Natural Resources and Environment

AGRICULTURE • RESOURCES • CONSERVATION • LAND MANAGEMENT

WELL SUMMARY

LAKES ENTRANCE DEVELOPMENT - 2 (W370)

1 Folio No	2 Referred to	3 Date	4 Clearing Officer's Initials

FILE COVER INSTRUCTIONS FOR ACTION OFFICERS

(1) FOLIO NUMBERS: Each subject paper attached to a file is to be given a consecutive number by the attaching officer. Papers must not be removed from or attached to a file without approval.

(2) REFERRAL TO OTHER OFFICERS: When an Officer completes action on the file and further action is required by some other Officer, please initial Column (4) and on the next vacant line, enter the relevant folio number in Column (1), indicate to whom the file is to be forwarded in Column (2) and record the date in Column (3).

3 BRING UP MARKINGS: When action on a file is required at a later date, the officer will initial Column (4) and, on the next vacant line, enter the relevant folio number in Column (1), then write "B/U" followed by the action officer's name in Column (2) and the date the file is required in Column (3).

4 PUTAWAY MARKINGS: When ALL action on a file is completed the officer concerned will initial Column (4) and, on the next vacant line, write "P/A" in column (2).

REGISTRY MUST BE NOTIFIED OF ANY FILE MOVEMENTS BETWEEN OFFICERS

LOCATION

LAKES ENTRANCE DEVELOPMENT-2 (W370)

Well Summary Report

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Well Summary Card

Driller's Reports

Lithology

Lithology, Stratigraphy and Palynology – B. Hocking

Hydrocarbon Analysis

PE904082

This is an enclosure indicator page.
The enclosure PE904082 is enclosed within the container PE906144 at this location in this document.

The enclosure PE904082 has the following characteristics:

ITEM_BARCODE	= PE904082
CONTAINER_BARCODE	= PE906144
NAME	= well card
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= WELL
SUBTYPE	= WELL_CARD
DESCRIPTION	= well card Lakes Entrance 2
REMARKS	= Abandoned 16/05/1928
DATE_CREATED	= 26/02/1927
DATE_RECEIVED	=
W_NO	= W370
WELL_NAME	= Lakes Entrance Development-2
CONTRACTOR	= Lakes Entrance Development Co
CLIENT_OP_CO	= Lakes Entrance Development Co

(Inserted by DNRE - Vic Govt Mines Dept)

DRILLERS REPORTS

W 370 1023

VICTORIA.—DEPARTMENT OF MINES.

BORING OPERATIONS.

The following is the Record of Work done on .... Drill No. .... while in charge for week ending 10/12/1927

Telegraphic Address Lakes Entrance

Postal Address do do

T. J. Hogan
Signature of Foreman.

Parish of .... Bore No. 2

POSITION: From .... corner allot. .... section .... go ....

.... then ....

STAFF.

Position.	Name.	Shift Hours.	Days worked.
Foreman	T. J. Hogan	till	
Shift-foreman	E. R. Duffield	till	
Shift-foreman	N. Lewis	till	
Assistant		till	
Assistant	N. Beazley	till	
Assistant		till	

TOOLS USED.

	From. feet.	To. feet.		From. feet.	To. feet.
Auger			Calyx		
Drive pump			Shot		
Star bit					

FUEL.

On hand at end of previous week	
Received during week	
Total	
On hand	
Used	

WATER.

Struck at .... feet.

Flow .... gallons per hour.

Quality ....

Standing at when bore completed .... feet.

TUBES.

	7" feet.	6" feet.	5" feet.	4" feet.	3" feet.
In hole					
Not in use					
Total					

Diameter of bore hole 8 inches.

Reduced to 7¼ inches diameter at 50 feet.

Dip at strata ....

Remarks on strata that are worth recording, also explanations of any delays, repairs, loss of material, &c. :—

good showing of oil in water while baling oil

T. J. H.
Initials of Foreman.

Received 13 DEC 1927 HHB

Director of Geological Survey

Engineer for Boring

FEET BORED.

Shift.		From. feet.	To. feet.	For Shift. feet.	METER. At end of Shift.
Monday 5/12/27	Night				
	Day	Boring out cement plug			
	Afternoon				
Tuesday 6/12/27	Night				
	Day	Boring out cement plug			
	Afternoon				
Wednesday 7/12/27	Night				
	Day	Cleaning out Bore			
	Afternoon				
Thursday 8/12/27	Night				
	Day	Baling water			
	Afternoon				
Friday 9/12/27	Night				
	Day	Baling water			
	Afternoon				
Saturday 10/12/27	Night				
	Day	Baling water			
	Afternoon				
TOTAL FOR WEEK					

STRATA PASSED THROUGH.

Material.	From. ft.	in.	To. ft.	in.	Thickness. ft.	in.	Core Obtained. ft.	in.

VICTORIA.—DEPARTMENT OF MINES. W 370

BORING OPERATIONS.

...wing is the Record of Work done on ..... Drill No. ..... while in
...r week ending 2 / 1 / 1928
...ne Address Lake Entrance
...l Address Lake Entrance
Parish of ..... Bore No. 2

Signature of Foreman.

POSITION : From ..... corner allot. ..... section ..... go .....
..... then .....

STAFF.

Position.	Name.	Shift Hours.	Days worked.
Foreman ...	J. Hoffman	7.30 to 5	6
Shift-foreman	C. L. Duffield	1.30 till	6
Shift-foreman		till	
Assistant ...	R. Lewis	6.30 till 1	6 3/4
Assistant ...	R. Bradley	1.30 till	6
Assistant ...		till	

TOOLS USED.

	From. feet.	To. feet.		From. feet.	To. feet.
Auger ...			Calyx ...		
Drive pump			Shot ...		
Star bit ...					

FUEL.

On hand at end of previous week	
Received during week	
Total	
On hand	
Used	

WATER.

Struck at ..... feet.
Flow ..... gallons per hour.
Quality .....
Standing at when bore completed ..... feet.

TUBES.

