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DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY
MINERAL RESOURCES DIVISION

REPORT ON GROUNDWATER PROSPECTS

NORTHWEST RESERVE

Grids C/1, A/1, B/1

- Department of Aboriginal Affairs -

Blue

by

P.C. MILLER
SENIOR GEOLOGIST
METALLIC MINERALS SECTION

D.M.1397/6

12th April, 1967

DEPARTMENT OF MINES
SOUTH AUSTRALIA

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NORTHWEST RESERVE

Grids C/1, A/1, B/1

- Department of Aboriginal Affairs -

ABSTRACT

Within the Northwest Reserve, groundwater with salinities from 500-1,500 ppm, occurs in three types of aquifers, unconsolidated Quaternary outwash sediments, broken and sheared basement rocks, and in the sediments of the Officer Basin. The Quaternary sediments constitute the most significant aquifer, and supplies from 300 to 900 gph may generally be obtained where the thickness of the sediments exceeds 80 feet. The bedrock aquifer involves difficulties in both siting and drilling, and too little information is available on the Officer Basin to assess groundwater potential.

There at present 20 bores in the Reserve suitable for use, of which 10 are equipped. All known bores are tabulated and future groundwater development of the area assessed.

INTRODUCTION

During the 1965 and 1966 field seasons, a South Australian Mines Department survey party was based in the Northwest Reserve engaged in a nickel exploration programme. Portion of the activities involved drilling of nickel prospects, and whilst the drill was in the area, several short phases of water bore construction were undertaken.

At the request of the Department of Aboriginal Affairs, the groundwater situation in the Musgrave Park area was assessed, and with the construction of a series of bores,

the existing water supply at the settlement was considerably increased, ensuring sufficient water resources for future expansion of the settlement.

In addition, water bores were established at two points within the Reserve by the Department of Mines. These bores were used as camp supplies, and at the close of the survey were left cased.

This report assesses the groundwater potential of the Reserve, particularly the northern portion, and all known bores have been located and tabulated.

LOCATION AND TOPOGRAPHY

The Northwest Reserve is a Reserve for Aborigines located in the northwest corner of South Australia, and contiguous with similar Reserves in Western Australia and the Northern Territory, (See Plan No. 67-110). Covering an area of 27,620 square miles, it comprises Pastoral Blocks 1031, 1032, 915, 948, 950, 953, 964, 1018 and 1019 (See Plan No. 95716). Portion of the reserve, Pastoral Blocks Nos. 915, 948, 950, 953, 964, 1018 & 1019 leased or controlled by Ernabella Mission, and as it is believed that there are untabulated bores, constructed by the Mission in the leased portion, this area is not discussed in the report.

Musgrave Park, the aboriginal settlement and cattle station within the Reserve, is situated in the Musgrave Ranges, seven miles S.S.E. of Mount Woodward, and 155 miles west of Mulgera by road. The Mulgera-Mulga Park-Mount Davies-Giles road passes through the settlement, and across the top of the Reserve.

Topography varies considerably within the Reserve. In the northern portion, the Musgrave, Mann, and Tomkinson Ranges

are rugged deeply incised masses extending en echelon along the border, and rising abruptly to up to 3,000 feet above general plain level. The southern portion is essentially flat, with occasional inselburg type peaks rising out of an extensive sand dune and plain area. The Birksgate Range near the southern boundary of the Reserve is an area where the peaks are more frequent and of a higher elevation.

Well developed drainage channels occur in the elevated masses, but rarely extend for any distance into the plains. The Officer and Currie Creeks near the eastern margin of the Reserve, and some of the creeks to the north of the ranges, where catchment areas are larger than normal, do extend up to 20 miles, but generally streams disappear into the sand dunes and plain within a few miles.

Drainage is generally directly away from the ranges, and a well defined and essentially simple water divide runs along most of the elevated masses. Under the influence of geological structures, and/or variation in rock weathering, minor systems of internal drainage have developed in some areas.

Rainfall records have not been kept for any long period in the area, but from Ernabella Mission Station readings an annual average rainfall of 10.5 inches, with extremes of 2 to 17 inches have been recorded. It is expected that rainfall in the southern portion of the Reserve away from the ranges would be of a much lower order.

The temperature range is extreme with very hot summer days in excess of 100°F, and very cold winter nights below freezing. Strong winds and dust storms are a feature of the area, particularly in late spring and early summer.

Previous Work

The construction of water bores and investigations into the groundwater resources of the various parts of the Reserve have been as follows:-

1955: Drilling by the S.A. Department of Mines for Geosurveys Ltd. to obtain water supplies for the nickel exploration programme in the Mount Davies area. Three successful bores were obtained from a total of twelve bores constructed.

1956: V. Johnson inspected the Musgrave Range area and reported on the possibility of groundwater supplies. (Johnson 1956).

1957: C. Dleys further investigated the Musgrave Range area, and drill sites were selected (Dleys 1957). Drilling was commenced by the S.A. Department of Mines for the Department of Aboriginal Affairs. Five successful bores were obtained from a total of ten constructed.

1960: Bores constructed in the Musgrave Park area by a local aboriginal contractor. Six successful bores were obtained from an unknown number of bores constructed.

1965: The Musgrave Park area was inspected, and one drill hole constructed to remedy a failing water supply. A report on the groundwater situation in the settlement area was prepared (Miller 1966).

1966: April: Drilling by the S.A. Department of Mines for the Department of Aboriginal Affairs. Two successful bores obtained from a total of four constructed.

May: Drilling by S.A. Department of Mines at Piltardi for a camp water supply. A successful bore obtained

at the third attempt.

October; Stratigraphic bore constructed by the S.A. Department of Mines, 50 miles east of Mount Davies, converted to a water bore for use by the Department of Aboriginal Affairs.

November; Two bores constructed in the Cave Hill area northeast of Musgrave Park for the Department of Aboriginal Affairs. One successful bore obtained.

REGIONAL GEOLOGY

A considerable span of geologic time is represented by the rocks within the Reserve.

The ranges in the north of the reserve are a sharply upthrust sequence of Lower Proterozoic crystalline rocks, portion of the Musgrave Block, a large positive area of the old basement which extends across the State borders into the Northern Territory and Western Australia. South of the ranges similar rock types occur although outcrop is limited to the occasional inselburg type of occurrence.

The Lower Proterozoic rocks were originally a very thick sequence of clastic sediments which have been metamorphosed under conditions of high temperature and pressure to the granulite metamorphic facies. They consist mainly of acid granulites and granitic gneisses with some basic varieties, and in the eastern and southern portion of the Reserve, large granitic masses occur. Intruding the sequence are local large basic intrusions, generally noritic or gabbroic, but with some ultra-basic varieties. The nickel mineralization in the Mount Davies area is associated with these basic intrusions.

Intruding both the metasediments and basic rocks are a series of younger dolerite type dykes, believed to be of early Proterozoic age. Some of these dykes are remarkably persistent, and individual swarms extend for distances up to 150 miles.

The Lower Proterozoic rocks are extensively folded and faulted, and structural relationships between the various units are complex. Strong shear zones, trending in a west-northwesterly direction run along the ranges, and play an important part in determining topography. The basic and ultra basic intrusions are associated with these major shears. Transverse shears cross the ranges, and the passes through the ranges are believed to be controlled by these shears. Musgrave Park is located within such a pass.

Overlying the crystalline basement rocks and post dating the metamorphic and organic processes is the Levenger Arkose. This occurs over a limited area to the south of Mt. Woodroffe in the vicinity of Levenger Creek, and is composed of flat dipping arkoses with some conglomerates, sandstones and siltstones, and occasional dolomitic bands. The age of the unit is uncertain, but it is believed to be Proterozoic.

Flanking the Musgrave Block in the southern portion of the Reserve, are the Proterozoic and Palaeozoic sedimentary rocks of the Officer Basin. These do not outcrop strongly, being largely covered by younger sediments and dune sands. The current oil drilling programme near the southern boundary of the Reserve may resolve some of the problems associated with these sediments.

A considerable hiatus in sedimentation occurred after Palaeozoic time and the next units represented are of Tertiary age. These consist of the erosional remnants of lateritic profiles, derived from the chemical weathering of the older rocks,

and no definite Tertiary sediments can be distinguished in the area. The nickeliferous ochres in the Mount Davies area are considered to have formed in the Tertiary era, resulting from residual enrichment in the weathering of nickel bearing Lower Proterozoic ultra-basic rocks.

The Quaternary era is represented by a series of outwash alluvial and lacustrine sediments, infilling depressions in and flanking the ranges. The sediments are generally unconsolidated, and consist of gravels, sands and clays, with some thin partially indurated limestones. The maximum thickness of the sequence recorded to date is 160 feet, and aeolian dunes and sand plains cover most of the sediments except in the ranges themselves.

The Quaternary sediments constitute the most significant groundwater aquifer in the reserve.

HYDROGEOLOGY

Groundwater occurs in three types of aquifer within the Reserve. By far the most significant are the Quaternary unconsolidated sediments, but good supplies have been obtained on occasions from the crystalline bedrock, and also from the sedimentary rocks of the Officer Basin.

Quaternary Sediment Aquifer

These sediments which infill depressions in and flank the crystalline bedrock, receive intake from the drainage of the elevated bedrock masses. In spite of the low rainfall, and high

temperatures of the area, groundwater quality is generally good due to rapid run-off and quick infiltration down through the relatively permeable outwash material. Salinity is in the range of 500 to 1,500 ppm of dissolved salts, hence the groundwater is almost always potable.

Away from the ranges, water quality may be expected to deteriorate as the distance from the intake areas increases, although the rate of increase in salinity has not been tested. Along major drainage channels e.g. the Officer, Curtis and Vide Cum Creeks, this effect would be decreased, because of the greater aquifer replenishment occurring when the streams are running.

Within the unconsolidated material the groundwater occurs as a series of local basins in the depressions of the basement surface. Within the present day drainage system the basins are connected, and water moves slowly from the higher basins to the lower, and finally drains away from the ranges, following an essentially similar course to the present day drainage. With the low rainfall, of the area intake into each basin is not great, and because of the groundwater movement only the deeper portions of the basins contain appreciable amounts of water. It has been found that reasonable supplies are rarely found where the fluvial material is less than 60 feet deep, and the deeper the section the greater the supply.

In times of drought when intake is not sufficient to compensate for groundwater movement, water levels drop, particularly in the higher areas, even if there is no water being withdrawn from the basin. Where there is constant pumping the effect is more pronounced. In the Musgrave Park area a severe drop in water level was recorded in 1965 due to the effects of the long drought and overpumping from the basin in the vicinity of the settlement. The large scale withdrawal of water from closely spaced bores is not therefore a practicable proposition.

