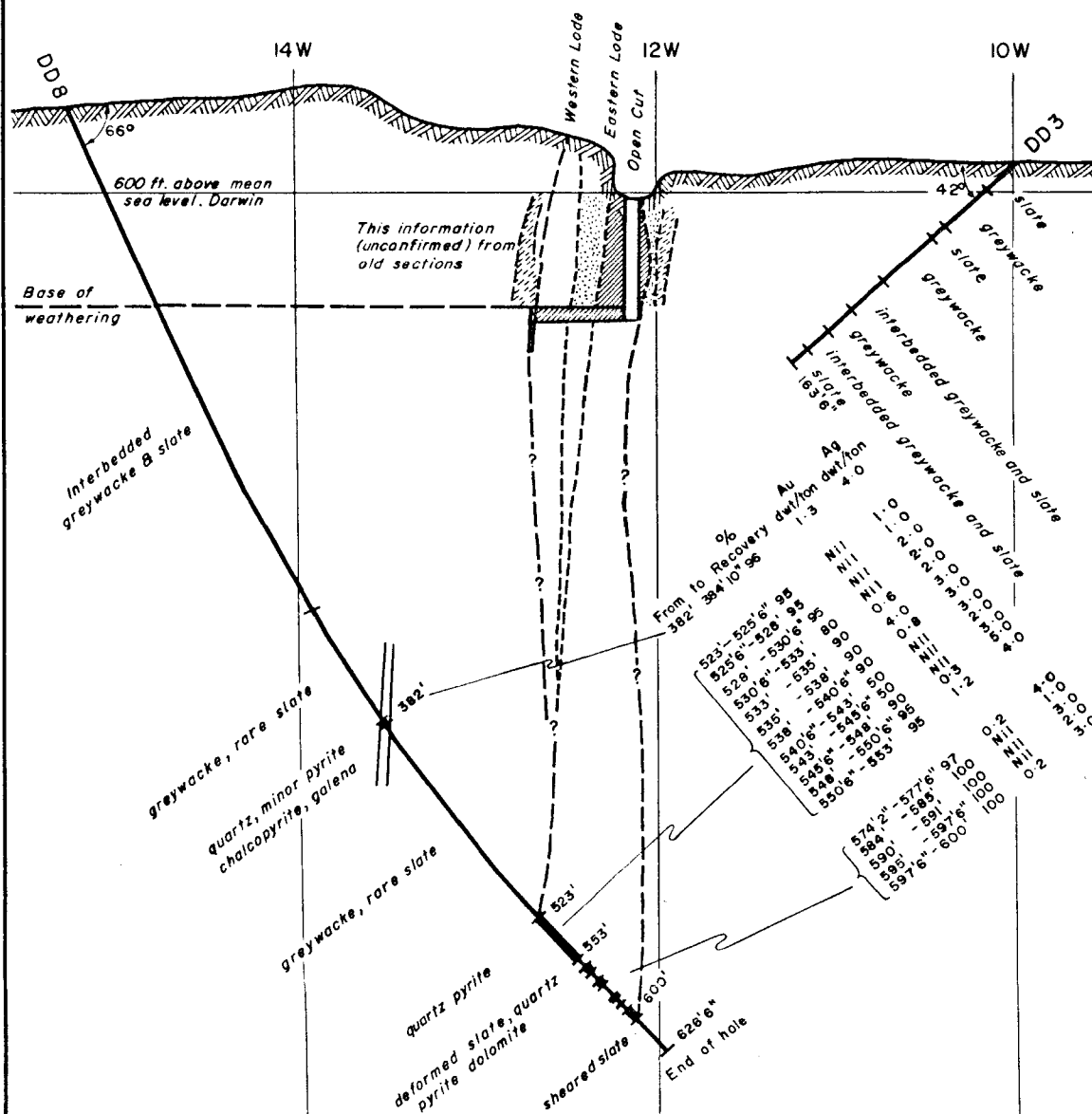
- I Lode, quartz vein
- Open cut, pit or slope
- Diamond drill hole showing projection in horizontal plane and inclination
- Wagon drill hole showing projection in horizontal plane and inclination
- Topographic contours with height above M.S.L. Darwin, N.T.

