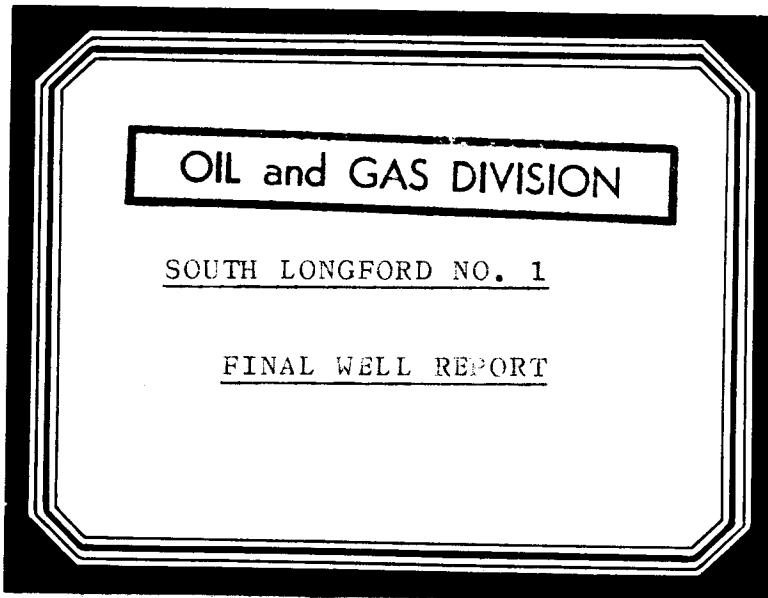


W 479

DEPT. NAT. RES & ENV

PE903999



WCR

SOUTH LONGFORD-1

(W479)

W479

ARCO LIMITED / WOODSIDE (LAKES ENTRANCE)

OIL CO. N. L.

OIL and GAS DIVISION

SOUTH LONGFORD NO. 1

FINAL WELL REPORT

by

GERALD FLEIT

ARCO LIMITED

SOUTH LONGFORD NO. 1

C O N T E N T S

COMPLETION REPORT

SUMMARY

INDEX MAP

INTRODUCTION

WELL HISTORY

DRILLING DATA

LOGGING AND TESTING

G E O L O G Y

Summary of Previous Work

Geological and Drilling

Geophysical

Summary of the Regional Geology

Stratigraphic Table

Stratigraphy

Structure

Relevance to the Occurrence of Petroleum

Porosity and Permeability of the Drilled Section

**Contribution to Geological Concepts Resulting
from Drilling**

ENCLOSURES

West-East Cross section

Electric Logs

Lithologic Log

3/12

S U M M A R Y

The South Longford No. 1 was spudded on 14th December, 1963 and completed as a dry hole at a total depth of 2450 feet on 7th January, 1964. Neither hydrocarbon shows nor significant porosity and permeability were encountered during the drilling operation.

The South Longford No. 1 is the second of a series of stratigraphic holes on the Baragwanath Anticline to examine the hydrocarbon possibilities of the basal Tertiary and Upper Mesozoic formations.

The Tertiary section in this well was thin and fresh water-bearing. The Mesozoic section is characterized by tight greywackes, siltstones and shales.

