B.O.C. OF AUSTRALIA LIMITED

DRILLING PROGRAMME

Table of Contents

B.O.C. OF AUSTRALIA LIMITED

GOLDEN BEACH NO.1

GEOLOGICAL AND DRILLING PROGRAMME (REVISED)

54 PAGES

I. LOCATION

The well will be situated in the offshore Gippsland area of southeastern Victoria, approximately 21 miles east-southeast of Sale and about 2½ miles from the coast. Location for the well coincides with fix No.4, Hydrosonde line No.8 (east). The co-ordinates of this point are:-

Latitude : 38°15'30.5"S.
Longitude : 147°25'21"E.

II. ELEVATION, DATUM, AND WATER DEPTH

Ultimate datum for all vertical measurements will be mean sea level. During drilling all depths will be related to the subsea guide base structure.

Minimum depth of water at the location is 62 feet. Tidal range is about 3-4 ft. There is no reliable information available on currents but these are known to be slight.

III. POSITIONING OF DRILLING VESSEL

The location will be marked by Raydist. This will employ the identical set up and electronic positioning system which was used to control the Hydrosonde-seismic survey of the structure.

During drilling operations the vessel will be relocated over the hole with the aid of a hole position indicator and/or by reference marks on the anchor chains.

In the event of extreme movement of the vessel due to dragging or parting of some anchors, relocation over the hole will be effected by:-

i) well head buoy.
ii) visual reference to onshore markers.

IV. OBJECTIVES AND TOTAL DEPTH

The primary objective of the well is to locate hydrocarbons in the upper part of the Latrobe Valley Coal Measures of Eocene age. Secondary prospects are offered by underlying Upper Cretaceous sediments which have been informally named the "Golden Beach" Formation.

The Upper Cretaceous sequence is expected to be some 4000 ft. thick and may extend to the anticipated total depth of approximately 10,000 ft. below sea level. The Strzelecki Group will be regarded as economic basement, and a maximum of 1000 ft. of this formation will be drilled if encountered above the proposed T.D.

V. ESTIMATED DEPTH OF FORMATIONS

Age	Formation	Estimated Depth (ft.bsl) estimate	possible error	Depth (ft.bsl) G.B. West No.1	Barracouta No.A1
Miocene	Gippsland Limestone	550'*	±60'	591'	736'
Oligocene	Lakes Entrance	1880'*	±70'	1953'	3210'
Eocene	Latrobe Valley CM	1920'*	±110'	2241'	3427'
U. Cretaceous	"Golden Beach"	5460'**	±260'	5783'	5347'
L. Cretaceous	Strzelecki Group	9800'**	?	-	-

* From seismic/Hydrosonde data
** From deconvolved seismic data which is not universally accepted.

VI. ZONES OF INTEREST

Gippsland Limestone

A porous sandstone occurred at the base of this formation at Barracouta No.A1 (formerly Gippsland Shelf No.1). This sand development has not been encountered onshore. The equivalent interval is expected to occur between about 1245-1715 ft. at Golden Beach No.1.

Latrobe Valley Coal Measures

Over 350 ft. of gross gas column occurs in the top sand at Barracouta No.A1 the discovery well for the Barracouta Gas Field. As neither coring nor open hole drillstem testing will be attempted in this range, it is therefore very important to make best use of other data in order to obtain the fullest evaluation possible.

"Golden Beach" Formation

Many porous intervals are expected. Hydrocarbon shows were obtained in several ranges at Barracouta No.A1, and are summarised as follows:

Barracouta No.A1

Well Depth	Depth Below Fm. Top	Show	Est. Equiv. Depth*(b.s.l.) at Golden Beach No.1
5707-6030'	327- 650'	gas on mud logger	5790-6110'
7334-7346'	2454-2466'	gas on mud logger, light gold fluorescence, est. S_w = 47%	about 7840'
8637-8693'	3307-3313'	brown staining in cores	about 8770

At Golden Beach West No.1 gas cut salt water was recovered in drill stem tests of the following ranges:

Golden Beach West No.1 Well Depth	Depth Below Fm. Top	Equiv. Depth*(b.s.l.) at Golden Beach No.1
6650-6840'	828-1018'	6210-6400'
7130-7165'	1308-1343'	6690-6725'
7380-7512	1558-1690'	6940-7070'

* Note:- estimated depths at Golden Beach No.1 assume a similar degree of non-deposition/erosion at the post-"Golden Beach" unconformity as at the Barracouta A1 and West Golden Beach No.1 control wells.

VII. FORMATION LOGGING

a) Hydrocarbons

Continuous monitoring of the mud will be carried out by Geoservices during all periods when mud is in circulation. Gas samples will be collected and analysed as necessary. All flush samples will be examined for fluorescence and tested for solvent cuts.

b) Flush Samples

Flush samples will be collected over the shale shaker at 10 ft. intervals. All samples will be collected, logged and packed by Geoservices' personnel under the supervision of B.O.C.'s wellsite geologist. Normal lag corrections will be applied so that samples are representative of the labelled depth. In general the formation logging procedures will comply with those set out in the B.O.C.'s Wellsite Manual.

VIII. CASING PROGRAMME

Depth (approx) (ft. below guide base)	Hole Size	Casing	Cement
80-100'	36"	30", B x 319 lb.	To sea bed
500'	26"	20", J55 x 94 lb.	To sea bed
1700'	17½"	13 3/8", J55 x 54.5lb.	To sea bed
4000'	12¼"	9 5/8", J55 x 36 lb. and 40 lb.	To 1000 ft.
8000'	8 5/8"	7" N80 x 26 lb. and 23 lb. J55 x 23 lb.	To 1000 ft.
10,000' (T.D.)	6 1/8"	5" N80 x 18 lb. (Liner)	To 7500 ft.

Normal construction cement will be used down to and including the 13 5/8" string. All other strings will be cemented with Class B type oilwell cement.

IX. CASING DESIGN SUMMARY

O.D.	Gr.	Wt (lb/ft)	Type	Depth Interval (ft)	Length (ft)	Safety Factors Collapse	Tension	Burst
30"	B	319	Welded	0- 100'	100'	High	High	High
20"	J55	94	LT&C	0- 500'	500'	High	High	High
13 3/8"	J55	54.5	Butt.	0- 1,700'	1700'	1.30	High	3.42
9 5/8"	J55	40	Butt.	0- 200'	200'	High	High	0.99
	J55	36	Butt.	200- 3,200'	3000'	1.125	High	0.9
	J55	40	Butt.	3,200- 4?000'	800'	1.17	High	High
7"	N80	26	Butt.	0- 500'	500'	High	4.2	1.45
	N80	23	Butt.	500- 7,550'	7050'	1.125	High	1.33
	N80	26	Butt.	7,550- 8,000'	450'	1.33	High	High
5"	N80	18	XL	7,500-10,000'	2500'	1.71	High	High

Design Factors

i) Minimum Safety Factors:- Collapse - 1.125, Tension - 1.60 (in air), Burst - 1.33 (oil string).
ii) 30" x 20" set in sea water
9 5/8" set in 11.4 lb/gal mud (0.59 psi/ft gradient)
All other casing set in 9.625 lb/gal mud (0.50 psi/ft gradient)
iii) No allowance made for gas column differentials.
iv) Note 9 5/8" casing underdesigned in burst.

X. DRILLING NOTES

Subsea well head and marine riser equipment will be installed after setting the 20" casing.

Initially a 12¼" hole will be drilled to the 13 3/8" casing depth and the hole then opened to 17½" after running electrical logs.

The 9 5/8" casing depth is designed to protect the primary objective sand from excessive exposure to mud. It will also serve to isolate the major Tertiary coal horizons which are prone to caving.

Hole deviation is not critical, but should not exceed about 3 degrees to a depth of 2000 feet and 5 degrees thereafter. Totco non directional readings will be taken at about 500 ft. intervals.

Full details of drilling procedures, safety practices etc. are given in the Drilling Procedures Manual.

XI. MUD PROGRAMME

Depth (ft. below guide base)	Hole Size	Type	Oil %	Properties Wt. (lb/gal)	Vis. (marsh)	W/L (ccs)
0-500'	36" & 26"	Sea water	Nil	-	-	-
500-1700'	12¼" & 17½"	Spersene-XP20 (partially in-hibited)	Nil	9.0-10.0	40-55	Max 10
1700-4000'	12¼"	Spersene-XP20 (fully in-hibited)	8-10	10.0-11.5	40-55	Max 5
4000-8000'	8 5/8"	As above	8-10	9.5-10.5	40-55	Max 5
8000-T.D.	6 1/8"	As above	8-10	9.5-10.5	40-55	Max 5

All muds will be fresh water base.