	7″ feet.	6″ feet.	5″ feet.	4″ feet.	3″ feet.
In hole					
Not in use					
Total					

Diameter of bore hole 4 1/4 inches.
Reduced to 3 1/4 inches diameter at 50 feet.
Dip at strata .....

Remarks on strata that are worth recording, also explanations of any delays, repairs, loss of material, &c. :—

Fair drawing of oil at times while Baiting

J. H.

Initials of Foreman.

Received 24 JAN. 1928
Director of Geological Survey .....
...r for Boring .....

FEET BORED.

Shift.	From. feet.	To. feet.	For Shift. feet.	METER. At end of Shift.
Monday 16/1/28 — Night ...				
Monday 16/1/28 — Day ...	Bailing water			
Monday 16/1/28 — Afternoon	Repairs			
Tuesday 17/1/28 — Night ...				
Tuesday 17/1/28 — Day ...	Bailing water			
Tuesday 17/1/28 — Afternoon				
Wednesday 18/1/28 — Night ...				
Wednesday 18/1/28 — Day ...	Bailing water			
Wednesday 18/1/28 — Afternoon				
Thursday 19/1/28 — Night ...				
Thursday 19/1/28 — Day ...	Bailing water			
Thursday 19/1/28 — Afternoon				
Friday 20/1/28 — Night ...				
Friday 20/1/28 — Day ...	Bailing water			
Friday 20/1/28 — Afternoon				
Saturday 21/1/28 — Night ...				
Saturday 21/1/28 — Day ...				
Saturday 21/1/28 — Afternoon				
TOTAL FOR WEEK ...				

STRATA PASSED THROUGH.

Material.	From. ft. in.	To. ft. in.	Thickness. ft. in.	Core Obtained. ft. in.

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VICTORIA.—DEPARTMENT OF MINES. W 370

BORING OPERATIONS.

...following is the Record of Work done on .... Drill No. .... while in ...ge for week ending 1 / 2 / 1928

...graphic Address Lakes Entrance

Postal Address do do

T. J. O'Fair — Signature of Foreman.

Parish of .... Bore No. 2

POSITION: From .... corner allot. .... section .... go .... then ....

STAFF.

Position.	Name.	Shift Hours.	Days worked.
Foreman	[illegible]	till	[illegible]
Shift-foreman	[illegible]	till	[illegible]
Shift-foreman	[illegible]	till	[illegible]
Assistant	[illegible]	till	[illegible]
Assistant	[illegible]	till	[illegible]
Assistant	[illegible]	till	[illegible]

TOOLS USED.

	From. feet.	To. feet.		From. feet.	To. feet.
Auger			Calyx		
Drive pump			Shot		
Star bit					

FUEL.

On hand at end of previous week	
Received during week	
Total	
On hand	
Used	

WATER.

Struck .... feet.

Flow .... gallons per hour.

Quality ....

Standing at when bore completed .... feet.

TUBES.

	7" feet.	6" feet.	5" feet.	4" feet.	3" feet.
In hole					
Not in use					
Total					

Diameter of bore hole [illegible] inches.

Reduced to 7¾ inches diameter at [illegible] feet.

Dip at strata ....

Remarks on strata that are worth recording, also explanations of any delays, repairs, loss of material, &c. :—

Rice Drawing of oil coming out of core

T. J. O'F. — Initials of Foreman.

Received ... 28

...ctor of Geolo...

... for Boring

FEET BORED.

Day	Shift.	From. feet.	To. feet.	For Shift. feet.	METER. At end of Shift.
Monday 6/12/28	Night				
	Day	Bailing water			
	Afternoon				
Tuesday 7/12/28	Night				
	Day	Bailing water			
	Afternoon				
Wednesday 8/12/28	Night				
	Day	Bailing water [illegible]			
	Afternoon				
Thursday 9/12/28	Night				
	Day	Bailing water			
	Afternoon				
Friday 10/12/28	Night				
	Day	1236	1243	7	
	Afternoon				
Saturday 11/12/28	Night				
	Day	1243	1247	4	
	Afternoon	[illegible]			
	TOTAL FOR WEEK				

STRATA PASSED THROUGH.

Material.	From. ft. in.	To. ft. in.	Thickness. ft. in.	Core Obtained. ft. in.
Green Glauconite Sandstone	1236	1247	11	8

LITHOLOGY

L.E.D. No 2 Bore. W370

Year 1927

PARISH OF BULLAROOK.

For bores 1 to 7, see Annual Report for 1899.

Bore 8.

Position.—45 chains east then 5 chains south from north-west corner of allotment 11, section A.

Strata.	Thickness. ft.	in.	Depth struck. ft.	in.
Soil and clay	2	0	0	0
Clay and ironstone boulders ..	6	0	2	0
Basalt	27	0	8	0
Clay and decomposed basalt ..	1	0	35	0
Clay, red	6	0	36	0
Basalt, decomposed in places ..	19	0	42	0
Basalt, hard	9	0	61	0
Depth bored			70	0

Artesian water (600 gallons per hour) struck at 35 feet.

Water analysis; grains per gallon.

Lab. No. 735; *depth* 35 *feet.*

$CaCO_3$	8·2
$MgCO_3$	11·9
$MgCl_2$	3·1
Na_2CO_3	Nil
Na_2SO_4	Nil
$CaSO_4$	Nil
NaCl	47·5
Insol.	Trace
Total	70·7

PARISH OF COLQUHOUN.

For L.E.D. Co. No. 1 Bore, see Boring Report for 1924.

LAKES ENTRANCE DEVELOPMENT CO. No. 2 BORE.

(This bore was sunk by the company.)

Position.—13 chains west from the north-east corner of allotment 25.

Surface level, 31·39 feet.