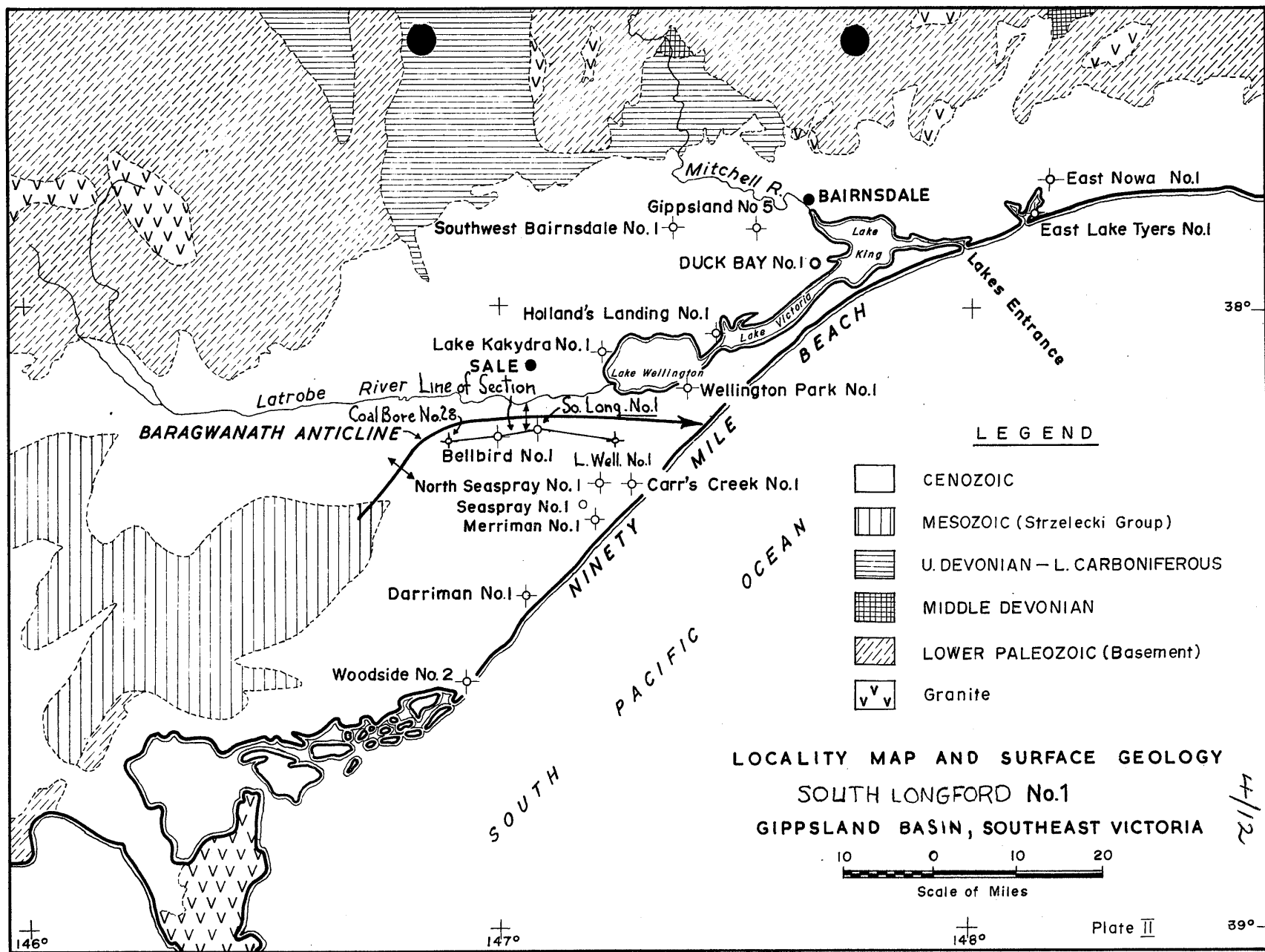
PE906324

This is an enclosure indicator page.
The enclosure PE906324 is enclosed within the
container PE903999 at this location in this
document.

The enclosure PE906324 has the following characteristics:

ITEM_BARCODE = PE906324
CONTAINER_BARCODE = PE903999
NAME = Geological Cross-section
BASIN = GIPPSLAND
PERMIT = PEP44
TYPE = WELL
SUBTYPE = CROSS_SECTION
DESCRIPTION = Geological Cross-section of South
Longford-1
REMARKS =
DATE_CREATED = 20/04/64
DATE_RECEIVED =
W_NO = W479
WELL_NAME = SOUTH LONGFORD-1
CONTRACTOR =
CLIENT_OP_CO = ARCO LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)



INTRODUCTION

The Baragwanath Anticline is a large northeast-southwest trending surface structure on the north flank of the Gippsland Basin. The structure is reflected in the Tertiary rock on the surface in the Longford area. A series of stratigraphic holes have been proposed to examine the lithology and structure of the beds above and below the Tertiary - Mesozoic unconformity.

The South Longford No. 1 is located 2½ miles south of the community of Longford and along the axis of the Baragwanath anticline. The well is further situated on a closed portion of the structure as mapped on top of the Latrobe Valley Coal Measures by a series of coal bores. Gravity work has confirmed the presence of the anticline in the Tertiary section.