Properties will be checked a minimum of three times per 12 hour shift.

XII. CEMENT AND MUD ADDITIVES - STOCKS

The following stocks of important mud additives and cement will be maintained aboard the drilling vessel:-

Item	Drilling Short Tons	Vessel Sacks
Bentonite	20	400
Barytes	75	1500
Spersene	6	240
XP20	3	120
Caustic Soda	1½	-
Lost Circulation Material	-	400
Cement	75	1600

XIII. HIGH PRESSURE ZONES

While coring between 4346-4351 ft. at Barracouta No.A1, a strong gas inflow lifted the drill string and, according to reports, could not be contained with weighted mud. Subsequent bottom hole pressure measurements taken during production testing indicated normal pressure gradients in the range 3490 to 3810 ft. There was no evidence of high pressures at Golden Beach West No.1.

The estimated equivalent depth of the above inflow zone will be about 2800 ft. in Golden Beach No.1. A minimum 10 lb/gal mud will be in use while drilling out of the 13 3/8" shoe. Thereafter very close surveillance of all systems will be maintained so that further weight increments may be effected immediately they are required. Drilling below the 9 5/8" shoe will be carried out with 9.5-10.5 lb/gal mud.

XIV. LOST CIRCULATION ZONES

Major thief zones are not expected. A sufficient stock of plugging materials will be retained in the drilling vessel to deal with normal mud loss occurrences.

Care should be taken to avoid excessive mud weights and viscosities which may aggravate pressure surges caused by running drillpipe or casing.

XV. CORING

No conventional cores will be cut in Tertiary or younger formations. A limited amount of coring may be considered if Upper Cretaceous porous formations give strong indications of hydrocarbons.

Side wall cores will be taken as required.

XVI. DRILL STEM TESTING

No drill stem tests will be run in open hole.

XVII. SCHLUMBERGER SERVICES

The proposed logging programme is as follows:-

Depth (G.guide base)	Hole Size	Survey	Interval	Remarks
500'	26"	Nil	-	-
1700'	12¼"	Induction Electrical	500-1700'	Before opening hole to 17½".
		Microlog/Caliper	" "	
		Sonic	" "	For seismic information.
		C.B.L.	As required	Inside 13 3/8" casing
4000'	12¼"	Induction Electrical	1700-4000'	
		Microlog/Microlaterolog/ Caliper	" "	
		Laterolog-7	" "	
		Formation Density	" "	
		Gamma Ray-Neutron	" "	
		Continuous Dipmeter	" "	
		Sonic	" "	For seismic information.
		C.B.L.	As required	Inside 9 5/8" casing
6500'	8 5/8"	Induction Electrical	4000-6500'	"Consolidation" survey
		Microlog-Caliper	" "	
8000'	8 5/8"	Induction Electrical	6500-8000'	
		Microlog/Microlaterolog/ Caliper	" "	
		Formation Density	4000-8000'	
		Continuous Dipmeter	" "	
		Gamma Ray-Sonic	" "	
		Laterolog-7	" "	If hydrocarbons present
		C.B.L.	As required	Inside 7" casing
10,000'	6 1/8"	Induction Electrical	8000-10,000'	
		Micro/Microlaterolog/ Caliper	" "	
		Formation Density	" "	
		Continuous Dipmeter	" "	
		Laterolog 7	" "	If hydrocarbons present
		Gamma Ray-Sonic	" "	

16

The above programme is subject to modification depending on the results obtained during any series of runs, or as dictated by other circumstances which may alter the drilling and casing programme.

For this initial offshore well it has been decided to take Sonic surveys from T.D. to the 20" casing shoe. The uphole part of this survey is mainly to provide velocity information for interpretation of seismic data.

Scales of 2"=100 ft. and 5"=100 ft. will be recorded on all runs.

A special sheave arrangement will be used to compensate for vertical movement of the drilling vessel.

The wireline Formation Tester may be used to test potential pay zones if hole conditions are favourable.

A conventional seismic velocity survey will be carried out in this well, preferably immediately after reaching T.D.

XVIII. SERVICE COMPANIES

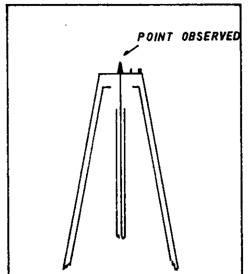
Electronic Positioning	-	Australian Hydrographic Services.
Mud Logging	-	Geoservices Australia, Brisbane.
Mud Supply	-	Magcobar, Sydney.
Cementing & Testing	-	Halliburton Ltd., Brisbane.
Coring	-	Christensen Diabort (Aust.) Pty. Ltd. North Plympton, South Australia.
Electric Logging	-	Schlumberger Seaco, Inc., Brisbane.
Diving	-	Divcon International, London.
Helicopter	-	Rotor-Work, Avalon, N.S.W.

XIX. DATA REQUIREMENTS

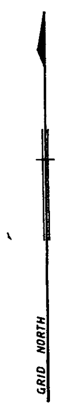
	Samples		E.Logs (sets)		Lith	Analyses		Test	Completion*
	Flush	Core	Field	Final	Logs	Core	Fluid	Results	Report
A.O.G.	-	-	1	-	1	1	1	1	1
B.O.C.	2	1	1	2	1	1	1	1	2
Continental	-	-	2	2	2	2	2	2	2
Planet	-	-	1	1	2	1	1	1	1
Woodside	-	-	1	1	1	1	1	1	1
Vict. Mines Dept.	1	1	1	1	1	1	1	1	1
B.M.R.									

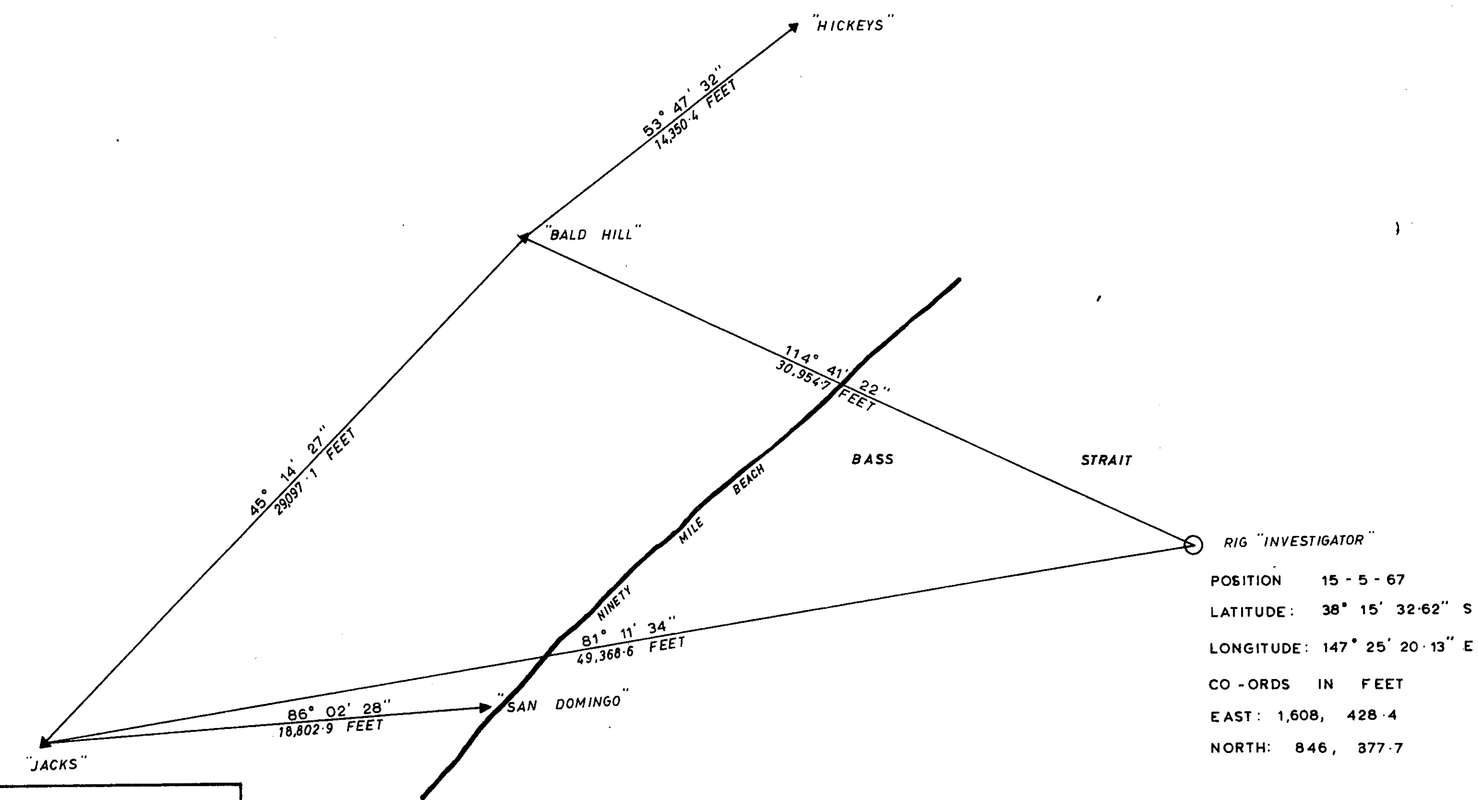
* The Completion Report will include a complete set of all logs.