Strata.	Thickness. ft.	in.	Depth struck. ft.	in.
Clay, sandy	30	0	0	0
Sand, yellow, with shells	30	0	30	0
Sand, cemented, calcareous ..	20	0	60	0
Limestone, impure	10	0	80	0
Sand, fine, cemented, calcareous ..	30	0	90	0
Limestone, impure	20	0	120	0
Sand, fine, cemented, calcareous ..	20	0	140	0
Limestone, fossiliferous, polyzoal ..	20	0	160	0
Sand, cemented, fine, calcareous, coarse bands	200	0	180	0
Limestone, blue-grey	10	0	380	0
Sand, cemented	10	0	390	0
Limestone, fine grained	40	0	400	0
Sand, calcareous, cemented ..	40	0	440	0
Limestone	10	0	480	0
Sand, polyzoal, calcareous ..	20	0	490	0
Limestone, soft	10	0	510	0
Sand, cemented, coarse, calcareous	50	0	520	0
Marl, with shells	10	0	570	0
Sand, grey and green, calcareous ..	40	0	580	0
Limestone, polyzoal	40	0	620	0
Marl	20	0	660	0
Sand, cemented, calcareous ..	20	0	680	0
Marl, with shells	20	0	700	0
Sand, calcareous, cemented ..	90	0	720	0
Limestone, polyzoal	20	0	810	0
Sand, calcareous, fine grained, cemented	10	0	830	0
Marl	10	0	840	0
Sand, coarse, cemented, calcareous	40	0	850	0
Marl	10	0	890	0
Limestone, polyzoal	10	0	900	0
Marl	10	0	910	0
Sand, calcareous	20	0	920	0
Marl	30	0	940	0
Limestone, impure	10	0	970	0
Sand, cemented, calcareous ..	20	0	980	0
Marl	10	0	1,000	0
Sand, brown, cemented, calcareous, micaceous	10	0	1,010	0
Marl, shelly	20	0	1,020	0
Sand, cemented, micaceous, calcareous	34	0	1,040	0
Limestone compact—				
1 ft. hard band at 1,074 0 ..	16	0	1,074	0
1 ft. „ „ „ 1,090 0 ..	17	0	1,090	0
10 in. „ „ „ 1,107 0 ..	13	0	1,107	0
6 in. „ „ „ 1,120 0 ..	30	0	1,120	0
9 „ „ „ „ 1,150 0 ..	22	0	1,150	0
5 „ „ „ „ 1,172 0 ..	28	0	1,172	0
Sand, glauconitic	10	0	1,200	0
Glauconite, conglomerate ..	60	0	1,210	0
Granite, bedrock	5	0	1,270	0
Depth bored			1,275	0

N.B. Gas, oil & water encountered but not recorded here.

PARISH OF EGERTON.

For bores 1 to 7, see Boring Report for 1925; 8, see Boring Report for 1926.

Bore 9.

Position.—1 chain west, then 2 chains south from north-east corner of allotment 1, section 8.

Strata.	Thickness. ft.	in.	Depth struck. ft.	in.
Clay	7	0	0	0
Sand, fine and coarse	33	0	7	0
Sand and gravel	35	0	40	0
Sand, fine	5	0	75	0
Sand, cemented	10	0	80	0
Sand, fine	5	0	90	0
Drift sand	2	0	95	0
Depth bored			97	0

Water struck at 95 feet.

Bore 10.

Position.—1 chain west, then 126 feet south from north-east corner of allotment 1, section 8.

Strata.	Thickness. ft.	in.	Depth struck. ft.	in.
Soil	1	6	0	0
Clay	5	6	1	6
Sand, fine	39	0	7	0
Gravel	29	0	46	0
Sand, cemented	10	0	75	0
Sand, fine	25	0	85	0
Clay, white	15	0	110	0
Sand, fine	2	0	125	0
Clay, stiff	5	0	127	0
Sand, fine	13	0	132	0
Gravel and clay	2	0	145	0
Sand, fine	3	0	147	0
Sand, coarse	9	0	150	0
Depth bored			159	0

Water struck at 125 feet, standing at 62 feet

Water analysis; grains per gallon.

Lab. No. 407; *depth*, 72 *feet.*

$CaCO_3$	9·5
$MgCO_3$	0·5
$MgSO_4$	17·5
$MgCl_2$	13·8
NaCl	177·3
Total	218·6

(Copy of Log)

LAKES ENTRANCE DEVELOPMENT COMPANY - No.2. BORE - LAKES ENTRANCE.

Elevation 30'.

Surface to 30' - sandy clay.

30'	to	180'	- Alternating sands calc. limestone fossiliferous.
180'	"	380'	- Cemented sand, fine calcareous with coarse bands.
380'	"	1074'	- limestone blue grey and green polyzoal and marl, all alternating.

1074'	hard band	1'
1090'	" "	"
1107'	" "	10"
1120'	" "	6"
1150'	" "	9"
1172'	" "	5"

Micaceous calcs. cemented sand and limestone alternating.

1200' to 1210' - sand cemented, with glauconite

Water at 1210'.

Oil at 1218'

1218' to 1270' - glauconite conglomerate

Water at 1270'.

1270' to 1275' - bedrock.

Above detail copies from Departmental log prepared by Mines Department.

Quite an appreciable amount of oil and gas was coming up with the fluid as the casing was being pulled, prior to being sealed off and ABANDONED.

LITHOLOGY, STRATIGRAPHY AND PALYNOLOGY

- B. HOCHING

LAKES ENTRANCE DEVELOPMENT CO. NO. 2 BORE

Year: 1927

Location: Parish of Colquhoun, lat. 37° 52' 21" S, long. 148° 00' 43" E.

Elevation: 31 feet.

Samples: cores every 10 ft. below 70 ft., less frequent below 1050 ft.

LITHOLOGIC LOG:

References have also been made to the drillers log.

0 - 30: sandy clay

30 - 60: yellow shelly sand

60 - 80: dark greenish brown shelly calcareous sand

80 - 90: grey shelly glauconitic sandy marl

90 - 160: weakly bedded yellowish grey polyzoal marly limestone, relatively friable, containing fine shell fragments, rare glauconite

160 - 180: whitish limestone, abundant polyzoa

180 - 380: light grey to mid-grey marly limestone, either richly polyzoal or fine-grained (sandy texture) and less polyzoal

380 - 390: very dense dark grey limestone

390 - 480: light grey to yellowish grey polyzoal marly limestone, hard in parts

480- 660: white, yellow, or grey polyzoal limestone, usually hard.

