EXPLORATORY DRILLING FOR COAL, LAKE WEATHERSTONE

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South Australia ——

Petroleum Geology Section copy.

DEPARTMENT OF MINES
SOUTH AUSTRALIA

EXPLORATORY DRILLING FOR COAL, LAKE WEATHERSTONE

by

G.M. MEYER

Rept.Bk.No. 74/228
G.S. No. 5539
D.M. No. ~~136/73~~ 135/75

19th December, 1974.

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DEPARTMENT OF MINES
SOUTH AUSTRALIA

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ABSTRACT

Three shallow holes were drilled on two negative Bouguer gravity anomalies, east and south of Lake Weatherstone. This concludes a programme designed to find Triassic, carbonaceous sediments similar to those containing economic coal seams near Leigh Creek.

Drilling shows that the anomalies are caused by low density, highly weathered, Adelaidean rocks and Paleocene-Eocene (?) Eyre Formation. The weathered zone is part of the Eocene-Pliocene duricrust profile. Recognised overlying the Tertiary sediments were Pleistocene Avondale Clay, Telford Gravel or "Conglomerate near Lyndhurst", and possible Pooraka and Arrowie formations.

No carbonaceous sediments were found, and it is concluded that further exploration would not reveal Triassic coal bearing sediments in those anomalies examined, nor in other undrilled anomalies.

INTRODUCTION

The results of a small drilling programme designed to ascertain the coal potential in an area near Lake Weatherstone (Fig. 1) are presented in this report. The survey was conducted for the Electricity Trust of South Australia. Hiern (1973) originally considered the area as a possible locality for the accumulation of Triassic coal-bearing sediments similar to those near Leigh Creek. The exploration programme was based on drilling exploration holes on two negative Bouguer gravity anomalies interpreted as basement

depressions filled with low density Triassic sediments.

Lake Weatherstone is about 50 kilometres northwest of Leigh Creek (Fig. 1) and lies on a flat plain terminated to the west by an up-faulted block of Precambrian basement.

Considerations by Carr (in prep.) of gravity measurements conducted in the vicinity of Lake Weatherstone by Mumme and Moorcroft (1961), led to the conclusion that some areas of possible sediment accumulation were present. A bouguer gravity anomaly map showed the location of these areas, interpreted as basement depressions containing low density Triassic sediments.

For economic reasons, only features which could contain accumulations of coal larger than 3×10^6 tonnes were considered, based on a seam thickness of 2 metres. An anomaly, lying parallel to the Norwest Fault, near Termination Hill (Fig. 1) was not drilled as it is almost certainly caused by low density alluvial outwash material. Bouguer gravity anomalies of significant size are located east and south of the lake.

The gravity survey by Mumme and Moorcroft was an extension of numerous previous gravity surveys conducted east of Lake Weatherstone. These surveys found several anomalies similar in shape and magnitude to the Triassic coal-bearing Basins (North Field lobes C and D) north of Leigh Creek (Pegam, 1962). Hillwood (1964) drilled 12 wells on these anomalies but found only low density (?) Tertiary sediments and highly weathered Adelaidean basement rocks.

WELL HISTORIES

General Data

Well names and numbers:

Lake Weatherstone (L.W.) No. 1, No. 2, No. 3, and No. 3A.

Locations:

L.W. NO. 1: latitude: 30°21.0'
longitude: 138°9.8'

The well is located approximately 8 kilometres south of Lake Weatherstone.

L.W. NO. 2: latitude: 30°16.2'
longitude: 138°9.3'

The well is located approximately 2.5 kilometres east of Lake Weatherstone.

L.W. No. 3: latitude: 30°21.6'
longitude: 138°9.4'

The well is located approximately 0.8 kilometres west of L.W. No. 1.

L.W. NO. 3A: latitude: 30°21.6'
longitude: 138°9.4'

The well is located 1 metre south of L.W. No. 3.

Map References:

1:250 000 sheet: COPLEY

1: 63 360 sheet: Myrtle

Details of Exploration Licence:

The wells were drilled within E.L. 136 held by the Electricity Trust of South Australia.

Elevations:

No survey has been carried out to determine elevations.

	L.W. No.1	L.W.No.2	L.W.No.3	L.W.No.3A
Total depth (metres)	19.00	46.00	12.75	38.18
Date drilling commenced	19.9.74	20.9.74	23.9.74	23.9.74
Date drilling completed and wells abandoned	20.9.74	21.9.74	23.9.74	24.9.74
Drilling time to T.D. (days)	1.0	1.0	0.5	1.0

Status

All holes were abandoned.

Drilling Data

Name and address of drilling contractor:

S.A. Department of Mines Mechanical and Drilling Branch, Dalgleish Street, Thebarton, S.A. 5031.

Drilling Rig:

Make:	Mayhew 1000
Type:	Rotary Drill
Rated capacity:	1000ft. with 2-3/8" drill pipe
Motor:	Cummins Diesel C-160
Power rating:	154 B.H.P. at 2500 R.P.M.

Mast:

Make:	Mayhew 1000
Type:	21 ft. hydraulic raise
Rated capacity:	35 000 lbs.

Pump:

Make:	Gardner-Denver
Type:	FGFXG

Size:	5" x 6"
Motor:	Cummins Diesel C-160
Power rating:	42.5 B.H.P.

Hole Sizes:

All holes were 4½" from 0 m. to T.D.

Bit Record:

No. of bits used	Size	Make
2	4½"	Varel
2	4½"	Skid-Morcrook
2	4-1/8"	S.A.D.M. tungsten carbide core bit.

Drilling fluids:

All wells were drilled with water.

Water Supply:

Water for L.W. No. 1, No. 3 and No. 3A was obtained from Yadlakina Well and for L.W. No. 2, from Termination dam. Camp water was obtained from Leigh Creek.

Lithologic Sampling

Coring:

A total of 32.17 metres core was cut using 3-metre HQ-triple tube wire line core barrels and tungsten carbide core bits manufactured by S.A. Department of Mines.

Well No.	Core interval No.	Depth From	Depth To	Length Cored (m)	Recovery (m)	Recovery (%)	Core Size (in.)
2	1	24.23	46.00	21.77	3.00	14	2-1/4
3	1	10.00	12.75	2.75	2.18	79	2-1/4
3A	1	19.56	22.63	3.07	1.89	62	2-1/4
	2	33.60	38.18	4.58	2.30	50	2-1/4
TOTALS				32.17	9.37	29	

Ditch Cuttings:

One sample was collected for every 6 m. interval (except cored intervals) from surface to total depth. Washed samples were examined under a binocular microscope to determine lithology of cuttings. Both ditch cuttings and cores are stored at the S.A. Department of Mines Core Laboratory, Thebarton.

Logging and Surveys

No electrical or radiation logs were run.

Penetration rate:

The penetration rate was not recorded.

Petrographic analysis:

Amdel Laboratories carried out petrographic analyses on three samples of core material (see Appendix 3).

PHYSIOGRAPHY AND ACCESS

The area of study is accessible along graded tracks easily traversed by 2-wheel-drive vehicles. The climate is arid with average rainfall less than 15 cm. per annum. Vegetation consists of mainly sparse native grasses, salt

bush and other low bushes, with occasional small trees lining river beds.

The topography is a flat plain abruptly terminated to the west by an up-faulted block of Precambrian basement. The plains are covered with northeasterly trending, parallel, low, sand ridges. Surface drainage is towards Lake Weatherstone, and other salt pans in the locality.