T. C. Earls
for Operations Manager.



DETAIL OF
POINT OBSERVED ON
TOP OF RIG "INVESTIGATOR"





POSITION 15 - 5 - 67
LATITUDE: 38° 15' 32·62" S
LONGITUDE: 147° 25' 20·13" E
CO-ORDS IN FEET
EAST: 1,608, 428·4
NORTH: 846, 377·7

SCALE: 4000 FEET TO 1 INCH

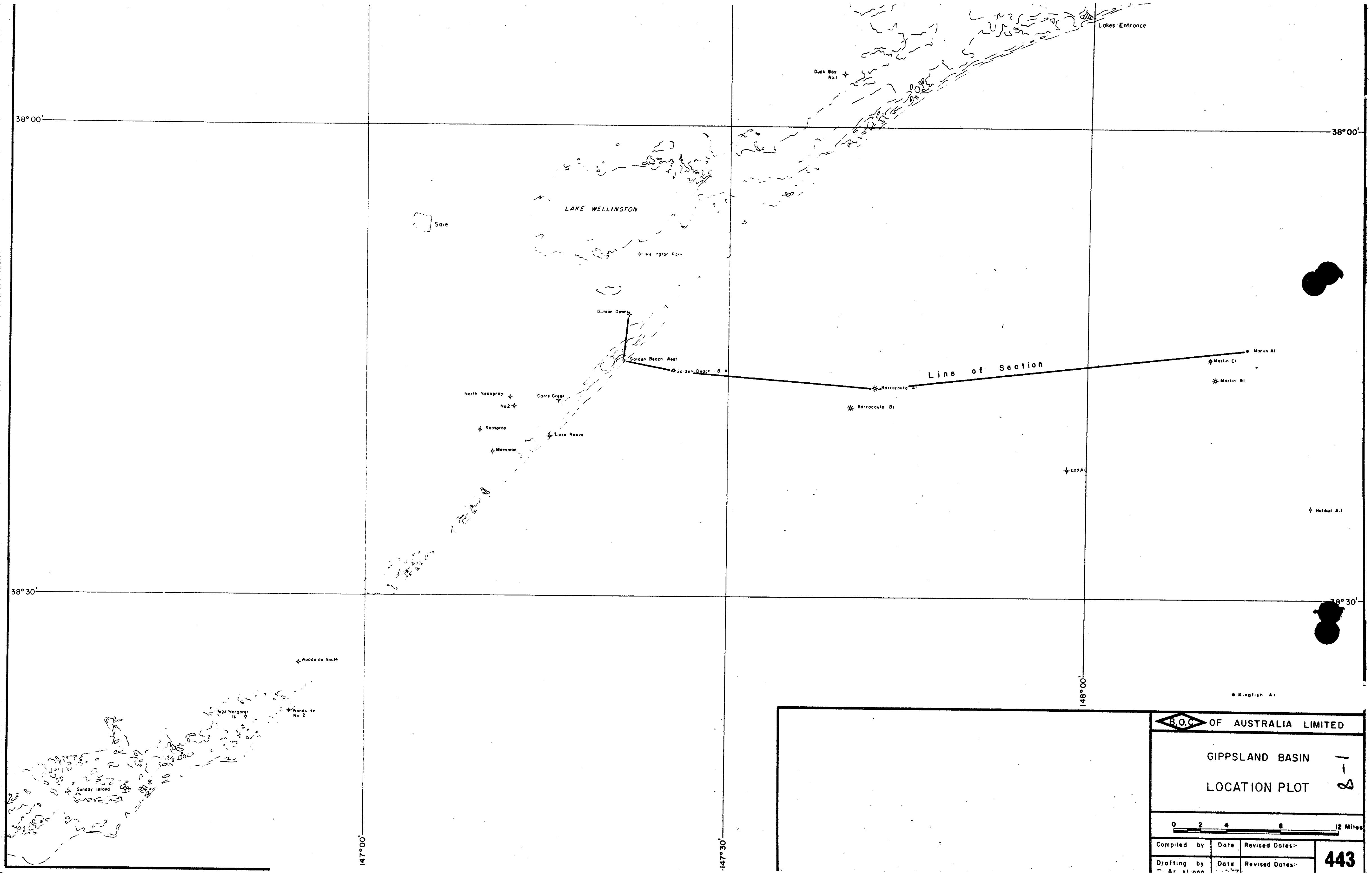
NOTES

1. RECTANGULAR & GEOGRAPHICAL CO-ORDS ARE BASED ON "OLD" FIGURE OF THE EARTH - ZONE 7.
2. DETERMINATION OF POSITION OF RIG WAS CARRIED OUT BY INTERSECTION FROM THE FOLLOWING 4th ORDER TRIG STATIONS:
   "JACKS" CO-ORDS IN FEET { 1,559,642·12 / 838,818·88
   "BALD HILL" CO-ORDS IN FEET { 1,580,303·55 / 859,307·47
3. DATUM FOR BEARINGS:
   FROM "JACKS" - "SAN DOMINGO" (4th ORDER TRIG.)
   FROM "BALD HILL" - "HICKEYS" (4th ORDER TRIG.)
4. ABOVE FOUR TRIG STATIONS WERE ESTABLISHED BY THEODOLITE & TELLUROMETER TRAVERSES MARCH 1965. RESULTS OF LEAST SQUARES ADJUSTMENT OF THE TRAVERSE SHOW PROBABLE ERROR IN POSITION OF EACH STATION TO BE AS FOLLOWS:

"BALD HILL"	0·29	FEET EAST	0·58	FEET NORTH
"JACKS"	0·56	" "	0·38	" "
"HICKEYS"	0·29	" "	0·78	" "
"SAN DOMINGO"	0·54	" "	0·60	" "