660 - 680: grey marl with small polyzoa; very weak bedding

680 - 700: hard yellowish grey marly limestone

700 - 720: relatively hard brownish grey marl; abundant small polyzoa, and also shells

720 - 730: brownish grey marly limestone (sandy texture)

730 - 770: hard yellowish polyzoal limestone

770 - 820: light brownish grey marly limestone, with polyzoa and occasional mollusca

820 - 850: hard yellowish polyzoal limestone

850 - 880: as for 770 - 820 ft; large tubular structures at 870 ft. (? algae).

880 - 900: hard yellowish polyzoal limestone

900 - 910: yellow marly limestone, abundant polyzoa

910 - 920: hard yellowish polyzoal limestone, common Terebratulids

920 - 990: hard yellowish grey marly limestone with very fine polyzoal and shell fragments; gastropods occur in a cemented horizon at 980 ft.

990 - 1020: brownish grey marl; polyzoa, mollusca, and Terebratulids.

1020 - 1200: dark olive brown micaceous marl and siltstone; few polyzoa and also gastropods (including Turritella); flaky grey marls with frondose polyzoa between 1040 and ?1060 ft.; hard bands of 'limestone' containing well-preserved gastropods at :-

1074 ft. (1 ft. thick)
1090 ft. (1 ft.)
1107 ft. (10 in.)
1120 ft. (6 in.)
1150 ft. (9 in.)
1172 ft. (5 in.)

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1200 : (a) khaki-green micaceous sandy siltstone
(b) green glauconitic sandstone with limonite pellets; rare shell material

1210 : relatively soft glauconitic fine sandstone; remains of gastropods (including Turritella).

1210 - 1272: dark green glauconitic sandstone (clayey maitrix), partially gritty; shell fragments rare.

1272 - 1275: greenish granite with pink felspars.

STRATIGRAPHIC INTERPRETATION:

0 - 30 feet:

Sandy clay of presumably post-Kalimnan age.

30 - 80 feet (Jemmys Point Formation):

Shelly sand overlying glauconitic calcareous sand. Typical Kalimnan species were recorded in the basal sample, pelagics being uncommon.

80 - 160 feet (Tambo River Formation):

Weakly bedded grey glauconitic sandy marl and marly limestones. Elphidium and miliolids are rare, and Orbulina universa becomes common. Kalimnan characteristics are still quite evident, however.

160 - 1020 feet (Gippsland Limestone):

160 - 540 ft. (Bairnsdalian):-

First limestone (in drilled order) at 160 ft. marks the top of the Gippsland Limestone. Orbulina universa is recorded down to 540 ft. Other pelagic species include Biorbulina bilobata, Globigerinoides bispherica and G. triloba.

540 - ?590 ft. (Balcombian):-

Limestones. Benthonic species are predominant, although at 540 ft. Globigerinoides bispherica and G. triloba are not uncommon. Amphistegina lessonii and Operculina victoriensis are recorded together below this same depth. Upper samples also contain Elphidium sp. Astrononion obesum, a typical Balcombian benthonic species, occurs down to 590 ft.

?590 - 660 ft. (Batesfordian):-

Limestones, with typical Batesfordian species such as Gypsina howchini and Lepidocyclina howchini. Pelagic species are rare.

660 - 1020 ft. (Longfordian):-

The first definite marl (in drilled order) occurs at 660 ft., although the lithology isprimarily of interbedded yellowish grey marly limestone and cream polyzoal limestones. Astrononion centroplax occurs below 660 ft., and also Cibicides perforatus. Globigerina apertura occurs, but pelagic species are again uncommon.

1020 - 1272 feet (Lakes Entrance Formation):

1020 - 1200 ft. (Micaceous Marl):-

Micaceous marls and siltstones with hardlimestone bands. Janjukian species - typical of Carter's F.U.5 - include Victoriella plecte, Globigerina

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ampliapertura, G. parva, Cibicides perforatus, Elphidium crespinae, Gyroidina zealandica, and Notorotalia crassimura.

1200 - 1272 ft. (Glauconitic Sandstone):-

Fine to coarser glauconitic sandstone, generally with a very poor fauna, but at 1200 ft. containing abundant small pelagic species including Globigerina ampliapertura, G, parva, and those approaching the G. linaperta type. Elphidium crespinae occurs also. This fauna appears to be a pre - F.U.5 type. A sample between 1210 and 1272 ft. yielded a single species only : Calcarina c.f. mackayi.

1272 - feet:

Granitic basement rock.

Comments on Stratigraphy:

A significant point is the occurrence of more calcareous lithologies than are usually encountered throughout the Gippsland Limestone. True marls are rare, particularly in the Longford Limestone Member where they are normally predominant. True limestones occur in considerable thicknesses, and are significant even in the lower part of the Gippsland Limestone where normally they are absent. In response to this overall increase in lime content polyzoa are correspondingly more abundant throughout.

No sediments referable to Boutakoff's 'Colquhoun Gravels' have been recorded.

B.H.

B. HOCKING
GEOLOGIST
30.8.63.

LED. No. 2

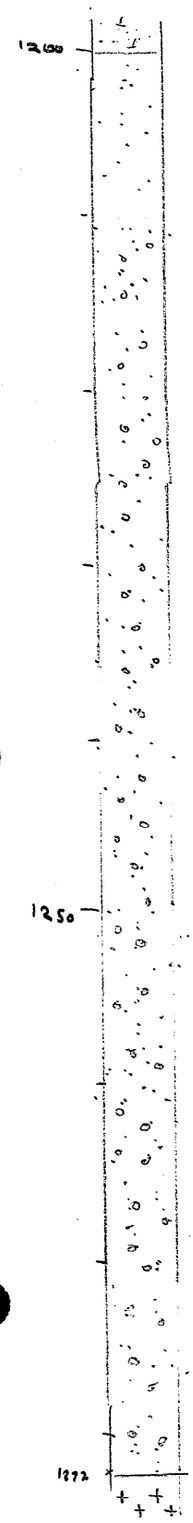
BASAL TERTIARY SECTION.

Down to 1200 : dark brown micaceous marl + siltstone, glauc.
- F.U.5.

