DEPARTMENT OF MINES & ENERGY
SOUTH AUSTRALIA

NORTH-WEST ABORIGINAL RESERVES DRILLING PROGRAMME NOVEMBER 1977 - JANUARY 1978

by

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Rept.Bk.No. 78/37
G.S. No. 6011
DM. No. 437/77
Eng. No. 78/6

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DEPARTMENT OF MINES & ENERGY
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ABSTRACT

A rotary drilling programme was carried out in the North-West Aboriginal Reserve in the period November, 1977 to January, 1978.

A total of 14 water wells were drilled, and of these, 10 were successful in obtaining groundwater supplies. Eight of the wells are suitable for domestic use.

Several sites were drilled purely on a speculative basis, even though the prospects of obtaining a potable groundwater supply were thought to be low.

INTRODUCTION

A request was made by the Department of Aboriginal Affairs, the S.A. Department of Community Welfare and the Western Australian Government for the S.A. Department of Mines and Energy to drill a number of water wells in the Aboriginal Reserves in South Australia and Western Australia.

A reconnaissance field trip was made in August, 1977 to select potential drilling sites and to determine accessibility for vehicles. Approximately 50 sites were visited.

In order to avoid drilling in the hot summer months, it was necessary to divide the drilling into two programmes. The first programme was to drill those sites of highest priority, and these results are presented in this report.

The drilling programme, using a rotary down-hole hammer rig, commenced on the 31st October, 1977. Due to the poor condition of the tracks, numerous mechanical breakdowns caused frequent delays in drilling and the programme was not completed until the end of January, 1978.

SITE SELECTION

Where possible, drilling sites were selected to intersect fractured 'hard rock' material at relatively shallow depth (5-10 metres). A number of sites however had to be selected along surface drainage lines, in order to intersect possible water bearing alluvial sediments.

DRILLING RESULTS

1. General

Fourteen water wells were drilled at various localities (see Fig. 1), and of these, eight were successful in providing a usable supply of potable groundwater. A summary of the drilling results is given in Table 1. The logs for the wells are presented in Appendix I and the water analyses are given in Appendix II.

2. Indulkana (see Fig. 2)

One water well, IND 19, was drilled in the ranges south of the settlement. Good quality water (334 mg/litre) was obtained from fractured quartzite/meta-sandstone. Air lifting the water gave a supply of about 38 kilolitres/day. The well was drilled to

TABLE 1

SUMMARY OF DRILLING RESULTS

LOCALITY	WELL NUMBER	DEPTH (metres)	SUPPLY (kl/day)	QUALITY* (mg/litre)	STANDING WATER LEVEL (metres)	COMMENTS
Indulkana (S.A.)	IND 19	68	38	334*	15.6	Suitable domestic supply
Waltjitjata (S.A.)	WJ 1	57	26	5 332*	16.9	Stock supply only
(N.T.)	WJ 2	43	92	1 040*	26.9	Suitable domestic supply
Kuntjanu (S.A.)	KR 2	47	131	1 471*	10.7	Suitable domestic supply
Kata-ala (W.A.)	KL 1	78	1	1 313*	46.3	Small domestic supply
	KL 2	70	4	1 050*	12.0	Suitable domestic supply
	KL 3	64	seepage	-	-	Abandoned
	KL 4	45	dry	-	-	Abandoned
Jameson (W.A.)	JR 1	54	50	1 000	28.0	Suitable domestic supply
	JR 2	53	70	600	26.7	Suitable domestic supply
Wannan (W.A.)	WN 1	20	15	4 500	9.0	Stock supply only
	WN 2	6	dry	-	-	Abandoned
Pipalyatjara (S.A.)	MD 8B	16	27	600	14.5	Suitable domestic supply
Anamara Piti (W.A.)	AP 1	50	dry	-	-	Abandoned

*Full Analysis Available (see Appendix II)

a depth of 68 metres and cased to 6 metres.

It is recommended that the well be equipped with a windmill.

3. Waltjitjata (see Fig. 3)

Initially, one water well (W.J.1) was drilled on the edge of a clay pan near the camp area. Prior to drilling this well, a shallow hole (W.J.1A) was started but had to be abandoned at 4 metres because it was claimed to be a sacred site. The well was drilled to a depth of 57 metres and a supply of about 26 kilolitres/day of poor quality water (5 322 mg/litre) was obtained from silty clay and sands. The well was left as an open-hole and may be completed at a later date for a stock water supply.

A second well (W.J.2) was drilled in a broad alluvial valley, approximately 6 km north of the camp area. About 92 kilolitres/day of good quality water (1 040 mg/litre) was obtained from alluvial gravels and sands. The well was drilled and cased to a depth of 43 metres; with slotted casing from 31 to 39 metres. It is recommended that the well be equipped with a windmill and tank.

4. Kuntjanu (see Fig. 4)

One water well (K.R.2) was drilled on a low limestone ridge approximately 6 km south of the camp area. The well was drilled to a depth of 47 metres and good quality water (1 471 mg/litre) was obtained from laterite. Airlifting the water gave a supply of about 120 kilolitres/day. The well was cased to final depth, with slotted casing from 41.3 to 47 metres. This well should be equipped with a windmill and tank.

5. Kata-ala (see Fig. 5)

Initially, one water well (K.L. 1) was drilled in a narrow alluvial valley about 1 km north of the camp area. A small supply (about 1 kilolitre/day) of good quality water (1 313 mg/litre) was obtained from fractured granite. The well was drilled to a depth of 78 metres and cased to 10.8 metres. It should be possible to obtain a small domestic supply if the well is equipped with a hand-pump.

The supply was considered inadequate for the proposed community and consequently further attempts were made to obtain a greater supply. A second well (K.L. 2) was drilled about 500 m southwest of the camp area near the junction of two watercourses. Numerous soaks were encountered until a small supply of 4 kilolitres/day of potable groundwater (1 050 mg/litre) was cut at 51.5 m in fractured granite.

Because of requests from the Irrunyitju Community and the adviser (Mr. R. Patterson) for a windmill supply, two further unsuccessful attempts were made to obtain this (holes K.L. 3 and K.L. 4). Subsequently, the successful well (K.L. 2) was cased to 23.7 m and equipped with a hand-pump.

6. Jameson (see Fig. 6a)

Two successful wells were drilled within 5 km of the Jameson settlement, near the Jameson Range. These were required to cater for an anticipated increase in the settlement population and for gardening purposes.

The first well (J.R. 1) was sited about 500 metres north-west of the settlement, in an area from which the existing groundwater supply is obtained. Apart from the known occurrence of the existing well, there are no surface indications of the presence of a potable groundwater supply. The new well was therefore selected at a site determined by the need to minimize interference effects with the existing well and to minimize the cost of reticulation of the water supply. A supply of about 110 kilolitres/day was obtained from strongly weathered gabbroic bedrock underlying 42 metres of clay. The well was completed with 150 mm casing to 45 metres, slotted between 39 and 45 metres. A supply of about 50 kilolitres/day of good quality water (1 000 mg/litre) was obtained from the completed well.

The second well (J.R. 2) was drilled approximately 4.4 km south-west of the settlement, in an area selected for gardening purposes. Good quality groundwater (600 mg/litre) was obtained from weakly weathered to fresh, fractured gabbroic bedrock beneath 31 metres of clay. The well was completed with 150 mm casing to 47 metres; slotted from 44 to 47 metres. A yield of about 70 kilolitres/day was airlifted from the completed well.

Due to the very weathered nature of the bedrock intersected by the well J.R. 1, it is possible that the yield of the well may eventually deteriorate as the slotted casing becomes blocked with clay. This is not likely to occur in well J.R. 2 because of the clean, unweathered nature of the bedrock.

The great thickness (about 30 metres) of confining clay and the reasonably large potentiometric head (11 to 16 metres above the water cut) in both wells indicates that recharge to the aquifer does not occur locally, hence there is expected to be a fairly large volume of water held in storage. Significant dewatering of the aquifer by the 3 low yielding wells is not expected to occur.

7. Wannan (see Fig. 6b)

The Wannan area is located in a gneissic/granitic province south of the "Cobb Depression" - an extensive sedimentary trough with reported large supplies of generally good quality groundwater (Farbridge, 1967). With the lack of well defined drainage lines and the lack of obvious fracturing in the shallow bedrock, the prospects of an adequate potable groundwater supply were thought to be low.

The first hole (W.N. 1) was sited 0.85 km west of the Wannan shed in a topographic low and along strike with outcropping quartz reefs (less than 2 metres thick). A supply of about 16 kilolitres/day of poor quality water (4 500 mg/litre) was obtained from weathered granitic material, at a depth of 20 metres. The well was completed with 150 mm casing to 6.2 metres. Due to the quality of water, the well is only suitable for a stock water supply. Fitted with a hand-pump, the well could possibly be used to augment the water supply by diluting the saline water with fresh water carted from either the Jameson settlement or Warburton.