(Assays by Government Assayer, Tennant Creek and Australian Mineral Development Laboratories, Adelaide)

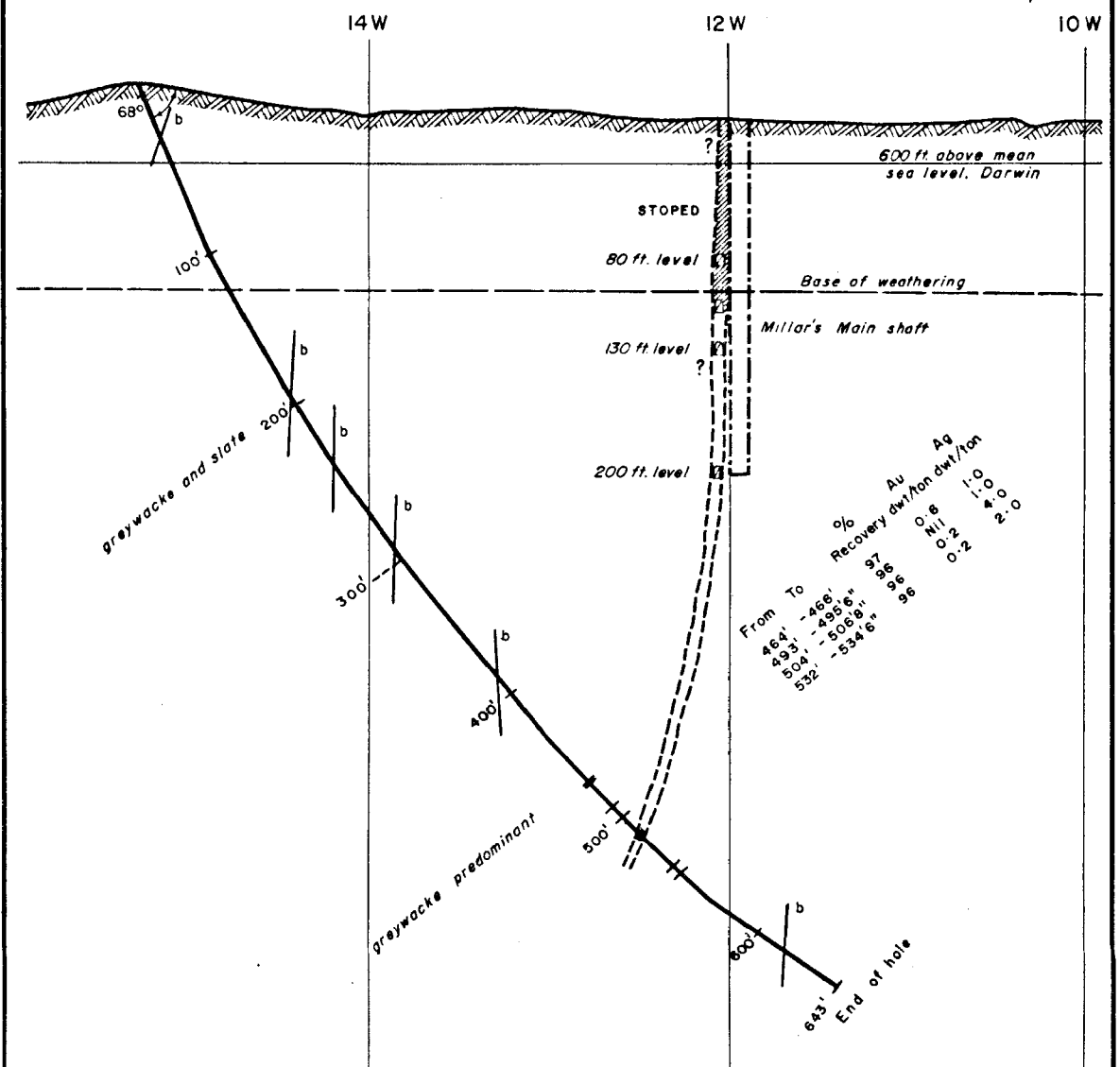
CROSS SECTION
DIAMOND DRILL HOLE No 6