REGIONAL GEOLOGY

Basically, the N.W. Flinders Ranges including the area of study, is represented by Adelaidean rocks of the Burra and Umberatana groups interspersed with cover rocks of Tertiary and Quaternary age. This section is a brief review of the geology of this area. Stratigraphy has been described in detail by Parkin (1953), Johns (1958), Coats (1973), and Wopfner et al. (1974).

Stratigraphy

Adelaidean

1. Burra Group: The oldest unit is the Copley Quartzite which consists of resistant, massive feldspathic quartzites and forms the highest relief. This is conformably overlain by a sequence of dolomites, slates, and quartzites of the Skillogalee Dolomite which is overlain by siltstones and sandstones of the Myrtle Springs Formation.

2. Umberatana Group: This group is represented southeast of Lake Weatherstone where it comprises a sequence of flaggy, silty shales of the Tapley Hill Formation with a basal un-

named quartzitic boulder tillite. These are overlain by dolomites and limestones of the Balcanoona Formation and in turn by flaggy siltstones and shales of the Angepena Formation and overlying Amberoona Formation.

Triassic

Late Triassic sediments consisting of fresh water carbonaceous shales, sandstones, and semi-bituminous coal seams occur in intramontane basins within Adelaidean rocks near Leigh Creek.

(?) Jurassic

Sediments of (?) Jurassic age were found at Tom Hill (approximately 10 kilometres north of Lake Weatherstone). They comprise buff to grey clays with minor ironstones. The presence of (?) Jurassic sediments considerably boosted the coal potential of the Lake Weatherstone area as Jurassic sediments overlie coal-bearing Triassic sediments of the Copley Basin, near Leigh Creek.

Tertiary

The Tertiary in this area is represented by deposition in the Great Artesian Basin and the Pirie-Torrens Basin although some Tertiary sediments extend into the Flinders Ranges.

The earliest Tertiary sediments in the Great Artesian Basin are Paleocene - Eocene fluviatile sands and gravels of the Eyre Formation (Wopfner et al., 1974). A typical section cropping out at Reedy Springs (approximately 150 kilometres NE of Lake Weatherstone) consists of sub-mature to mature quartz sandstone with interbeds of siltstone.

Towards the end of the Eocene, extending into the Pliocene, most of the Great Artesian Basin was a flat, stable land surface (Cordillo Surface of Wopfner, 1974). Conditions led to deep chemical weathering and the development of a leached soil horizon. Subsequent silicification of the (?) B horizon formed a silcrete horizon known as the Silcrete of the Cordillo Surface (Wopfner, 1974). Silcrete usually overlies Eyre Formation but has been found overlying older rocks past the margins of the basin. Remnants occur approximately 15 kilometres south of Lake Weatherstone.

Hillwood, (1964) found mottled grey and red gypseous clays and light grey to off-white sands of possible Tertiary age, in gravity anomalies northwest and southwest of Lyndhurst (Fig. 1.).

The Pirie-Torrens Basin which lies west of the Norwest Fault contains a thick sequence of Tertiary limestones and carbonaceous sediments.

Quaternary

Firman, (1967 a and b, 1969, 1970) summarized Quaternary deposits in South Australia.

Quaternary sedimentation in the N.W. Flinders Ranges began with deposition of the Lower Pleistocene Avondale Clay, a unit found extensively near Leigh Creek, and comprising lacustrine clays with local freshwater limestones and gypsite sediments. During later Pleistocene time, deposits of gravel such as the Telford Gravel, a "Conglomerate near Lyndhurst" (Firman, 1969) and the younger Arrowie Formation (Coats, 1973) formed

extensive outwash fans flanking the ranges. Parts of the gravels were later calcified. The "Conglomerate near Lyndhurst" is similar in appearance to the Telford Gravel, but may be older (Firman, 1969). In a section, near Lyndhurst, it overlies clay similar in appearance to Avondale Clay.

Younger fluvial clay, sands and gravels of the Pooraka Formation occur near the margins of the ranges.

Structure

The dominant structural feature in the study area is the Norwest Fault. Post-Sturtian movements of the eastern block occurred west of Copley resulting in a vertical displacement of 12 200 metres. However, near Termination Hill the western side of the block is upthrust.

RESULTS

General

No coal or carbonaceous sediments or sediments resembling the Triassic sediments near Leigh Creek were intersected in any of the holes.

Drill hole L.W. No. 1 intersected well indurated calcareous, conglomeratic sandstones at 17.2 metres, which at the time of drilling were considered basement. This fell considerably short of the expected 150 metres depth (Hiern, 1973) and so L.W. No. 3 was drilled closer to the centre of the

same anomaly. This hole was abandoned at 12.75 metres, due to an unretreivable stilsen in the hole, after passing well indurated calcareous, conglomeratic sandstones from 8.50 metres. L.W. No. 3A was drilled one metre south of L.W. No. 3 and bottomed in highly weathered Adelaidean rocks after intersecting Quaternary and (?) Tertiary sediments.

L.W. No. 2, drilled on a separate anomaly east of Lake Weatherstone, entered a lithological sequence similar to that in L.W. No. 3A.

Stratigraphy

Complete descriptions of the various lithologies encountered are given in Appendices 1 and 2, and Encl. 1. Correlations are shown in the cross-section (Fig. 2).

TABLE 1

Depth intervals and thicknesses (metres)

		L.W. No. 1	L.W. No. 2	L.W. No. 3A
(1)	Pleistocene - Recent (unnamed and possible Pooraka Fm. or Arrowie Fm.).	0-17.2 (17.2)	0 - 10.5 (10.5)	0 - 8.5 (8.5)
(2)	Pleistocene (Telford Gravel or "Conglomerate near Lyndhurst")	17.2-19.0 (T.D.) (1.8?)	-	8.5-17.2 (8.7)
(3)	Pleistocene (Avondale Clay)	-	10.5-15.0 (4.5)	17.2-32.6 (15.4)
(4)	(?)Paleocene - Eocene (Eyre Fm)	-	15.0-40.6 (25.6)	32.6-34.9 (2.3)
(5)	Adelaidean	-	40.6-46.0 (T.D.) (5.4+)	34.9-38.2 (T.D.) (3.3+)

(1) Pleistocene - Recent

Each well encountered a sequence of sediments possibly belonging to the Pooraka Formation, Arrowie Formation and unnamed Pleistocene - Recent.

L.W. No. 1 consists dominantly of red clay and silty clay with bands of well-rounded to rounded gravels up to 4 metres thick. L.W. No. 3A contains dominantly sub-rounded to subangular gravel with minor red sands, while L.W. No. 2 contains dominantly very coarse grained, red sand with up to 25% gypsum, minor ironstone, and minor bands of gravel.

(2) Pleistocene (Telford Gravel or "Conglomerate near Lyndhurst")

Sediments possibly belonging to the Pleistocene Telford Gravel or "Conglomerate near Lyndhurst" were found in L.W. No. 1 and No. 3A. These consist of calcareous, conglomeratic sandstones (pebbles up to 50 mm) and are 8.7 metres thick in L.W. No. 3A. In L.W. No. 3 they were cored between 10 and 12.8 metres.

(3) Pleistocene (Avondale Clay)

Approximately 15.4 metres of Pleistocene Avondale Clay was recognised below the Pleistocene conglomerates in L.W. No. 3A, and 4.5 metres below the "Pleistocene - Recent" in L.W. No. 2. These consist of red-green mottled sandy clays and in L.W. No. 3A were cored between 19.6 and 22.6 metres.