5. ANGLES READ WITH "KERN" DKM2 THEODOLITE (DIRECT READING TO 1 SECOND.)

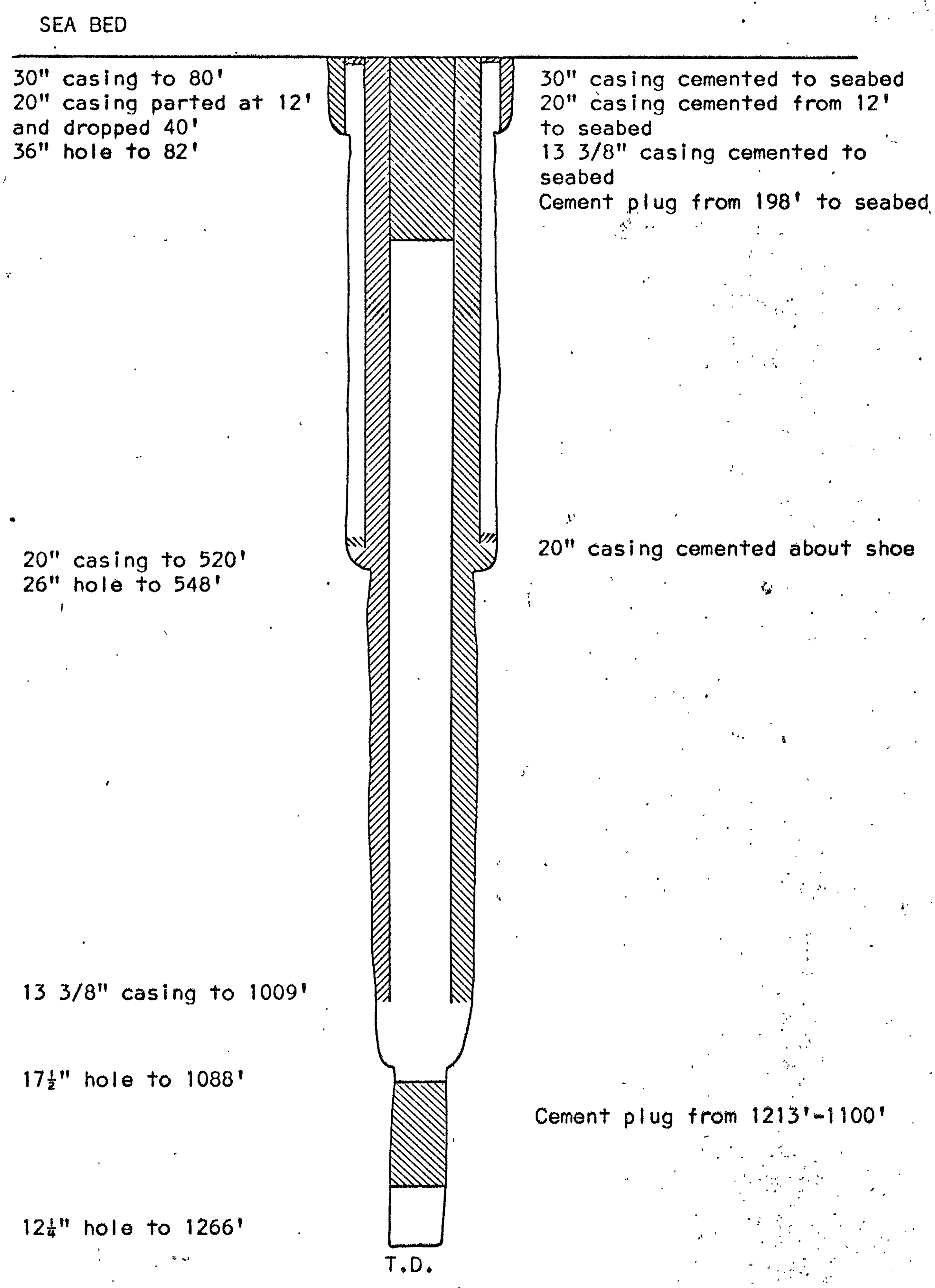
BURMAH OIL CO. LTD.			
SURVEY TO DETERMINE RECTANGULAR CO-ORDS OF RIG "INVESTIGATOR" ON 15-5-67			
J.A. GANNON & ASSOCIATES SURVEYORS 7 RAYMOND STREET SALE			
SURVEYED	J.A. GANNON 15-5-67	DRAWN	S.K. 16-5-67
CHECKED	S.K. 16-5-67	REF. N°	759



38°00'
38°30'
147°00'
147°30'
148°00'
Lakes Entrance
Duck Bay No.1
LAKE WELLINGTON
Sale
Dutson Downs
Golden Beach West
Golden Beach A
Line of Section
Barracouta A
Barracouta B1
Marlin A1
Marlin C1
Marlin B1
Cod A1
Halibut A-1
Kingfish A1
North Seaspray
No2
Carrs Creek
Seaspray
Lake Reeve
Merriman
Woodside South
St Margaret Is
Woods Is No 2
Sunday Island
B.O.C. OF AUSTRALIA LIMITED
GIPPSLAND BASIN
LOCATION PLOT
1-8
0 2 4 8 12 Miles
Compiled by
Date
Revised Dates:-
Drafting by
Date
Revised Dates:-
443

GOLDEN BEACH NO.1

STATUS AFTER ABANDONMENT



Remarks

There were intermittent shut-downs as a result of rough weather. However, during the week drilling of 8-5/8 inch hole was continued to 7926 ft. and two Schlumberger logs were taken.

Deviation: 1 degree at 7637 feet.

III. MATERIALS

Item	Unit	Consumption		Stocks on	
		Weekly	Cumulative	Vessel	Shorebase
Barytes	Sks (x100 lb.)	175	2770	2315	4000
Bentonite	(do)	151	1576	617	938
Spersene	Sks (x50 lb.)	116	739	362	358
XP20	(do)	53	362	193	141
C.M.C.	(do)	0	5	55	40
L.C.M.	(do)	0	0	438	100
H.S.D.	bls	36	280	-	-
Caustic	(x140 lb)	1	36	36	25
Soda Bi Carb	(x93 lb)	0	48	28	0
Soda Ash	(x93 lb)	0	10	22	0
Cement	Sks (x94 lb.)	0	4995	2816	66
Fuel	barge bls	165	2124	1119	Nil
	boats	128	786	1903	Nil
Water	bls	1410	20699	3277	Nil

Active Mud Volumes

Circulation	hole	590	bls
	tank	500	bls
Stock	tank	250	bls
Total		1340	bls

Made during week	90	bls
Total last week	1250	bls
Consumption/losses	0	bls

Remarks

Form A-3

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 10 for week ending 2400 hours Saturday 8th July 1967

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.;	30 inch casing to 80 ft.
26 inch hole to 523 ft.;	20 inch casing to 472 ft.
17½ inch hole to 1718 ft.;	13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4055 ft.;	9 5/8 inch casing to 4003 ft.

~~8 5/8 8080~~

8½ inch hole to 8374 ft.; Operation running in new bit.

II. DRILLING SUMMARY

Progress 448 ft.

Time Analysis (hrs.)

Drilling	Circulating	Tripping	Shut Down		Logging	Testing
			Mechanical	Weather		
31 3/4	7 3/4	25½	nil	75½	27½	

No. of bits used during week 2 ; Total 33

Weight on bit 30,000 ; R.P.M. 70

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6 inch	47-50	2500	350

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
10.1	45-50	0/2	3.8-4.4	1.5	9.6-9.7	¼-3/4

Coring

A total of 30 side wall cores were attempted by Schlumberger of which 28 were recovered.

Drill Stem Testing

NIL

Electrical Logging

Formation Density Log 4011 to 7900
[illegible]ic Gamma Ray Log 4011 to 7888
[illegible]inuous D[illegible]meter [illegible]1 to 78[illegible]

Remarks

Rough seas again prevailed permitting only the running of three Schlumberger logs and the taking of side wall samples during the first half of the week. Weather was good during the remainder of the week and drilling of 8 5/8 and 8½ inch hole was continued to 8374 ft.

III. MATERIALS

Item	Unit	Consumption Weekly	Consumption Cumulative	Stocks on Vessel	Stocks on Shorebase
Barytes	Sks (x100 lb.)	nil	2770	2315	4000
Bentonite	(do)	59	1635	558	938
Spersene	Sks (x50 lb.)	104	843	258	358
XP20	(do)	52	414	141	141
C.M.C.	(do)		5	55	40
L.C.M.	(do)			438	100
H.S.D.	bls	24	304		
Caustic Soda		5	41	31	25
Soda Bicarb			48	28	
Soda Ash		1	11	21	
Cement	Sks (x94 lb.)		4995	3000	66
Fuel barge	bls	215	2339	904	
Fuel service boats	bls	75	861	70	
Water barge	bls	1497	22196	3306	

Active Mud Volumes

Circulation	hole	580	bls
	tank	360	bls
Stock	tank	350	bls
Total		1290	bls

Made during week	50	bls
Total last week	1340	bls
Consumption/losses	100	bls

Remarks

The loss of mud was a result of pulling the riser twice when full of mud and also dumping the sand trap.

Form A-3
1-12

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 11 for week ending 2400 hours Saturday 15th July 19 67

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4055 ft.; 9 5/8 inch casing to 4003 ft.
8 5/8 8080

8½ inch hole to 9534 ft.; Operation logging

II. DRILLING SUMMARY

Progress 1160 ft.

Time Analysis (hrs.)

Drilling	Circulating	Tripping	Shut Down		Logging	Testing
			Mechanical	Weather		
83	19½	44¼		18	3¼	

No. of bits used during week 6 ; Total 39

Weight on bit 30,000 ; R.P.M. 60-80

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6	37-50	2500-2900	260-350

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
10.0-10.2	46-50	0/3	3.4-4.2	1.5	9.6-9.7	½-1

Coring

NIL

Drill Stem Testing

NIL

Electrical Logging

-duction Electrical Log Run 5 7700-9545.

Remarks

With only 18 hrs. lost due to bad weather, drilling of 8½ inch hole was continued to 9534 feet, after which logging was commenced.