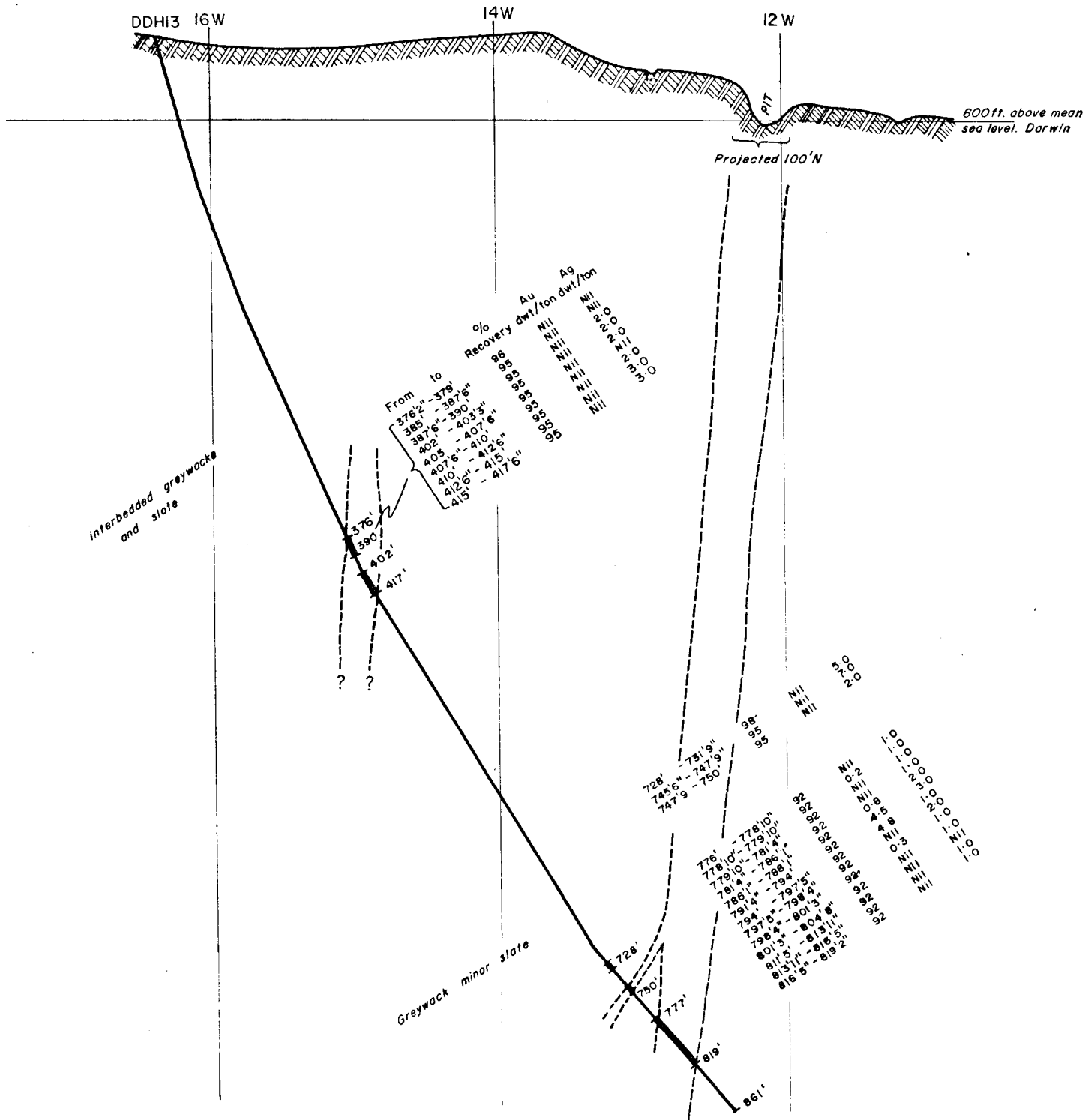
CROSS SECTION
DIAMOND DRILL HOLES No 8 AND 3



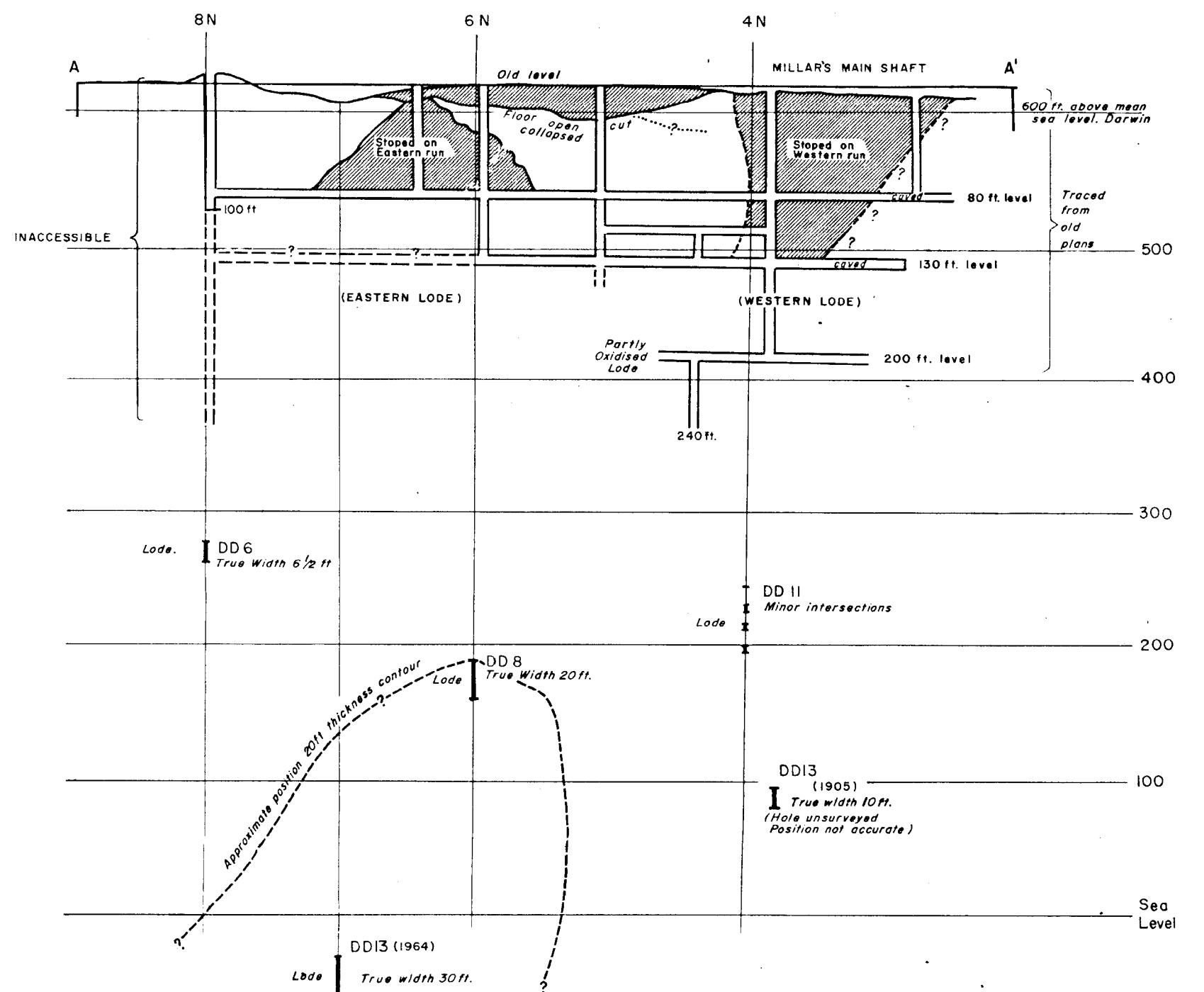
CROSS SECTION
DIAMOND DRILL HOLE No 11