1200 - 1272 : - glauconitic sandstone, gritty towards base
- F.U.4.

1272 - : granitic basement.

L.E.D. No. 2



Mica marl & silt st., glauc. — — FU 5
FU 4

Glauc. sandst, gritty

(? O)

Granite

HYDROCARBON ANALYSIS

Lakes Entrance Dev. - 2. W 370
Records Geological Survey of Victoria 1937.
Volume 5 - part 4.

underlie 82 deg. north, the probabilities are that a greater distance would have to be driven to encounter the auriferous shoot, should it pitch easterly.

The reef in the face of the Kong Meng adit reveals about 1 foot of formation dipping 84 deg. south, indicating that the channel has taken a roll to the south between the surface level and adit, a depth of approximately 230 feet.

The proposed continuation of this level is the most practical method of testing the downward continuation of the old Kong Meng shoot. [17.4.35.]

Previous report by J. P. L. Kenny, B.C.E., Rec. G. S., Vol. 4, Part 4, p. 408.

BORING FOR OIL, LAKES ENTRANCE.

By W. Baragwanath.

The Lakes Entrance Development Company is engaged in boring (No. 2 bore, L. E. D. Co.), at a site south of the Prince's Highway, about 1½ miles east of the township of Lakes Entrance. After drilling through about 1,200 feet of polyzoal limestones and marls, a marked change of strata was encountered, and signs of oil were reported in August of last year.

To investigate the occurrence, Mr. J. W. Binney (Assistant Engineer for Boring) and Mr. J. C. Watson (Chief Chemist), visited the site on 22nd August, and further core and samples for testing were obtained. At that date the bore had passed through 1,209 feet of polyzoal limestones and marl, then a layer of glauconite strata 3 feet thick, followed by about 2 feet of sand, then 15 feet into glauconite strata, making a total depth of 1,229 feet. Messrs Binney and Watson reported that during the boring, films and globules of oil were noticeable, also inflammable gas. On testing the core and oil obtained from the bore in the laboratory on return, Mr. Watson stated that mineral oil was present, and this fact was of scientific value. The oil proved to be a brownish-coloured, heavy, asphaltic base petroleum.

Following this discovery, further developments were watched by officers of the Department. Some delay was occasioned by a mishap to the casing, but this was overcome, and by the end of November the casing was set in cement in the upper portion of the glauconite strata. Prior to this operation, water level stood at about 20 feet in the bore. The plugs and cement were bored out under Mr. Binney's supervision, and a further 3 feet of core obtained during December. Bailing operations were conducted to endeavour to secure a flow of oil into the bore, but little progress was made, and in January, a further boring was carried out, making the hole a total depth of 1,236 feet. The results had proved somewhat unsatisfactory, and on 7th February, in company with Mr. Binney, I visited the bore to conduct a series of tests.

Operations just prior to my visit had been with a view to unwatering the bore, and at 10 a.m. on the 7th the water level was at 70 feet from the surface. Before removing the casing head a slight pressure was noticeable, but no gas was detected. Bailing was commenced, and the water allowed to discharge into a tub for observation. Although the bailer was not fully submerged, no traces of oil could be detected. On

reaching a depth of 594 feet the water was found to be discoloured, and a slight film was detected for the first time. At 6.43 p.m., water level had been reduced to 935 feet, and the bore was closed down till 8.25 p.m. It was found at this time that the water in the bore was making at the rate of 1 gallon per minute, and slow bailing was carried on till daylight, when the water level was measured, and found to be 1,152 feet from surface. A little oil scum and froth were noticeable soon afterwards, the bailer now reaching the bottom of the hole 1,240 feet from surface. At 7.45 the water was only a few feet in the bore, and bailing ceased to allow the water to rise. At 10 a.m., 80 feet of water was in the bore, and steady bailing was conducted till 12 o'clock. A few globules of oil and some scum were obtained. The bore was allowed to stand till 2.15, when bailing was resumed, the water having risen 40 feet during the interval. Films of oil, occasional globules, and scum attached to the side of the bailer were noticeable. At 4 o'clock the bore was nearly dry again, and a further cessation of two hours allowed the water to again make in the bore. At 6.37 slow bailing was resumed, and continued till 10 p.m. when the bore was again dry. By taking three dips to the hour the water was kept at under 20 feet in the bore, and held at this level until 11 a.m. on the 9th. The oil and scum obtained throughout these tests, extending over 49 hours, were forwarded to the laboratory, and yielded 2½ oz. of a heavy, dark-brown, viscous oil.

From observations made* during bailing operations, I concluded that a small quantity of oil was present in the bore; that the pockets of gas were practically exhausted; that the flow of water into the bore was only about 1 gallon per minute; that the oil coming in was, owing to the low gas pressure and small flow of water, chiefly adhering to the sides of the bore, and that even if the head of water in the bore was reduced, no further quantity could be secured, consequently I advised the further deepening of the hole. This was agreed upon, and at noon on the 9th the boring tools were again lowered.

On Monday, the 13th instant, a further section of core had been obtained, and I returned to the locality on the 14th. An examination of the core showed it to be still glauconitic from which globules of oil had exuded, and were still visible. As further boring was in progress, the following results were noticed on the 14th:—

At 8 a.m. artesian water was running from the bore at the rate of half a gallon per minute; the bore was 1,257 feet in depth. Water was pumped into the bore, and clean water was discharged until 9 o'clock, when sediment came up with films and globules of oil and scum. This was collected in the tank, and pumping was continued till 10 o'clock. The oil was collected and forwarded to the Laboratory (sample No. 104) as a result of two hours' pumping, half of which time was taken for the circulating water to reach the surface and bring along with it the oil globules imprisoned with sediment at the bottom of the hole.