III. MATERIALS

Item	Unit	Consumption Weekly	Consumption Cumulative	Stocks on Vessel	Stocks on Shorebase
Barytes	Sks (x100 lb.)	700	3470	1615	4000
Bentonite	(do)	97	1732	461	1938
Spersene	Sks (x50 lb.)	124	967	234	258
XP20	(do)	62	476	129	91
C.M.C.	(do)	-	5	55	40
L.C.M.	(do)	-	-	438	100
H.S.D.	bls	85	389	1	-
Caustic Soda	Drums	13	54	18	25
Soda Bi Carb	Sacks (93 lbs)	-	48	28	-
Soda Ash	(93 lbs)	-	11	21	-
Cement	Sks (x94 lb.)	-	4995	3000	1266
Fuel barge	bls	271	2610	1147	-
Fuel service boats	bls	49	910	77	-
Water barge	bls	2439	24635	3667	-

Active Mud Volumes

Circulation	hole	720	bls
	tank	260	bls
Stock	tank	350	bls
Total		1330	bls

Made during week	100	bls
Total last week	1290	bls
Consumption/losses	60	bls

Remarks

Form A-3

1-14

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 12 for week ending 2400 hours Saturday 22nd July 1967

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.;	30 inch casing to 80 ft.
26 inch hole to 523 ft.;	20 inch casing to 472 ft.
17½ inch hole to 1718 ft.;	13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4055 ft.;	9 5/8 inch casing to 4003 ft.
8 5/8 8080	

8 ½ inch hole to 9534 ft.; Operation running casing

II. DRILLING SUMMARY

Progress ______ ft.

Time Analysis (hrs.)

Drilling	Circulating	Tripping	Shut Down		Logging	~~Xxxxx~~ running casing
			Mechanical	Weather		
	23	43		18	72½	11½

No. of bits used during week ______ ; Total 39

Weight on bit ______ ; R.P.M. ______

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6"	50	1250	350

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
10.2	49	1/3	3.8-4.0	1.5	9.6	¼-½

Coring

Of 60 side wall cores attempted, 56 were recovered.

Drill Stem Testing

Schlumberger Formation Testing:

1. 8973 2. 9105 3. 8837 4. 8645

Microlog Run 2 7700-9545. Sonic Gamma Ray Log Run 7700-9528
Formation Density Log Run 770[illegible] Continuous D[illegible]ter Run 3 7700-9530 &
7700-[illegible]. Cement Bond Log Ru[illegible]0-2740.

Remarks

Schlumberger logging was completed and 4 Schlumberger tests were taken. At the end of the week 7 inch casing was being run.

III. MATERIALS

Item	Unit	Consumption		Stocks on	
		Weekly	Cumulative	Vessel	Shorebase
Barytes	Sks (x100 lb.)	100	3570	1515	4000
Bentonite	(do)	12	1744	449	938
Spersene	Sks (x50 lb.)	40	1007	194	258
XP20	(do)	20	496	109	91
C.M.C.	(do)	–	5	55	40
L.C.M.	(do)	–	–	438	100
H.S.D.	bls	28	417	–	–
Caustic Soda		2	56	16	25
Soda Bi Carb		–	48	28	–
Soda Ash		–	11	21	–
Cement	Sks (x94 lb.)	–	4995	3000	1266
Fuel barge	bls	197	2807	950	–
service boats		84	5079	1899	–
Water barge	bls	1227	25862	2155	–

Active Mud Volumes

Circulation	hole	570	bls
	tank	370	bls
Stock	tank		bls
Total		940	bls

Made during week nil bls

Total last week 1290 bls

Consumption/losses 350 bls

Remarks

The contents of the stock tanks were dumped so that the tank could be used to mix the Bentonite, cement retarder (H R 4) and a water necessary for the cementation of the 7 inch casing.

Form A-3

1-16

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 13 for week ending 2400 hours Saturday 29th July 1967

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4005 ft.; 9 5/8 inch casing to 4003 ft.
8 5/8 8080 7 9218

8½ inch hole to 9534 ft.; Operation lowering B.O.P. stack to sea bed

II. DRILLING SUMMARY

Progress nil ft.

Time Analysis (hrs.)

Drilling	Circulating	Tripping	Shut Down		~~xxxxxxx~~ misc.	Testing
			Mechanical	Weather		
nil	10	15	7½	57½	78	

No. of bits used during week 1 ; Total 40

Weight on bit ; R.P.M.

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6"	20	2500	150

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
10.2	51	1/4	3.7	1.5	9.6	1/4

Coring

NIL

Drill Stem Testing

NIL

Electrical Logging

NIL

Remarks

The 7 inch casing was run and cemented to 9218 ft. Most of the 4½ inch drill pipe was broken down and 2 7/8 inch drill pipe was picked up. The 4½ inch pipe rams were replaced by 2 7/8 inch rams but subsequent testing of these failed. The stack was pulled and the pipe ram rubbers replaced. At the end of the week the stack was being lowered to the sea bed.

III. MATERIALS

Item	Unit	Consumption Weekly	Consumption Cumulative	Stocks on ______ Vessel	Stocks on ______ Shorebase
Barytes	Sks (x100 lb.)	–	3570	1515	4000
Bentonite	(do)	15	1759	434	838
Spersene	Sks (x50 lb.)	24	1031	170	258
XP20	(do)	12	508	97	91
C.M.C.	(do)		5	55	40
L.C.M.	(do)	–	–	438	100
H.S.D.	bls	–	417	–	–
Caustic Soda		1	57	15	25
Soda Bi Carb		–	48	28	–
Soda Ash		–	11	21	–
Cement	Sks (x94 lb.)	500	5495	2500	1266
Fuel barge	bls	135	2942	825	–
Fuel service	bls	75	5163	1850	–
Water	bls	1557	27419	2912	–

Active Mud Volumes

Circulation	hole	nil	bls
	tank	695	bls
Stock	tank	240	bls
Total		935	bls

Made during week – bls

Total last week 940 bls

Consumption/losses 5 bls

Remarks

All mud in the hole was displaced by water prior to testing of the B.O.P. stack.

Form A-3

1-18

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 14 for week ending 2400 hours Saturday 5th August, 19 67

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4055 ft.; 9 5/8 inch casing to 4003 ft.
8 5/8 8080 7 9218

8½ inch hole to 9534 ft.; Operation running in tester for DST No.4

II. DRILLING SUMMARY

Progress nil ft.

Time Analysis (hrs.)

~~Drilling~~ Misc.	Circulating	Tripping	Shut Down		Logging	Testing
			Mechanical	Weather		
27½	2	4½		33½		88½ (including tripping)

No. of bits used during week ______ ; Total 40

Weight on bit ______ ; R.P.M. ______

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6"	22	2500	150

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
10.2	50	1/4	3.7	1.5	9.6	nil

Coring

NIL

Drill Stem Testing

No.1 9102-07
2 8968-73
3 8808-15.5: 8828-38
(depths relate to gamma ray log) Gamma Ray/Neutron/casing collar locator (inside casing) 8000-9148 ft. Cement Bond Log run No.3: 6800-9318 ft.

Electrical Logging

NIL

Remarks

Schlumberger logs were taken and drill stem tests were carried out on three sandstones. At the end of the week testing was being continued.

III. MATERIALS

Item	Unit	Consumption Weekly	Consumption Cumulative	Stocks on Vessel	Stocks on Shorebase
Barytes	Sks (x100 lb.)	-	3570	1515	4000
Bentonite	(do)	-	1759	444	838
Spersene	Sks (x50 lb.)	-	1031	220	208
XP20	(do)	-	508	122	66
C.M.C.	(do)	-	5	55	40
L.C.M.	(do)	-	-	438	100
H.S.D.	bls	-	417	-	-
Caustic Soda		-	57	25	15
Soda Bi Carb		-	48	28	-
Soda Ash		-	11	21	-
Cement	Sks (x94 lb.)	-	5495	2500	1266
Fuel Barge	bls	277	3219	834	-
Fuel Service boats	bls	67	1136	1842	-
Water Barge	bls	974	28393	2226	-

Active Mud Volumes

Circulation	hole	375	bls
	tank	560	bls
Stock	tank	nil	bls
Total		935	bls

Made during week nil bls

Total last week 935 bls

Consumption/losses nil bls

Remarks

Form A-3

1-20

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 15 for week ending 2400 hours Saturday 12th August 1967

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4055 ft.; 9 5/8 inch casing to 4003 ft.
8 5/8 8080 7 9218

8½ inch hole to 9534 ft.; Operation servicing testing tools

II. DRILLING SUMMARY

Progress nil ft.

Time Analysis (hrs.)

~~Drilling~~ Misc.	Circulating	Tripping	Shut Down		Logging	Testing
			Mechanical	Weather		
13 (perforating & running bridge plug)				90½		64½

No. of bits used during week ______ ; Total 40

Weight on bit ______ ; R.P.M. ______

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6"			

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
not taken during week						

Coring

NIL

Drill Stem Testing

D.S.T. No.4 8808-8815.5 ft. & 8828-38 ft.; packer set at 8758 ft. bridge plug set at 8750 ft.
D.S.T. No.5 8632-47 & 8660-80 ft.; packer set at 8608 ft.
D.S.T. No.6 Interval as for D.S.T. No.5

Electrical Logging

NIL

1-21

Remarks

Testing was continued during the week when weather would permit.