(4) (?) Paleocene - Eocene (Eyre Formation)

A thick (26 metres) section of possible Paleocene - Eocene, Eyre Formation sediments were recognised, in L.W. No. 2, underlying the red-green mottled sandy clays. These consist of mature , white-buff, well sorted, slightly kaolinitic, medium-coarse grained, pebbly (up to 50 mm) sands. Within the sands are three thin (maximum thickness, 10 cm) bands of well indurated buff coloured silcrete.

Two metres of similar sands and silcrete was found in L.W. No. 3A. The sands are identical but the silcrete differs in morphology from that in L.W. No. 2 (Enclosure 1).

(5) Adelaidean

Adelaidean rocks in L.W. No. 2 consist of white-buff argillaceous silty, sandy claystones with thin darker laminae (35° dip) and beds of well indurated medium to coarse sandstone. A thin section of the claystones (Appendix 3) revealed networks of limonitic material in the matrix.

L.W. No. 3A contains mottled, yellow-white, sightly ferruginous, silty, sandy claystones with minor bands of quartz granules, sandstones and fine dark laminae dipping 70 - 80°. A thin section of the claystones (Appendix 3) revealed kaolinite flakes and networks of limonitic material as before.

DISCUSSION OF RESULTS

Lithological correlations were used to identify sediments in the Lake Weatherstone area. Age dating by palynology or palaeontology was not possible as the clays

were highly oxidized and barren of fossils.

Sediments from the Lake Weatherstone area are lithologically unlike Triassic sediments near Leigh Creek. However, they closely resemble sediments of Quaternary and Tertiary age found elsewhere in the Flinders Ranges and the Great Artesian Basin.

J.B. Firman (pers. comm., 1974) considers sequences in L.W. No. 2 and No. 3A to show lithological similarity to a sequence near Lyndhurst. Here, calcareous conglomeratic sandstones of the "Conglomerate near Lyndhurst" overlie the red-green mottled, Pleistocene Avondale Clay. The "Conglomerate near Lyndhurst" resembles the Middle Pleistocene Telford Gravel (type section near Leigh Creek) but may be Lower Pleistocene in age (Firman, 1969).

The sequence of mature quartz sands and silcrete found in L.W. No. 2 and No. 3A is characteristic of Eyre Formation. Eyre Formation sediments form extensive fluvial deposits north of the Flinders Ranges and crop out on low rises north-east of Lyndhurst. It is evident that the Eyre Formation was continuous southeast to Lake Weatherstone and once covered large areas of the Flinders Ranges.

Following the drilling results it must be concluded that low density, highly weathered Adelaidean rocks and (?) Tertiary Quaternary sediments are responsible for the low gravity values near Lake Weatherstone. This interpretation is reinforced by the results obtained by Hillwood in 1964. His twelve holes drilled on anomalies further east ended in highly weathered basement. One drill hole

Penetrated 100 metres of highly weathered basement.

The deep chemical weathering is part of the Eocene - Pliocene duricrust profile (Wopfner and Twidale, 1967). Weathering occurred on the Cordillo Surface subsequent to the termination of deposition of Eyre formation (Wopfner, 1974) and affected both the thin Eyre Formation and the underlying Adelaidean basement. Although the Silcrete of the Cordillo Surface is not present in the Lake Weatherstone wells, it crops out in an area topographically higher, south of Lake Weatherstone. Erosion has therefore removed the silcrete from the lower areas.

The area covered in this study and that in Hillwood (1964) are part of the same geological province. This differs from the province near Leigh Creek where Triassic sediments are preserved. For this reason, the anomalies, not drilled (see Fig. 1) are considered devoid of Triassic sediments, and to be due to weathered basement rocks. In particular, the anomaly lying parallel to the Norwest Fault, near Termination Hill coincides with a thick (up to 100 metres) sequence of alluvial outwash material (Fig. 3). This anomaly is a result of low density outwash material and is possibly reinforced by low density basement.

CONCLUSIONS AND RECOMMENDATIONS

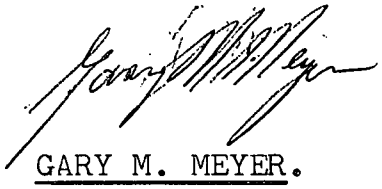
The coal potential in the area surrounding Lake Weatherstone has been assessed by a small drilling programme and is considered very low.

Three drill holes were sited on negative Bouguer gravity anomalies originally interpreted as depressions in Adelaidean basement filled with low density, coal bearing, Triassic sediments similar to those at Leigh Creek.

Two anomalies were drilled and found to contain Quaternary sediments and low density, highly weathered (?) Eyre Formation and Adelaidean basement rocks. The third anomaly which lies parallel to the Norwest Fault, east of Termination Hill, was not drilled because it almost certainly results from a thick alluvial outwash deposit.

Hillwood (1964) found similar results in an area east of Lake Weatherstone. This area and the Lake Weatherstone area are considered part of the same geological and geophysical province.

The results of the three wells drilled, show that no coal bearing sediments exist in the Lake Weatherstone area. Therefore, it is recommended that no further exploration for coal be done in the Lake Weatherstone area.



GARY M. MEYER.

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SCALE (metres)

L.W. NO.3A L.W. NO.1 — 0.5 km — SECTION AA' — 6 Kms — L.W. NO.2

A — A'

SURFACE

PLEISTOCENE – RECENT
(?) POORAKA FORMATION OR (?) ARROWIE FORMATION
AND UN-NAMED

TELFORD GRAVEL (PLEISTOCENE)
OR "CONGLOMERATE NEAR
LYNDHURST"
(PLEISTOCENE)

T.D. 19.00 m

(?) AVONDALE CLAY (PLEISTOCENE)

(?) EYRE FORMATION
(PALEOCENE – EOCENE)

ADELAIDEAN BASEMENT

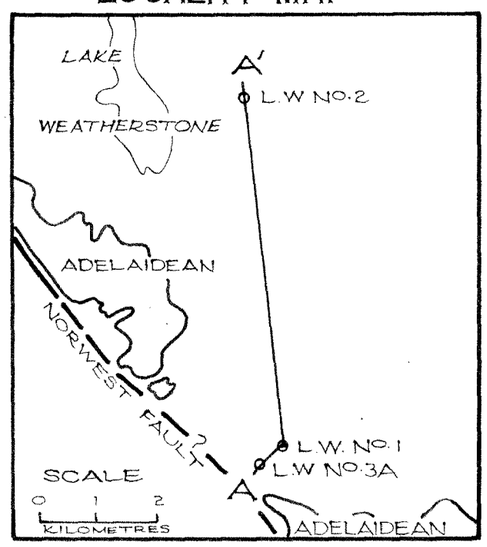
T.D. 38.18 m

T.D. 46.00 m

DEPTH BELOW SURFACE

5 10 15 20 25 30 35 40 45

LOCALITY MAP



Datum = Ground Level
Vertical exaggeration = 1000

SCALE
0 1
Kilometres

FIG. 2

DEPARTMENT OF MINES – SOUTH AUSTRALIA

LAKE WEATHERSTONE NOS. 1, 2 & 3A CROSS-SECTION AA'

PETROLEUM GEOLOGY SECTION	G. Meyer GEOLOGIST	Drn. G.M	SCALE: 1:2000
		Trd. R.B.	74–1023
Director of Mines		Ckd. A.F.	
		Exd.	DATE: 2ND DEC. 1974