WELL HISTORY

GENERAL DATA :

Well Name and Number	:	<u>SOUTH LONGFORD NO. 1</u> / 16"
Location	:	Longitude 147°5'56" East Latitude 38°11'54" South
Name and Address of Tenement Holder	:	Lakes Oil Ltd. 792 Elizabeth St. Melbourne, Victoria
Details of Petroleum Tenement	:	P.E.P. No. 44
District	:	Gippsland
Total Depth	:	2450 Driller
Date Drilling Commenced	:	14th December, 1963
Date Drilling Completed	:	6th January, 1964
Date Well Abandoned ✓	:	7th January, 1964
Date Rig Released	:	7th January, 1964
Drilling Time in Days to Total Depth	:	23 days
Elevation :		
Ground	:	304 feet
Kelly Bushing	:	309 feet
Status	:	Dry, plugged and abandoned
Cost	:	Not available

DRILLING DATA

Name and Address of Drilling Contractor : Woodside (Lakes Entrance) Oil Co. N. L.
792 Elizabeth St. Melbourne
Victoria

Drilling Plant : Make Mindrill
Type 5000
Rated Capacity 4500' with 2 3/4" drill pipe
Motor (1) Perkins Diesel BHP 38.4

Mast : Make Mindrill
Type Twin leg telescopic 48'
Rated Capacity 40,000 lbs.

Pumps : Make Bofec
Type SP 12/165 Duplex
Size 6" x 12"
Make Mindrill
Type 4 1/4" x 5"
Size 4 1/4" x 5"

Blowout Preventer Equipment : Make Baash Ross Master Gate
Model Auto Lock Manual
Size 6 1/2" 6"
Working Pressure 2000 psi 2000 psi

Hole Size and Depths : 12" 0 - 30'
8 1/4" 30' - 601'
6" 601' - 2450'

Casing and Liner Details : Size 9 1/2"
Weight 36 lbs/ft
Grade J-55
Setting Depth 30'
Size 7"
Weight 20 lbs/ft
Grade J-55
Setting Depth 520'

Casing and Liner Cementing Details : Size 9 1/2"
Setting Depth 30'
Quantity of Cement 12 sax
Cemented to Surface
Method Poured by hand
Size 7"
Setting Depth 520'
Quantity of Cement 93 sax
Method used Poured from cement mixer

Drilling Fluid	:	Type	Water base bentonite, low pH
		Average Weight	Depth
		8.8 lbs/gal.	30' - 601'
		9.0 "	601' - 1000'
		9.4 "	1000' - 1500'
		9.7 "	1500' - 2000'
		9.3 "	2000' - 2499'
Mud and Chemicals Used During Drilling	:	Bentonite	33,000 lbs
		Caustic	435 "
		C.M.C.	700 "
		Lo Vis	450 "
		Mica	425 "
		Salt	180 "
		Soda Ash	25 "
		Calgon	10 "

A mud with a medium weight and an average viscosity of 55-60 sec/qt was the most satisfactory drilling fluid. Lost circulation zones in the unconsolidated Tertiary sands below the 7" casing temporarily interrupted the drilling.

The average weekly analysis of the drilling mud is listed below :

Week ending	Viscosity	Weight	Water loss	Filter Cake	pH
22nd Dec. 1963	40	8.6	10	2/32	10
29th Dec. 1963	55	9.5	9	2/32	10
5th Jan. 1964	58	9.7	13	2/32	11

WATER SUPPLY

Water was hauled by truck from the Latrobe River, a distance of 3 miles.

PERFORATIONS AND SHOOTING RECORD

None.

PLUGGING BACK

The only plug was set for the purpose of abandonment. A cement plug was set at 470 - 720 feet using 60 sacks of cement. This plug extended from 50 feet below the top of the Strzelecki Group to 50 feet above the base of the 7" casing. The well was capped with a steel plate and marker.

FISHING OPERATIONS

None.

SIDE-TRACKED HOLES

None.

LOGGING AND TESTING

SOUTH LONGFORD

8/12

Ditch Cutting :

Standard sample catching procedures were followed in collecting 10 foot samples while drilling and 5 foot samples while coring. Complete sets of samples were sent to the Bureau of Mineral Resources and the Victorian Department of Mines.