A second attempt was made 4.4 km south-east of the Wannan shed on a small outcrop of calcrete. The bore was abandoned at 6 m in collapsing mica schist, after intersecting only 2 metres of calcrete.

No further attempt was made in this area. The more promising "Cobb Depression" (approximately 10 km north of Wannan) was, at the time, inaccessible. It was suggested to the Jameson administrator (R. Collins) that drilling should be attempted in the "Cobb Depression"; the programme, however, to be preceded by the construction of a graded track across the sand dunes.

8. Pipalyatjara (Mt. Davies) (see Fig. 6c)

Considerable difficulties were encountered in the drilling of a replacement well for M.D. 8 due to collapsing gravels and boulders of alluvial material. The first attempt (M.D. 8A) was abandoned at 14 metres when the drilling rods became jammed and the hammer bit was lost down the hole. A second attempt (M.D.8B) was made 5 metres west of M.B. 8A. Using drilling fluid to stabilize the hole, M.D.8B was drilled to a depth of 22.5 metres and a yield of 44 kl/day was obtained. During casing operations, the hole collapsed to 15.6 metres, reducing the final yield to 27 kl/day. The water quality was good (600 mg/litre).

9. Anamara Piti (see Fig. 5)

One well (A.P.1) was drilled in well-fractured gabbro to a depth of 51 metres but was dry.

CONCLUSIONS AND RECOMMENDATIONS

Of the 14 water wells drilled during the programme, 10 were successful in obtaining a water supply. Eight of these wells are suitable for domestic use and the remaining two may be used for stock supplies.

Several unsuccessful sites (W.N. 1, W.N. 2, K.L. 3 and K.L. 4) were drilled, even though the prospects of obtaining a potable groundwater supply appeared poor. It is recommended that for future drilling programmes the field geologist be given the authority to use his discretion in deciding whether sites like these are drilled.

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X.P. SIBENALER

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REFERENCE

Farbridge, R.A., 1967. Drilling for Water in Cobb Depression, North of Wingellina. W.A. Geol. Surv. unpublished report 1967/17.

APPENDIX I

WATER WELL LOGS

PROJECT: N.W.A.R. DRILLING PROGRAMME NOV. 1977-JAN. 1978

LOCATION OR COORDS: INDULKANA (S.A)

SEC. HD. EL Surface m EL Ref. Point m Datum

MINES DEPARTMENT — SOUTH AUSTRALIA
ENGINEERING DIVISION

WATER WELL LOG

HOLE NO: IND 19

UNIT / STATE NO 5544000WW00101

DM 437/77

	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY kilolitres/day*	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	TOTAL DISSOLVED SOLIDS Analysis No:
AQUIFER SUMMARY:	40.5-41.0	15.63 (Final)	40.5	41	5		AIRLIFT	450	W — FIELD TEST
	55-58 59-60 66-66.5		6	68	38	1.6	"	334	7021/77

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia(mm)	CASING From(m)	CASING To(m)
0	4.5		SLOPEWASH AND SCREE MATERIAL	Red sand and silt, with pale grey to pink quartzite boulders (up to 20cms). Minor red, yellow and green siltstone and shale.	QUATERNARY		160	-0.3	6
4.5	68		QUARTZITE/META-SANDSTONE	Fine to medium grained, predominantly pale grey but bands of cream, dark grey, pale red and dark red. Fractured, with minor pyrite/chalcopyrite mineralization.	ORDOVICIAN- Mt. Chandler Sandstone				

REMARKS:

Usable domestic supply. Full analysis available.

* NOTE: 110 kl / day = 1000gals / hr.

DRILL TYPE: ROTARY

CIRCULATION: AIR

SHEET 1 OF 1

COMPLETED: 8/11/77

LOGGED BY: F.S.

DATE:

PROJECT: N.W.A.R. DRILLING PROGRAMME
NOV. 1977 - JAN. 1978
LOCATION OR COORDS: WALTJITJATA (S.A.)

SEC. HD. EL Surface m EL Ref. Point m Datum

MINES DEPARTMENT — SOUTH AUSTRALIA
ENGINEERING DIVISION

WATER WELL LOG

HOLE NO: W.J. 1
UNIT / STATE NO 4745000W00075
DM 437/77

AQUIFER SUMMARY:	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY kilolitres/day*	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	TOTAL DISSOLVED SOLIDS Analysis No:
	19	16.92 (Final)			Seepage				W —
	33-34				"				
	37-38				Not tested			4850	7007/77
	42-45		19	57	26	1	AIRLIFT	5200	7008/77

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE
0	0.5		SAND	Red-brown, predominantly coarse grained with minor amount of silt.	
0.5	5.5		KUNKAR	Mottled pale grey to brown.	
5.5	14		SILT	Pale brown clayey silt with calcrete concretions.	
14	15		CALCRETE	Pale grey to off-white.	
15	33		CLAY	Pale to dark brown, indurated, silty, with calcrete concretions. 27-33m. Calcrete content up to 40%	
33	57		CLAY	Pale to dark brown, silty with minor amount of sand. Nodules of pale green clay near base (? completely weathered bedrock fragments)	

DEPTH CORE SAMPLE	CASING Dia(mm)	CASING From(m)	CASING To(m)

REMARKS:

Water not suitable for human consumption. May be completed at later date for stock water supply.

* NOTE: 110 kl / day = 1000gals / hr.

DRILL TYPE: ROTARY
CIRCULATION: AIR
SHEET 1 OF 1

COMPLETED: 15/11/77
LOGGED BY: F.S.
DATE:

PROJECT: N.W.A.R. DRILLING PROGRAMME
NOVEMBER 1977 - JANUARY 1978

LOCATION OR COORDS:
WALTJITJATA (N.T.) El Surface m
SEC. HD. EL Ref. Point m Datum

MINES DEPARTMENT — SOUTH AUSTRALIA
ENGINEERING DIVISION

WATER WELL LOG

HOLE NO: W.J.2
UNIT / STATE NO: 4746000WW00001
DM 437/77

AQUIFER	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY kilolitres/day*	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	Analysis No:
SUMMARY:	29				Seapage		-	-	W —
	31-32	26.9	29	32	1		Airlift	1010	7010/77
	34-35	(Final)			not tested		-	1010	7011/77
	37-38		29	43	92		Airlift	995	7012/77

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia(mm)	CASING From(m)	CASING To(m)
0	1.7		SAND AND SILT	Red, fine grained quartz sand and silt.			152	0.25	43.0
1.7	6.5		GRAVEL	Pale brown, poorly sorted, gravel consists of weathered granite and diorite.					
6.5	43		CLAY AND GRAVEL	Dark red/brown, indurated, silty and sandy clay; with thin interbeds of poorly sorted, red/brown gravel.					

REMARKS:
Usable domestic supply. Full analysis available

* NOTE: 110 kl / day = 1000gals / hr.

DRILL TYPE: Rotary
CIRCULATION: Air
SHEET 1 OF 1

COMPLETED: 16/11/77
LOGGED BY: F.S.
DATE:

PROJECT: N.W.A.R. DRILLING PROGRAMME NOV. 1977-JAN. 1978

LOCATION OR COORDS: KUNTJANU (S.A.)

SEC. HD. EL Surface m EL Ref. Point m Datum

MINES DEPARTMENT — SOUTH AUSTRALIA
ENGINEERING DIVISION

WATER WELL LOG

HOLE NO: K.R. 2

UNIT / STATE NO: 4744000WW00003

DM 437/77

AQUIFER	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY kilolitres/day*	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	TOTAL DISSOLVED SOLIDS Analysis No:
SUMMARY:	16	10.65 (Final)			Seepage		-		W —
	23-24				Not tested		-	1515	7016/77
	44.5		16	45	55		AIRLIFT	1415	7017/77
	46-47		16	47	131		"	1385	7018/77

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE
0	8.0		LIMESTONE	White to pale pink, with solution cavities, and veins of white, iron-stained chalcedony.	
8.0	18.5		SILT AND CLAY	Pale to dark brown, with minor amount of coarse gravel and sand.	
18.5	44.5		CLAY	18.5-19.5 Dark brown, highly plastic 19.5-32.0 Pale brown, silty and sandy 32.0-38.0 Mottled pale grey, green, yellow and dark brown, with fragments of red laterite near base 38.0-44.5 Dark red/brown and pale grey, silty and sandy.	
44.5	47.0	Fe Fe	LATERITE	Dark red/brown and dark purple, gossanous, with coarse grains quartz	

DEPTH CORE SAMPLE	CASING Dia(mm)	CASING From(m)	CASING To(m)
	127	-0.54	47.0

REMARKS:

Usable domestic supply. Full analysis available.