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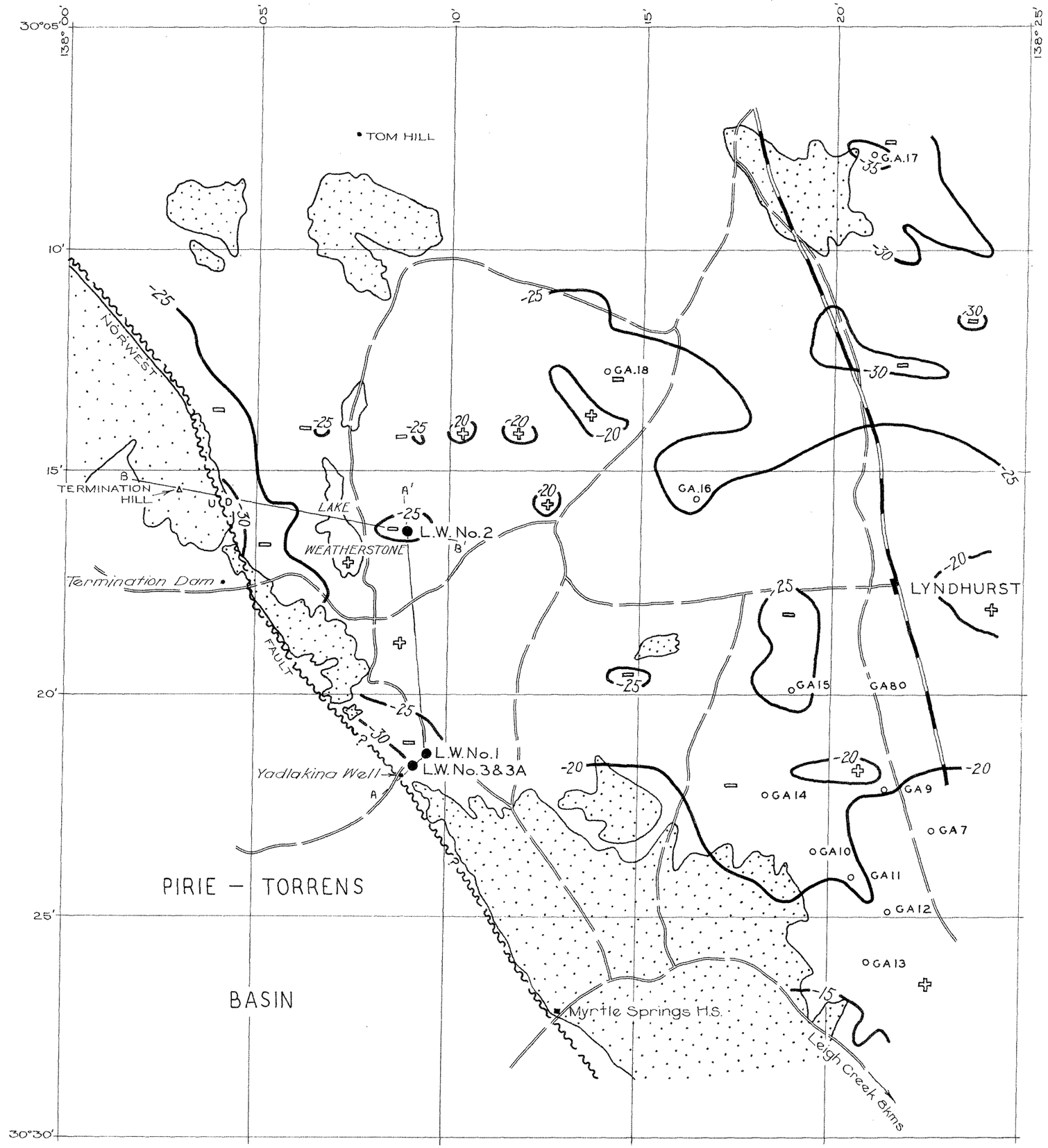


LOCALITY MAP

LEGEND

-25 — Gravity contours in milligals
Contour Interval : 5 milligals

● L.W.No.1 — Lake Weatherstone drill hole

o G.A.14 — Hillwood, 1964 drill hole

Pre-Cambrian basement

Fault (Observed)

Fault (Inferred)

Track

Railway

Δ — Triangulation station

KILOMETRES
0 2 4 6 8 10

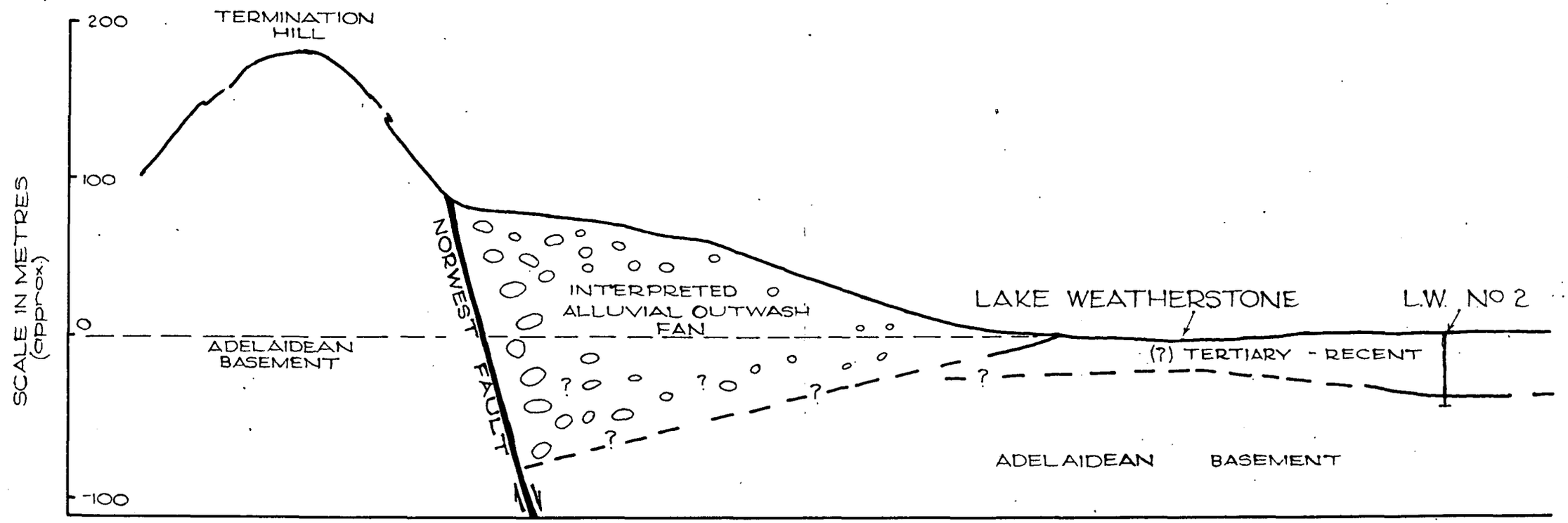
FIG.1

DEPARTMENT OF MINES — SOUTH AUSTRALIA

LAKE WEATHERSTONE AND ENVIRONS

LOCALITY MAP

PETROLEUM SECTION	G. Meyer GEOLOGIST	Drn. G.M.	SCALE: 1:153,650
		Tcd. A.R.	74-930 Cc
Director of Mines		Ckd. A.F.	
		Exd.	DATE: 29TH. OCT. 1974



SCALE
0 1 2
KILOMETRES

FIG. 3

DEPARTMENT OF MINES — SOUTH AUSTRALIA

DIAGRAMMATIC SECTION BETWEEN TERMINATION HILL AND LAKE WEATHERSTONE NO. 2

PETROLEUM GEOLOGY SECTION	G. Meyer GEOLOGIST	Drn. G.M.	SCALE : 1:67000 (Approx.)
		Tcd. R.B	74–1025
		Ckd. A.F.	
Director of Mines		Exd.	DATE : 29th NOV. 1974

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APPENDIX 1.