CROSS SECTION
DIAMOND DRILL HOLE No 13



LONGITUDINAL PROJECTION - MILLAR'S LODE



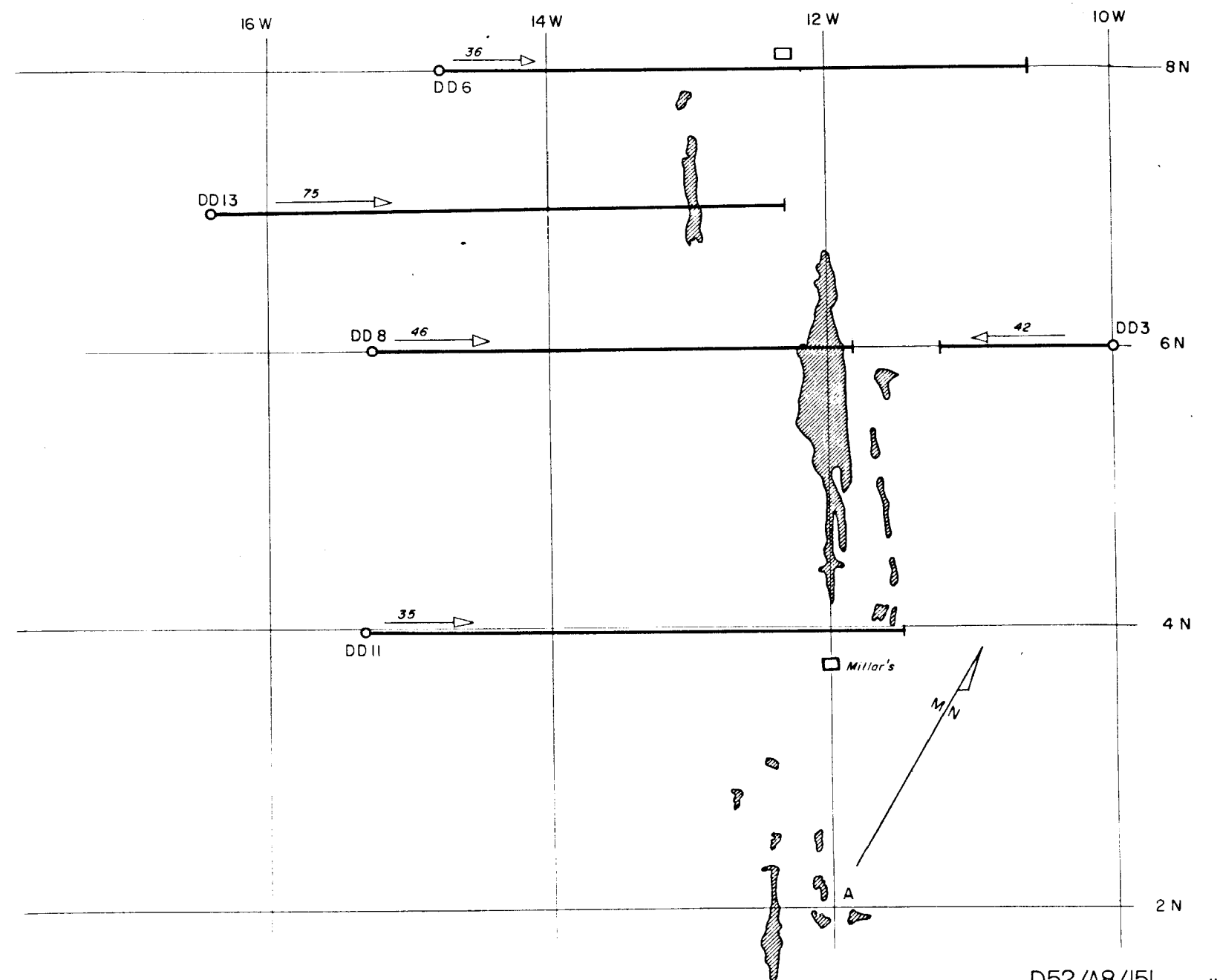
MILLAR'S LODE UNION REEFS, AGICONDI GOLDFIELD, N.T.