The successful bores in this aquifer are from 100 to 150 feet deep, and have been located in the larger flats occurring in the passes through the ranges, and in the outwash aprons of major drainage channels draining away from the ranges. Even in these favourable localities, the success rate has not been high, as it is impossible to predict the thickness of Quaternary sediments lying above the basement, and many of the unsuccessful bores have bottomed on bedrock at relatively shallow depths. In these cases, it has been necessary to resite bores; in the passes moving across the section of the pass, and in the aprons moving further away from the ranges.

Drilling conditions in the Quaternary sediments are relatively good, and amenable to cable tool equipment. Casing is generally required to the base of the unconsolidated material, and slotted or perforated liners have been necessary in some bores.

Bedrock Aquifer

The crystalline Lower Proterozoic metasediments and basic igneous rocks are generally very tight, with insufficient joints and openings to permit the storage of groundwater in appreciable quantities. In addition, the rocks are very hard, causing very slow drill penetration rates.

However, during the more recent drilling programme carried out by the Department of Mines supplies of from 600 to 900 gallons per hour have been obtained from bores in which bedrock was encountered above the water table. The water has occurred

in extremely weathered or broken bedrock, resulting from local or regional shears, and the water is often restricted to narrow zones within the bedrock below the water table.

Bores of this type are the Piltardi Bore, and Bores B5 and B6 in the Musgrave Park area. In the selection of these boresites, local geological conditions were extrapolated into the concealed areas. However, except for major tectonic shears, the prediction of suitable bedrock aquifer material is difficult, and often shearing has been under such extreme conditions of temperature and pressure, that recrystallisation of the sheared rock has occurred and openings are lacking. In other cases, shearing and weathering have been so pronounced that the rocks have decomposed to clay minerals which lack sufficient permeability for groundwater extraction.

Difficult drilling conditions were encountered in the bedrock aquifer. The material is often very hard above the water table, and even with the rotary-percussion and down hole hammer equipment which was used, drilling rates were very slow. Such material would be beyond the capabilities of cable tool equipment.

Deep sections of highly weathered and decomposed bedrock were encountered in some of the nickel exploratory drilling, and in some of the bores relatively large supplies of water were present. This was in an area southwest of Mt. Caroline, where extremely deep remnants of laterite profiles were tested. However, the majority of the bores in this clayey weathered bedrock were dry, and areas where the weathered zone is permeable cannot be predicted. The locations of exploratory drill holes where groundwater was encountered are shown on the attached Plan No. 67-92. These holes are not cased, but could

probably be restored with cable tool equipment.

Officer Basin

Little is known of the sediments within the basin, as drill holes are few in number, and most of the subsurface information is based upon geophysical surveys. However, in the current oil drilling programme south of the Birksgate Ranges, large supplies of potable water were obtained in sandy sediments between 200 and 1,000 feet below the surface.

The area is relatively close to the edge of the Musgrave Block, and obviously intake conditions into the basin sediments from the crystalline basement surface must be good. Whether this is a purely local condition, or whether similar conditions apply along the margins of the Musgrave Block is not known.

The areal extent of the good quality water and the potential yield of the aquifer cannot be determined from the one bore. It is known that in the southern margins of the Officer Basin groundwater is very saline, and how far south of the Musgrave Block the good quality water extends could only be determined by deep drill holes.

BORE DETAILS

Tabulated below are brief details of the bores which at present are suitable for use within the reserve. This includes bores which are cased, although not necessarily equipped. Detailed logs of all bores constructed by the Department of Mines are appended to the report, and locations of

all known bores constructed within the Reserve are shown on the attached Plans, Nos. 67-92 and 85696. The eastern portion of the Reserve controlled by Ernabella Mission is not included, as details and locations of bores constructed by the Mission are not known.

Musgrave Park Area (See Plan No. 85696)

Bore No. 22

Local Name: Arkulkintama Bore Constructed by: Private Contractor

Location: 4½ miles S.S.W. of Musgrave Park Homestead

Depth: 148 feet Water Level: 50 feet Supply: 350 gph

Salinity: 831 ppm Casing: 148 feet of 6" Equipment: Nil

Bore No. 24

Local Name: Bore R2 Constructed by: S.A. Mines Dept.

Location: 2 miles S.S.W. of Homestead

Depth: 89 feet Water Level: 69 feet Supply: small

Salinity: 913 ppm Casing: 74' of 6" Equipment: Nil

Bore No. 25

Local Name: Amaraltjanja Bore Constructed by: Private Contractor

Location: 2½ miles N.W. of Homestead

Depth: 73 feet Water Level: - Supply: 350 gph

Salinity: Good Casing: 73' of 6" Equipment: W/Mill and Tank

Bore No. 26

Local Name: Bore R3 Constructed by: S.A. Mines Dept.

Location: 1 mile N.N.W. of Homestead

Depth: 137 feet Water Level: 66 feet Supply: 900 gph

Salinity: 956 ppm Casing: 81' of 6" Equipment: Pumpjack and Motor

Bore No. 27

Local Name: Horseyard Bore Constructed by: Private Contractor

Location: ¼ mile north of Homestead

Depth: 104 feet Water Level: 63 feet Supply: 300 gph

Salinity 736 ppm Casing: 104' of 6" Equipment: W/Mill and Tank

Bore No. 28

Local Name: Bore R1 Constructed by: S.A. Mines Dept.

Location: ¼ mile S.W. of Homestead

Depth: 156 feet Water Level: 77 feet Supply: 350 gph

Salinity: 651 ppm Casing: 151' of 4" Equipment: Pumpjack and Motor

Bore No. 29

Local Name: Tommy Dodd's Bore Constructed by: Local Contractor

Location: ¼ mile S.S.E. of Homestead

Depth: 127'6" Water Level: Supply: 300 gph

Salinity: Good Casing: 124' of 6" slotted Equipment: Pump-jack and Tank

Bore No. 30

Local Name: Homestead Bore Constructed by: S.A. Mines Dept.

Location: ¼ mile S.E. of Homestead

Depth: 135 feet Water Level: 78 feet Supply: 500 gph

Salinity: 553 ppm Casing: 136'5" of 6" Equipment: W/Mill and Tank

Bore No. 36

Local Name: No. 12 Bore Constructed by: S.A. Mines Dept.

Location: 10 miles S.W. of Homestead

Depth: 115 feet Water Level: 71 foot Supply: 800 gph

Salinity: 663 ppm Casing: 113'3" of 6" Equipment: W/Mill and Tank

Bore No. 37

Local Name: Bore R6 Constructed by: S.A. Mines Dept.

Location: 9 miles N.E. of Homestead

Depth: 107 feet Water Level: 49 feet Supply: 360 gph

Salinity: 2,485 ppm Casing: 45' of 6" Equipment: Nil

Mount Davies Area (See Plan 67-92)

Bore No. 2

Local Name: Wirrunya Bore Constructed by: S.A. Mines Dept.

Location: 8 miles N.W. of Mount Davies Airstrip

Depth: 150 feet Water Level: 59 feet Supply: 300 gph

Salinity: 1,404 ppm Casing: 140' of 6" Equipment: Nil

Bore No. 3

Local Name: — Constructed by: S.A. Mines Dept.

Location: 4 miles N.N.E. of Mt. Davies Airstrip

Depth: 110 feet Water Level: 89 feet Supply: 500 gph

Salinity: 687 ppm Casing: 94'4" of 6"
19'9" of 5" Equipment: Nil

Bore No. 4

Local Name: Mt. Davies Bore Constructed by: S.A. Mines Dept.

Location: ½ mile N. of Mt. Davies Airstrip

Depth: 108 feet Water Level: 66 feet Supply: 800 gph

Salinity: 907 ppm Casing: 93'8" of 6" Equipment: Pumpjack and Motor (Note: the pump cannot be removed from this bore)

Other Areas (See Plan 67-92)

Bore No. 13

Local Name: Mann No. 1 Constructed by: SA. Mines Dept.

Location: 37 miles E of Mt. Davies Airstrip, adjacent to main road.

Depth: 120 feet Water Level: 71 feet Supply: 250 gph

Salinity: 645 ppm Casing: 112' of 6" Equipment: Nil

Bore No. 14

Local Name: Pittardi Bore Constructed by: S.A. Mines Dept.

Location: On main road, 69 miles W. of Musgrave Park

Depth: 180 feet Water Level: 80 feet Supply: 400 gph

Salinity: 328 ppm Casing: 180' of 5" Equipment: Pumpjack, motor and tank

Bore No. 17

Local Name: No. 25 Bore Constructed by: S.A. Mines Dept.

Location: 17 miles S.W. of Musgrave Park Homestead

Depth: 102 feet Water Level: 84 feet Supply: 300 gph

Salinity: 339 ppm Casing: 105' of 6" Equipment: W/Mill and tank

Bore No. 18

Local Name: No. 16 Bore Constructed by: S.A. Mines Dept.

Location: 11 miles W. of Musgrave Park Homestead

Depth: 82 feet Water Level: 45 feet Supply: 350-400 gph

Salinity: 919 ppm Casing 82'6" of 6" Equipment: W/Mill and tank

Bore No. 20

Local Name: Arkrayilba Bore Constructed by: Local Contractor

Location: 16 miles S.S.W. of Musgrave Park Homestead

Depth: 102 feet Water Level: 64 feet Supply: 250 gph

Salinity: Good Casing: 102' of 6" with slotted 5" liner at base

Equipment: Nil

Bore No. 40

Local Name: Bore No. 18 Constructed by: S.A. Mines Dept.

Location: 25 miles S.E. of Musgrave Park Homestead

Depth: 97 feet Water Level: 45 feet Supply: 3-400 gph

Salinity: 571 ppm Casing: 97'5" of 6" Equipment: Nil

Bore No. 42

Local Name: Bore No. 19 Constructed by: S.A. Mines Dept.

Location: 35 miles S.E. of Musgrave Park

Depth: 85 feet Water Level: 49 feet Supply: 250 gph

Salinity: 1,595 ppm Casing: 85' of 6" Equipment: Nil

CONCLUSIONS AND RECOMMENDATIONS

Within the Reserve, good quality groundwater may generally be found within or adjacent to the ranges in the northern portion, from bores 100 to 200 feet deep. South of the ranges, little is known of the groundwater potential, but it is considered that salinity would increase and the water table deepen with distance away from the intake areas. Where sufficient run-off occurs as in the Birksgate Ranges, conditions similar to the ranges in the north would apply.

There are at present, 20 bores in the Reserve suitable for use. Groundwater occurs in two types of aquifer, the unconsolidated Quaternary outwash material, and in the crystalline basement where weathering and shearing have increased the porosity and permeability of these otherwise tight rocks.

In the Quaternary material, successful bores have been confined to the large alluvial flats within the ranges, and to the outwash aprons of major drainage channels. In these positions, intake conditions and storage capacity are most favourable, but it has been found that the thickness of Quaternary sediments must be greater than 80 feet for a successful bore.