III. MATERIALS

Item	Unit	Consumption Weekly	Consumption Cumulative	Stocks on Vessel	Stocks on Shorebase
Barytes	Sks (x100 lb.)	-	3750	1515	4000
Bentonite	(do)	-	1759	444	838
Spersene	Sks (x50 lb.)	-	1031	220	208
XP20	(do)	-	508	122	66
C.M.C.	(do)	-	[illegible]5	55	40
L.C.M.	(do)	-	-	438	100
H.S.D.	bls	-	417	-	-
Caustic Soda		-	57	25	15
Soda Bi Carb		-	48	28	-
Soda Ash		-	11	21	-
Cement	Sks (x94 lb.)	-	5495	2500	1266
Fuel service boats	bls	114	1250	1825	-
Fuel barge	bls	145	3364	1070	-
Water barge	bls	783	30176	3009	-

Active Mud Volumes

Circulation	hole	350	bls
	tank	540	bls
Stock	tank	890	bls
Total			bls

Made during week nil bls

Total last week 935 bls

Consumption/losses 45 bls

Remarks

Most of the mud lost is located in the casing below the bridge plugs.

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 16 for week ending 2400 hours Saturday 19th August 1967

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4055 ft.; 9 5/8 inch casing to 4003 ft.
8 5/8 8080 7 9218 cut and recovered from 2518 ft. plugged back to 2284 ft.

8½ inch hole to 9534 ft.; Operation waiting on weather

II. DRILLING SUMMARY

Progress ______ ft.

Time Analysis (hrs.)

Misc.	Circulating	Tripping	Shut Down		Logging	Testing
			Mechanical	Weather		
53	5	22½		28½	9½	49½

No. of bits used during week ______ ; Total 40

Weight on bit ______ ; R.P.M. ______

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6			

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
10.4-10.5	43-47	0/2	4.0	1.5	9.6-10.5	Tr.

Coring

NIL

Drill Stem Testing

D.S.T. No.7 (8632-47 8660-80) packer set at 8608 ft. bridge plug set at 8580.

Electrical Logging

Gamma-ray neutron casing collar locator run No.2 1790-2297
Cement bond log run No.4 1650-2287.

1-23

Remarks

Testing of the deep sands was completed and a cement plug was placed from 5658-5408 ft. and 11 cu.ft. was squeezed through perforations at 5658 ft. The 7" casing was cut at 2518 ft. and another cement plug placed from 2541 to 2284 ft. The 9 5/8" casing was perforated at 2070 ft. and squeeze cementation was carried out to ensure good cement above the gas/water contact and the 2000 ft. sand. The squeeze was only partially successful and will be repeated when weather conditions permit.

III. MATERIALS

Item	Unit	Consumption		Stocks on	
		Weekly	Cumulative	Vessel	Shorebase
Barytes	Sks (x100 lb.)	450	4020	1065	4000
Bentonite	(do)	120	1879	324	838
Spersene	Sks (x50 lb.)	48	1079	172	208
XP20	(do)	24	532	98	66
C.M.C.	(do)	-	5	55	40
L.C.M.	(do)	-	-	438	100
H.S.D.	bls	-	417	-	-
Caustic Soda		4	61	21	15
Soda Bi Carb		-	48	28	-
Soda Ash		-	11	21	-
Cement	Sks (x94 lb.)	310	5305	2190	1266
Serv. boats		46	1296	1800	-
Fuel barge	bls	117	3481	1053	-
Water barge	bls	1371	31547	3443	-

Active Mud Volumes

Circulation	hole	170 bls		Made during week	300 bls
	tank	580 bls		Total last week	890 bls
Stock	tank	750 bls		Consumption/losses	440 bls
Total		bls			

Remarks

The large mud loss can be accounted for the following ways:

I. A large amount of mud was left in the hole below cement plug No.2
II. A large amount of mud was dumped because of cement contamination.
III. Mud was lost following the parting of the 7" casing.

Form A-3

1-24

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 17 for week ending 2400 hours Saturday 26th August 19 67

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4055 ft.; 9 5/8 inch casing to 4003 ft.
8 5/8 8080 7 9218 - cut and recovered from 2518 ft.
well plugged back to 1691 ft.

8½ inch hole to 9534 ft.; Operation waiting on cement

II. DRILLING SUMMARY

Progress ________ ft.

Time Analysis (hrs.)

~~XXXXX~~ Misc.	Circulating	Tripping	Shut Down		Logging	Testing
			Mechanical	Weather		
42	5	14½		83		23½

No. of bits used during week ________ ; Total 40

Weight on bit ________ ; R.P.M. ________

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6"			

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
not taken during week						

Coring

NIL

Drill Stem Testing

D.S.T. No.8 2040-2045 ft. packer set at 1973 ft.

Electrical Logging

NIL

1-25

Remarks

After a successful squeeze cementation at 2070 ft. a bridge plugswas placed at 2065 ft. and the 2000 ft. sand was tested through perforations at 2040-45 ft. Cement plug was placed from 2065 to 1691 ft.

III. MATERIALS

Item	Unit	Consumption		Stocks on	
		Weekly	Cumulative	Vessel	Shorebase
Barytes	Sks (x100 lb.)	380	4400	685	4000
Bentonite	(do)	100	1979	224	838
Spersene	Sks (x50 lb.)	60	1139	112	208
XP20	(do)	30	562	68	66
C.M.C.	(do)	-	5	55	40
L.C.M.	(do)	-	-	438	100
H.S.D.	bls	[illegible]	417	-	-
Caustic Soda		-	61	21	15
Soda Bi Carb		-	48	28	-
Soda Ash		-	11	21	-
Cement	Sks (x94 lb.)	196	5501	2594	1266
Fuel (Service boats	bls	105	1401	1702	-
Fuel (Barge	bls	113	3594	940	-
Water Barge	bls	2831	34378	2426	-

Active Mud Volumes

Circulation	hole	140 bls		Made during week	50	bls
	tank	600 bls		Total last week	750	bls
Stock	tank	bls		Consumption/losses	40	bls
Total		740 bls				

Remarks

Form A-3

1-26

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 18 for week ending 1900 hours Saturday 2nd September, 1967
(final report)

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4055 ft.; 9 5/8 inch casing to 4003 ft.

8 5/8 inch hole to 8080 ft. 7 inch casing to 9218 ft., cut and recovered from 2518 ft. Plugged back to surface and capped.

8½ inch hole to 9534 ft.; Operation under tow.

II. DRILLING SUMMARY

Progress - ft.

Time Analysis (hrs.)

Misc.	Towing	Tripping	Shut Down		Logging	Testing
			Mechanical	Weather		
118½	5	0	0	34½	0	-

No. of bits used during week - ; Total 40

Weight on bit - ; R.P.M. -

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6	-	-	-

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %

Coring

NIL

Drill Stem Testing

NIL

Electrical Logging

NIL

Remarks

The well was plugged as follows:

Plug No.1	5658-5070	100 sks.	
No.2	2541-2284	110 sks.	Located and tested.
No.3	2063-1589	146 sks.	Located and tested.
No.4	1250-1000	100 sks.	
No.5	450-surface	107 sks.	

A corrosion cap was attached to the well-head. Operations on the well were completed at 0400 hrs. on 29th August 1967. The barge was released from the location at 1900 hrs. on 2nd September 1967.