DITCH CUTTINGS - DESCRIPTIONS

DITCH CUTTINGS - DESCRIPTIONS

Lake Weatherstone No. 1

Depths(m)	%	Constituents	Description
0-6	85-90	Gravel & very coarse sand	Rounded subrounded grains (up to 8 m.m.) of white, buff,dark grey,and black quartzite (45-50%),yellow, white calcite(15-20%); clear quartz(15-20%);fine grained kaolinitic sandstone(5-10%).
	10-15	Silty clay	Red,calcareous, sandy (fine-med.grained).
6-12	60-70	Gravel & very coarse sand	a.a. but subrounded to subangular grains(up to 20m.m.)and more quartzite (60-70%).
	30-40	Silty clay	a.a.
12-18	55-65	Gravel	a.a.
	35-45	Silty clay	a.a.
18-19(T.D.)	40-50	Sandstone	Red,orange,yellow,buff and white calcified,rounded - subangular,medium-coarse grained,quartz sandstone.
	30-40	Gravel	Well rounded - rounded grains of white,grey quartzite.(30-40%);clear quartz (25-30%);red-brown,black ferruginous,slightly micaceous siltstones and quartzites(25-30%);calcite(5-10%).
	5-10	Silty clay	a.a.

Lake Weatherstone No. 2.

0-6	65-75	Silty clay	Red,brown,yellow,slightly calcareous.
	20-25	Sand	Medium-very coarse grained, rounded,clear quartz; and minor black grains.
	5-10	Gypsum	Powdery,white,weathered.
6-12	60-70	Silty Clay	a.a.
	20-25	Sand	Medium-very coarse grained, clear ferruginous quartz; and minor red-brown siltstone grains.
	10-15	Gypsum	a.a.
12-18	40-60	Clay	Red,brown,orange,white, light green,slightly calcareous.
	20-30	Sand	a.a.
	10-20	Gypsum	a.a.
	5-10	Gravel	Subangular-rounded,ironstone(up to 5 m.m.).
18-24.23	50-55	Clay	a.a.
	30-40	Silcrete	White,yellow,buff,red,brown, black,mottled,siliceous material. Most fragments (50-60%)have white-buff silica cement;and rounded,medium - coarse grained, quartz grains.
	10-20	Gypsum	a.a.
	5-10	Gravel	a.a.
24.23-46(T.D.)		See core description.	Cutting samples were taken in "core loss" parts. These were medium grained, kaolinitic(5-10%),well sorted, quartz sands.

Lake Weatherstone No. 3

0-6	80-90	Gravel	Calcareous, subrounded-sub-angular (up to 10m.m.). Grains of blue grey, white, brown quartzite (40-50%); clear, white quartz (20-30%); calcite (10-20%); silcrete (medium-coarse grained, quartz grains in buff silica matrix) (10-20%); dendritic, grey dolomite (5-10%); and black (?) chert fragments (5-10%).
	10-20	Sandy clay	Red-brown, calcareous, silty.
6-10	30-40	Quartzite	White, light and dark grey.
	30-40	Silcrete	Scattered medium-coarse, quartz grains in a buff-yellow siliceous matrix.
	10-20	Calcite	White.
	10-20	Gravel	Rounded to well rounded grains (up to 4m.m.) of white quartzite and quartz.
	10-20	Clay	White, calcareous.
	5-10	Sandy Clay	a.a.
10-12.75 (T.D.)		See core description.	

Lake Weatherstone No. 3A

0-12	See L.W. No. 3		
12-18	20-30	Gravel	Rounded to well rounded grains of quartzite and quartz.
	20-30	Silcrete	Silicified red, orange, mottled and yellow-buff quartz grains.
	10-20	Quartzite	White, light-dark grey.
	10-15	Calcite	White.
	10-15	Clay	White, calcareous.

	10-15	Silty clay	Red-brown,sandy,calcareous.
18-19.66	60-70	Sandy Clay	60% red,minor black with ferruginous medium-coarse quartz grains. 40% light green with medium-coarse clear quartz grains.
	10-20	Silcrete	a.a.
	5-10	Quartzite	a.a.
	Trace	Calcite	a.a.
	Trace	Clay	a.a.
19.66-22.63		See core description	
22.63-30	100	Sandy clay	a.a. but with 30% red clay and 70% green clay.
30-33.60	50-60	Sandy clay	yellow,red,grey,white,green, mottled red-green,with medium-coarse grained sand.
	20-30	Silcrete	Scattered medium-coarse quartz grains in a white-buff,minor orange,silica matrix.
	10-20	Sand	Medium-very coarse,clear, rounded,quartz grains.
33.60-38.18 (T.D.)		See core description.	

APPENDIX 2.

CORE - DESCRIPTIONS.

A total of 32.17 metres core was cut using 3-metre HQ- triple tube wire line core barrels. Only continuously cored intervals are designated numbers and not each core barrel length. Further details are given in the text under "Lithologic Sampling".

DEPARTMENT OF MINES — SOUTH AUSTRALIA

CORE DESCRIPTION

WELL *LAKE WEATHERSTONE N°2*
LOCATION *N.W. FLINDERS RANGES*
LAT. *30° 16·2'*
LONG. *138° 9·3'*
ELEVATION GR. –
R.T. –
DATUM –

CORE NO. *1*
DEPTH *24·23 - 46·00 m.*
DATE DRILLED *21st September, 1974*
RECOVERY *3·00* m. *14* %
FORMATION (?) *Eyre Formation.*

DEPTH (METRES)	GRAPHIC LOG	DRILL TIME MINS	RECOVERY LOG	DESCRIPTION
24·00				
24·50				
25·00				
25·50				*Nil Recovery.*
26·00				
26·50				
27·00				
27·50				

CORE BARREL *HQ triple tube wire line* LOGGED BY *G.M. Meyer.*
CORE BIT *S.A.D.M. tungsten carbide*
TIME—START
FINISH
DATE *10·10·74*

PETROLEUM GEOLOGY SECTION

SHEET *1* OF *6* DRG. NO. *S11124 Cc*

DEPARTMENT OF MINES — SOUTH AUSTRALIA

CORE DESCRIPTION

WELL *LAKE WEATHERSTONE N°2*
LOCATION *N.W. FLINDERS RANGES*
LAT. *30°16.2'*
LONG. *138°9.3'*
ELEVATION GR. –
R.T. –
DATUM –

CORE NO. *1*
DEPTH *24*
DATE DRILLED *21st September, 1974*
RECOVERY *3.00* m *14* %
FORMATION (?) *Eyre Formation*

DEPTH (METRES)	GRAPHIC LOG	DRILL TIME MINS	RECOVERY LOG	DESCRIPTION
28.00				
28.50				
29.00				*Nil Recovery.*
29.50				
30.00				
30.50				
31.00	Si Si			*31.00 - 31.10 m. Silcrete:- scattered, medium - coarse size, rounded-well rounded, clear quartz grains in a siliceous, buff-yellow matrix. A 1cm band of tightly packed quartz grains dips 30°*
31.50				*Nil Recovery.*

CORE BARREL *HQ triple tube wire line* LOGGED BY *G.M. Meyer.*
CORE BIT *S.A.D.M. tungsten carbide*
TIME—START
FINISH
DATE *10.10.74*

PETROLEUM GEOLOGY SECTION

SHEET *2* OF *6*
DRG. NO. *S11124a* CC

DEPARTMENT OF MINES — SOUTH AUSTRALIA

CORE DESCRIPTION

WELL *LAKE WEATHERSTONE N°2*
LOCATION *N.W. FLINDERS RANGES*
LAT. *30° 16·2'*
LONG. *138° 9·3'*
ELEVATION GR. –
R.T. –
DATUM –