The rods were withdrawn and the sediment in chip cup examined, and found to consist largely of fine-grained, glauconitic material, but, owing to the core having fallen out, it was necessary to put down the drill again, and bore a further few feet to secure another core. Drilling was resumed at 3.15 p.m., and in under the hour a further 18 inches

* See addendum, p. 565.

was bored. At 4.45 numerous oil globules appeared, and much inflammable gas effervesced from the bore. Pumping* was continued slowly until 6 p.m.; the films and globules were present throughout, and the surface of the water highly iridescent. A small stream of water continued to flow with globules of oil until 10 p.m., when the globules were few. At 8 p.m. on the 16th the water was flowing steadily, but no oil was evident, though gas was flowing freely. At 8.20 pumping was resumed at full pressure, and at 8.50 globules and films showed at the surface, becoming more plentiful until 9.10, when the rods were brought up. A sample of core 18 inches in length was secured, and was found to consist of two kinds, one portion being free of traces of oil, and the other showing gas effervescing with oil films. This was evident not only on the outside of core, but also on the inside of the core when broken. On placing the core in water free oil in globules and films rose to the surface in plenty. On emptying the chip cup layers of coarse sand were present, showing that at a depth of about 1,260 feet two layers of sand exist in the glauconitic strata. The tank was skimmed of oil content and submitted to the laboratory (sample No. 105).

To summarize the position, it may be stated that the existence of free oil in glauconitic strata has been established. The quantity, though small, is appreciable. The oil has a specific gravity which permits of it rising slowly to the surface of the water, but, on account of its extreme viscosity, it has a tendency to adhere to the side of the bore hole until freed by the action of the boring tools, or the flow of water used for flushing purposes. On cessation of boring the sediment in the return water rapidly settles, and, acting as a filter, retains the oil. The gas pressure exists in the glauconite, and probably in the sand layers.

Glauconite is a green-coloured mineral consisting of a hydrous silicate of alumina, iron, potassium, &c., and is an alteration product derived from the decaying organic matter in marine organisms, chiefly foraminifera.

The result of tests at the laboratory is as follows:—

No. 104.—This sample, which was contained in a wide mouth jar fitted with screw top and rubber washer, measured twenty-five (25) fluid ounces. It possessed a characteristic odour resembling that of a crude mineral oil. The separation of impurities (water and sediment) from the oil by physical methods gave the following proportions:—

	Fluid oz.	Per cent.
Dark-brown oil ..	.. 9	.. 36.0
Sediment and water	.. 16	.. 64.0
	25	100.0

Examination of the Oil.

Colour.—Dark-brown.
Fluorescence.—Faint dark-green.
Odour.—Characteristic, petroliferous.
Transparency.—Opaque.
Condition.—Thick, viscous.
Specific gravity (60°F.).—0.960.
Saponifiable matter.—Trace.

* Hollow rods through which water was pumped were in use.

Fractional Distillation.

Initial boiling point = 255°C.

Fraction.	Range of Temperature.	Percentage.
		%
1. Light oil (benzine)	Up to 170° C.	Nil
2. Intermediate oil (kerosene)	170 to 230° C.	Nil
3. Intermediate oil (gas oil)	230 to 300° C.	14·7
4. Heavy oil (fuel oil)	Over 300° C.	85·3
Total	..	100·0

This sample could be classed as a heavy, low-grade, crude mineral oil.

No. 105.—Was contained in a glass jar fitted with washer and screw cap. The contents of this sample measured thirty-two (32) fluid ounces. The oil possessed a disagreeable odour which was probably caused by the presence of decomposing insects which had found their way into the oil after it was discharged on the surface of the collecting tank. The sample consisted of a thick viscous mixture of emulsified oil, water, and sediment, which was separated out as follows:—

	Fluid oz.	Per cent.
Dark-brown oil	11 ..	34.4
Water and sediment ..	21 ..	65.6
	32	100.0

Examination of the Recovered Purified Oil.

Colour.—Dark-brown.
Fluorescence.—Faint dark-green.
Odour.—Characteristic, petroliferous.
Transparency.—Opaque.
Condition.—Thick, viscous, heavy.
Specific gravity (60°F.).—0.960.
Saponifiable matter.—Trace.

Fractional Distillation.

Initial boiling point=258°C.

Fraction.	Boiling Point Range.	Percentage.
1. Light oil (benzine)	Up to 170° C.	Nil
2. Intermediate oil (kerosene)	170 to 230° C.	Nil
3. Intermediate oil (gas oil)	230 to 300° C.	13·7
4. Heavy oil (fuel oil)	Over 300° C.	86·3
Total	..	100·0

This oil is identical with that recovered from No. 104, and could be classed as a heavy-grade, crude mineral oil. [22.2.28.]

ADDENDUM.

No. 2 Bore, L.E.D.Co.

Bailing Tests Conducted 7th February, 1928.

A.M.
10.15.—Examined bailer. Tested casing for discharge of gas by opening stop valve; slight pressure; no gas. Took off casing head. Lowered bailer to water level (75 feet), then 20 feet into same. Drew up bailer and discharged into tub. No trace of oil or films.
10.40.—After 5 dips, water level 127 feet from surface. No traces of oil.
10.55.—After 10 dips, water level 180 feet from surface. No traces of oil.
11.13.—Sent bailer to bottom of bore. Emptied same. No trace of oil.
11.30.—20th dip; water level 286 feet. Still no traces of oil.
11.45.—25th dip.

P.M.
12.3.—30th dip; water level 399 feet. Closed down; water rose to 324 feet.
12.55.—Resumed bailing.
2.31.—50th dip; water level 594 feet. Water discoloured; slight film.
5.49.—81st dip; water level 880 feet.
6.43.—Water level 935 feet. Closed down till 8.25; water rose 28 feet.
8.25.—Resumed bailing at 907 feet.
9.56.—Down 965 feet.
10.20.—Decided to hold water for night with 5 dips to hour.

8th February, 1928.

A.M.
6.20.—Measured to water; 1,152 feet from surface. Bailed on.
6.34.—Little scum and froth on water.
6.45.—Little scum with bloom on water.
6.57.—Dipped to bottom with bloom on water. Three more dips till 7.45; a little scum and froth. Closed down to allow water and gas to make.
9.53.—Water now 80 feet from bottom; 1,150 feet from surface. Bailed; a little scum on water.
10.2.—Bailing; a little scum.
10.12.—Bailing.
10.20.—Dry bailer.
10.30.—Bailer full; little scum.
10.40.—Bailer full; little scum.
10.50.—Bailer to bottom; water now at 20 feet in bore.
11.0.—Scum and oil on side of bailer 20 feet up.
11.10.—Scum and oil on side of bailer 20 feet up.
11.20.—Scum and oil on side of bailer 20 feet up.
11.31.—Dry dip.
11.42.—Dry dip.
11.57.—Oil globules show. Bailer only half full.