III. MATERIALS

Item	Unit	Consumption (up to 29.8.67) Weekly	Cumulative	Stocks on ______ Vessel	Shorebase
Barytes	Sks (x100 lb.)		4400	685	4000
Bentonite	(do)		1979	224	838
Spersene	Sks (x50 lb.)		1139	112	208
XP20	(do)		562	68	66
C.M.C.	(do)		5	55	40
L.C.M.	(do)			438	100
H.S.D.	bls		417		
Caustic Soda			61	21	15
Soda Bicarb			48	28	
Soda Ash			11	21	
Cement	Sks (x94 lb.)	207	5708	4500	66
Fuel Service Boats	bls	5	1301	1510	
Fuel Barge	bls	115	3596	1025	
Water Barge	bls	153	31,700	3573	

Active Mud Volumes

Circulation	hole	–	bls
	tank	–	bls
Stock	tank	–	bls
Total		–	bls

Made during week	–	bls
Total last week	740	bls
Consumption/losses	740	bls

Remarks

BIT RECORD

B.O.C. OF AUSTRALIA LTD

1-29

BIT RECORD

Well Golden Beach No.1A Field

Bit No.	Depth From	Depth To	Size	Make and Type	Footage	Hours Run	Remarks
1	Surface	588	17½	Security S3J	588	8	Rerun from G.B. No.1
2			36" & 26"	Hole Openers	588	7½	
3	588	1717	12¼	Security S3J	1130	8	Rerun from G.B. No.1
4			17½	Hole Opener	1130	10	Reaming
5	1718	3143	12¼	Security S3J	1425	18½	T6 B2
6	3143	3808	12¼	Security S3J	665	14	T7 B4
7	3808	4055	12¼	Security S3TJ	247	3½	
8	4055	4482	8 5/8	Security S3TJ	427	8	(1 x 11) (2 x 10)
9	4482	4576	8 5/8	Security M4LJ	94	3	(2 x 10) (1 x 11)
10	4576	4676	8 5/8	Security M4LJ	100	3½	(2 x 10) (1 x 11) T5 B4
11	4676	4866	8 5/8	Security M4LJ	190	5	(3 x 10) T6 B4
12	4866	5118	8 5/8	Security M4NJ	252	6½	(2x10) (1x12) T6 B4
13	5118	5263	8 5/8	Security M4LJ	145	7	(2x10) (1x11) T6 B4
14	5263	5451	8 5/8	Security M4NJ	188	5½	(2x10) (1x11) T8 B8
15	5451	5510	8 5/8	Security M4NJ	59	3	(2x10) (1x11) T6 B3
16	5510	5607	8 5/8	Security M4NJ	97	3½	(2x10) (1x11) T6 B3
17	5607	5615	8 5/8	Security M4NJ	108	4	(2x10) (1x11) T4 B2
18	5615	5927	8 5/8	Hughes OSCIGJ	212	8	(2x10)(1x11) T3 B2
19	5927	6088	8 5/8	Hughes OSCIGJ	161	8	(2x10) (1x11) T4 B2
20	6088	6299	8 5/8	Hughes OSCIGJ	211	8	(2x10)(1x11) T4 B3
21	6299	6463	8 5/8	Hughes OSCIGJ	164	8	(2 x 10) (1 x 11)
22	6463	6630	8 5/8	Security S6J	167	8	(2 x 10) (1 x 12)
23	6630	6818	8 5/8	Security S6J	188	11	(2 x 10) (1 x 12)
24	6818	6926	8 5/8	Security S6J	108	7½	(2x10) (1x11) T6 B4
25	6926	7198	8 5/8	Hughes XIG	272	15	(2x10) (1x11) T7 B1
26	7198	7398	8 5/8	Hughes XIG	200	16	(3x11) T7 B1
27	7398	7638	8 5/8	Hughes XIG	240	18	(3x11) T7 B1
28	7638	7858	8 5/8	Hughes XIG	220	13	(3x11) T7 B1
29	7858	7926	8 5/8	Hughes XCJ	68	5½	(3 x 11)
30	7926	8080	8 5/8	Hughes XCJ	154	14½	(2 x 10) (1 x 11) T4 B1

B.O.C. OF AUSTRALIA LTD

1-30

BIT RECORD

Well: Golden Beach No.1A Field:

Bit No.	Depth From	Depth To	Size	Make and Type	Footage	Hours Run	Remarks
31	8080	8374	8½	Hughes XIG	294	17¼	(2x10) (1x11) T6 B1
32	8374	8573	8½	Hughes XIG	199	14½	(2x10) (1x11)
33	8573	8630	8½	Hughes XIG	57	3	Bit partially plugged
34	8630	8871	8½	Hughes XIG	241	13½	T6 B1 GO (2x11)(1x10)
35	8871	9123	8½	Hughes XIG	252	18 3/4	(2x11) (1x10) T7 B3
36	9123	9323	8½	Hughes XIG	200	17	(2x11) (1x10)
37	9323	9534	8½	Hughes XIG	211	16	(2x11) (1x10) T8 B6 G
		T.D. 9534 ft. below guide base.					

DAILY MUD RECORD

Form C-2
1-32
1

B.O.C. OF AUSTRALIA LTD.

DRILLING MUD RECORD

WELL Golden Beach No.1A AREA Gippsland

MUD COMPANY Magcobar SERVICE ENGINEER L. Bergh

		Properties							Additives					
Date	Depth 6.00 AM	Weight (lbs/gal)	Visc. (Secs.)	Gel.	W/L (ccs)	Filter Cake (mm.)	P.H.	Sand %	A	B	C	D	E	F
1/5	-									135				
3	-									61				
5	190	water								100			2	
6	625	"								130				
7	625									117	96	48	1	
8	625									80				
9	1030	9.1	57		8.2	1.5	9.5	0.25		62	10	5	2	
10	1820	9.2	56		4.4	1.5	9.5	1.5		6				
11	1820	9.2	53	1/3	3.8	1.5	9.2	1.5						
12	1820								600		26	13		
13	1820	10.0	50								70	35	3	
14	1938	10.0	47		2.6	1.5	9.3	Tr.		16			1	
15	1938													
16	1938								220	100	32	16	2	
17	3015	10.2	48		3.2	1.5	9.4	1.0		35	34	17	4	42
18	3890	10.4	50		3.4	1.5	9.0	1.5		25	20	10	3	20
19	4157	10.2	48	1/3	3.4	1.5	9.3	1.5	210	64	28	14	3	
20-29	4157	Schlumberger, casing and weather												
30	4157									64	20	10		24
31	4585	9.6	46		6.8	2.0	10.4	1.5	130	5	20	10		
1/6	4585													
SUB-TOTAL									1160	1000	356	178	21	86
TOTAL									1160	1000	356	178	21	86

A Barytes x 100 lb. B Bentonite x 100 lb. C Spersene x 50 lb. D XP20 x 50 lb.

E Caustic Soda x 140 lb. F Diesel (bls)

Also used:	Soda Ash & Soda Bicarb (x 93 lb)	CMC (x 50 lb)
Sub-Total	34	5
Total	34	5

Signed ....

Form C-2
1-33
2

B.O.C. OF AUSTRALIA LTD.

DRILLING MUD RECORD

WELL: Golden Beach No.1A AREA: Gippsland

MUD COMPANY: Magcobar SERVICE ENGINEER: L. Bergh

		Properties							Additives					
Date	Depth 6.00 AM	Weight (lbs/gal)	Visc. (Secs.)	Gel.	W/L (ccs)	Filter Cake (mm.)	P.H.	Sand %	A	B	C	D	E	F
2/6	4585								550	76	15			
3	4679	9.5	43	1/3	5.8	1.5	9.7	1.0		52	6	8		
4	4968	9.5	47		6.2	1.5	9.7	Tr.	140	22	30	20		24
5	5365	9.5	44		5.2	1.5	9.6	Tr.		56	24	12	1	
6	5612	9.6	47		5.0	1.5	9.8	Tr.	70	78	34	17	2	38
7	5709	9.6	51		5.0	1.5	9.8	0.25						
8	5709										10		1	
9	6029	9.5	42		4.4	1.5	9.5	Tr.		12			2	
10	6284	9.7	44	1/3	4.4	1.5	9.6	0.25						12
11	6565	9.8	44		4.6	1.5	9.5	0.25		10	20	10	2	
12	6732	9.8	45		4.6	1.5	9.5	0.25		35	20	10	2	
13	6920	9.7	47		4.5	1.5	9.5	0.25						
14	6989	9.8	44	1/4	4.5	1.5	9.5	0.5						
15-17	6989	W.O.W.												
18	6989									4				
19	7200	9.8	45		5.0	1.5	9.5	Tr.	400					48
20	7421	9.8	45		4.4	1.5	9.5	Tr.		5	10	5	1	
21	7500	9.8	45		4.4	1.5	9.5	Tr.						
22	P.B. to 2269	9.1	45		4.4	1.5	9.5	Tr.	75		48	24	2	
23	7500	9.8	46		4.2	1.5	9.6	Tr.	300	75	50	25	1	12
24	7510	9.6	46	0/3	4.2	1.5	12.0	Tr.						
SUB-TOTAL									1535	425	267	131	14	156
TOTAL									2695	1425	623	309	35	244

A: Barytes B: Bentonite C: Spersene D: XP20

E: Caustic Soda F: Diesel

Also used:	Soda Ash Soda Bicarb	CMC
Sub-Total	24	0
Total	58	5

Signed ....

Form C-2
1-34
3

B.O.C. OF AUSTRALIA LTD.