* NOTE: 110 kl / day = 1000gals / hr.

DRILL TYPE: ROTARY

CIRCULATION: AIR

SHEET 1 OF 1

COMPLETED: 21/11/77

LOGGED BY: F.S.

DATE:

PROJECT: N.W.A.R. DRILLING PROGRAMME NOV. 1977 - JAN. 1978

LOCATION OR COORDS: KATA-ALA (W.A.)

SEC. HD. EL Surface m EL Ref. Point m Datum

MINES DEPARTMENT — SOUTH AUSTRALIA
ENGINEERING DIVISION

WATER WELL LOG

HOLE NO: K.L. 1

UNIT / STATE NO: 4545000/W00001

DM 437/77

AQUIFER SUMMARY:	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY kilolitres/day*	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	Analysis No:
	16 - 17.8 49 - 49.5	46.25 (FINAL)	49	78	1		AIRLIFT	- 1100	W — 7014/77

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE
0	10.8		Alluvium and Scree Material	Dark brown coarse grained sand and silt, with boulders of highly weathered pale yellow granodiorite and slightly weathered red granite	
10.8	31.0		Granite	Pale to dark red/brown, with quartz, feldspar, hornblende and ultra-mafics, fractured.	
31.0	34.0		Dolerite	Dark grey to black, highly weathered, fractured.	
34.0	78.0		Granite	Dark red/brown, fractured, with quartz, feldspar, hornblende and ultramafics.	

DEPTH CORE SAMPLE	CASING Dia(mm)	CASING From(m)	CASING To(m)
	152	-0.3	10.8

REMARKS:

Capable of providing small domestic supply. Full analysis available.

* NOTE: 110 kl / day = 1000gals / hr.

DRILL TYPE: ROTARY

CIRCULATION: AIR

SHEET 1 OF 1

COMPLETED: 25/11/77

LOGGED BY: F.S.

DATE:

PROJECT: NWAR DRILLING PROGRAMME

LOCATION OR COORDS: KATA-ALA (W.A.)

SEC. HD. EL Surface m EL Ref. Point m Datum

MINES DEPARTMENT — SOUTH AUSTRALIA
ENGINEERING DIVISION

WATER WELL LOG

HOLE NO: KL2

UNIT / STATE NO 4545000WW00002

DM 437/77

AQUIFER SUMMARY:	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY kilolitres/day*	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	Analysis No:
	52	9.50	9.5	70	5		Airlift	1050	W — FIELD TEST

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE
0	0.75		TOPSOIL	Red-brown sandy silt	
0.75	18		WEATHERED GRANITE	Angular red and grey fragments of weathered granite grading to fawn in colour.	
18	24		DOLERITE	Dark grey-green to black, fine to medium grained.	
24	70		GRANITE	Reddish brown medium grained granite containing quartz, feldspar and hornblende, fractured.	

DEPTH CORE SAMPLE	CASING Dia(mm)	CASING From(m)	CASING To(m)
	152	0	23.7

REMARKS:

DRILLER - W.J. BOYD

Serial No. 999/78

* NOTE: 110 kl / day = 1000gals / hr.

Equipped with hand pump (set at 31.70 m).

DRILL TYPE: ROTARY

CIRCULATION: AIR

SHEET 1 OF 1

COMPLETED: 23.1.78

LOGGED BY: SRB

DATE:

PROJECT: NWAR DRILLING PROGRAMME

LOCATION OR COORDS: NOV. 1977-JAN. 1978 KATA-ALA (W.A.)

SEC. HD. EL Surface m EL Ref. Point m Datum

MINES DEPARTMENT — SOUTH AUSTRALIA
ENGINEERING DIVISION

WATER WELL LOG

HOLE NO: KL3

UNIT / STATE NO 4545000WW00003

DM 437/77

AQUIFER SUMMARY:	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY kilolitres/day*	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	TOTAL DISSOLVED SOLIDS Analysis No:
	-				DRY				W —

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia(mm)	CASING From(m)	CASING To(m)
0	9		WEATHERED SILTSTONE/SHALE	Weathered pink and white shale and siltstone with minor calc frags. and alluvium near surface.					
9	24		SILTSTONE	Grey soft and slightly calcareous. Thinly laminated.					
24	33		SHALE	Dark grey-black, finely laminated hard shale, Pyrite odour.					
33	64		QUARTZITE	Pink and grey-green fine grained quartzite.					

REMARKS:

DRILLER - W.J. BOYD

Serial No. 1000/78

* NOTE: 110 kl / day = 1000gals / hr.

ABANDONED

DRILL TYPE: ROTARY

CIRCULATION: AIR

SHEET 1 OF 1

COMPLETED:

LOGGED BY: SRB.

DATE:

PROJECT: NWAR DRILLING PROGRAMME NOV. 1977-JAN. 1978

LOCATION OR COORDS: KATA-ALA (W.A)

SEC. HD. EL Surface m EL Ref. Point m Datum

MINES DEPARTMENT — SOUTH AUSTRALIA
ENGINEERING DIVISION

WATER WELL LOG

HOLE NO: KL4

UNIT / STATE NO 454500OWW00004

DM 437/77

AQUIFER SUMMARY:	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY kilolitres/day*	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	TOTAL DISSOLVED SOLIDS Analysis No:
					DRY				W —

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia(mm)	CASING From(m)	CASING To(m)
0	9		WEATHERED GRANITE	Faun, weathered fine grained granite					
9	24		GRANITE	Pink in colour, contains quartz, feldspar and hornblende Mafic content increases 21-24 m. and becoming grey in colour.					
24	45.50		DOLERITE	Dark grey to black in colour, not well fractured.					

REMARKS:

DRILLER - W.J. BOYD

Serial 1001/78

*NOTE: 110 kl / day = 1000gals / hr.

Abandoned

DRILL TYPE: ROTARY

CIRCULATION: AIR

SHEET 1 OF 1

COMPLETED: 26.1.78

LOGGED BY: SRB

DATE:

PROJECT: N.W.A.R. DRILLING PROGRAMME
NOV. 1977 - JAN. 1978
LOCATION OR COORDS: JAMESON (W.A.)

MINES DEPARTMENT — SOUTH AUSTRALIA
ENGINEERING DIVISION

WATER WELL LOG

HOLE NO: J.R. 1

UNIT / STATE NO: 4446000WW00001

DM 437/77

SEC. HD. EL Surface m EL Ref. Point m Datum

AQUIFER	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY kilolitres/day*	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	TOTAL DISSOLVED SOLIDS Analysis No:
SUMMARY:	39	27.7	40	54	50	1½hr	air lifting	1000	W— FIELD TEST

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia(mm)	CASING From(m)	CASING To(m)
0	6		Sandy clay	brown sandy clay with numerous medium to pebbly ironstone fragments			150 slotted linctex seal at 37.5m	0	45 38-45
6	39		Clay	mainly brown clay, minor ironstone gravel 36-39: 30% grey green clay, damp at 38-39					
39	42		gritty clay	grey, gritty (ironstone, irregular, broken) with large fragments of weathered ferruginous rock.					
42	58		weathered olivine gabbro	strongly weathered grey (mottled green) and white olivine gabbro					

REMARKS:

* NOTE: 110 kl / day = 1000gals / hr.

The yield was tested at 110 kl/day with the hole left open . This was reduced to 50 kl/day through slotted casing.

DRILL TYPE: Rotary-Hammer
CIRCULATION: Air
SHEET 1 OF 1

COMPLETED: 29/11/77
LOGGED BY: X.P.S.
DATE: 29/11/77

PROJECT: N.W.A.R. DRILLING PROGRAMME NOV. 1977- JAN. 1978

LOCATION OR COORDS: JAMESON (W.A.)

SEC. HD. EL Surface EL Ref. Point m m Datum

MINES DEPARTMENT — SOUTH AUSTRALIA
ENGINEERING DIVISION

WATER WELL LOG

HOLE NO: J.R. 2

UNIT / STATE NO 4446000WW00002

DM 437/77

AQUIFER	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY kilolitres/day*	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	TOTAL DISSOLVED SOLIDS Analysis No:
SUMMARY:	31 43m	- 22.8 m	44	52.6	soak 65	2hrs	air lifting	600	W — Field analysis

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE
0	31		Clay	0-6m; brown gravelly silty clay (50%) 50% fine to large fragments of magnetite-ilmenite 6-16m; as above but more clay (60-70%) 16-31: khaky gritty greasy clay, damp from 24m, grit (5-30%) consists of mainly fine to v. coarse white grey strongly weathered mildly indurated rock fragments and opaques.	16-31: strongly weathered Jameson Range Gabbro
31	43		Gritty clay	khaky, wet 30-40% fine to v. coarse grit, consisting of grey and white strongly weathered bedrock, mildly indurated.	weathered Jameson Range Gabbro
43	47		weakly weathered gabbro	broken fragments of weakly weathered feldspar/ hypersthene assemblages minor muscovite	
47	52.6		gabbro	As above, fresh, fractured Jameson Range gabbro	

DEPTH CORE SAMPLE	CASING Dia(mm)	CASING From(m)	CASING To(m)
	150 slotted	0	47
	44-47 Linotex seal at 43.5m		

REMARKS:

Productive well 4.4km southwest of settlement. To be used for gardening purposes.