CORE NO. *1*
DEPTH *24·23 - 46·00 m.*
DATE DRILLED *21st September, 1974*
RECOVERY *3·00* m *14 %*
FORMATION *(?) Eyre Formation.*

DEPTH (METRES)	GRAPHIC LOG	DRILL TIME MINS	RECOVERY LOG	DESCRIPTION
32·00				
32·50				
33·00				
33·50				*Nil Recovery.*
34·00				
34·50				
35·00				
35·50				

CORE BARREL *HQ triple tube wire line* LOGGED BY *G.M. Meyer.*
CORE BIT *S.A.D.M. tungsten carbide*
TIME—START
FINISH
DATE *10·10·74*

PETROLEUM GEOLOGY SECTION

SHEET *3* OF *6*
DRG. NO. *S111246*

DEPARTMENT OF MINES — SOUTH AUSTRALIA

CORE DESCRIPTION

WELL *LAKE WEATHERSTONE N°2*
LOCATION *N.W. FLINDERS RANGES*
LAT. *30°16·2'*
LONG. *138°9·3'*
ELEVATION GR. –
R.T. –
DATUM –

CORE NO. *1*
DEPTH *24·23 - 46·00 m.*
DATE DRILLED *21st September, 1974*
RECOVERY *3·00* m *14* %
FORMATION (?) *Eyre Formation*

DEPTH (METRES)	GRAPHIC LOG	DRILL TIME MINS	RECOVERY LOG	DESCRIPTION
36·00				*Nil Recovery.*
36·50				
37·00				
37·50				
38·00				
38·50				
39·00				
39·50				

CORE BARREL *HQ triple tube wire line* LOGGED BY *G.M. Meyer*
CORE BIT *S.A.D.M. tungsten carbide*
TIME—START
FINISH
DATE *10·10·74*

PETROLEUM GEOLOGY SECTION

SHEET *4* OF *6*
DRG. NO. S11124 Cc

DEPARTMENT OF MINES — SOUTH AUSTRALIA

CORE DESCRIPTION

WELL *LAKE WEATHERSTONE N°2*
LOCATION *N.W. FLINDERS RANGES*
LAT. *30°16.2'*
LONG. *138°9.3'*
ELEVATION GR.
R.T. DATUM

CORE NO. *1*
DEPTH *24.23 - 46.00 m*
DATE DRILLED *21st September 1974*
RECOVERY *3.00* m *14 %*
FORMATION (?) *Eyre Formation and Adelaidean.*

DEPTH (METRES)	GRAPHIC LOG	DRILL TIME MINS	RECOVERY LOG	DESCRIPTION
40.00				*Nil Recovery.*
				40.26 - 40.61 m. Friable, medium-coarse size, well sorted sandstone with 5% clay matrix.
40.50				*40.61 - 40.71 m. White-buff claystone.*
				40.71 - 40.81 m. White clayey sand with few pebbles of quartzite up to 30 mm. Sand is medium-coarse size.
				40.81 - 40.92 m. Large pebbles of well indurated, translucent quartzite in a medium-coarse sandstone.
41.00				*40.92 - 41.15 m. White claystone with yellow and black porallel laminae, dipping 30-35°*
				41.15 - 41.60 m. Pebbly claystone. Pebbles, up to 40 mm size of quartz and quartzite. Medium grain size, well sorted sandstone band at 41.50 m.
41.50				
				41.60 - 43.50 m. Well indurated, medium-coarse size, well sorted sandstone with < 5% white clay matrix. Laminae of silica dip 60-70°
42.00				
42.50				
43.00				
43.50				*43.50 - 43.69 m. Pebbles and granules of white-buff clay, quartz and quartzite, up to 25 mm in size, in a poorly sorted clayey sand matrix. Sand is medium-v. coarse in size.*

CORE BARREL *HQ triple tube wire line* LOGGED BY *G.M. Meyer.*
CORE BIT *S.A.D.M. tungsten carbide*
TIME—START
FINISH
DATE *10.10.74*

PETROLEUM GEOLOGY SECTION

SHEET *5* OF *6*
DRG. NO. *S11124CG*

DEPARTMENT OF MINES — SOUTH AUSTRALIA

CORE DESCRIPTION

WELL: LAKE WEATHERSTONE N°2.
LOCATION N.W. FLINDERS RANGES.
LAT. 30°16·2'
LONG. 138°9·3'
ELEVATION GR.
R.T.
DATUM

CORE NO. 1
DEPTH 24·23 - 46·00m.
DATE DRILLED 21st September, 1974.
RECOVERY 3·00 m. 14 %
FORMATION Adelaidean.

DEPTH (METRES)	GRAPHIC LOG	DRILL TIME MINS	RECOVERY LOG	DESCRIPTION
44·00				
44·50				
45·00				Nil Recovery.
45·50				
46·00				

CORE BARREL HQ triple tube wire line LOGGED BY G.M. Meyer.
CORE BIT S.A.D.M. tungsten carbide
TIME—START
FINISH
DATE 10·10·74.

PETROLEUM GEOLOGY SECTION

SHEET 6 OF 6. DRG. NO. S11124e Cc

DEPARTMENT OF MINES — SOUTH AUSTRALIA

CORE DESCRIPTION

WELL *LAKE WEATHERSTONE No3*
LOCATION *N.W. FLINDERS RANGES*
LAT. *30°21·6'*
LONG. *138°9·3'*
ELEVATION GR. –
R.T. –
DATUM –

CORE NO. *1*
DEPTH *10·00 - 12·75 m.*
DATE DRILLED *23rd September, 1974*
RECOVERY *2·18* m *79* %
FORMATION *Telford gravel or "Conglomerate from Lyndhurst."*

DEPTH (METRES)	GRAPHIC LOG	DRILL TIME MINS	RECOVERY LOG	DESCRIPTION
10.00				10.00-10.35m. Rounded - well rounded granules and pebbles of brown, buff, white quartzite, white quartz, ferruginous material and brown clay in a calcite cemented medium-coarse sandstone. Pebbles often have calcite rims.
				Nil Recovery.
10.50				As above.
11.00				
11.50				
				Nil Recovery.
12.00				As above.
12.50				
				Nil Recovery.
13.00				

CORE BARREL *HQ triple tube wire line* LOGGED BY *G.M. Meyer*
CORE BIT *S.A.D.M. tungsten carbide*
TIME—START
FINISH
DATE *11.10.74*

PETROLEUM GEOLOGY SECTION

SHEET *1* OF *1*
DRG. NO. *S11121 Cc*

DEPARTMENT OF MINES — SOUTH AUSTRALIA

CORE DESCRIPTION

WELL *LAKE WEATHERSTONE N° 3A*
LOCATION *N.W. Flinders Ranges*
LAT. *30° 21·6'*
LONG. *138° 9·3'*
ELEVATION GR. —
R.T. —
DATUM —

CORE NO. *1*
DEPTH *19·56 - 22·63 m.*
DATE DRILLED *24th September, 1974*
RECOVERY *1·89* m *62 %*
FORMATION *Avondale clay or Etadunna Formation Equiv.*

DEPTH (METRES)	GRAPHIC LOG	DRILL TIME MINS	RECOVERY LOG	DESCRIPTION
20·00				*Nil Recovery*
20·50				*20·61 - 22·50 m. Light green sandy clays with patches of mottled red-green sandy clay. Parts are very sandy (clayey sand) and parts of the mottled zones are ferruginous.*
21·00				
21·50				
22·00				
22·50				*Nil Recovery*
23·00				