The basement rock aquifer has only recently been tested,

and although relatively large supplies of water have been obtained in this aquifer, there are problems associated with it. Detailed geological mapping is required for the projection of suitable structures into the concealed areas, and even when sufficient information is available, the ratio of successful to unsuccessful bores is low. Drilling conditions are often poor, and penetration of the hard crystalline basement which has often been encountered above the water table, would be beyond the capabilities of cable tool equipment.

Although there is a considerable number of bores within the Reserve, most of the bores are concentrated near Musgrave Park, and there are large areas in the ranges where there are no permanent water supplies. In these areas it is considered that successful water bores could be sited if required, and such bores could be used for both domestic and stock purposes.

If cable tool equipment is to be used in future drilling programmes, it would be advisable to confine sites to where the softer unconsolidated outwash and alluvial material would constitute the aquifer. Such sites would be in the alluvial flats located in the passes and broader valleys within the ranges, and in the outwash fans from major drainage channels not more than four miles from the intake areas.

It would be inadvisable to space bores too closely in any particular locality. Because of the limited water available for intake, and the relative local and isolated nature of each basin, the danger of overpumping in any area is always present. A minimum spacing of one mile is considered suitable.

Drilling in those areas south of the ranges where there is little outcrop for run-off and intake cannot be recommended, although the behaviour of groundwater on leaving the ranges is

not known. Local basins may be present in the concealed areas, but prediction of those is not possible, and water drilling would entail considerable risk.

The significance of the recently discovered water in the Officer Basin in the southern limits of the Reserve cannot be realised at this stage, as too little is known of the areal extent of the good quality groundwater. The area is remote, and deep bores are required on present indications. This would appear to preclude use of the water for purely stock or domestic purposes. Whether there would be any call on the water for industrial uses will depend upon future mineral development within the Reserve and on adjoining areas in Western Australia.

PGM:SMA:GM
12.4.1967

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Table No. 2

S.A. DEPARTMENT OF MINES

SUMMARY OF BORE RECORDS

SHEET 2 ~~Hundred~~ PLAN NO. 67-92

Ground Water Survey

County .....

PLAN BORE NO.	SECTION P.S.A.	DEPTH *in feet below surface*			SUPPLY	SALINITY		HEIGHT *above sea level*	*Strata passed through*	*Remarks*
		Total	Water cut	Static level	*Gallons per hour*	*Parts per million*	*Analysis No.*			
4	Native Reserve	108	74	66	800	907	88/1917/55		0'- 9' Dark rusty brown sand & clay with some fine gravel. 9 - 14 Pale brown marl with some gravel and calcareous gravel. 14 - 20 Pale brown sandy & gritty marl with gravel. 20 - 24 Dirty pale brown marly sand and gravel. 24 - 29 Light buff marl with fine gravel. 29 - 45 Light cream & some dark blue limestone with quartzite grit and gravel. 45 - 52 Pale brown limestone with quartz grit and gravel. 52 - 54 Light brown sandy marl with quartz and limestone grit. 54 - 69 Whitish and pale brown limestone with quartzite pebbles. 69 - 92 Light rusty brown calcareous sand and gravel with some quartzite pebbles. 92 - 100 Vari-coloured gravel, with granite, hematite, quartzite.	Mount Davies Bore Lat. 26°10'00" Long. 129°07'50" Mines Dept. Ref: Grid A/1 Bore No. 4 Folder No. 4/-
5	Native Reserve	123	80	70	100	523	88/1915/55		0'- 2' Dark brown sandy clay. 2 - 9 Reddish dark brown sandy marl with travertine and ferruginous grit. 9 - 25 Brown clay with sand & quartzite & ferruginous gravel. 25 - 50 Vari-coloured granitic, quartzite & ferruginous gravel & some jasper chips. 50 - 56 Pale red and grey conglomerate limestone. 56 - 74 Pale red clayey fine grained sand with some gravel. 74 - 80 Vari-coloured sand, gravel & pebbles, mainly quartzitic. 80 - 102 Pink & white gravelly clays, gravel mainly quartzite. 102 - 123 Vari-coloured quartzite conglomerate.	Supply failed with use and bore abandoned. Lat.26°10'30" Long. 129°08'30" Mines Dept. Ref.: Grid A/1 Bore No. 5 Folder No. 2/-
6	Native Reserve	87	-	-	-	-	-		0'- 9' Light brown silt and fine sand with fragments of fine grained silicified sediments. 9 - 26 Light brown silt and sand with sub-angular pieces of amphibolite. 26 - 40 Light grey and brown silt, sand and grit with subrounded amphibolite pebbles with some calcareous material. 40 - 87 Grey hard amphibolite.	Bore Abandoned. Lat.26°08'55" Long.129°14'10" Mines Dept. Ref.: Grid A/1 Bore No. 6 Folder No. 38/-
7	Native Reserve	42	-	-	-	-	-		0'- 2' Dark rusty brown fine sand & some grit. 2 - 12 " " " sandy marl with ferruginous grit. 12 - 19 Pale brown sandy marl with quartz and ferruginous grit & limestone pellets. 19 - 25 Dirty light brown sandy marl with quartzite grit and chips. 25 - 42 Grey and bluish quartzite.	Bore Abandoned. Lat.26°09"05" Long. 129°14'30" Mines Dept. Ref.: Grid A/1 Bore No. 7 Folder No. 5/-

PLAN: 67-92
GRIDS: A/1 B/1 C/1 DM-C8

Table No. 1

S.A. DEPARTMENT OF MINES

SUMMARY OF BORE RECORDS

Hundred

Ground Water Survey

County

Report BORE	Local Name SECTION if applicable	DEPTH *in feet below surface*			SUPPLY	SALINITY		HEIGHT *above sea level*	*Strata passed through*	*Remarks*
		Total	Water cut	Static level	*Gallons per hour*	*Parts per million*	*Analysis No.*			
1	Native Reserve	42							0'- 4' Light reddish brown silt and fine sand with fragments of silicified sediments. 4 - 25 Brown and grey subangular pebbles of amphibolite and silicified sediments. 25 - 26 Brown and grey silt, sand, and grit with fragments of travertine limestone and amphibolite. 26 - 42 Grey hard crystalline rock rich in felspar.	Bore Abandoned. Lat.26°06'00" Long.128°59'00" Mines Dept.Ref. Grid A/1 Bore No. 1 Folder 40/-
2	Mt. Davies Native Reserve	150	110 "	59 "	300 "	1404	98/608/57		0' - 15' Reddish brown sand and silt - somewhat calcareous - with angular fragments of granitic rock. 15 - 16 Reddish brown sand and silt with travertine limestone fragments and subrounded pebbles of dark grey quartzite and quartzite-mica-felspar rock. 16 - 30 Brown, slightly calcareous silt, sand, and grit with chips of hard limestone. 30 - 31 Brown and grey angular coarse fragments predominantly of limestone, with some silt. 31 - 46 Brown fine sandy limestone. 46 - 47 Brown and grey fine sandy limestone with clayey and ferruginous material. 47 - 76 Brown and grey calcareous silt with ferruginous chips and fragments of sandy limestone and clay. 76 - 117 Greenish brown altered clayey and talcy granitic rock with pieces of hard reddish fine grained granitic rock. 117 - 144 Brown and grey ferruginous clays with fine quarts grains. 144 - 150 Greenish serpentineous and hard quartzose metasediments.	Wirrumya Bore. Lat.26°06'15" Long.129°02'00" Mines Dept.Ref. Grid A/1 Bore No. 2 Folder No. 41/-
3	Native Reserve	110	92	89	500	687	88/1916/55		0'- 8' Dark rusty brown fine sand with some grit. 8 - 23' Rusty brown marly sand with limestone grit. 23 - 54 Light reddish gritty & sandy marl. 54 - 64 Rusty brown fine to coarse grained sand with some gravel. 64 - 90 Rusty brown & some dark grey sandstone or conglomerate (poor sample). 90 - 92 Rusty brown, dark grey & some white sand and gravel. 92 - 192 ~~Rusty brown, dark grey & some white sand,~~ gravel and pebbles.	Lat.26°07'00" Long.129°09'10" Mines Dep. Ref. Grid A/1 Bore No. 3 Folder 3/-

Table No. 3

S.A. DEPARTMENT OF MINES

SUMMARY OF BORE RECORDS

SHEET NO. 3 Hundred ~~Pastoral~~ PLAN NO. 67-92

Ground Water Survey

~~County~~

PLAN BORE NO.	SECTION P.S.A.	DEPTH *in feet below surface*			SUPPLY	SALINITY		HEIGHT *above sea level*	*Strata passed through*	*Remarks*
		Total	Water cut	Static level	*Gallons per hour*	*Parts per million*	*Analysis No.*			
8	Native Reserve	25	-	-	-	-	-		2'- 10' Grey and brown subrounded pebbles and fragments of amphibolite and silicified rock with calcareous coating. 10 - 25 Grey hard silicified sediments.	Bore Abandoned. Lat. 26°9'50" Long.129°16'00" Mines Dept. Ref.: Grid A/1 Bore No.8 Folder 39/-
9	Native Reserve	45	-	-	-	-	-		0'- 4' Dark red sandy clay. 4 - 13 Brown gritty marl. 13 - 20 Pale brown gritty marl with calcareous gravel and ferruginous concretions. 20 - 30 Dirty buff sandy and gritty marl with some gravel. 34 - 45 Vari-coloured quartzite.	Bore Abandoned. Lat.26°10'30" Long.129°15'40' Mines Dept. Ref.: Grid A/1 Bore No.9 Folder No. 7/-
10	Native Reserve	130	108	108	40	-	-		0'- 1½' Brown clayey sand. 1½ - 3 White and reddish travertine limestone. 3 - 10 Pale brown gritty marl with limestone gravel. 10 - 30 Buff gritty marl with some limestone grit. 30 - 50 Cream gritty marl. 50 - 80 Dirty buff slightly calcareous clay with some quartz grit. 80 - 100 Pale brown & white clay with coarse quartz sand. 100 - 123 Brown, grey and dark blue quartzite. 123 - 130 Whitish & bluey black quartzite.	Bore Abandoned. Lat. 26°11'00" Long. 129°16'00" Mines Dept. Ref.: Grid A/1 Bore No. 10 Folder No. 1/-
11	Native Reserve	150	134	110	50	1165	88/1919/55		0'- 1½' Dark reddish brown fine sand soil with some gravel. 1½- 5 Rusty brown sand and ferruginous and quartzite gravel. 5 - 12 Creamy brown marl with fine gravel. 12 - 25 Parti clay with granitic, ferruginous quartz gravel and diopside crystals. 25 - 42 Dirty brown and some grey clay with some fine gravel. 42 - 50 Dirty grey clay with some gravel and calcareous grit. 50 - 81 Dirty dark brownish grey marl with some granite, grit and some mica. 81 - 94 Dirty bluish grey & some brown clay with grit. 94 - 115 Dirty bluish & some rusty brown flint shales. 115 - 124 Grey & bluish violet marl with gravel & pebbles. 124 - 150 Light green and bluish violet quartzite and schist.	Bore Abandoned. Lat. 26°11'30" Long. 129°15'30" Mines Dept. Ref.: Grid A/1 Bore No. 11 Folder No. 8/-
12	Native Reserve	121	-	-	-	-	-		0'- 5' Dark reddish brown fine sandy soil with some gravel. 5 - 11 Dirty brownish cream rubbly travertine limestone. 11 - 19 Pinkish cream fine grained sand with fine gravel and limestone grit. 19 - 50 Parti clay with granitic, ferruginous	Bore Abandoned. Lat.26°11'40" Long. 129°16'00" Mines Dept. Ref.: Grid A/1 Bore No. 12 Folder No. 6/-