* NOTE: 110 kl / day = 1000gals / hr.

DRILL TYPE: Rotary-Hammer

CIRCULATION: Air

SHEET 1 OF 1

COMPLETED: 30/11/77

LOGGED BY: XPS

DATE: 30/11/77

PROJECT: N.W.A.R. DRILLING PROGRAMME
NOV. 1977 - JAN. 1978
LOCATION OR COORDS: WANNAN (W.A.)

SEC. HD. EL Surface m EL Ref. Point m Datum

MINES DEPARTMENT — SOUTH AUSTRALIA
ENGINEERING DIVISION

WATER WELL LOG

HOLE NO: W.N. 1
UNIT / STATE NO 4447000WW00001
DM 437/77

AQUIFER	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY kilolitres/day*	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	TOTAL DISSOLVED SOLIDS Analysis No:
SUMMARY:	11	9	11	20	16	1	AIRLIFT	4500	W — Field Test

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia(mm)	CASING From(m)	CASING To(m)
0	3		Weathered GRANITE	Brown, medium to coarse fragments of weathered granitic material - up to 10% brown silty sand fraction	Middle (?) Proterozoic		150	0	5.8
3	18		Biotite GRANITE	Weakly weathered biotite granite, thin quartz reef at 11 m. 15-16m. More fractured and weathered - increase in water supply.	"				
18	20		Mica GNEISS	30-40% coarse mica gneiss fragments	"				

REMARKS:

* NOTE: 110 kl / day = 1000gals / hr.

DRILL TYPE: ROTARY-HAMMER
CIRCULATION: AIR
SHEET 1 OF 1

COMPLETED: 3.12.77
LOGGED BY: X.P.S.
DATE: 3.12.77

PROJECT: N.W.A.R. DRILLING PROGRAMME NOV. 1977-JAN. 1978

LOCATION OR COORDS: WANNAN (W.A.)

SEC. HD. EL Surface m EL Ref. Point m Datum

MINES DEPARTMENT — SOUTH AUSTRALIA
ENGINEERING DIVISION

WATER WELL LOG

HOLE NO: W.N. 2

UNIT / STATE NO 4447000WW00002

DM 437/77

AQUIFER SUMMARY:	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY kilolitres/day*	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	TOTAL DISSOLVED SOLIDS Analysis No:
	-				DRY				W —

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia (mm)	CASING From (m)	CASING To (m)
0	2		CALCRETE	Calcrete	Middle (?) Proterozoic				
2	6		SCHIST	Weathered to fresh mica schist.					

REMARKS:

Unstable dry hole, abandoned at 6m. Backfilled

* NOTE: 110 kl / day = 1000gals / hr.

DRILL TYPE: ROTARY-HAMMER

CIRCULATION: AIR

SHEET 1 OF 1

COMPLETED: 2/12/77

LOGGED BY: X.P.S.

DATE: 2/12/77

PROJECT: N.W.A.R. DRILLING PROGRAMME NOV. 1977- JAN. 1978

LOCATION OR COORDS: PIPALYATJARA (S.A.)

SEC. HD. El. Ref. Point m Datum

MINES DEPARTMENT — SOUTH AUSTRALIA
ENGINEERING DIVISION

WATER WELL LOG

HOLE NO: MD 8B

UNIT / STATE NO 4745000WW00077

DM 437/77

AQUIFER SUMMARY:	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY kilolitres/day*	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	TOTAL DISSOLVED SOLIDS Analysis No:
	14.5	11.5	11	15	27	1	Air lifting	600	W — Field analysis

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia(mm)	CASING From(m)	CASING To(m)
0	3		Silty to gravelly clay	brown, up to 60% rounded, coarse to pebbly rock fragments			125 slotted 11.6-15.6 gravel packed.	0	15.6
3	9		alluvial gravel	coarse to pebbly, rounded rock fragments; 6-9 m about 30-50% limy off-white siliceous duricrust					
9	22.5		siliceous duricrust	80% of off-white dolomitic and siliceous ? duricrust 20% dark grey igneous rock fragments mainly mildly weathered igneous rock fragments, coarse to pebbly, rounded to broken, irregular, feldspar rich, dark grey, medium grained, Minor fragments of dark grey, v. fine grained rock fragments. Up to 20% brown jasper fragments.					

REMARKS:

* NOTE: 110 kl / day = 1000gals / hr.

Well drilled to 22.5m and tested at 44 kl/day, but casing stuck at 15.6m.
Final yeild reduced to 27 kl/day
Well MD8A, 5m East of MD8B, was abandoned due to unstability of hole

DRILL TYPE: Rotary-hammer

CIRCULATION: Air

SHEET 1 OF 1

COMPLETED: 8/12/77

LOGGED BY: X.P.S.

DATE: 8/12/77

PROJECT: NWAR DRILLING PROGRAMME

MINES DEPARTMENT — SOUTH AUSTRALIA
ENGINEERING DIVISION

WATER WELL LOG

HOLE NO: A.P. 1

LOCATION OR COORDS: ANAMARA PITT (W.A.)

UNIT / STATE NO: 6450000WW00001

EL Surface m

SEC. HD. EL Ref. Point m Datum

DM 437/77

AQUIFER SUMMARY:	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY kilolitres/day*	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	TOTAL DISSOLVED SOLIDS Analysis No:
	-				DRY				W —

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia(mm)	CASING From(m)	CASING To(m)
0	6		SILTY SAND	Light brown silty sand containing alluvial pebbles of calcrete and gabbro					
6	51		GABBRO	Soft, weathered gabbro to 12m. Gabbro dk. grey-green containing hypersthene and plagioclase. Minor dolerite at depth.					

REMARKS:

DRILLER - W.J. BOYD
Serial No. 1002/78

Abandoned. Backfilled.

* NOTE: 110 kl / day = 1000gals / hr.

DRILL TYPE: Rotary

CIRCULATION: Air

SHEET 1 OF 1

COMPLETED: 28/1/78

LOGGED BY: SRB

DATE:

APPENDIX II

WATER ANALYSES

WATER ANALYSIS REPORT

SAMPLE No. W7021/77 JOB No. 2142-78

CHEMICAL COMPOSITION

		MILLIGRAMS PER LITRE mg/ℓ	MILLEQUIVS. PER LITRE me/ℓ
CATIONS			
CALCIUM	(Ca)	18	
MAGNESIUM	(Mg)	16	
SODIUM	(Na)	80	
POTASSIUM	(K)	10	
IRON	(Fe)		
ANIONS			
HYDROXIDE	(OH)		
CARBONATE	(CO_3)		
BICARBONATE	(HCO_3)	25	
SULPHATE	(SO_4)	40	
CHLORIDE	(Cl)	157	
FLUORIDE	(F)		
NITRATE	(NO_3)	<1	
PHOSPHATE	(PO_4)		
TOTALS AND BALANCE			
CATIONS	(me/ℓ)	DIFF =	
ANIONS	(me/ℓ)	SUM =	

DIFF 100 / SUM =

DERIVED AND OTHER DATA

CONDUCTIVITY (E.C.) 724
MICRO-S/cm AT 25 DEG.C

TOTAL DISSOLVED SOLIDS	MILLIGRAMS PER LITRE mg/ℓ
A. BASED ON E.C.	
B. CALCULATED (HCO_3=CO_3)	334
C. RESIDUE ON EVAP. AT 180 DEG.C	

TOTAL HARDNESS AS $CaCO_3$	111
CARBONATE HARDNESS AS $CaCO_3$	21
NON-CARBONATE HARDNESS AS $CaCO_3$	90
TOTAL ALKALINITY AS $CaCO_3$	21
FREE CARBON DIOXIDE (CO_2)	
SUSPENDED SOLIDS	
SILICA (SiO_2)	
BORON (B)	

	UNITS
REACTION - pH	7.2
TURBIDITY (JACKSON)	
COLOUR (HAZEN)	

SODIUM TO TOTAL CATION RATIO(me/ℓ) 58.5%

NAME -
ADDRESS
DATE COLLECTED
SAMPLE COLLECTED BY:

FIELD TEMP. °C
FIELD pH @ °C
FIELD COND. µ-S/cm

OBS. No.
HOLE No. IND.19
D.M. No.