CORE BARREL *HQ triple tube wire line* LOGGED BY *G. M. Meyer.*
CORE BIT *S.A.D.M. tungsten carbide*
TIME—START
FINISH
DATE *11·10·74*

PETROLEUM GEOLOGY SECTION

SHEET *1* OF *1*
DRG. NO. S11122 Cc

DEPARTMENT OF MINES — SOUTH AUSTRALIA

CORE DESCRIPTION

WELL *LAKE WEATHERSTONE N°3A*
LOCATION *N.W. FLINDERS RANGES*
LAT. *30° 21·6'*
LONG. *138° 9·3'*
ELEVATION GR. –
R.T. –
DATUM –

CORE NO. *2*
DEPTH *33·60 - 38·18 m*
DATE DRILLED *24th September, 1974*
RECOVERY *2·30* m *50%*
FORMATION *(?) Eyre Formation & Adelaidean*

DEPTH (METRES)	GRAPHIC LOG	DRILL TIME MINS	RECOVERY LOG	DESCRIPTION
33·50				
				Nil Recovery
34·00				
34·50				*34·53 - 34·90 m. Silcrete, grading downwards into a friable conglomeratic clayey sandstone. Silcrete consists of 20-30% medium - v.coarse size, angular - rounded, quartz sand grains, and quartz granules in a white - buff silicified matrix. Grains are randomly dispersed throughout. The conglomeratic clayey sandstone consists of pebbles (up to 20mm in size) of buff - light grey and red-black silcrete in a medium - coarse size sandstone containing a white - buff clay matrix.*
35·00				
35·50				*34·90 - 35·68 m. Yellow, white and light grey mottled claystone. Minor grey laminae and a thin (5m.m) band of quartz sand and granules all dipping 70-80°*
36·00				*Nil Recovery.*
36·50				*36·60 - 38·18 m. As above, but the colour is a paler yellow grading to white in places.*
37·00				

CORE BARREL *HQ Triple tube wire line* LOGGED BY *G. M. Meyer*
CORE BIT *S.A.D.M. tungsten carbide*
TIME—START
FINISH
DATE *15·10·74*

PETROLEUM GEOLOGY SECTION

SHEET *1* OF *2*
DRG. NO. *S11123 cc*

DEPARTMENT OF MINES — SOUTH AUSTRALIA

CORE DESCRIPTION

WELL LAKE WEATHERSTONE N° 3A

LOCATION N.W. FLINDERS RANGES

LAT. 30° 21.6'

LONG. 138° 9.3'

ELEVATION GR. –

R.T. –

DATUM –

CORE NO. 2

DEPTH 33.60 - 38.18 m

DATE DRILLED 24th September 1974

RECOVERY 2.30 m 50 %

FORMATION Adelaidean.

DEPTH (METRES)	GRAPHIC LOG	DRILL TIME MINS	RECOVERY LOG	DESCRIPTION
37.50				36.60 - 38.18 m Continued.
38.00				
38.50				

CORE BARREL HQ triple tube wire line LOGGED BY G.M. Meyer.

CORE BIT S.A.D.M. tungsten carbide

TIME—START

FINISH

DATE 15.10.74.

PETROLEUM GEOLOGY SECTION

SHEET 2 OF 2

DRG. NO. S11123 cc

APPENDIX 3.

PETROGRAPHIC DESCRIPTIONS

by

Dr. B.G. STEVESON

AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

REPORT MP 1332/75

EXAMINATION OF THREE BORE HOLE SAMPLES - LAKE WEATHERSTONE

Three samples of core material were submitted to the Australian Mineral Development Laboratories for petrographic descriptions. Details of the samples described are as follows:-

Sample No.	Thin Sec. No.	Hole No.	Depth(metres)	Age/ Formation
PG97, P291/74	TS32899	L.W. No.2	41.00	Adelaidean
PG98, P292/74	TS32900	L.W. No.3A	22.10	Pleistocene Avondale Clay.
PG99, P293/74	TS32401	L.W. No.3A	35.00	Adelaidean

PETROGRAPHIC DESCRIPTIONS

Sample PG97,P291/74. TS32899

Location: Lake Weatherstone No. 2; 41.00 m.

Rock Name: Siltstone (?Surface cemented)

Hand Specimen: A friable white and fine grained sand which shows vestiges of bedding directions.

Thin Section: The sample consists of silt grade quartz crystals which occur in a very fine grained argillaceous matrix.

Approximately 15% of the volume of the rock is occupied by equant subangular quartz crystals which range in size up to about 0.05mm. In addition there are a few subrounded to subangular crystals up to 0.4mm in diameter and these are widely and randomly distributed throughout the thin section.

In plane polarized light the matrix has a relatively dark turbid appearance and under crossed nicols it can be seen that the matrix almost has a submicroscopic grain size and an even granular texture. It is likely that the clays are an important component of the matrix but it is possible that some opaline silica is present also. The matrix is further obscured by the presence of irregular patches and networks of limonitic material.

In summary therefore the rock is a siltstone which contains an abundant argillaceous matrix. By examination of the thin section alone it is not possible to determine the exact composition of the matrix and this would require X-ray diffraction methods; however it is possible that there is a component of opaline silica and that the rock is a silcrete.

Sample PG98, P292/74, TS 32900

Location: Lake Weatherstone No. 3A; 22.10m.

Rock Name: Argillaceous sandstone.

Hand Specimen: A compact but very friable sandstone with a fine grained argillaceous appearance. The sample has an overall dull grey colour and is somewhat darker than samples P291/74 and P293/74

Thin Section: This is a poorly cemented and ill-sorted fine grained sand which has superficial resemblances to sample P291/74.

The detrital fragments range in size from approximately 0.02 mm to 0.3 mm and there is some indication of a bimodal grain size distribution . The large and small detrital grains are randomly mixed together and there is no apparent stratification or ordering of the grains.

The grains are well separated by a fine grained argillaceous matrix. This material is similar in many respects to the matrix of sample P291/74 but some patches of clay appear to have a moderate birebringence and it is possible that illite or montmorillonite are significant components of the argillaceous material. The sample is somewhat more friable than sample P291/74 and hence only a small proportion of the matrix has been preserved in the thin section.

This is an immature fine grained sand which contains an abundant matrix of largely argillaceous material.

Sample PG99, P293/74, TS32401

Location: Lake Weatherstone No. 3A; 35.00m .

Rock Name: Argillaceous siltstone

Hand Specimen: A pale buff coloured rock which is aphanitic in texture but appears to be massive. The hand specimen is clearly rich in clay minerals and is friable.

Thin Section:

The detrital grains in this sample have a maximum size of about 0.06 mm and hence the rock can be defined as a siltstone. Among the detrital minerals clays are particularly abundant in some parts of the rock and there appear to be

small stacks of kaolinite flakes up to about 0.04 mm in size. In other parts of the thin section quartz is by far the most abundant detrital mineral.

The matrix is a distinct brown colour in plane polarized light but is dark and indefinite under crossed nicols. The extact mineralogical composition of the matrix could only be determined by X-ray diffraction methods, but it is likely that it consists largely or clay minerals together with a little fine grained silica.

Overall, the rock is distinctly more heterogeneous than the two preceding samples and limonitic material is concentrated in a series of fractures and this material has discoloured irregular areas of the matrix of the rock.

In brief therefore, the rock is a silty sediment which contains some detrital clay as well as a abundant clay matrix.