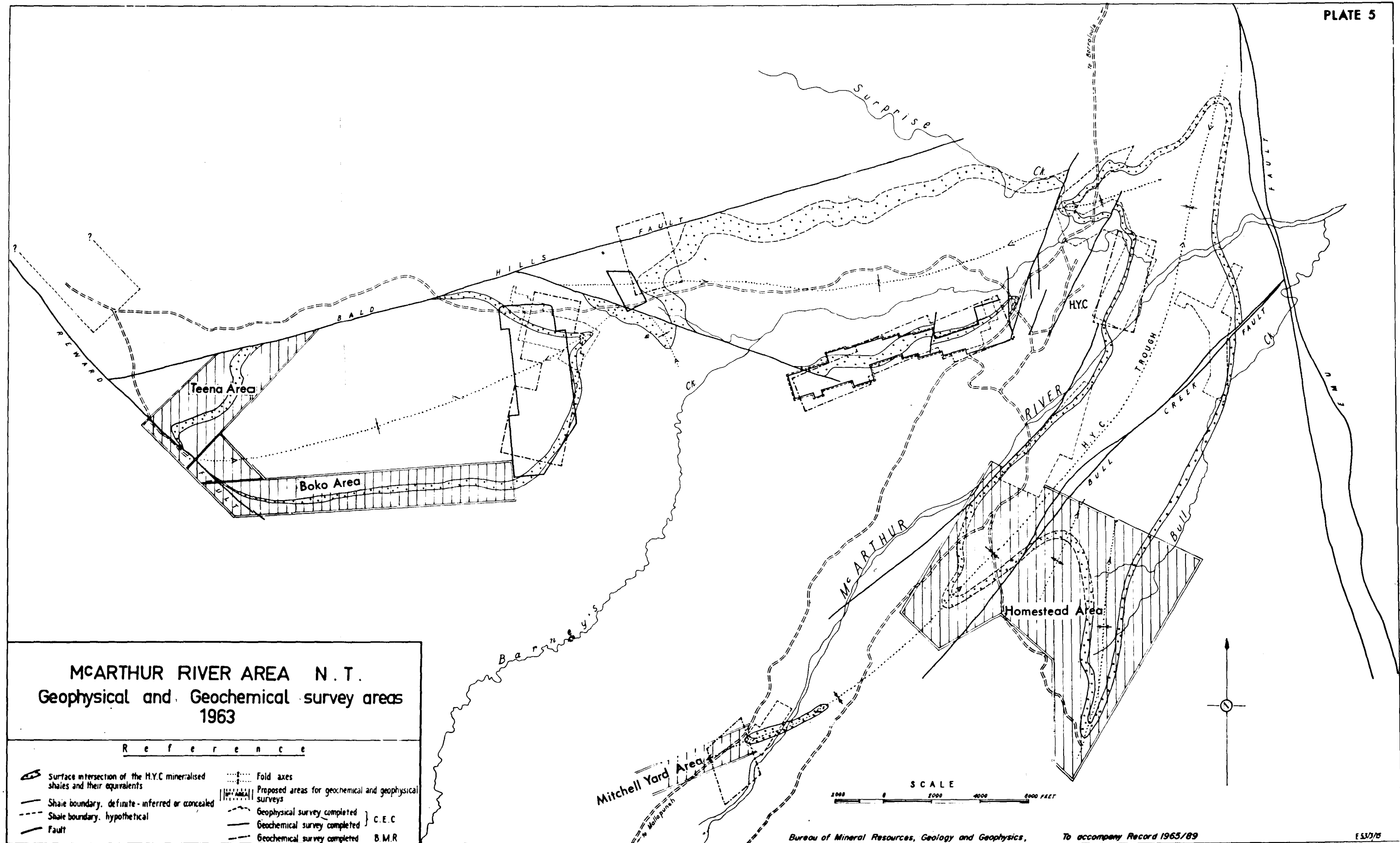
100 50 0 100 200 300 FEET

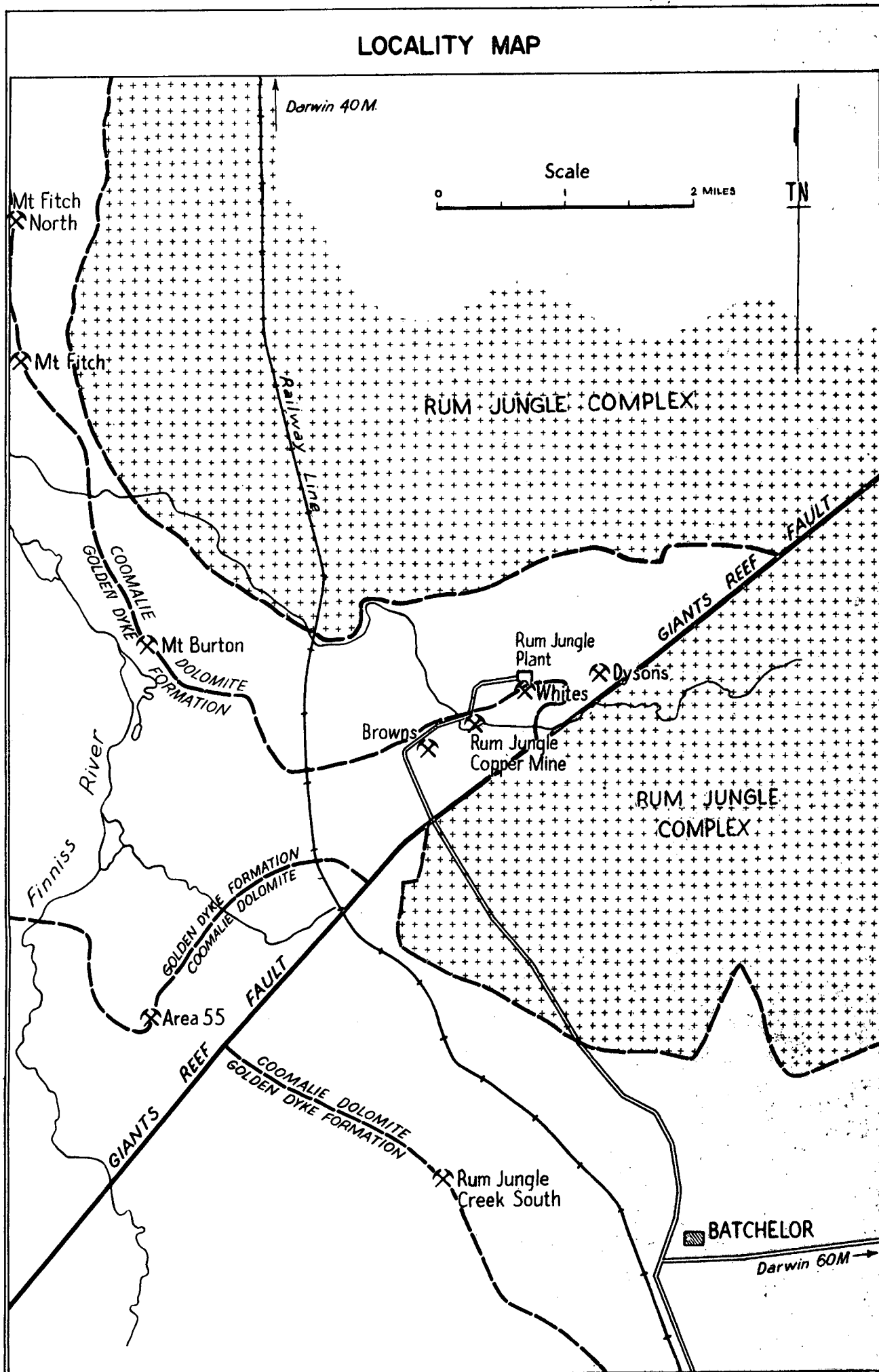
- I Lode, quartz vein
- Open cut, pit or stope
- Greywacke
- Shale
- Bedding
- Projected - in front plane of Section
- Projected - behind plane of Section
- Diamond drill hole showing projection in horizontal plane and inclination