WATER ANALYSIS REPORT

SAMPLE No. W7009/77 JOB No. 2142-78

CHEMICAL COMPOSITION

		MILLIGRAMS PER LITRE mg/ℓ	MILLEQUIVS. PER LITRE me/ℓ
CATIONS			
CALCIUM	(Ca)	303	
MAGNESIUM	(Mg)	190	
SODIUM	(Na)	1332	
POTASSIUM	(K)	26	
IRON	(Fe)		
ANIONS			
HYDROXIDE	(OH)		
CARBONATE	(CO_3)		
BICARBONATE	(HCO_3)	339	
SULPHATE	(SO_4)	1123	
CHLORIDE	(Cl)	2170	
FLUORIDE	(F)		
NITRATE	(NO_3)	22	
PHOSPHATE	(PO_4)		
TOTALS AND BALANCE			
CATIONS	(me/ℓ)	DIFF =	
ANIONS	(me/ℓ)	SUM =	

$\frac{\text{DIFF } 100}{\text{SUM}}$ =

DERIVED AND OTHER DATA

CONDUCTIVITY (E.C.) 8159 MICRO-S/cm AT 25 DEG.C

	MILLIGRAMS PER LITRE mg/ℓ
TOTAL DISSOLVED SOLIDS	
A. BASED ON E.C.	5332
B. CALCULATED (HCO_3=CO_3)	
C. RESIDUE ON EVAP. AT 180 DEG.C	
TOTAL HARDNESS AS $CaCO_3$	1538
CARBONATE HARDNESS AS $CaCO_3$	278
NON-CARBONATE HARDNESS AS $CaCO_3$	1261
TOTAL ALKALINITY AS $CaCO_3$	278
FREE CARBON DIOXIDE (CO_2)	
SUSPENDED SOLIDS	
SILICA (SiO_2)	
BORON (B)	

	UNITS
REACTION - pH	8.0
TURBIDITY (JACKSON)	
COLOUR (HAZEN)	

SODIUM TO TOTAL CATION RATIO(me/ℓ) 64.7%

NAME -
ADDRESS
DATE COLLECTED
SAMPLE COLLECTED BY:

FIELD TEMP. °C
FIELD pH @ °C
FIELD COND. µ-S/cm

OBS. No.
HOLE No. W.J.1
D.M. No.

WATER ANALYSIS REPORT

SAMPLE No. W.259/78 JOB No. 2604-78

CHEMICAL COMPOSITION

		MILLIGRAMS PER LITRE mg/ℓ	MILLEQUIVS. PER LITRE me/ℓ
CATIONS			
CALCIUM	(Ca)	98	
MAGNESIUM	(Mg)	82	
SODIUM	(Na)	166	
POTASSIUM	(K)	22	
IRON	(Fe)		
ANIONS			
HYDROXIDE	(OH)		
CARBONATE	(CO_3)		
BICARBONATE	(HCO_3)	478	
SULPHATE	(SO_4)	102	
CHLORIDE	(Cl)	328	
FLUORIDE	(F)		
NITRATE	(NO_3)	6	
PHOSPHATE	(PO_4)		
TOTALS AND BALANCE			
CATIONS	(me/ℓ)	DIFF =	
ANIONS	(me/ℓ)	SUM =	

DIFF 100 / SUM =

DERIVED AND OTHER DATA

CONDUCTIVITY (E.C.) 1905 MICRO-S/cm AT 25 DEG.C

	MILLIGRAMS PER LITRE mg/ℓ
TOTAL DISSOLVED SOLIDS	
A. BASED ON E.C.	1040
B. CALCULATED (HCO_3=CO_3)	
C. RESIDUE ON EVAP. AT 180 DEG.C	
TOTAL HARDNESS AS $CaCO_3$	582
CARBONATE HARDNESS AS $CaCO_3$	392
NON-CARBONATE HARDNESS AS $CaCO_3$	190
TOTAL ALKALINITY AS $CaCO_3$	392
FREE CARBON DIOXIDE (CO_2)	
SUSPENDED SOLIDS	
SILICA (SiO_2)	
BORON (B)	

	UNITS
REACTION - pH	7.9
TURBIDITY (JACKSON)	
COLOUR (HAZEN)	
SODIUM TO TOTAL CATION RATIO(me/ℓ)	37.20%

NAME -
ADDRESS
DATE COLLECTED
SAMPLE COLLECTED BY:

FIELD TEMP. °C
FIELD pH @ °C
FIELD COND. µ-S/cm

OBS. No.
HOLE No. W.J.2
D.M. No.

WATER ANALYSIS REPORT

SAMPLE No. W.7019/77 JOB No. 2142-78

CHEMICAL COMPOSITION

		MILLIGRAMS PER LITRE mg/ℓ	MILLEQUIVS. PER LITRE me/ℓ
CATIONS			
CALCIUM	(Ca)	116	
MAGNESIUM	(Mg)	80	
SODIUM	(Na)	285	
POTASSIUM	(K)	47	
IRON	(Fe)		
ANIONS			
HYDROXIDE	(OH)		
CARBONATE	(CO_3)		
BICARBONATE	(HCO_3)	364	
SULPHATE	(SO_4)	249	
CHLORIDE	(Cl)	480	
FLUORIDE	(F)		
NITRATE	(NO_3)	35	
PHOSPHATE	(PO_4)		

TOTALS AND BALANCE

CATIONS (me/ℓ) DIFF =
ANIONS (me/ℓ) SUM =

DIFF 100 / SUM =

DERIVED AND OTHER DATA

CONDUCTIVITY (E.C.) 2618
MICRO-S/cm AT 25 DEG.C

	MILLIGRAMS PER LITRE mg/ℓ
TOTAL DISSOLVED SOLIDS	
A. BASED ON E.C.	1471
B. CALCULATED (HCO_3=CO_3)	
C. RESIDUE ON EVAP. AT 180 DEG.C	
TOTAL HARDNESS AS $CaCO_3$	619
CARBONATE HARDNESS AS $CaCO_3$	298
NON-CARBONATE HARDNESS AS $CaCO_3$	321
TOTAL ALKALINITY AS $CaCO_3$	298
FREE CARBON DIOXIDE (CO_2)	
SUSPENDED SOLIDS	
SILICA (SiO_2)	
BORON (B)	

	UNITS
REACTION - pH	8.1
TURBIDITY (JACKSON)	
COLOUR (HAZEN)	
SODIUM TO TOTAL CATION RATIO(me/ℓ)	47.7%

NAME -
ADDRESS
DATE COLLECTED
SAMPLE COLLECTED BY:

FIELD TEMP. °C
FIELD pH @ °C
FIELD COND. µ-S/cm

OBS. No.
HOLE No. K.R.2
D.M. No.

WATER ANALYSIS REPORT

SAMPLE No. W.7015/77 JOB No. 2230-78

CHEMICAL COMPOSITION

		MILLIGRAMS PER LITRE mg/ℓ	MILLEQUIVS. PER LITRE me/ℓ
CATIONS			
CALCIUM	(Ca)	33	
MAGNESIUM	(Mg)	26	
SODIUM	(Na)	389	
POTASSIUM	(K)	55	
IRON	(Fe)		
ANIONS			
HYDROXIDE	(OH)		
CARBONATE	(CO_3)	12	
BICARBONATE	(HCO_3)	409	
SULPHATE	(SO_4)	186	
CHLORIDE	(Cl)	391	
FLUORIDE	(F)		
NITRATE	(NO_3)	20	
PHOSPHATE	(PO_4)		
TOTALS AND BALANCE			
CATIONS	(me/ℓ)	DIFF =	
ANIONS	(me/ℓ)	SUM =	

$\frac{\text{DIFF}}{\text{SUM}} \times 100 =$

DERIVED AND OTHER DATA

CONDUCTIVITY (E.C.) 2219 MICRO-S/cm AT 25 DEG.C

	MILLIGRAMS PER LITRE mg/ℓ
TOTAL DISSOLVED SOLIDS	
A. BASED ON E.C.	1313
B. CALCULATED (HCO_3=CO_3)	
C. RESIDUE ON EVAP. AT 180 DEG.C	
TOTAL HARDNESS AS $CaCO_3$	189
CARBONATE HARDNESS AS $CaCO_3$	189
NON-CARBONATE HARDNESS AS $CaCO_3$	< 1
TOTAL ALKALINITY AS $CaCO_3$	356
FREE CARBON DIOXIDE (CO_2)	
SUSPENDED SOLIDS	
SILICA (SiO_2)	
BORON (B)	

	UNITS
REACTION - pH	8.4
TURBIDITY (JACKSON)	
COLOUR (HAZEN)	
SODIUM TO TOTAL CATION RATIO(me/ℓ)	76.5%

NAME -
ADDRESS
DATE COLLECTED
SAMPLE COLLECTED BY:

FIELD TEMP. °C
FIELD pH @ °C
FIELD COND. µ-S/cm

OBS. No.
HOLE No. K.L.1
D.M. No.