Table No. 4

S.A. DEPARTMENT OF MINES

SUMMARY OF BORE RECORDS

Hundred PLAN NO. 67-92

Ground Water Survey

County

PLAN BORE NO.	SECTION P.S.A.	DEPTH *in feet below surface* Total	Water cut	Static level	SUPPLY *Gallons per hour*	SALINITY *Parts per million*	*Analysis No.*	HEIGHT *above sea level*	*Strata passed through*	*Remarks*
12 cont.	Native Reserve	121	-	-	-	-	-		continued. 50'- 62' Bright reddish marl and greenish grey with some white clay with quartz grit. 62 - 70 Dirty greyey brown clay with a little calcareous grit and granitic, quartz & ferruginous gravel. 70 - 115 Dirty grey & bluish black quartzite. 115 - 121 " " " " " "	
13	Native Reserve	120	80	71'6"	250	A.T.S. 645	176/2281/66		0 - 6" Calcrete and calcreted limestone rubble and plates. Some red-brown loam. 6"- 1'3" Layered calcrete and fragments of dolomitic limestone. 1'3"- 5'0" dense, white pale-grey to pale-brown dolomitic limestone with softer earthy patches. Massive to micronodular texture. Pockets of pale-brown calcrete. 5'- 10' White to buff dolomitic limestone with solution cavities infilled with secondary lime. Some veins of chalcedony. 15'- 20' Dense to earthy white limestone, possibly dolomitised in part. 20'- 40' Red-brown partly indurated clayey sand. Abundant rounded quartz grains with some magnetite and pyroxene. Some fine grained laterite fragments. 40 - 55 Red-brown and brown sandy clay with frequent quartz grit and some magnetite fragments. Humid. 55 - 70 Red-brown and brown silty clay with occasional quartz grit. Damp. 70 - 75 Reddish brown silty clay with occasional layers of acid gneiss gravel. Damp. 75 - 80 Reddish brown very gritty clay with angular gneiss and granulite fragments up to 1/8". 80 - 115 Gritty gravel with interstitial clay and sand, becoming less clayey and sandy with depth. Some laterite fragments in gravel. 115 - 120 Hard quartz pyroxene felspar granulite with ironstained joints.	MANN No. 1 Bore Lat. 26°08'30" Long. 129°42'30" Mines Dept. Ref.: Grid A/1 Bore No. 32 Folder 65/-
14	Native Reserve	180'6"	115	80	400	828	169/290/66	-	0'- 10' Reddish brown slightly clayey gritty sand. 10 - 20 Gravel with interstitial sandy clay. 20 - 40 Reddish brown sandy clay with abundant gravel fragments. Some dense limestone fragments. 40 - 60 Pale-grey sandy and limy clay with dense hard limestone fragments. 60 - 70 Very weathered fine grained siliceous granulite. 70 - 180'6" Weathered and occasionally decomposed fine grained siliceous granulite, possibly mylonised. Clayey and saponitic in patches.	Piltardi Bore No. 3 Lat. 26°10'30" Long. 130°13'45" Mines Dept. Ref.: Grid B/1 - Bore 4. Folder 4/-.

DM-C8

Table No. 5

S.A. DEPARTMENT OF MINES

SUMMARY OF BORE RECORDS

~~Hundred~~ PLAN NO. 67-92

Ground Water Survey

~~County~~

PLAN BORE NO.	SECTION	DEPTH *in feet below surface*			SUPPLY	SALINITY		HEIGHT *above sea level*	*Strata passed through*	*Remarks*
		Total	Water cut	Static level	*Gallons per hour*	*Parts per million*	*Analysis No.*			
15	Native Reserve	51'4"	-	-	-	-	-	-	0'- 10' Sands and gravels. 10 - 51'4" Quarts felspar pyroxene granulite. Weathered and broken at the top becoming hard with depth. Occasional fragments of tachylitic material.	Piltardi Bore No. 2 Bore Abandoned. Lat. 26°10'00" Long. 130°18'00" Mines Dept. Ref.: Grid B/1 - Bore 5 Folder No. 5/-
16	Native Reserve	151'6"	-	-	-	-	-	-	0'- 15' Red gritty sand, clayey. 15 - 35 Yellowish grey and reddish brown gritty sandy clay with fragments of very weathered granulite. 35 - 40 Dense white limestone with some clayey patches andsome red-brown clay. 40 - 70 Off-white and reddish brown sandy and gritty limy clay. 70 - 105 Reddish brown sandy and limy clay with frequent quartz grit fragments. 105 - 120 Kaolinised quartz felspar granulite becoming less decomposed with depth. 120 - 151'6" Quarts pyroxene felspar granulite.	Piltardi Bore No.1 Bore Abandoned Lat. 26°10'00" Long. 130°23'00" Mines Dept. Ref.: Grid B/1 Bore No.6 Folder No. 6/-
17(a)	BLK. 1031	102'	93' 93'	18' 84	- 300	ATS 27 539	102/2093/57 102/2094/57		0'- 2' Brown red silty fine sand. 2 - 8 Brick red silty fine sand with calcareous grit and subangular grit of various rocks. 8 - 28 Brown and subangular grit of various rocks. 28 - 56 Brown clay with calcareous and other grit and pebbles of gneissic rock. 56 - 70 Pale brown silt and fine calcareous and other grit. 70 - 90 Creamy grey clay with calcareous grit and grit of various other rocks. 90 - 102 Parti. granitic sand and gravel subangular and some ferruginous pebbles and granitic pebbles.	No. 25 Bore Lat. 26°16'05" Long. 130°55'35' Mines Dept. Ref.: Grid B/1 Bore No. 3 Folder No. 3/-

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Table No. 6

S.A. DEPARTMENT OF MINES

SUMMARY OF BORE RECORDS

Ground Water Survey

Hundred PLAN No. 67-92

County

GEOLOGICAL SHEET

PLAN BORE No.	SECTION	DEPTH *in feet below surface* Total	Water cut	Static level	SUPPLY *Gallons per hour*	SALINITY *Parts per million*	*Analysis No.*	HEIGHT *above sea level*	*Strata passed through*	*Remarks*
18	Native Reserve	82'6"	- 52'6" 70'	46' 37'6" 45'6"	500 350.400 350.400	919	169/291/66		0' - 4' Reddish brown and white silty very fine sand, and travertine limestone rubble. 4 - 8 Pale brown marl with sand and subangular quarts and calcareous gravel. 8 - 12 Pink marl with abundant limestone grit and gravel. 12 - 20 Pale creamy brown subangular grit and gravel mainly limestone. 20 - 25 Pale brown mainly subangular calcareous sand and gravel and some ferruginous gravel. 25 - 30 Cream clayey very fine sand and subangular fine to coarse gravel with some limestone grit. 30 - 35 Cream clay with subangular sand and gravel. 35 - 42 Pale brown clay with angular sand and grit. 42 - 58½ Pale brown clay with subangular grit and gravel. 58½ - 60 Grey subangular sand and gravel. 60 - 70 Pale brown clayey sand and gravel and some limestone grit and pebbles.	No. 16 Bore Lat. 27°09'30" Long. 130°59'50" Mines Dept. Ref. Grid B/1 Bore No. 1. Folder No. 1/-
19	Native Res.	50'							0' - 4' Dark brown silty very fine sand. 4 - 18 Brown and dark grey silt and sand, gravel and pebbles. 18 - 27 Pale greyey brown marl with subangular sand, grit and gravel with some calcareous grit. 27 - 34 Grey marl with subangular sand grit and gravel with some calcareous grit. 34 - 38 Light and dark grey marl with quartzite some grits and gravel subangular. 38 - 40 Grey quartzite slightly decomposed. 40 - 50 Dark grey quartzite.	Bore Abandoned Lat. 26°10'25" Long. 130°59'50" Mines Dept. Ref. Grid B/1 Bore No. 2 Folder No. 2/- Plan 67-92 and S 5696
20	Native Res.	102	64'	64'	300	-	-		No details	Arkmyilba Bore. Lat. 26°22'05" Long. 131°04'10" Mines Dept. Ref. Grid C/1, Bore No. 21 Folder 1/10

DM-C8

Table No. 7

S.A. DEPARTMENT OF MINES

SUMMARY OF BORE RECORDS

~~Hundred~~ PLAN NO. 67-92 and S 5696

Ground Water Survey

County .....

PLAN BORE NO.	SECTION	DEPTH *in feet below surface*			SUPPLY	SALINITY		HEIGHT *above sea level*	*Strata passed through*	*Remarks*
		Total	Water cut	Static level	*Gallons per hour*	*Parts per million*	*Analysis No.*			
21	Native Reserve	29	-	-	-	-	-	-	0'- 18' Brown silt with angular grit. 18 - 29 Light brown silt with angular rock fragments.	Bore Abandoned. Lat. 26°12'40" Long. 131°04'30" Mines Dept. Ref.: Grid C/1 Bore No. 11 Folder 6/-
22	Native Reserve	148	50	50	800	831	133/418/62	-	Bottomed in sand.	Arkulkintama Bore. Lats. 26°13'10" Long. 131°07'00" Mines Dept. Ref.: Grid C/1 Bore No. 20 Folder 1/5
23	Native Reserve	185	83	71	Very small	703	174/1673/66	-	0'- 5' Sand. 5 - 11 Light reddish brown fine grained sandy limestone with angular quartz fragments. 11 - 30 White limestone with angular quartz grit. Occasional gravel fragments near the top becoming more abundant with depth. 30 - 40 Lime cemented gravel and clay. 40 - 50 Variegated blue-grey, red-brown, yellow-brown and orange clayey sands with 20% gravel fragments. 50 - 60 As above with laterite fragments in gravel. 60 - 80 Light blue-grey sandy and gritty clay. 80 - 90 Light grey soapy sandy clay, possibly highly decomposed saponitic bedrock. 90 - 110 Light grey and yellow-brown soapy saponitic clay. 110 - 150 As above with some vague relict textures appearing near the base. 150 - 183 Soft wet saponitic clays. Generally yellow-brown with occasional fragments of very weathered bedrock.	Bore (R3) Abandoned. Lat. 26°11'10" Long. 131°08'10" Mines Dept. Ref.: Grid C/1 Bore No. 22 Folder 5/-
24	Native Res.	113'6"	89	69	Small	913	174/1671/66	-	0'- 5' Sand. 5'- 20' Lime cemented gravel, some calcrete. 20 - 30 Highly decomposed bedrock. 30 - 50 Kaolinised granulite, very soft with relict textures. 50 - 90 Broken moderately fresh, medium to coarse-grained quartz felspar granulite. More extreme weathering on joint faces. 90 - 100 Dark grey pseudo-tachylitic material. 100 - 113 Fresh, hard, fine-grained gneissic granulite.	Bore R2. Lat. 26°10'50" Long. 131°08'00" Mines Dept. Ref.: Grid C/1 Bore No. 23 Folder 15/-.