Coring :

Two cores were cut in the Mesozoic :

Core No. 1	929' - 938'	recovered	4½'	of 9',	greywacke
" " 2	2444' - 2450'	"	5½'	of 6',	siltstone and mudstone

Sidewall Cores :

None

Electric Logging :

Schlumberger tools logged the hole. The electrical survey and microlog were run from 522 to 2450 feet on scales of 2" and 5" equal 100 feet. The continuous dipmeter was run from 522' - 2450'.

Drilling Time and Gas Log :

Continuous gas detector and drilling time charts were maintained at the well site with Core Lab equipment.

Formation Testing :

None.

Deviation Surveys :

A Totco device measured the hole deviation. A survey at 1150 feet indicated a hole deviation of 1/4° and a survey at 2400 feet indicated a deviation of 1-1/4°.

G E O L O G YSUMMARY OF PREVIOUS WORK**Geological and Drilling :**

Only a few wells have probed the Mesozoic near the east end of the Baragwanath anticline. The nearest wells along the axial trend that reached the Mesozoic are six miles to the west. The Tanjil Pt. Addis No. 1, two miles to the South, bottomed in a questionable Jurassic section. We cannot get information on this well which is located on the southwest flank of the surface structure. There are many coal evaluation bores east of the South Longford No. 1. These wells were drilled into the Latrobe Valley Coal Measures to an average depth of 200 - 300 feet.

The known nature of the anticline precluded doing field work.

Geophysical :

Previous geophysical work in the Gippsland sedimentary area includes two regional gravity surveys made in 1949 by R.H. Ray Company for Oilco Ltd., followed by a semi-regional gravity survey by the Bureau of Mineral Resources in East Gippsland in 1951. The Bureau of Mineral Resources conducted a detailed gravity survey south of the Rosedale - Sale road and west of the South Gippsland highway in 1960, at the request of the Victorian State Electricity Commission.

The Bureau of Mineral Resources made an aero-magnetic survey of the on-shore area of the Gippsland Basin in 1951-52.

Austral Geo Prospectors carried out the Bairnsdale - Sale survey for Woodside (Lakes Entrance) Oil Co. N.L., from mid-May to mid-September, 1960, between the north shore of Lake Wellington and the Princes Highway. From mid-March to early June, 1961 this same contractor, working for the same client, evaluated the Sale area which lies between Lake Wellington and the Coast. From early January to early June, 1962 this same contractor extended the latter survey for Arco - Woodside to include control along the coast from Lakes Entrance to Woodside and west of the South Gippsland highway to Longford.

SUMMARY ON THE REGIONAL GEOLOGY

The Gippsland Basin is one of several small basins along the south coast of Australia. The basin is defined and delineated by the presence of Tertiary coal measures and marine sediments. The basin proper can be considered as that area west of the Lakes Entrance granite high, south of the Tertiary - Paleozoic contact on the north side of the basin and east of a line between the Wilson's Promontory granite and the town of Warragul. The position of the south boundary is not known as it lies in the area of Bass Strait.

The Longford area of the Gippsland Basin is underlain in the sub-surface by the Strzelecki Group, a non-marine sequence consisting of shale, mudstone, sandstone, siltstone and greywacke of Lower Cretaceous - Jurassic age. The thickness of this sequence is probably in excess of 10,000 feet.

The Latrobe Valley coal measures overlie the Strzelecki group. This section is of Eocene - Oligocene age and

consists of coal, clay, and unconsolidated sands. This stratigraphic unit, where not affected by erosion, has a total thickness of about 1200 feet in the Longford area.

The formations overlying the Latrobe Valley coal measures, from bottom to top, are the Lakes Entrance formation, Gippsland Limestone, Tambo River formation, Jemmy's Point formation and the Haunted Hills gravels. These units extend in age from Oligocene to Pliocene and have an aggregate thickness of about 2000 feet. The formations above the Latrobe Valley are not represented in the South Longford No. 1 due to erosion and/or non-deposition.