WATER ANALYSIS REPORT

SAMPLE No. W 960/78 JOB No. 3333-78

CHEMICAL COMPOSITION

		MILLIGRAMS PER LITRE mg/ℓ	MILLEQUIVS. PER LITRE me/ℓ
CATIONS			
CALCIUM	(Ca)	22	
MAGNESIUM	(Mg)	21	
SODIUM	(Na)	295	
POTASSIUM	(K)	42	
IRON	(Fe)	0.18	
ANIONS			
HYDROXIDE	(OH)		
CARBONATE	(CO_3)	6	
BICARBONATE	(HCO_3)	433	
SULPHATE	(SO_4)	93	
CHLORIDE	(Cl)	275	
FLUORIDE	(F)	4.1	
NITRATE	(NO_3)	<1	
PHOSPHATE	(PO_4)	14.7	
TOTALS AND BALANCE			
CATIONS	(me/ℓ)	DIFF =	
ANIONS	(me/ℓ)	SUM =	

DIFF 100 / SUM = 2.7%

DERIVED AND OTHER DATA

CONDUCTIVITY (E.C.) MICRO-S/cm AT 25 DEG.C	1715	
TOTAL DISSOLVED SOLIDS		MILLIGRAMS PER LITRE mg/ℓ
A. BASED ON E.C.		986
B. CALCULATED (HCO_3=CO_3)		
C. RESIDUE ON EVAP. AT 180 DEG.C		
TOTAL HARDNESS AS $CaCO_3$		142
CARBONATE HARDNESS AS $CaCO_3$		142
NON-CARBONATE HARDNESS AS $CaCO_3$		<1
TOTAL ALKALINITY AS $CaCO_3$		365
FREE CARBON DIOXIDE (CO_2)		
SUSPENDED SOLIDS		
SILICA (SiO_2)		
BORON (B)		
		UNITS
REACTION - pH		8.3
TURBIDITY (JACKSON)		
COLOUR (HAZEN)		
SODIUM TO TOTAL CATION RATIO(me/ℓ)		76.7%

NAME -
ADDRESS
DATE COLLECTED
SAMPLE COLLECTED BY:

FIELD TEMP. °C
FIELD pH @ °C
FIELD COND. µ-S/cm

OBS. No.
HOLE No. K.L. 2
D.M. No.

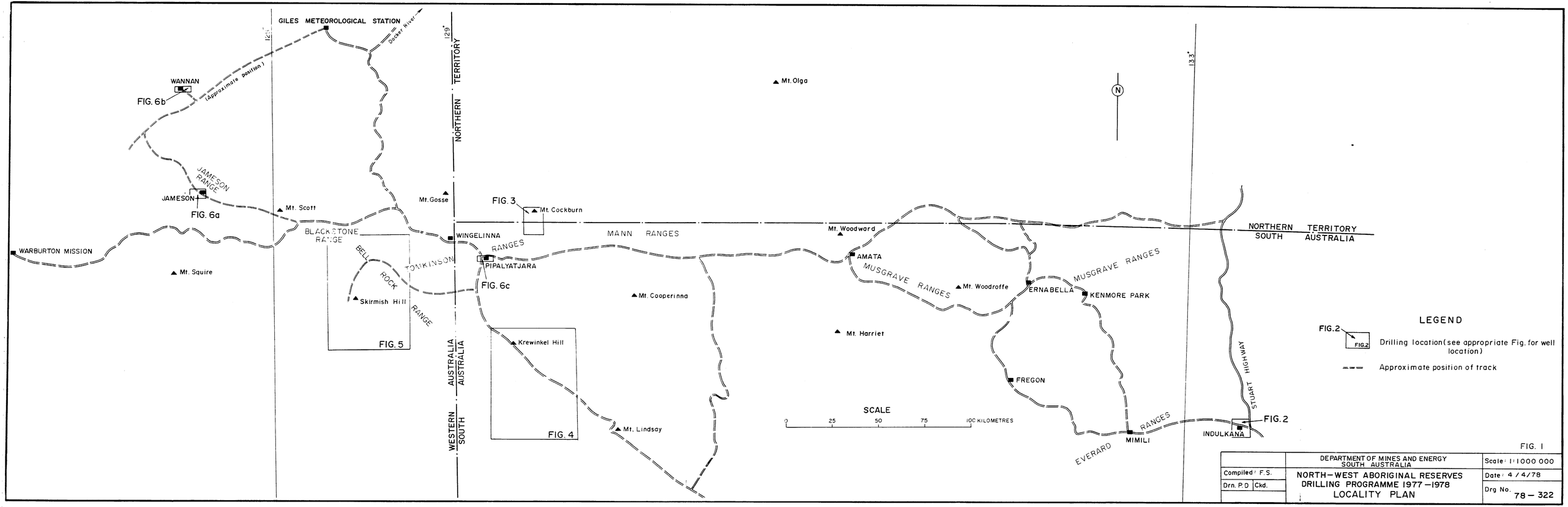


FIG. 1

	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	Scale: 1:1 000 000
Compiled: F.S.	NORTH-WEST ABORIGINAL RESERVES DRILLING PROGRAMME 1977-1978	Date: 4/4/78
Drn. P.D. Ckd.	LOCALITY PLAN	Drg No. 78-322

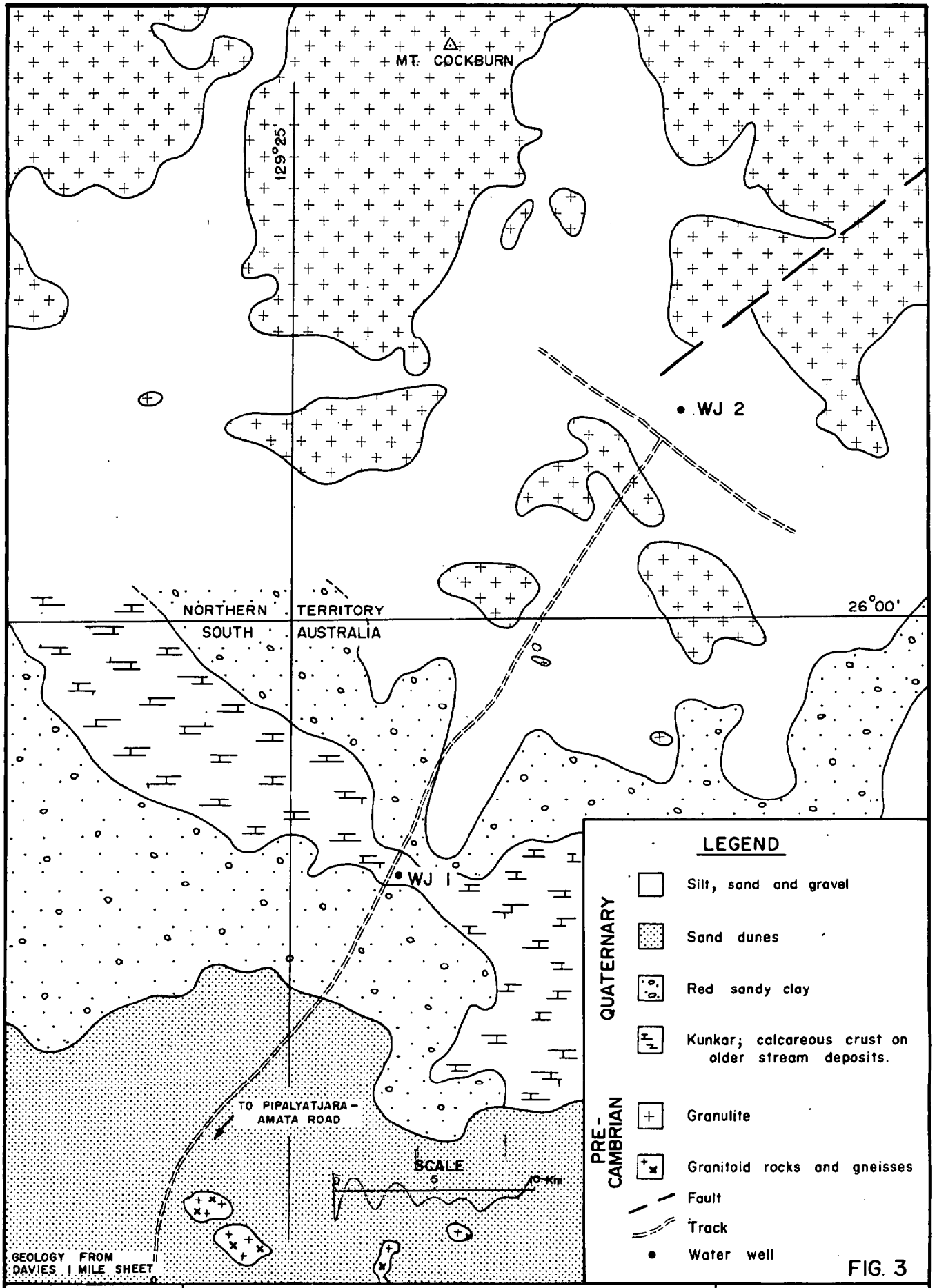


FIG. 3

	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE: 1 : 63,360
COMPILED: F.S.	NORTH - WEST ABORIGINAL RESERVES DRILLING PROGRAMME 1977 - 1978	DATE: APRIL 1978
DRN. M.R.	WALTJITJATA AREA	DRG. No. S 13335