Table No. 8

S.A. DEPARTMENT OF MINES

SUMMARY OF BORE RECORDS

~~Hundred~~ PLAN NO. 67-92

Ground Water Survey and S 5696

~~County~~

PLAN BORE NO.	SECTION	DEPTH *in feet below surface*			SUPPLY	SALINITY		HEIGHT *above sea level*	*Strata passed through*	*Remarks*
		Total	Water cut	Static level	*Gallons per hour*	*Parts per million*	*Analysis No.*			
25	Native Reserve	73	-	-	350	-	-		No details.	Amaraltjanja Bore Lat. 26°07'30" Long. 131°08'30" Mines Dept. Ref.: Grid C/1 Bore 24 Folder No. 1/6
26	Native Reserve	137	69 100	66'3" 66'3"	Small 900	956	174/1674/66		0'- 5' Brown gritty sand, some gravel 5 - 10 Gravel. 10 - 15 Reddish brown clayey limestone. Occasional quartz grit. 15 - 30 Hard white limestone grading to a lime cemented gravel at its base. 30 - 60 Very weathered and decomposed granulite. Limy in part. 60 - 70 Moderately fresh fine-grained basic granulite or dolerite. Frequent quartz veins. 70 - 90 Fresh quartz felspar-pyroxene granulite. 90 - 110 Broken and jointed quartz felspar granulite with green sepenitic staining on joints. Shearing evident with some slickensiding and sericitic material on joint faces. 110 - 130 Sheared and broken quartz felspar granulite withsiliceous mylonitic material. Thin veins of puggy green material and abundant quartz veins. 130 - 137 Fresh quartz felspar pyroxene granulite with minor ironstaining or joints. Very hard.	Bore R5 Lat. 26°08'00" Long. 131°08'45" Dept. of Mines Ref. Grid C/1 Bore No. 25 Folder 21/-
27	Native Reserve Blk1031	104	75-104	65	300	736	133/417/62		Bottomed on basement.	Horseyard Bore. Lat. 26°09'00" Long. 131°06'30" Mines Dept. Ref.: Grid C/1 Bore No. 10 Folder 1/4
28	Native Reserve	156	98	77	350	812	168/2521/65		0'- 10' Surface sand and off-white to pale reddish brown calcrete. 10 - 20 Pale yellowish brown to white sandy limestone. 20 - 40 Yellow and white clayey limestone to limy clay. 40 - 50 Yellow-brown slightly limy silty clay. 50 - 60 Yellowish brown gritty clay with occasional small angular gravel fragments. 60 - 80 As above with increasing gravel. 80 - 90 Yellowish brown gritty clay with abundant gravel fragments. 90 - 120 Yellowish brown gritty clay with from 10-30% gravel fragments. 120 - 140 Weathered and broken quartz felspar granulite. 140 - 156 Fresh quartz felspar granulite with some Pyroxene.	Bore R.1 Lat. 26°09'20" Long. 131°08'55" Mines Dept. Ref.: Grid C/1 BoreNo.26 Folder No. 22/-

Table No. 9

S.A. DEPARTMENT OF MINES

SUMMARY OF BORE RECORDS

Ground Water Survey

Hundred ~~XXXXXX~~ PLAN NO. ~~S 5696~~

County .....

BORE	SECTION	DEPTH *in feet below surface*			SUPPLY	SALINITY		HEIGHT *above sea level*	*Strata passed through*	*Remarks*
		Total	Water cut	Static level	*Gallons per hour*	*Parts per million*	*Analysis No.*			
29	Native Reserve Blk103	127'6"	116-127'6"	90	300	Comparable to existing bores			Basement rock at 127'6".	Tommy Dodd's Bore Lat. 26°09'20" Long. 131°09'05" Mines Dept. Ref.: Grid C/1 Bore 19 Folder 1/2
30	Native Reserve Blk103	135	105 130	78	500 500	671 553	99/1179/57 100/1423/57		0'- 2' Dark brick red silty very fine sand with fine ferruginous sand. 2 - 10 Brick red silty very fine to fine and some medium ferruginous sand. 10 - 20 Yellowish cream clay with some fine sand and calcareous concretions. 20 - 70 Pale yellowish cream and some white clay with some fine sand and a few calcareous concretions. 70 - 90 Buff clay with some fine sand well rounded and subangular coarse sand and gravel. 90 - 105 Cream clay with fine to medium well rounded and subangular sand. 105 - 115 Pale buff clay and subangular sand and gravel and limestone pebbles. 115- 130 Pale buff clayey sand and gravel subangular. 130 - 135 Pale buff subangular sand and gravel and limestone at bottom.	Homestead Bore Musgrave Park Lat. 26°09'20" Long.131°09'10" Mines Dept. Ref.: Grid C/1 Bore No. 8 Folder 4/-.
31	Native Reserve Blk103	26			Dry				0'- 2' Dark brick red silty very fine sand. 2 - 12 Brick red sandy and gritty clay. 12 - 16 Pale brown marl with sandstone sand and gravel and some travertine limestone concretions. 16 - 18 Pale pink marl with subangular sandstone sand, grit and gravel. 18 - 24 Light cream mainly subangular to angular sand, grit and gravel. 24 - 25 Vari pebbles, granitic, quartzitic, dolomitic conglomerate. 25 - 26 Light cream quartzite.	Bore Abandoned. Lat. 26°09'50" Long.131°09'05" Mines Dept. Ref.: Grid C/1 Bore No. 9 Folder No. 3/-
32	Native Reserve	57'6"	-	-	Dry	-	-	-	0'- 7' Sand with heteregeneous gravel fragments. Some lime cement. 7 - 57'6" Quarts felspar pyrexene granulite. Decomposed and broken at the top, becoming progressively harder and less weathered with depth.	Bore (R4) Abandoned Lat. 26°10'05" Long.131°09'00" Mines Dept. Ref.: Grid C/1 Bore No. 27 Folder 23/-
33	Native Reserve	-	-	-	-	-	-	-	No details.	Bore Abandoned Lat. 26°04'10" Long. 131°10'30" Mines Dept. Ref.: Grid C/1 BoreNo.28 Folder 1/7
34	Native Reserve	79	79	-	350	Good quality	-	-	No details.	Louie's Bore. Lat. 26°05'15" Long.131°12'00" Mines Dept. Ref.: Grid C/1 Bore No. 29 Folder 1/8

Table No. 10

S.A. DEPARTMENT OF MINES

SUMMARY OF BORE RECORDS

~~Hundred~~ PLAN NO. 67-92

Ground Water Survey

~~County~~

BORE	SECTION	DEPTH *in feet below surface*			SUPPLY	SALINITY		HEIGHT *above sea level*	*Strata passed through*			*Remarks*
		Total	Water cut	Static level	*Gallons per hour*	*Parts per million*	*Analysis No.*					
35	Native Res.	-	-	-	-	-	-	-	No details.			Bore Abandoned. (Private contractor) Lat. 26°06'45" Long.131°11'50" Mines Dept. Ref.: Grid C1 Bore No. 30 Folder: 1/9
36	Native Res. Blk103	115	80	71	800+	578	99/1180/57		0'- 7'	Reddish brown silt.		No. 12 Bore Lat. 26°16'30" Long.131°15'00" Mines Dept. Ref.: Grid C/1 Bore No. 12 Folder 7/-
			"	"	-	ATS 470	100/1424/57		7 - 15	Darker reddish brown silt with some calcareous material.		
			"	"	-	ATS 470	100/1425/57		15 - 55	Light brown calcareous silt with various angular pebbles.		
			"	"	800	663	100/1426/57		55 - 75	Light grey brown silt with angular grit and pebbles - some calcareous.		
									75 - 80	Light brown silt and grey angular grit and pebbles.		
									80 - 105	Brown and grey angular sand grit and gravel.		
									105 - 115	Yellow brown and grey clay, silt and fine to coarse sand and grit.		
37	Native Reserve	107	59	49	360	ATS2485	174/2275/66		0'- 5'	Red-brown gritty sand.		Bore R6 Lat. 26°05'00" Long. 131°16'30" Dept. of Mines Ref.: Grid C/1 Bore No. 31 Folder 24/-
									5 - 15	Medium-grained gravel (up to ¼") with a matrix of red-brown gritty sandy clay.		
									15 - 20	Moderately hard pale-brown to pale reddish brown sandy limestone or calcrete.		
									20 - 25	As above but grading to a reddish brown sandy and limy clay with gravel fragments at the base.		
									25 - 30	Heteregeneous gravel, rounded to sub-angular.		
									30 - 35	Weathered basic granulite.		
									35 - 60	Weathered fine grained felspar pyroxene granulite, becoming fresh and very hard at 40'.		
									60 - 65	Broken felspar pyroxene granulite, slightly sheared.		
									65 - 107	Dark felspar pyroxene granulite or dolerite, with occasional patches of quartz. Occasional small pyrite flecks. Occasional joints with minor shearing on joint faces. At 104'6" strong shear with saponite-quarts veining and associated with a large increase in water supply.		

Table No. 11

S.A. DEPARTMENT OF MINES

SUMMARY OF BORE RECORDS

Hundred xxxxxx PLAN NO. 67-92

Ground Water Survey

County .....