(Assays by Government Assayer, Tennant Creek and Australian Mineral Development Laboratories, Adelaide)

PLAN SHOWING DD 3, 6, 8, 11, 13.



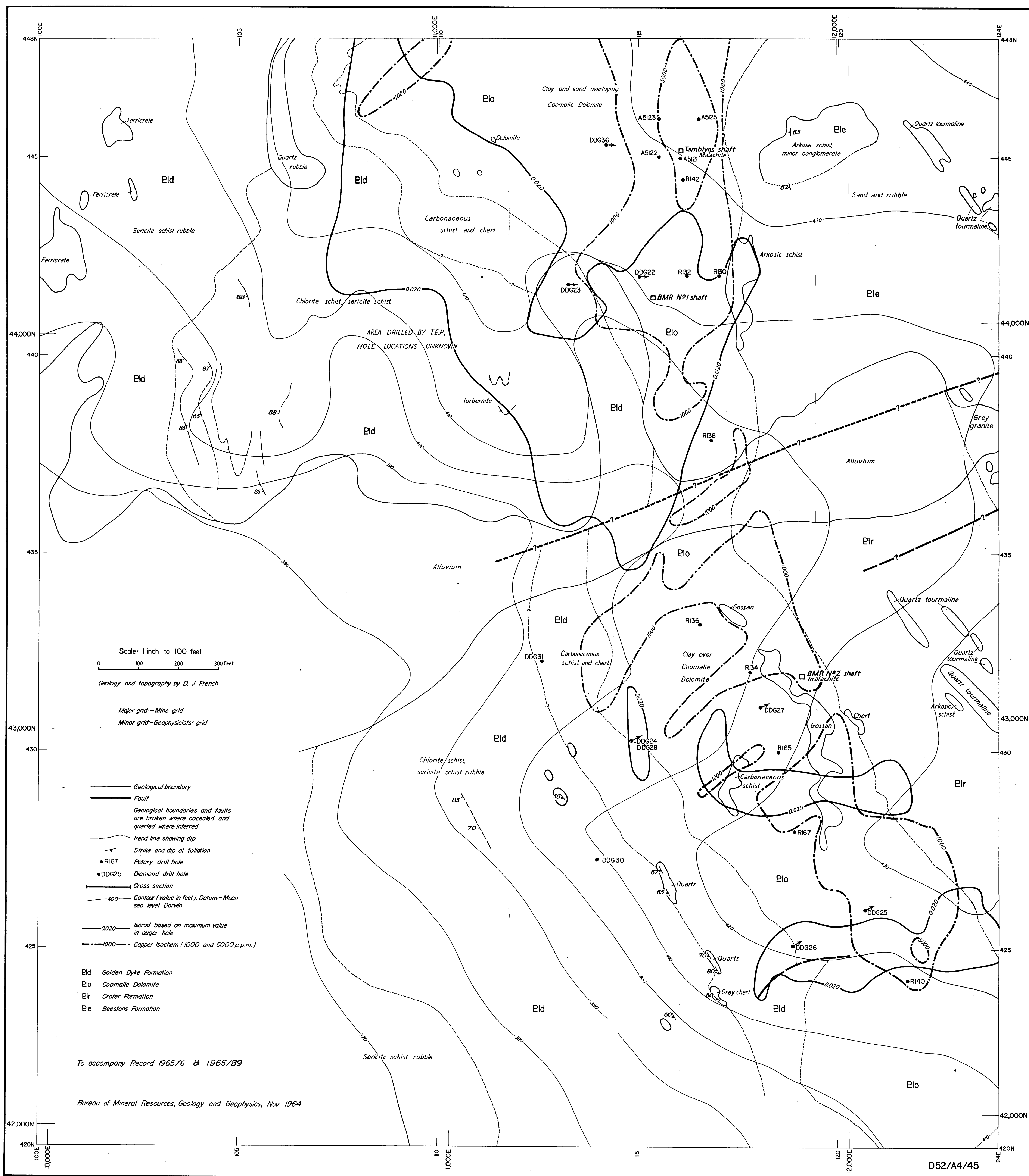




Bureau of Mineral Resources, Geology and Geophysics, Sept. 1964

To accompany Records 1965/6 and 1965/89

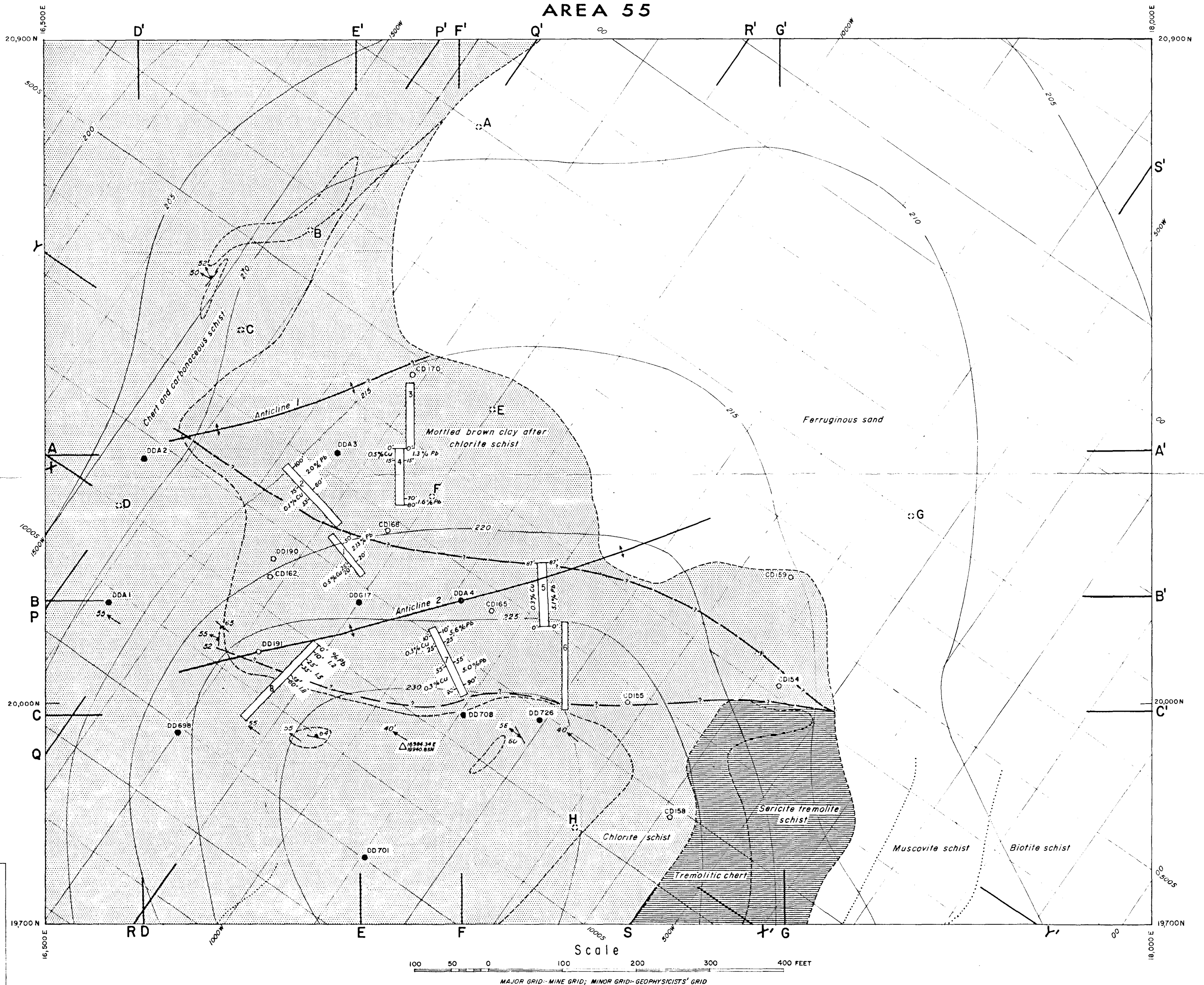
D52/A4/29



RUM JUNGLE SURVEY, 1963

PLATE 8
GEOLOGY

AREA 55



QUATERNARY

Ferruginous sand

LOWER PROTEROZOIC

Golden Dyke Formation

Coomalie Dolomite

Geological boundary

Geological boundary concealed

Attitude of foliation

Plunge of lineation

Inferred shear zone

Anticline axis

Topographic contour

Costean Nr.1

Lands Department Trig. Station

Diamond drill hole

Churn drill hole

Proposed diamond drill hole

Section line