P.M.
12.2.—A few globules. Bailer under half full. Stopped for lunch; put on casing head.
2.15.—Resumed bailing; cleaned scum off bailer, and placed in tank. Bailed from bottom; no oil globules; 40 feet of water in hole.
2.26.—Little scum.
2.37.—Little scum.
2.45.—Iridescent films; traces of oil.
2.56.—Dry; oil shows on side of bailer.
3.7.—Dry again.
3.18.—Bailer full; scum on water; oil thicker on side of bailer; little on water.
3.27.—Three-quarters full; scum on water; no froth.
3.39.—Half-full; scum.
3.47.—Dry.
3.57.—Full; bloom on water; no scum.
4.10.—Half-full; few globules; hole nearly dry. Closed down to let water make.
6.27.—Resumed and bailed four to hour.
8.39.—Tied waste on bailer to swab hole.
8.43.—Now 30 feet water in hole; several globules of oil.
9.0.—Full bailer scum and oil globules.
9.9.—Half-full; scum and oil globules. Cleaned outside of bailer.
9.20.—Dry; tested inside of bailer; no trace; 10 feet of water.

4/4

P.M. ADDENDUM—*Continued.*

9.35.—Dry.
9.45.—Three-quarters full: scum and fine globules. Continued bailing three to hour: holding water.
10.15.—Half bailer; 20 feet of water: scum on water and bailer.
10.30.—Dry.
10.45.—Dry.
11.0.—Half-bailer: 15 feet of water.
11.15.—Stopped bailing.

Water making at rate of 1 gallon per minute throughout test.

on the old shore-line,
it at present forming
'arish of Bumberrah),
k by the Point Addis
t, showed similar con-
d artesian water was
no oil was noted.

drilled in the Lakes
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LABORATORY DETERMINATIONS OF OIL OBTAINED.

The following show the nature of the oil obtained from typical samples at Lakes Entrance, and analysed by the Mines Department Chemist, Mr. J. C. Watson, viz.:—

No. 2 Bore—Lakes Entrance Development Co.
Depth, 1,210 feet. Collector—Mr. J. C. Watson. W370 ?

	Degrees.	Per cent.
Light oil (benzine)	to 170 C.	Nil
Intermediate oil (kerosene)	.. 170 230 C. ..	Nil
Intermediate oil (gas oil)	.. 230 300 C. ..	13·0
Heavy oil (fuel oil)	over 300 C.	87·0
		100·0

No. 2 South Australia Company, Lakes Entrance.
Depth, 1,305 feet. Collector—Mr. J. C. Watson.

	Degrees.	Per cent.
Light oil (benzine)	to 170 C.	Nil
Intermediate oil (kerosene)	.. 170 230 C. ..	Trace
Mineral seal oil	.. 230 300 C. ..	24·0
Light lubricating oil (vacuo)	to 250 C.	18·0
Medium lubricating oil (vacuo) ..	.. 250 300 C. ..	12·0
Heavy lubricating oil (vacuo) ..	.. 300 C.	27·0
Bitumen (residue)	.. ..	16·0
Water	.. ..	3·0
		100·0

No. 1 Bore Texland Oil Co., Lakes Entrance.
Depth, 1,264 feet. Sender—Mr. H. Greville.

	Degrees.	Per cent.
Light oil (benzine)	to 170 C.	Nil
Intermediate Oil (kerosene)	.. 170 230 C. ..	Nil
Intermediate Oil (gas oil)	.. 230 300 C. ..	17·4
Light lubricating oil (vacuo) ..	to 300 C.	22·4
Heavy lubricating oil (vacuo) ..	over 300 C.	41·1
Bitumen (residue)	.. ..	15·2
Gas and loss	.. ..	3·9
		100·0

Carpenters Dome Pty. Ltd., Lakes Entrance.
Depth, 1,280 feet. Sender—Mr. R. W. McCulloch.

	Degrees.	Per cent.
Light oil (benzine)	to 170 C.	Nil
Intermediate oil (kerosene)	.. 170 230 C. ..	Trace
Mineral seal oil	.. 230 300 C. ..	26·0
Light lubricating oil (vacuo) ..	under 300 C.	22·0
Heavy lubricating oil (vacuo) ..	above 300 C.	32·0
Bitumen (residue and loss)	.. ..	20·0
		100.0

The oil present in all the samples is classified as a heavy grade, asphaltic base, crude mineral oil.

6843.—3

W370 ?

Geological Survey Laboratory,
Department of Mines,
MELBOURNE.
February 21st, 1929.

Report No.1062

Sample --- Crude oil
Locality --- Bore No.2, Lakes Entrance
Sender --- W.Baragwanath, Director of Geological Survey

Sample consisted of an emulsified crude oil mixed with impurities.

The purified crude oil, recovered by heat and solvent treatment, measured 625 cubic centimetres.

Samples of the crude purified oil were bottled for inspection.

500 cc. (cubic centimetres) of the filtered crude oil were treated by fractional distillation, with the following result:-

Initial boiling point = 265°C.

Fraction	Boiling Pt. Range	%	Remarks
Fuel oil	230°-300°C.	14.0	pale yellow
Light lubricating oil	under 300°C. (vacuo 20" Hg)	18.0	blue fluoresence
Heavy " "	above 300°C. (vacuo 20" Hg)	42.0	green "
Bitumen	residue	24.0	black, solid
Gas and loss		2.0	
	T o t a l	100.0	

Samples of the fractions forwarded herewith for inspection.

J.B. Watson
21/2/1929

form reservoirs, where they come into contact with the oil-bearing Tertiary strata. In this position their exploration has so far been neglected. In particular, the Jurassic sandstones directly overlain by the glauconitic sand in the plunging nose of the Baragwanath anticline, the only structural control in Gippsland (fig. 1) may be investigated. It seems also a pity that no deep boring has been carried out so far in the area south of the Won Wron monocline, between that structural feature and the coast where other reservoirs and/or accumulations of oil may possibly occur, and where structural control exists.