DM-C8

PLAN BORE NO.	SECTION	DEPTH *in feet below surface*			SUPPLY	SALINITY		HEIGHT *above sea level*	*Strata passed through*	*Remarks*
		Total	Water cut	Static level	*Gallons per hour*	*Parts per million*	*Analysis No.*			
38	Native Reserve Blk 1031	30	-	-	-	-	-	-	0'- 2' Dark brown silty very fine sand and some medium sand. 2 - 4 Dark brownish red clay and sand and gravel with some limestone concretions. 4 - 10 Dark brown clayey sand and gravel subangular. 10 - 18 Brown clayey sand and gravel and pebbles. 18 - 20 Pink clayey sand and gravel subangular. 20 - 28 Pale greyey brown marl with angular limestone gravel and some quartz gravel. 28 - 30 Vari dolomitic limestone.	Bore Abandoned Lat. 26°05'30" Long. 131°16'45" Mines Dept. Ref.: Grid C/1 Bore No. 2 Folder 2/-.
39	Native Res. Blk. 1031	31	-	-	-	-	-	-	0'- 2' Reddish brown silty very fine sand with some subangular coarse sand. 2 - 4 Reddish brown clay and subangular coarse sand. 4 - 8 Reddish brown clay with subangular gravel. 8 - 18 Light brown and some white clay with sub-angular sand and gravel. 18 - 25 Creamy grey subangular sand and gravel and quartz pebbles. 25 - 30 Buff clay and well rounded fine sand and subangular and angular sand and gravel and some quartz pebbles. 30 - 31 Buff clay and subangular pebbles and gravel, with limestone pebbles crystalline rock at bottom.	Bore Abandoned Lat. 26°22'20" Long. 131°26'50" Mines Dept. Ref.: Grid C/1 Bore No. 14 Folder No. 12/-
40	Native Res. Blk. 1031	97	50 50) 84) 50	50 50 45	3-400 3- 400 60	ATS 430 571 ATS 430	102/2089/57 102/2090/57 100/1430/57		0' - 2' Reddish brown silt and very fine sand. 2 - 4 Reddish brown silt, fine sand and sub-angular grit and gravel and limestone gravel. 4 - 8 Reddish brown silt, fine sand and sub-angular grit and gravel and limestone gravel plus granitic pebbles. 8 - 20 Brown silt and fine sand with subangular grit and gravel some of which limestone and granitic pebbles. 20 - 36 Creamy brown silt and gravel of various rocks and subangular grit. 36 - 40 Pale pink silt and subangular grit and gravel from varioms rocks limestone and others and granitic pebbles. 40 - 50 Light grey silt and subangular grit and gravel from various rocks limestone and others and granitic pebbles. 50 - 60 Pale grey silt and very fine to fine subangular to rounded sand and fine grit with some limestone grit and sand. 60 - 80 Pale grey silt and fine sand and gravel partly limestone and granitic and limestone pebbles.	Bore 18 Lat. 26°21'50" Long. 131°27'30" Mines Dept. Ref.: Grid C/1 Bore No. 15 Folder No. 13/-

Table No. 12

S.A. DEPARTMENT OF MINES

SUMMARY OF BORE RECORDS

~~Hundred~~ PLAN NO. 67-92

Ground Water Survey

County .....

PLAN BORE NO.	SECTION	DEPTH *in feet below surface*			SUPPLY	SALINITY		HEIGHT *above sea level*	*Strata passed through*	*Remarks*
		Total	Water cut	Static level	*Gallons per hour*	*Parts per million*	*Analysis No.*			
cont.									continued.	
40	Native Res. Blk. 1031								80'- 86' Light grey medium to coarse subangular and well rounded sand and some pebbles. 86 - 90 Grey silty angular medium and coarse granitic sand. 90 - 96 Greyey cream fine to coarse subangular to angular sand with granite pebble. 96 - 97 Parti subangular medium to coarse sand with abundant gravel and pebbles.	
41	Native Res. Block 1031	27	-	-	-	-	-	-	0'- 5' Reddish brown silt. 5 - 7 Light reddish brown silt. 7 - 20 Grey and brown sand, grit and gravel. 20 - 24 Multi-coloured fragments of various rock types, quartz and felspar present. 24 - 27 Quartz and felspar fragments of hard crystalline rock.	Bore abandoned. Lat. 26°17'30" Long. 131°27'50" Mines Dept. Ref.: Grid C/1 Bore No. 13 Folder 8/-
42	Native Res. Block 1031	85	72 "	49 "	250 "	ATS1190 1595	102/2091/57 102/2092/57		0'- 2' Reddish brown silty fine sand. 2 - 4 Dark brown silt with sharp grit and some gravel. 4 - 8 Brown marl with subangular and angular grit and gravel. 8 - 25 Reddish brown clay with angular and subangular grit and gravel, some calcareous grit and granitic pebbles. 25 - 34 Reddish brown and one grey clay with abundant angular and subangular grit and gravel and some calcareous grit and gravel. 34 - 40 Dark brown clay with abundant calcareous grit and gravel and well rounded and subangular grit and gravel. 40 - 48 Dark brown clay with subangular calcareous and other grit. 48 - 55 Dark brown clay with subangular grit and gravel and some calcareous grit and amphibolitic pebble. 55 - 60 Dark brown clay with subangular and angular grit and gravel some of which calcareous and subangular pebbles of amphibolite. 60 - 65 Brown clay with abundant subangular and angular grit and gravel, well rounded calcareous gravel and subangular pebbles and ferruginous gravel. 65 - 75 Pinkish brown marl with subangular grit and gravel and gypsum. 75 - 80 Reddish brown sandy gravel with gypsum pebbles, and ferruginous gravel. 80 - 85 Vari coarse subangular and well rounded sand and gravel and ferruginous gravel.	Bore 19. Lat. 26°26'00" Long. 131°36'40" Mines Dept. Ref.: Grid C/1 Bore No. 16 Folder 14/-

PLAN NO. 67-92 DM-C8

S.A. DEPARTMENT OF MINES

Table No. 13

SUMMARY OF BORE RECORDS

Ground Water Survey

Hundred .....

County .....

BORE	SECTION P.S.21N	DEPTH *in feet below surface* — Total	Water cut	Static level	SUPPLY *Gallons per hour*	SALINITY *Parts per million*	*Analysis No.*	HEIGHT *above sea level*	*Strata passed through*	*Remarks*
43	Native Res. Block 1031	20	-	-	-	-	-		0'- 1½' Reddish brown silty very fine sand with ferruginous gravel. 1½- 3 Grey quartzite boulders. 3 - 10 Pink marl with subangular coarse sand and gravel mainly quartzite. 10 - 20 Grey and white bedded quartzite.	Bore Abandoned. Lat. 26°25'30" Long. 131°41'10" Mines Dept. Ref.: Grid C/1 Bore No. 17 Folder No. 9/-
44	Native Res. Block 1031	43	-	-	-	-	-		0'- 5' Reddish brown silt with sand grit and pebbles. 5 - 12 Reddish brown sand and silt. 12 - 18 Light brown silt with sand and grit, slightly calcareous. 18 - 23 Light brown calcareous silt with sand and grit. 23 - 40 Light grey silt, sand and rock fragments. 40 - 43 Multi coloured fragments of crystalline rock.	Bore Abandoned. Lat. 26°26'35" Long. 131°49'30" Mines Dept. Ref.: Grid C/1 Bore No. 18 Folder 10/-

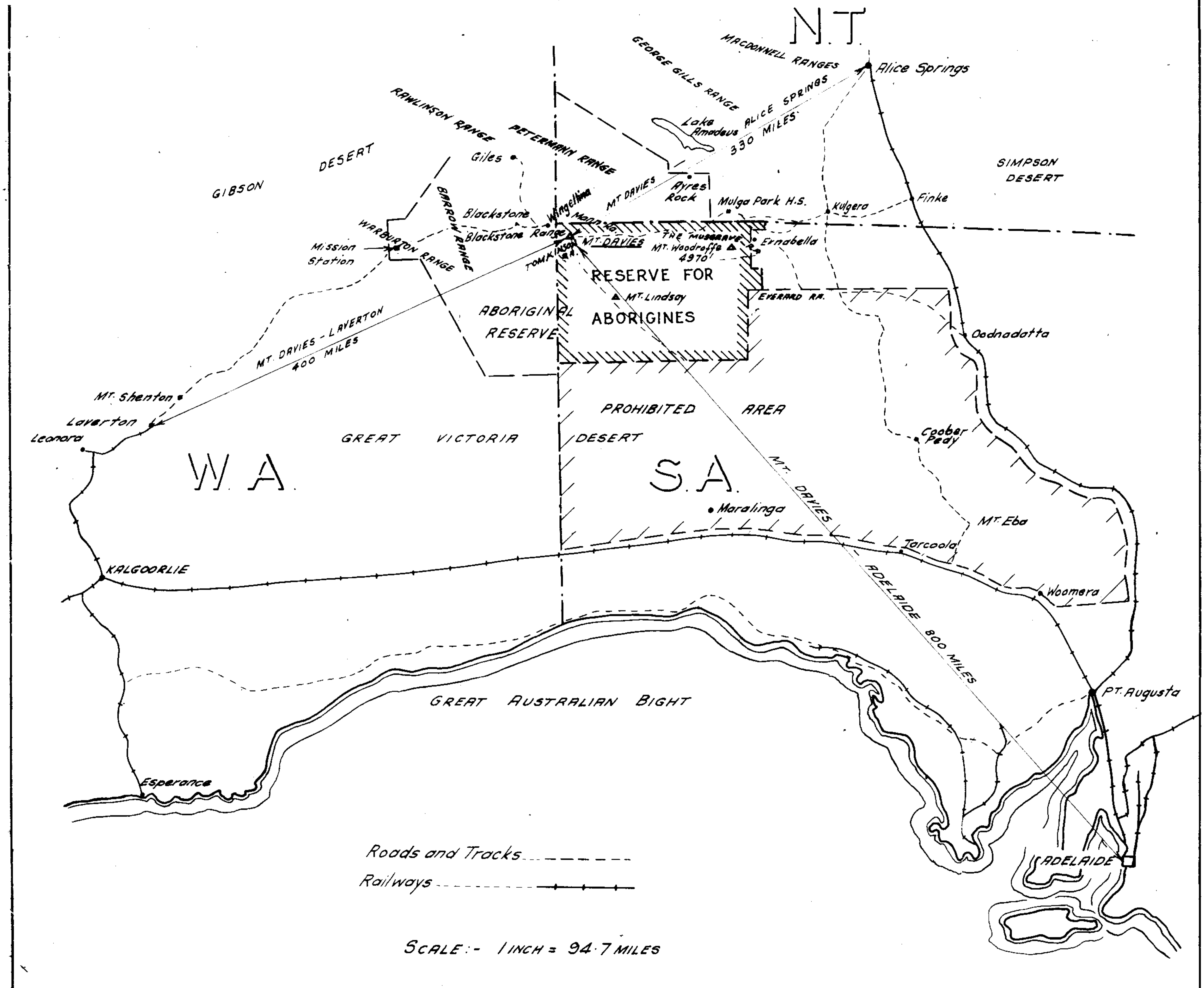
Table No.....