APPENDIX 4

PALYNOLOGY

PALYNOLOGY

Three specimens of core material were examined by J.M. Lindsay of the Biostratigraphy Division of the S.A. Department of Mines but were considered too oxidized and leached to warrant detailed investigation. The same specimens were examined by the Australian Mineral Development Laboratories and found to be barren of palynomorphs. (see Petrographic Description, appendix 3).

LAKE WEATHERSTONE NO.1

LOCATION : 30° 21·6′ Lat. 138° 9·8′ Long.
Date drilling commenced: 19·9·74
Date drilling completed: 20·9·74
Total depth : 19·00 metres
Status : Abandoned
Driller : S.A. Dept. of Mines
Drilling Method : Rotary
Coring Method : —

LITHOLOGICAL DESCRIPTIONS	STRATIGRAPHIC COLUMN	
CLAYEY SAND; Red-brown, quartz & quartzite, medium-coarse grained, moderately well sorted, loose, 10% red clay matrix	POSSIBLE POORAKA FORMATION ARROWIE FORMATION AND UN-NAMED	PLEISTOCENE - RECENT
GRAVEL; White, buff, dark grey and black quartzite, yellow & white calcite, clear quartz, fine grained kaolinitic sandstone, & light grey limestone granules & pebbles, up to 20 mm, rounded-well rounded, loose.		
SILTY PEBBLY CLAY; Red-brown (trace of white clay at 14 metres), silty, slightly sandy. Pebbles similar in composition & morphology to gravel above, soft calcareous clay		
CONGLOMERATIC SANDSTONE; white, grey quartzite, clear quartz, red-brown, black, ferruginous, slightly micaceous siltstone & red-black ironstone granules & pebbles up to 50 mm, poorly sorted, well indurated, rounded-well rounded, sandstone matrix (Quartzose med-coarse grained-well sorted) calcite cement.	Telford Gravel or Conglom. Near Lyndhurst	PLEISTOCENE

LAKE WEATHERSTONE NO.2

LOCATION : 30° 16·2′ Lat. 138° 9·3′ Long.
Date drilling commenced: 20·9·74
Date drilling completed: 21·9·74
Total depth: 46·00 metres
Status: Abandoned
Driller: S.A. Dept. of Mines
Drilling Method: Rotary
Coring Method : Wire line

LITHOLOGICAL DESCRIPTIONS	STRATIGRAPHIC COLUMN	
SILTYCLAY; Red-brown, yellow, silty, slightly sandy, soft, slightly calcareous.	POSSIBLE POORAKA FORMATION OR ARROWIE FORMATION & UN-NAMED	PLEISTOCENE - RECENT
PEBBLY SAND; Red-brown, quartz, medium-very coarse grained, pebbly (5%) rounded, poorly sorted, friable, trace red clay matrix. Weathered gypsum (5-25%) becoming more abundant towards base. Minor black (?) chert grains.		
CLAY; Red, pale green, white, sandy in parts, sticky. Minor red-pink sandstone bands (medium grained) with rare ironstone pebbles (up to 5 mm).	(?) AVONDALE CLAY	PLEISTOCENE
SANDSTONE; white-light grey, quartz, medium grained, well rounded, well sorted, friable, 5-10% kaolin matrix. Minor silcrete bands up to 10 c.m thick, (quartz grains in buff, siliceous matrix.)	(?) EYRE FORMATION	PALEOCENE — EOCENE
INTERBEDDED CONGLOMERATIC CLAYSTONE & CONGLOMERATIC CLAYEY SANDSTONE; Claystone; white-buff pebbles of quartz & quartzite, up to 40 m.m, indurated, fine yellow & black laminae dip 30-35°. Sandstone; white-light grey, quartz, medium-coarse grained, pebbles of quartz & quartzite up to 40 mm, well sorted well indurated, <5% kaolin matrix, laminae of silica dip 60-70°.	(?)	ADELAIDEAN
PEBBLY CLAYEY SANDSTONE, white, quartz, pebbles of white buff claystone quartz & quartzite up to 25 m; clayey, medium-very coarse grained, poorly sorted, well indurated, kaolin matrix.		

LAKE WEATHERSTONE NO3 & 3A

LOCATION: 30° 1·6′ Lat. 138° 9·4′ Long.
Date drilling commenced: L.W. No.3 23·9·74; L.W. No 3A 23·9·74
Date drilling completed: L.W. No3 23·9·74; L.W. No 3A 24·9·74
Total depths: L.W No 3 12·75 m. L.W No 3A 38·18 m
Status : Abandoned
Driller: S.A. Dept. of Mines
Drilling Method: Rotary
Coring Method: Wire line

L.W. N° 3 — T.D. 12·75 m; 2·18 m 79%
L.W. N° 3A

LITHOLOGICAL DESCRIPTIONS	STRATIGRAPHIC COLUMN	
PEBBLY SAND AND INTERBEDDED SANDY CLAY. Pebbly sand; blue, grey, white, brown quartzite, clear, white quartz, calcite, silcrete (medium to coarse quartz sand grains in buff, siliceous matrix), dendritic, grey dolomite, grey shale, black, (?) chert, minor kaolinitic sandstone & ironstone (below 8·0 m.) granules & pebbles up to 10 mm; subrounded-subangular, poorly sorted friable sand matrix (red, medium-coarse) grained. Sandy clay; red-brown, quartz, medium-coarse, poorly sorted friable, clay matrix (red-brown, trace of white below 8·3 m, calcareous.)	POSSIBLE POORAKA FM. OR ARROWIE AND UN-NAMED	PLEISTOCENE - RECENT
CONGLOMERATIC SANDSTONE; Brown buff, white, quartzite, white quartz, ironstone, brown clay granules & pebbles rounded-well rounded, poorly sorted, well indurated; sandstone matrix (medium-coarse grained & well sorted), white calcite cement. Pebbles often with calcite rims	TELFORD GRAVEL OR "CONGLOMERATE NEAR LYNDHURST"	PLEISTOCENE
SANDY CLAY; Light green, red, sandy (medium-coarse grained, quartz, rounded), sticky, patches of mottled red-green sandy; ferruginous in parts.	(?) AVONDALE CLAY	PLEISTOCENE
SANDY PEBBLY CLAY; Dominantly grey & white, yellow, red, light green, mottled red-green, pebbles of quartz & quartzite up to 25 mm, sandy, (quartzose, medium-coarse grained), sticky. Lost circulation. As above		
SANDSTONE & SILCRETE; Sandstone; white, light grey, med.-coarse grained, well sorted, friable, kaolin matrix. This overlies silcrete & conglomeratic clayey sandstone. Silcrete; is white-buff, well indurated & contains scattered quartz grains (clear, quartz, rounded, med-coarse grained) pebbles of light grey, red-black silcrete, (up to 20 mm.)	(?) EYRE FORMATION	PALEOCENE - EOCENE
CLAYSTONE; Yellow, white & light grey, indurated, mottled, minor dark laminae & a thin (5 m.m) band of quartz sand grains & granules all dipping 70°-80°	(?)	ADELAIDEAN

LEGEND

- Sand / Sandstone
- Clay / Claystone
- Sandy Clay / Claystone
- Silty Clay / Claystone
- Pebble, Granule
- Calcareous
- Siliceous

WELL SYMBOLS

- Core interval, loss & number

ENCL.1

DEPARTMENT OF MINES — SOUTH AUSTRALIA

LAKE WEATHERSTONE BORES NOS 1,2,3 & 3A LITHOLOGICAL LOGS

PETROLEUM GEOLOGY SECTION	GEOLOGIST	Compiled G. Meyer	Scale 1:100
			Date 28th Nov. 1974
Director of Mines		Dn. R.B.	Drg. No. 74–1024
		Ckd.	

6537