STRATIGRAPHIC TABLE

The stratigraphic sequence penetrated in the South Longford No. 1 is listed below :

T A B L E I

Age	Name	Depth Ref. KB	Thick- ness	Lithology
L. Oligocene to U. Eocene	Latrobe Valley Coal Measures		670'	<u>Sand, coal and clay</u>
		670'		<u>UNCONFORMITY</u>
Lower Cretaceous	Strzelecki Group		1780'	<u>Greywacke and Claystone</u>
		2450'		

STRATIGRAPHY

0 - 670 feet

Latrobe Valley Coal Measures

Lower Oligocene to Upper Eocene

Sand, white to light gray, fine to coarse grained, sub-rounded to sub-angular, with milky quartz grains. Clay, light grey, soft, as thin interbeds in the sand section. Coal, brown and soft.

The Latrobe Valley coal measures conform to Tertiary deposition in this area by thickening from northeast to southwest. A thick coal bed is present from 245 to 290 feet. This seam may correlate with the thick seams in the North Seaspray No. 1, the Wellington Park No. 1, and in the coal bores drilled in the South Longford area. Water sands are common in this interval.

670 - 2450 feet

SOUTH LONGFORD 11/12

Strzelecki Group

Lower Cretaceous

Greywacke, light gray to gray green, very fine to medium grained, friable, composed largely of quartz, chlorite grains and clay cement with secondary amounts of red shale, black shale and volcanic debris.

Claystone, light to medium gray, partly banded, forms a sticky gumbo.

The greywackes in this well are similar to those in the Bellbird No. 1. The porous sand that characterizes the upper part of the Mesozoic in the Merriman No. 1 is absent at South Longford No. 1.

STRUCTURE

The northeast - southwest trending Baragwanath anticline is the major structural feature in the Longford area. This Tertiary feature has been substantiated by gravity surveys and by coal bores drilled by individual concerns and the State Electricity Commission of Victoria. Seismic surveys, as yet, have not been able to map continuous reflections from within the Strzelecki group. The problem is further complicated by the presence of a pronounced unconformity between the Tertiary and the Mesozoic. The South Longford No. 1 was drilled on the axis of the Tertiary structure with the hope of localizing any Mesozoic warping. Some greywacke beds in the Upper Mesozoic appear to correlate with the massive greywackes in the Bellbird No. 1. These beds indicate the South Longford No. 1 is 173 feet higher. A structural comparison is very difficult at the base of each well because of apparent variable rates of sedimentation during Mesozoic time.

The Dipmeter survey on this well showed overall southeast dip for the Tertiary and Mesozoic. The rate and direction of dip averaged 12° South 82° East. There is a marked change in dip direction at the unconformity from southeast in the Tertiary to northeast in the first 100 feet of the Mesozoic. The South Longford No. 1 may be on the south side of a Mesozoic anticlinal axis with the Bellbird No. 1 on the north side. The high structural position of the Upper Mesozoic beds in the South Longford No. 1 could be a result of local closure or faulting.

RELEVANCE TO OCCURRENCE OF PETROLEUM

There were no shows of oil or gas in the South Longford No. 1. The gas sand present in the North Seaspray No. 1 was absent, either by erosion or non-deposition.

The sands in the Tertiary Latrobe Valley coal measures are fresh water-bearing.

The Mesozoic has almost a total absence of source and reservoir beds. There is a very small chance that there are hydrocarbons in the area of the axis of the Baragwanath anticline even if structural closure is present in the Mesozoic beds.

POROSITY AND PERMEABILITY OF SEDIMENTS PENETRATED

Clean, porous water sands are present from the surface to 670 feet. The Mesozoic section from 670 - 2500 feet consists of claystones and tight, massive greywackes. The Microlog indicates four thin (1 - 4 feet) porous zones in greywackes between 1250 and 1600 feet.

CONTRIBUTION TO GEOLOGICAL CONCEPTS

The important geological information obtained from the South Longford No. 1 is listed below :

1. The South Longford area is unfavorable for Tertiary objectives because of the thin section and the fresh water-bearing nature of the porous sands.
2. The South Longford area is unfavorable for Mesozoic objectives because of the absence of significant source and reservoir rocks.
3. The favorable sedimentary section at the top of the Mesozoic, in the Merriman No. 1, does not extend to the South Longford No. 1.
4. A structure may be present in the upper part of the Mesozoic in the Longford area by upwarping or faulting.