DEPARTMENT OF MINES—ADELAIDE

XXXXI PLAN No. 67-92

DETAILED ANALYSES OF UNDERGROUND WATERS IN PORTION OF CO.....

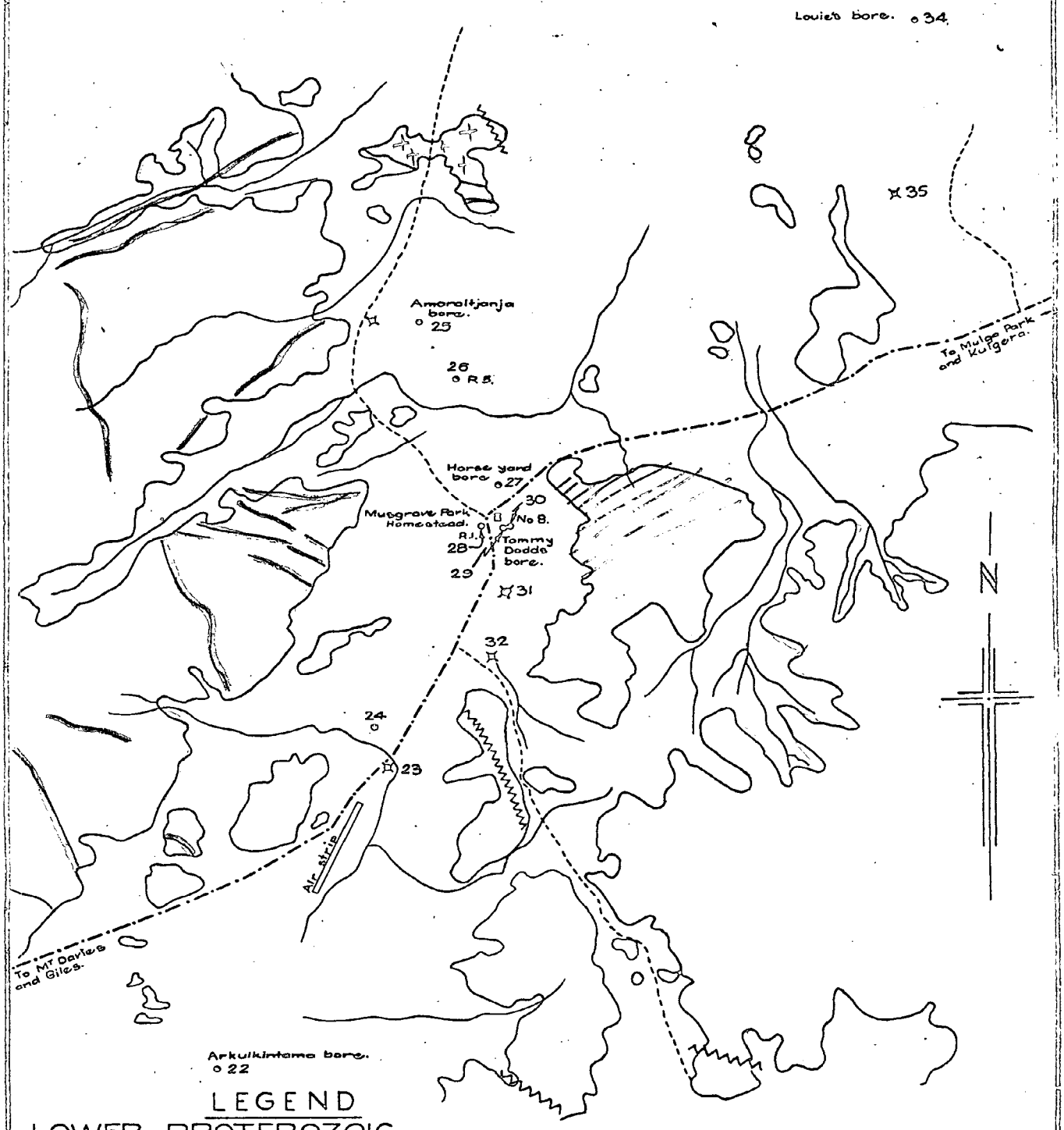
Bore Report No.	Serial No.	Section No.	Grid	Chlorine, Cl.	Sulphuric Acid radicle, SO_4	Carbonic Acid radicle, CO_3	Nitric Acid radicle, NO_3	Sodium, Na	Potassium, K	Calcium, Ca	Magnesium, Mg	Iron, Fe	Silica, SiO_2	Total Saline Matter Grains/Gall.	Total Saline Matter Ounces/Gall.	Assumed Composition of Salts: Calcium bicarbonate	Calcium sulphate	Calcium chloride	Magnesium bicarbonate	Magnesium sulphate	Magnesium chloride	Sodium bicarbonate	Sodium sulphate	Sodium chloride		Sodium nitrate	Potassium chloride	Silica	Hardness (degrees English): Total	Temporary	Permanent	Due to calcium	Due to magnesium	Analysis No.
2	2	A	1	480	209	277	Present	273		99	67			1404	0.20	366	29			236	79			694		Present			36.6	15.8	20.8	17.3	19.3	98/608/57
3	"			88	49	380	Nil	67		50	53			687	0.08	202			274	35			31	165		Nil			23.95	21.93	2.02	8.76	15.19	98/1916/55
4	"			144	63	482	"	97		26	95			907	0.11	104			484	71			10	238		"			31.82	27.66	4.16	4.49	27.33	98/1917/55
5	"			134	72	174	"	77		20	40			523		81			135	91	20			196		"			16.75	10.0	6.75	3.5	13.25	98/1915/55
11	"			196	92	599	"	199		17	62			1165	0.12	230			375			101	136	323		"			20.86	20.86		2.92	17.94	98/1919/55
14	B	1		66	34	489	22	142		44	31			828		178			187			274	50	109	2.6	30			238	238		110	128	169/290/66
17	"			66	34	297	Present	67		50	25			539	0.06	201			146			32	50	109		Present			15.7	15.7		8.7	7.0	102/2094/57
18	"			241	72	268	71	160		59	48			919		239			106	90	47			340	1.0	97			344	221	123	147	197	169/291/66
22	C	1		177	61	368	Trace	119		50	56			831		201			260	64			14	292					24.7	21.0	3.7	8.7	16.0	133/418/62
23	"			60	39	429	Nil	78		57	40			703		231			241			74	58	99					307	307	Nil	142	165	174/1673/66
24	"			148	52	460	Trace	146		72	35			913		291			211			90	77	244					324	324	"	180	144	174/1671/66
26	"			240	109	340	"	123		80	64			956		324			115	137	67			313					463	278	185	200	263	17/1674/66
27	"			141	57	342		77		73	46			736		293			146	71	29			197					25.9	19.7	6.2	12.7	13.2	133/417/62
28	"			161	57	316	50	131		58	39			812		235			167	55			19	266		70			305	260	45	145	160	168/2521/65
30	"			73	56	377	Present	36		86	44			671	0.08	347			146	70	23			91		Present			27.7	22.0	5.7	15.0	12.7	99/1179/57
30	"			77	56	278	Nil	74		26	41			553	0.07	104			241	7			74	127		Nil			16.4	16.0	0.4	4.5	119	100/1423/57
36	"			103	53	276	Present	53		43	50			578	0.07	174			176	65	28			134					21.9	16.1	5.8	7.5	14.4	98/1180/57
36	"			198	44	354	"	74		43	50			663	0.08	173			267	28			31	163		Present			21.9	20.3	1.6	7.5	14.4	100/1426/57
40	"			79	50	303	"	62		29	48			571	0.07	115			239	36			31	130		"			19.4	17.3	2.1	5.0	14.4	102/2090/57
42	"			290	192	563	51	474		9	16			1595	0.2	35			94			632	268	479		71			6.0	6.0	-	1.5	4.5	102/2092/57



DEPARTMENT OF MINES — SOUTH AUSTRALIA

NORTH-WEST RESERVE FOR ABORIGINES
LOCALITY PLAN

		Drn. P.G.M.	SCALE: As shown
		Tcd. R.H.	67-110
		Ckd. L.V.W.	Aa+d
Director of Mines		Exd.	DATE: 9-3-67



LEGEND

LOWER PROTEROZOIC

METASEDIMENTS. Acid granulites and gneisses.

Norites.

QUATERNARY.

Slope deposits, outwash fans, valley floor deposits, lacustrine limestones, dune material.

Fault or shear zone.

Dolerita dyke.

Main road.

Tracks.

Bore. . . . . Successful

" . . . . Unsuccessful

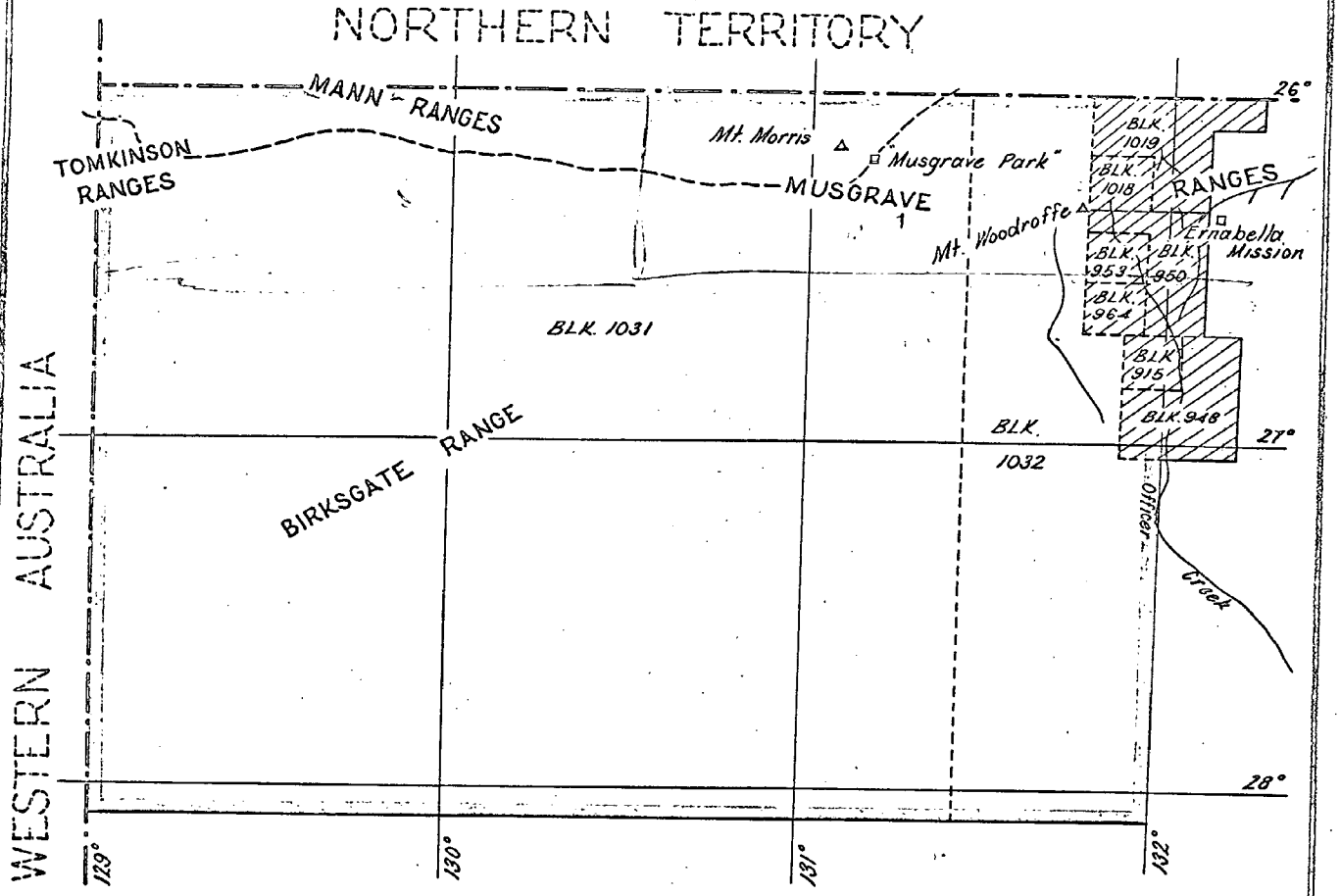
26 Bore No. in appendix of report No 64/39

R5 Local bore No.