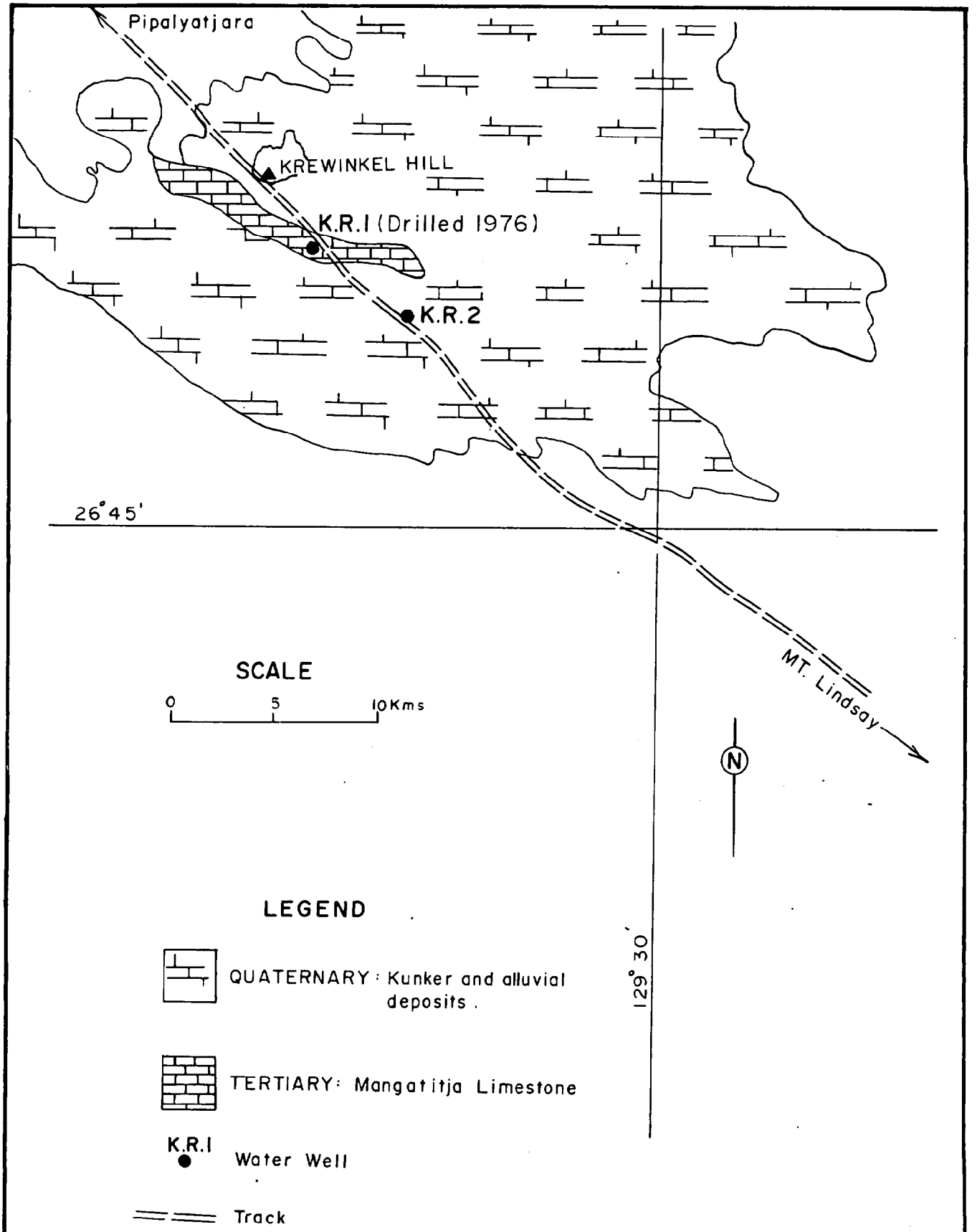


FIG. 4

	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE: 1:250000
COMPILED: F.S	NORTH—WEST ABORIGINAL RESERVES DRILLING PROGRAMME 1977-1978 KUNTJANU AREA	DATE: 4/4/78
DRN: P.D CKD:		PLAN NUMBER S 13336

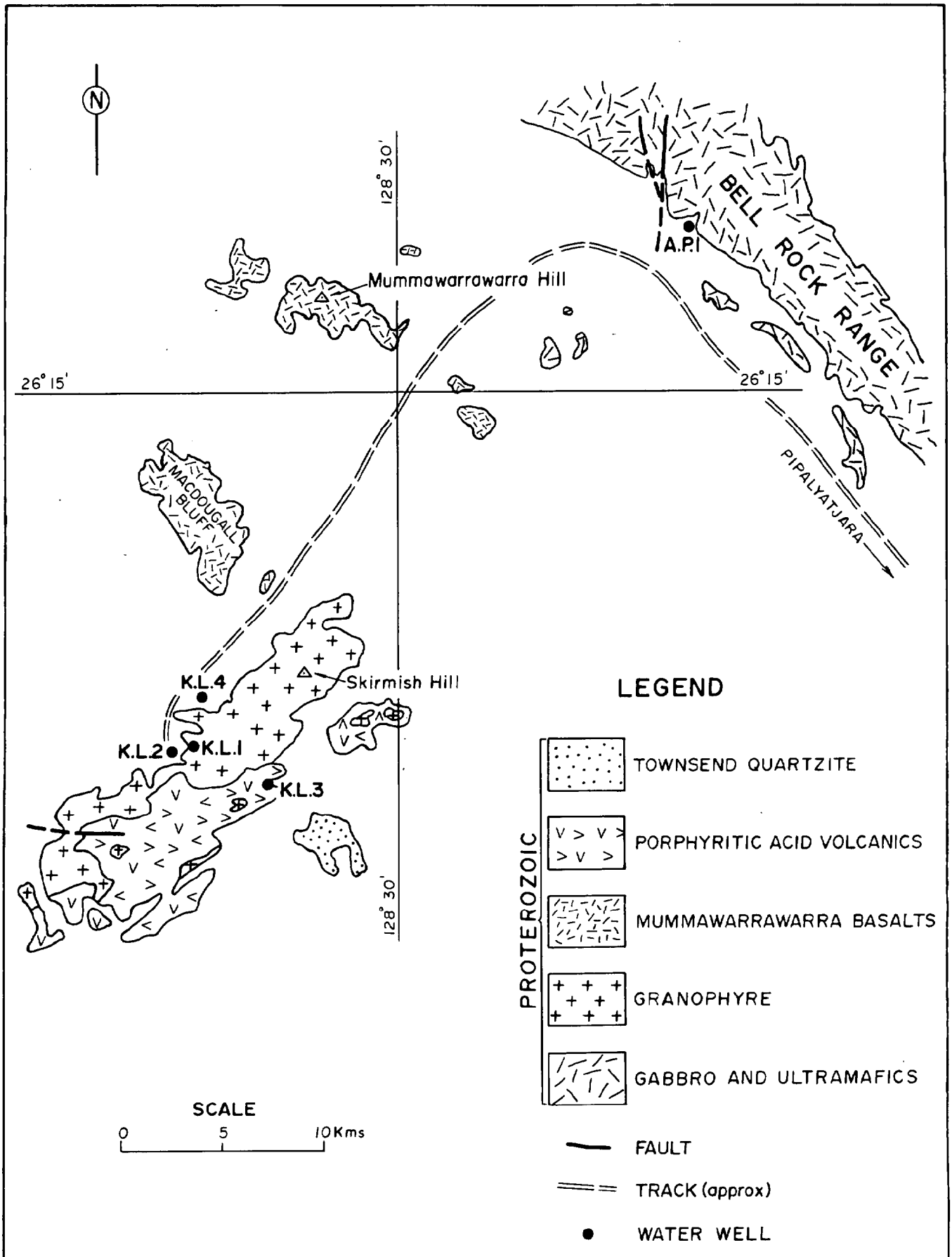


FIG. 5

	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	Scale: 1: 250 000
Compiled : F. S	NORTH-WEST ABORIGINAL RESERVES DRILLING PROGRAMME 1977-1978 KATA-ALA AND ANAMARA PITI AREAS	Date : 3 / 4 / 78
Drn. P.D | Ckd.		Drg. No. S13337