WELL SOUTH LONGFORD No 1. W479 TYPE, STRAT-STRUCTURE BASIN GIPPSLAND
 TEN. HOLDER ^{Lakes Oil Ltd} Arco Ltd - Woodside (L.E.) Oil. Co. Ltd. 38° 11' 54" S Ph. Glencoe.
 OPERATOR Arco Ltd LOCATION, Long. 147° 05' 16" E
 TENEMENT P.E.P. #4 Military Map. Well Completion Report.
 ELEVATION 304 G.L. 309 X.B. (Datum). T.O. 2450 STATUS, D4A
 SPUD. Dec 14th 1962. COMPL. 6 Jan '64 ABD. 7 Jan '64
 CASING 9 5/8" @ 30' C.T.S. 7" @ 520' C.T.S.

STRATIGRAPHY.

Age	Formation	Depth	Thickness
U. Oligo. - U. Eocene.	Latrobe Valley Coal	0 - 1309	670
	~~~~~ unconformity ~~~~~		
L. Cretaceous.	Strzelecki Group.	670 - 361	2141 +

FORMATION TESTS  
 None

LOG SUMMARY and INTERPRETATION

Type	Run	Interval	Date	Type	Run	Interval	Date	Interval	φ	Sw
E-log	1	522 - 2450								
Microlog	1	522 - 2450								
C.D.M.	1	522 - 2450								

SOUTH LONGFORD No 1





File/Well/Depth Increment & Status	Trace	Units	Depth Range		Data Range		Missing Data Depth Ranges	
BELLBIRD 1, TRACES	CALI	IN	569.5000	2509.5000	4.91	8.03	No Data Gaps	
BELLBIRD 1	LAT	OHMM	600.5000	2505.5000	4.94	621.33		
0.5000 f OPEN	LN	OHMM	600.5000	2503.5000	6.34	417.38		
	SN	OHMM	600.0000	2505.5000	4.97	243.60		
	SP	MV	600.5000	2508.5000	16.16	66.84		
	Total Data :		9561.5000 f		Total Gaps :		0.0000	
DUCK BAY 1, TRACES	CALI	IN	408.0000	4238.0000	7.18	18.63	No Data Gaps	
DUCK BAY 1	DT	US/F	407.5000	4227.0000	51.68	204.94		
0.5000 f OPEN	GR	SAPI	150.5000	4203.5000	4.97	135.48		
	LAT	OHMM	428.0000	4235.5000	0.19	371.46		
	LN	OHMM	411.5000	4237.5000	1.22	199.92		
	SN	OHMM	410.5000	4240.0000	1.06	114.34		
	SP	MV	411.5000	4244.5000	27.62	97.27		
	Total Data :		26998.5000 f		Total Gaps :		0.0000	
DUTSON DOWNS 1, TRACES	CALI	IN	357.5000	6112.5000	5.85	20.85	No Data Gaps	
DUTSON DOWNS 1	DT	US/F	372.5000	6100.0000	51.68	222.53		
0.5000 f OPEN	GR	SAPI	97.5000	6105.5000	3.80	186.13		
	LAT	OHMM	396.0000	6123.5000	0.43	267.43		
	LN	OHMM	379.5000	6123.5000	0.64	118.57		
	NEUT	NAPI	97.5000	6115.0000	331.94	1493.82		
	SN	OHMM	377.0000	6122.0000	1.04	65.93		
	SP	MV	373.0000	6131.0000	21.25	119.86		
	Total Data :		46482.5000 f		Total Gaps :		0.0000	
NORTH SEASPRAY 1, TRACES	CALI	IN	506.0000	5007.0000	6.17	20.25	No Data Gaps	
NORTH SEASPRAY 1	DT	US/F	500.0000	5002.5000	37.75	210.47		
0.5000 f OPEN	GR	SAPI	2983.0000	4442.0000	12.04	116.71		
	LAT	OHMM	536.0000	5012.5000	0.16	465.76		
	LN	OHMM	520.0000	4996.5000	1.08	207.25		
	SN	OHMM	520.0000	5014.0000	0.87	96.41		
	SP	MV	520.0000	5012.5000	0.73	61.39		
	Total Data :		28482.0000 f		Total Gaps :		0.0000	
SOUTH LONGFORD 1, TRACES	CALI	IN	511.0000	2450.5000	5.65	9.46	No Data Gaps	
SOUTH LONGFORD 1	LAT	OHMM	542.5000	2453.5000	5.24	541.21		
0.5000 f OPEN	LN	OHMM	526.0000	2451.5000	6.53	387.92		
	SN	OHMM	521.0000	2453.5000	1.14	177.49		
	SP	MV	515.0000	2457.0000	5.56	94.57		
	Total Data :		9650.5000 f		Total Gaps :		0.0000	