To accompany report by P.G. Miller.

DEPARTMENT OF MINES — SOUTH AUSTRALIA

	Drn.PGM Tcd.NHE Ckd.LVW Exd.	MUSGRAVE PARK AREA GEOLOGICAL PLAN SHOWING BORE LOCATIONS	SCALE : 80 chain to 1inch S5696 Ad DATE : 15 Feb 67.



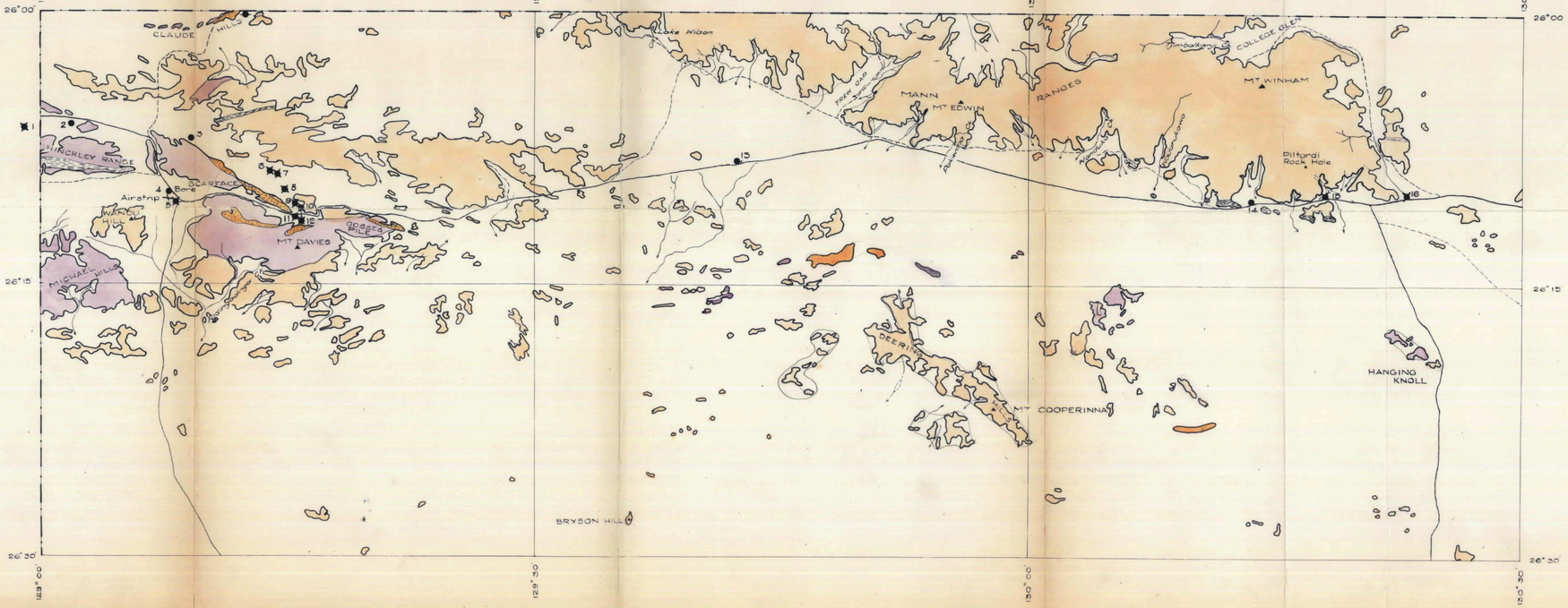
Boundary of Reserve for Aborigines

Area of Reserve controlled by Ernabella Mission

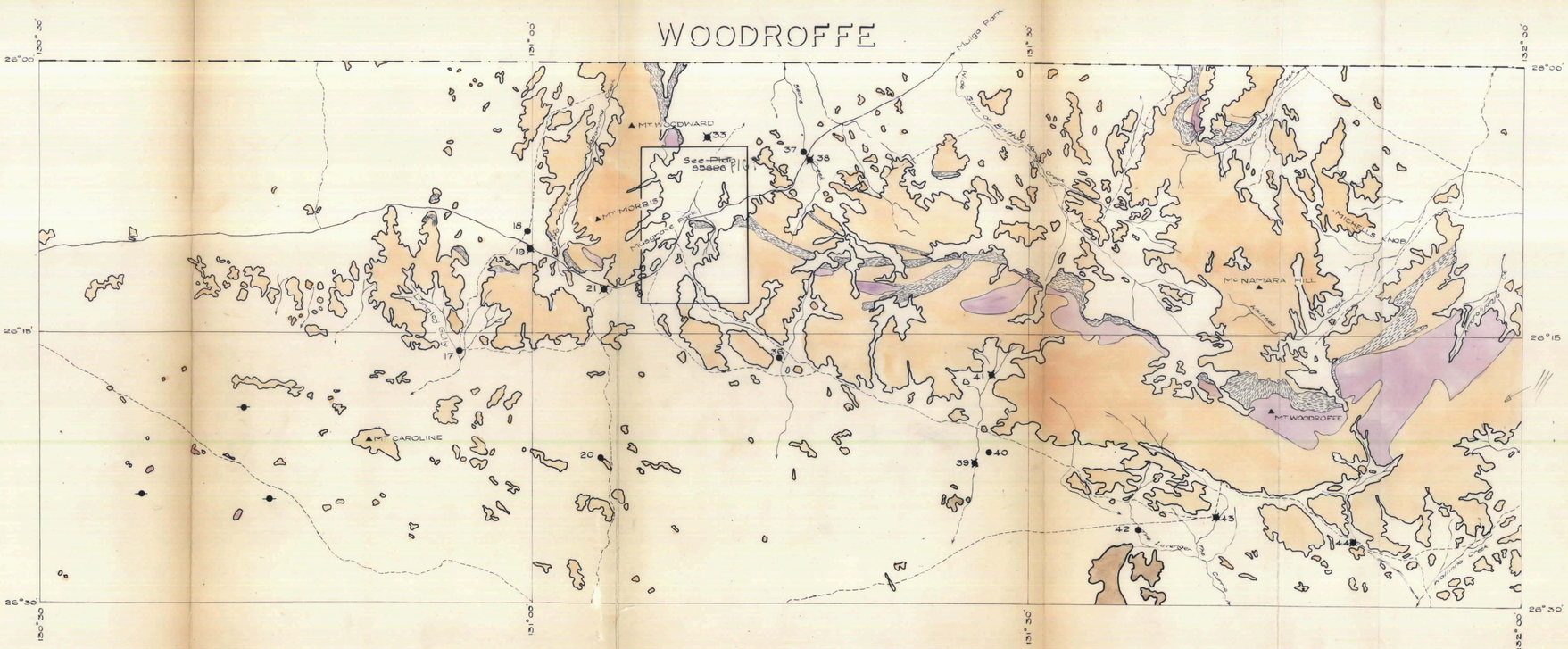
DEPARTMENT OF MINES — SOUTH AUSTRALIA

	Drn. P.M.	GROUNDWATER SURVEY	SCALE: 1 inch = 32 miles
	Tcd. R.H.	NORTH-WEST RESERVE	S5716 Aa+d
	Ckd. L.V.W.	SHOWING	
	Exd.	PASTORAL BLOCKS	DATE: 9-3-67

MANN



WOODROFFE



LEGEND

QUATERNARY

Alluvial ~~outwash~~ clays sands gravels; ~~with~~ minor ~~some~~ lacustrine limestones; ~~Generally covered with~~ sand dunes and sand plain, ~~except in principal drainage channels and active alluvial flats~~

TERTIARY

Ferruginous cappings; ~~locally grading to~~ laterites.

Jasper and ochre, ~~associated with deep weathering of ultra-basic rocks and/or serpentinites~~ (Nickeliferous in part)

PROTEROZOIC

Levenger Arkose: ~~Greenish coloured epidotised~~ Arkose, ~~and~~ conglomerate, sandstone and siltstones, ~~with occasional dolomitic bands~~. & minor dolomite.

Giles Complex: Basic and ultra-basic rocks, ~~locally serpentinised in the Mt Davies Area~~

Metasediments of Granulite ~~Metamorphic~~ Facies: ~~Acid to basic~~ Gneisses, granulites, ~~with metasomatised variants to~~ granitoid and anorthositic rocks. ~~Also includes granitic material of possible igneous origin, and probably younger than the metased-ments~~

Shear Zones

Road

Track

Bore-successful
-unsuccessful
-mineral exploration

● 17 Successful Bore: Cased
✖ 18 Unsuccessful Bore.
} Bore Number in appendix of report No. 64/38.

● Mineral Exploration bores where good supplies of water were encounted. These bores are not cased but could probably be restored with cable tool equipment.

SCALE
MILES 2 1 0 2 4 6 8 10 12 14 MILES

DEPARTMENT OF MINES — SOUTH AUSTRALIA

GROUNDWATER SURVEY
NORTH WEST ABORIGINAL RESERVE
ABORIGINAL AFFAIRS DEPARTMENT

		Drn. PM	SCALE: 1" = 250,000 inches
		Tcd. AMCD	67-92 Aa+d
		Ckd. L.V.W	
Director of Mines		Exd.	DATE: 23-2-67