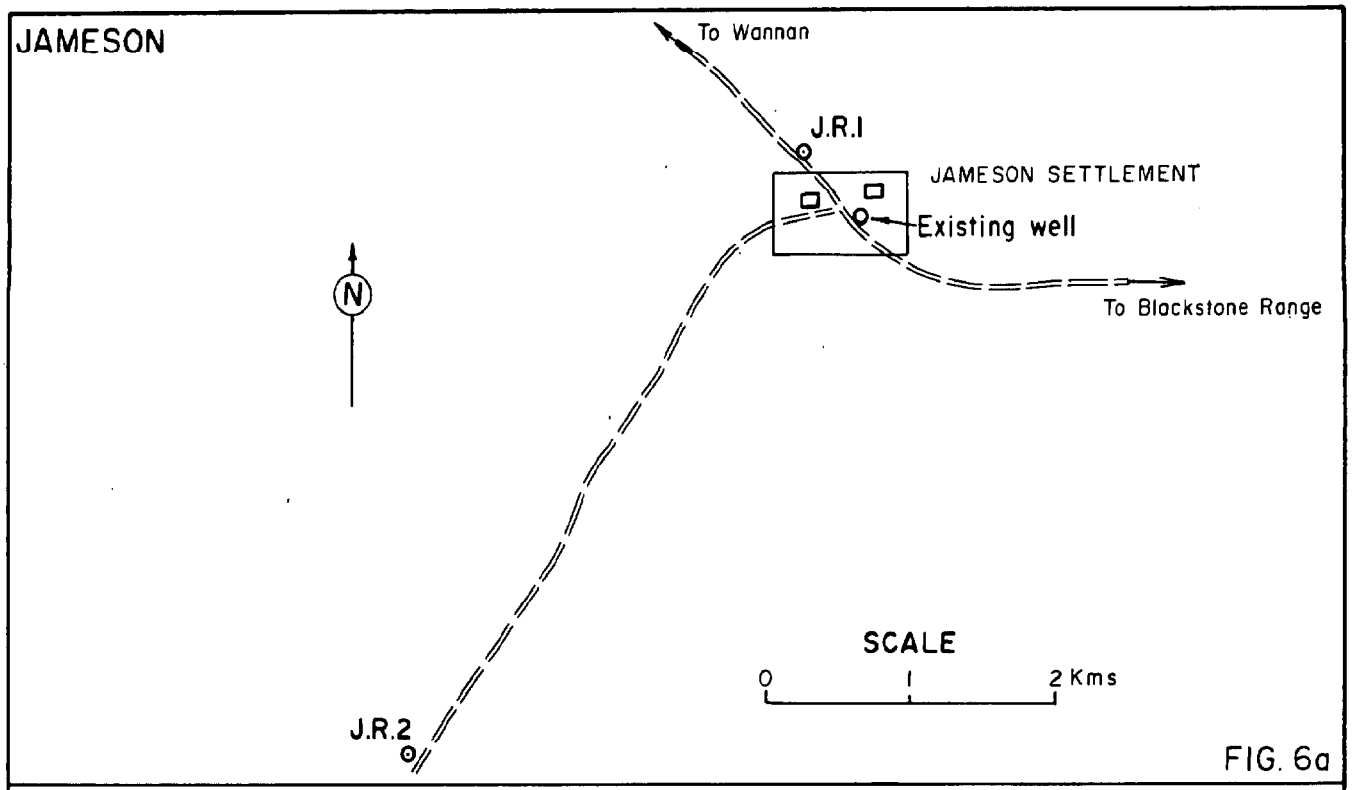


FIG. 6a

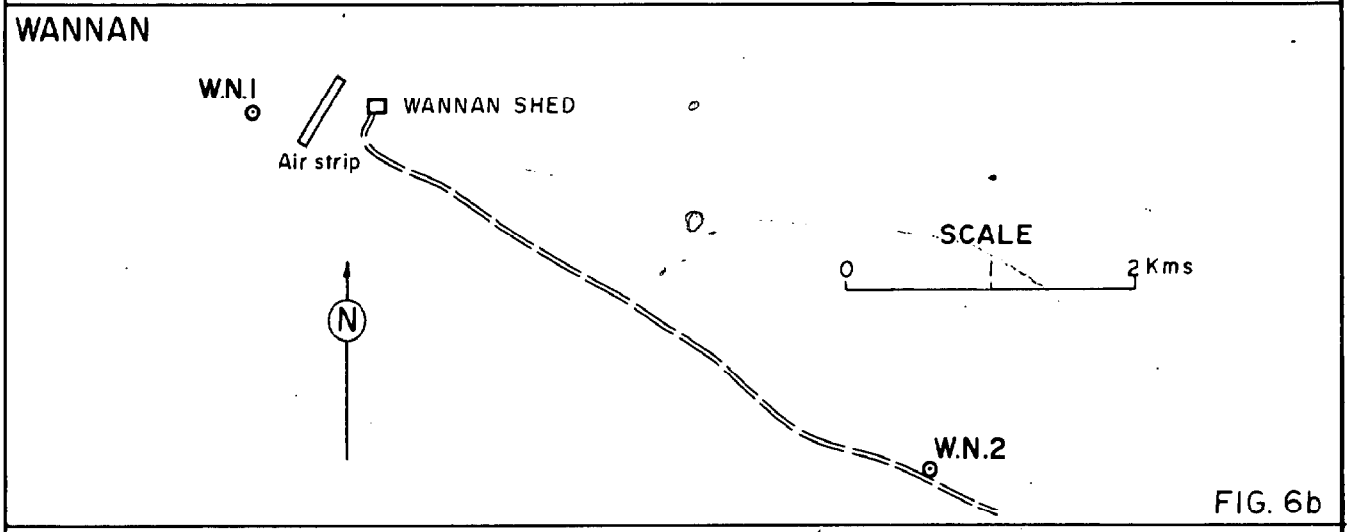
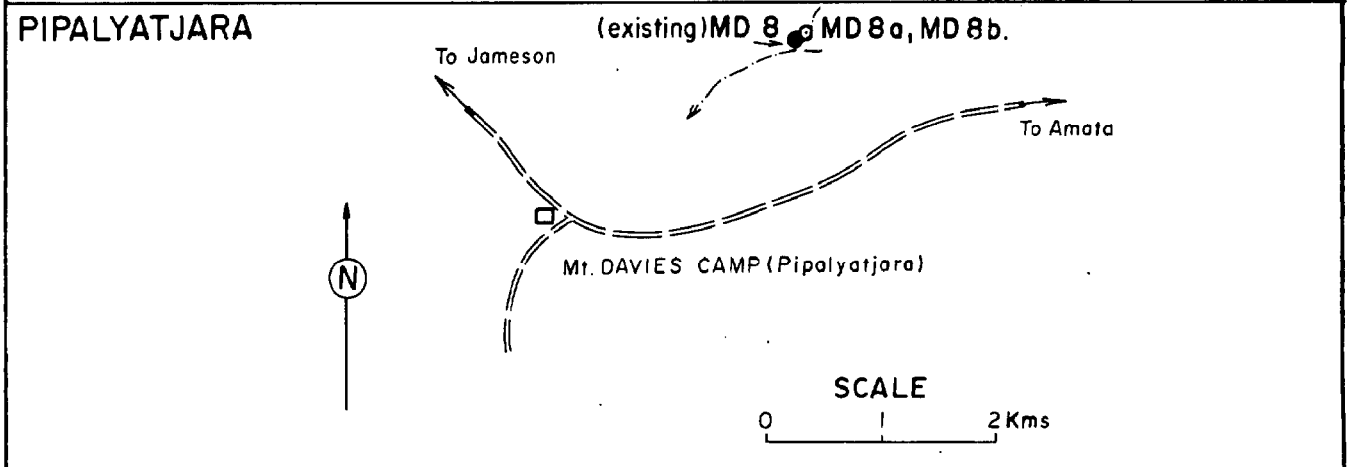


FIG. 6b



⊙ Wells drilled by Dept. of Mines in 1977

FIG. 6c

	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	Scale : As shown
Compiled: X.S	NORTH-WEST ABORIGINAL RESERVES	Date: 3/4/78
Drn. P.D | Ckd.	DRILLING PROGRAMME 1977—1978 JAMESON, WANNAN, PIPALYATJARA WELL LOCATION PLAN	Drg No. S13338