Another suggestion concerns gas. Volumes of gas have so far been allowed to escape from Gippsland bores for some thirty years without any organised attempt being made to tap this potentially commercial commodity. Judging from private attempts at exploitation for domestic purposes, this gas possesses valuable calorific properties.

CHARACTERISTICS OF GIPPSLAND OIL, WATER AND GAS

Gippsland oil characteristics are: 15.7° A.P.I. gravity — S.G. 0.961. It is an asphaltic base crude oil, devoid of gasoline or kerosene. Distillation tests show 17.9% gas oil. The rest consist in heavy lubricating oil and petroleum residue.(1) The production figures as supplied by the companies are as follows:—

	gallons		gallons
1930	10,000	1935	4,320
1931	20,000	1936	3,783
1932	20,000	1937	9,372
1933	20,000	1938	6,173
1934	5,588	1939	4,807

Artesian water is fresh. It contains 9 grains per gallon of sodium carbonate, 29 grains per gallon of sodium bicarbonate, and 60 grains per gallon of salt. It is a good quality fresh water, its only defect being an incurable taste of oil and frequent oil smears.

The gas has a calorific value of 898 B.T.U., i.e., approximately twice the heating value of ordinary metropolitan gas. The gas analysis is as follows (No accurate figures in respect of amounts yielded are available):—

GAS ANALYSES

	A %	B %	C %	D %	E %	F %	G %
Carbon dioxide	–	0.2	0.19	1.6	2.19	1.80	0.82
Unsaturated hydrocarbon	–	–	0.05	–	–	–	–
Oxygen	11.8	–	0.90	1.2	0.4	0.20	1.96
Carbon monoxide	–	–	–	–	–	–	–
Methane	44.2	81.25	93.74	26.1	94.21	56.45	78.54
Ethane	–	–	–	–	–	–	–
Hydrogen	–	–	–	–	–	–	–
Nitrogen	44.0	18.55	5.12	71.1	3.2	41.55	18.68
Hydrogen sulphide	–	–	–	–	–	–	–
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Gross calorific value calculated per cubic foot B.T.U.	–	865	998	278	1003	601.2	836
Calculated specific gravity	–	–	–	–	0.585	–	–

A = No. 1 L.E.D. Co. .. .. Lab. No. 1924/503
B = No. 1 L.E.D. Co. .. .. Lab. No. 1924/524
C = No. 1 L.E.D. Co. .. .. Lab. No. 1924/~~544~~ 546
D = No. 2 L.E.D. Co. .. .. Lab. No. 1928/627
E = No. 1 Point Addis Co. .. Lab. No. 1929/1032
F = No. 1 Kalimna Oil Co. .. Lab. No. 1930/138
G = No. 8 Parish of Colquhoun Lab. No. 1941/94

(1) Analysis on behalf of Commonwealth Department of Supply and Shipping, by Canadian Oil Co., Petrolia, Ontario, Canada.

	per cent.	sp. gr.	A.P.I.	Viscosity @ 100° F.
Light gasoline	nil			
Total gasoline or naptha	nil			
Kerosene	nil			
Gas oil	17.9	0.902	25.4	
Non-viscous lubricating distillate	14.9	920–939	22.3–19.2	50–100
Viscous lubricating distillate	11.8	939–954	19.2–16.3	100–200
Residium	23.4	954–984	16.3–12.3	above 200
Medium lubricating distillate	31.6	1.010	8.6	
Distillation loss	4	–	–	–

Lakes Entrance Development Co. L.E.D. No 2.

1927 El. 31 T.D. 1275. (lat. 37°52'21"S long. 148°00'43"E (under)

Ph. Colquhoun

Spudded Oct. 1926.

Abandoned

Plant + crew hired from Vic Mines Dept.

Location + Leases B.A. 1923-1939. p69 ~~Reports~~ p.

Location 13 ch. W. from NE. cor of allot 25, Ph Colquhoun.

Produced about 2 pints of oil per day.

In December 1927 the presence of oil stained of glauconite between 1200-1272 was established

Samples of core from glauconite zone, when exposed on the surface, showed globules of emulsified oil, freely effervescing by gas pressure.

Prior to entering the glauconite, the top waters had been shut off, but when the glauconite was passed through it was found that a lower artesian flow had been struck. It was found that the flow of oil was constant at 1 pint per day with artesian water flowing at the rate of 1500 g.p.d.

Flow of gas reported as 1000 c.f.d.

Trace of oil; gravity .960

The oil was not present throughout the glauconite zone but appeared to be in alternating bands.

Mr. Watson The oil proved to be a brownish coloured, heavy, asphaltic base petroleum. (mineral oil)

Gray & Croll

El. 31.

Depth to top of oil sands. 1210'

Thickness of " " 60'

Granite at. 1270'

T.D. 1275'

L.E.D. No 2. Cont.

From O.D.L.

Drill No. —

Spudded 26. Feb. 1927. (at 1234 - Dec. 1927).

Abandoned 16. May 1928.

later Strong flow below. 1700'

Casing. 7" @ 1231'

Cores 751' between 0 — 1210
32'6" " 1210 — 1270
1'6" " 1270 — 1275 T.D

Oil & Gas Shows. (See O.D.L's)

Shows of oil on water when bailing below. 1200

Oil in 8' core 1236' — 1247'.

Lakes Entrance Development Co. No 2 Bore.
ie. Rec. Geol. Surv. Vol 5 part 4. p 561-562.

During boring films + globules of oil were noticeable, also inflammable gas.
Analysis of the Water showed mineral oil.
Oil is brownish-coloured, heavy, asphaltic base petroleum.

Testing at 1236'.
7th. Feb. Water at 70'.
Before removing casing head a slight pressure was detected but no gas detected.
Bailing to 594 - No oil detected.
At 594 - Slight film noted.
Water making at rate 1/1 gallon per minute.
Bailed until only few feet of water in hole