SPOON BAY 1, TRACES	CALI	IN	324.5000	4600.0000	7.24	15.13	No Data Gaps	
SPOON BAY 1	DT	US/F	319.0000	4600.0000	53.87	205.52	2651.5000	2679.5000
0.5000 f OPEN	GR	SAPI	20.5000	4600.0000	6.26	256.94	2667.0000	2679.0000
	IND	OHMM	343.0000	4603.5000	0.83	73.85		
	SN	OHMM	340.0000	4611.0000	1.07	99.75		
	SP	MV	340.0000	4610.0000	-6.55	92.11		

PE603654

This is an enclosure indicator page.  
The enclosure PE603564 is enclosed within the  
container PE903999 at this location in this  
document.

The enclosure PE603564 has the following characteristics:

- ITEM_BARCODE = PE603564
- CONTAINER_BARCODE = PE903999
- NAME = Mud Log
- BASIN = GIPPSLAND
- PERMIT = PEP44
- TYPE = WELL
- SUBTYPE = MUD_LOG
- DESCRIPTION = Mud Log (Lithological Log) for South  
Longford-1
- REMARKS =
- DATE_CREATED = 7/01/64
- DATE_RECEIVED = 17/03/86
- W_NO = W479
- WELL_NAME = SOUTH LONGFORD-1
- CONTRACTOR =
- CLIENT_OP_CO = ARCO LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

PE603655

This is an enclosure indicator page.  
The enclosure PE603565 is enclosed within the  
container PE903999 at this location in this  
document.

The enclosure PE603565 has the following characteristics:

ITEM_BARCODE = PE603565  
CONTAINER_BARCODE = PE903999  
    NAME = Electrical Log  
    BASIN = GIPPSLAND  
    PERMIT = PEP44  
    TYPE = WELL  
    SUBTYPE = WELL_LOG  
DESCRIPTION = Electrical Log for South Longford-1  
REMARKS =  
DATE_CREATED = 6/01/64  
DATE_RECEIVED =  
    W_NO = W479  
    WELL_NAME = SOUTH LONGFORD-1  
CONTRACTOR = SCHLUMBERGER  
CLIENT_OP_CO = ARCO LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

PE603656

This is an enclosure indicator page.  
The enclosure PE603566 is enclosed within the  
container PE903999 at this location in this  
document.

The enclosure PE603566 has the following characteristics:

- ITEM_BARCODE = PE603566
- CONTAINER_BARCODE = PE903999
- NAME = Microlog
- BASIN = GIPPSLAND
- PERMIT = PEP44
- TYPE = WELL
- SUBTYPE = WELL_LOG
- DESCRIPTION = Microlog for South Longford-1
- REMARKS =
- DATE_CREATED = 6/01/64
- DATE_RECEIVED =
- W_NO = W479
- WELL_NAME = SOUTH LONGFORD-1
- CONTRACTOR = SCHLUMBERGER
- CLIENT_OP_CO = ARCO LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

PE603657

This is an enclosure indicator page.  
The enclosure PE603567 is enclosed within the  
container PE903999 at this location in this  
document.

The enclosure PE603567 has the following characteristics:

ITEM_BARCODE = PE603567  
CONTAINER_BARCODE = PE903999  
NAME = Continuous Dipmeter Log  
BASIN = GIPPSLAND  
PERMIT = PEP44  
TYPE = WELL  
SUBTYPE = WELL_LOG  
DESCRIPTION = Continuous Dipmeter Log for South  
Longford-1  
REMARKS =  
DATE_CREATED = 7/01/64  
DATE_RECEIVED =  
W_NO = W479  
WELL_NAME = SOUTH LONGFORD-1  
CONTRACTOR = SCHLUMBERGER  
CLIENT_OP_CO = ARCO LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)