DRILLING MUD RECORD

WELL Golden Beach No.1A AREA Gippsland

MUD COMPANY Magcobar SERVICE ENGINEER L. Bergh

		Properties							Additives					
Date	Depth 6.00 AM	Weight (lbs/gal)	Visc. (Secs.)	Gel.	W/L (ccs)	Filter Cake (mm.)	P.H.	Sand %	A	B	C	D	E	F
25/6	7510									50				
26	7520	9.7	42		5.4	2.0	10.5	Tr.	75	79	36	18		24
27	7750	9.8	47		5.0	1.5	10.0	0.5		12	70	35		12
28	7960	9.8	45		4.2	1.5	9.7	0.75		10	10		1	
29	8028	9.9	49	0/1	4.2	1.5	9.7	0						
30/6-5/7	8028	W.O.W.												
6/7	8028	10.0	48		4.0	1.5	9.7	0.25		27	70	35	3	24
7	8169	10.0	48		4.0	1.5	9.7	0.25						
8	8295	10.0	45	0/2	3.8	1.5	9.7	0.5		32	34	17	2	
9	8555	10.1	50		4.0	1.5	9.6	0.75	200	5	10	5	3	
10	8675	10.0	48		4.0	1.5	9.7	1.0			14	7	1	
11	8732	10.1	48		4.2	1.5	9.6	0.75	100	10	24	12	2	15
12	8973	10.1	48		4.2	1.5	9.6	0.75	200	30	30	15	4	20
13	9225	10.2	47		3.5	1.5	9.7	0.75	200	4	10	5	1	50
14	9420	10.2	48		3.4	1.5	9.7	0.5		14	26	13	2	
15	9586	10.1	46		3.8	1.5	9.6	0.5		34	10	5		
16	9636	10.1	46		4.0	1.5	9.6	0.25						
17	9636	10.3	48		4.2	1.5	9.7	0.25	100	7	20	10	1	28
18	9636	10.3	49		4.0	1.5	9.6	0.25						
19	9636	W.O.W.												
20	9636									5	20	10	1	
SUB-TOTAL									875	319	384	187	21	173
TOTAL									3570	1744	1007	496	56	417

A Barytes B Bentonite C Spersene D XP20

E Caustic Soda F Diesel

Also used:	Soda Ash & Soda Bicarb	CMC
Sub-Total	1	0
Total	59	5

Signed ....

Form C-2
1-35
4

B.O.C. OF AUSTRALIA LTD.

DRILLING MUD RECORD

WELL Golden Beach No.1A AREA Gippsland

MUD COMPANY Magcobar SERVICE ENGINEER L. Bergh

		Properties							Additives					
Date	Depth 6.00 AM	Weight (lbs/gal)	Visc. (Secs.)	Gel.	W/L (ccs)	Filter Cake (mm.)	P.H.	Sand %	A	B	C	D	E	F
21/7	9636	10.2	49		3.8	1.5	9.7	0.5						
22	9636	10.2	50	1/3	3.8	1.5	9.7	0.5						
23-26	9636	7" casing												
27	9636									5	24	12	1	
28	9636	10.2	51	1/4	3.7	1.5	9.6	0.25						
29/7-16/8	9636	weather and testing								100	48	24	4	
17/8	P.B. to 2400	9.7	45						450	20				
18	"	10.5	43	0/2	4.0	2.0	10.5	Tr.						
19-20	"	W.O.W.												
21	"								380	100	60	30		
22	"	10.5	50		4.2	1.5	10.5	Tr.						
SUB-TOTAL									830	225	132	66	5	0
TOTAL									4400	1969	1139	562	61	417

A Barytes x 100 lb. B Bentonite x 100 lb. C Spersene x 50 lb. D XP20 x 50 lb.

E Caustic Soda x 140 lb. F Diesel bls.

Also used: Soda Ash & Soda Bicarb CMC

Total 59 (x 93 lb) 5 (x 50 lb)

1-36

CASING AND TUBULAR REPORT

CASING

B.O.C. OF AUSTRALIA LTD.

CASING INFORMATION

Form B - 1

1-37

Surface Casing O.D. 30"

Well No. 1A Location Golden Beach Date May 4, 1967

Joints on Location	Feet on Location	Casing Weight	Grade	Range	Thread	Threads & Couplings	Make	Joints Run	Depth Landed	Feet Run in Well
2	80.00	319	8		welded			2	182'	80

Shoe: Make Inside Taper only Type (Texas style) Length

Collars: Make Type Length

Landing Joint (when used) Length

Overall Length of Casing String

Feet up from K.B. (Subtract)

Setting Depth: 182' By Driller By Tally

Shoe Joint: Overall (Subtract)

Float Collar Landed: By Driller By Tally

CENTRALIZERS:

Make

Number

Positions

SCRATCHERS:

Make

Number

Positions

No. of Joints Welded all

Remarks

Operator's Representative

1-38

B.O.C. OF AUSTRALIA LTD.
CASING RUNNING AND CEMENTING REPORT

Form B - 2

Surface Casing ~~xxxxxxxxxxx~~ O.D. 30"

GENERAL

Well No. 1A Location Golden Beach Date May 4, 1967

K.B./G.S. Elevation 101 K.B./G.S. Csg. Flange ______ Total Depth (Driller) 190

Hole Size	36"	26" & 17½"		Casing in Hole	81'		
Depth	182'	8.10		Depth Set	182' KB		

Mud: Type Gel Wt. 9.3 Visc. 50 W.L. ______

B.O.P.'s ______

RUNNING

Power Tongs ______ Torque: Max. ______ Nom. ______ Min. ______

Time Pipe Started 0600 Time on Bottom 1100 Time Circ. ______

Fill-up Points ______ Btm. by Casing 182 RT Ft. up from K.B. ______

Remarks ______

CEMENTING

Cement Co. Halliburton Operator D. Knackstedt Time on Location ______

Types & Quantities of Cement 800 sks. Construction

Water ahead ______ Bbls. Mix Times: Start 1100 hrs. Finish 1140 hrs. Slurry Wt. 15.5 16.0

Calc. Disp. 4 Bbls. Est. Disp. time ______ Mins. Start ______ Finish ______

Max. Pumping Press. ______ Bump. Press. ______ Bumped by ______ No. times bump. ______

Cement Returns: Yes/~~No~~ Remarks Displaced only cap. of D.P. & stinger.

LANDING

Time Landed 1100 Date May 4, 1967 Init. Wt. of Cem. String (Less Blks.) 25,000

Wt. Landed in Slips ______ Make of Bowl ______ Nom. Size ______ Series ______

Slip and Seal Assembly ______

Remarks
Rotary to sea bed - 101.00
39" csg. 81.00
30" shoe @ 182.00

Operator's Representative ______

B.O.C. OF AUSTRALIA LTD.

CASING AND TUBING TALLY

Form C-4

1-39

Page 1 of 1 Joint No. 1 to 2 Date May 4 1967

WELL: Golden Beach No.1A Size 30 Weight 3/9 Grade B Range .... Condition O.K.

Manufacturer .... Threads: On .... Off .... No. of Threads .... Coupling: Short .... Long ....

No. of Joints: Received at Well 2 Used 2 Disposition of Joints not used ....

Length of Cut-Off Joint above casing bowl .... Disposition ....

Joint No.	Length of Joint	
01	40	00
02	40	00
03		
04		
05		
06		
07		
08		
09		
10		
TOTAL	80	00
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
TOTAL		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
TOTAL		

Joint No.	Length of Joint	
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
TOTAL		
41		
42		
43		
44		
45		
46		
47		
48		
49		
50		
TOTAL		
51		
52		
53		
54		
55		
56		
57		
58		
59		
60		
TOTAL		

Joint No.	Length of Joint	
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
TOTAL		
71		
72		
73		
74		
75		
76		
77		
78		
79		
80		
TOTAL		
81		
82		
83		
84		
85		
86		
87		
88		
89		
90		
TOTAL		

Joint No.	Length of Joint	
91		
92		
93		
94		
95		
96		
97		
98		
99		
00		
TOTAL		

TALLY SUMMARY

Group No. Ending	Length (Forward)	
10	80	00
20		
30		
40		
50		
60		
70		
80		
90		
00		
TOTAL	80	00

Tally By: ....

Checked By: ....

(Note: Include casing shoe and collar in first joint)

REMARKS: 2 Jts. 30" = 80.00

National Conn. below structure 1.00

Bottom of structure 30" shoe 81.00

Note: Inside taper only (Texas style) was used as shoe.

Operator's Representative ....

B.O.C. OF AUSTRALIA LTD.

CASING INFORMATION

Form B - 1

1-40

Surface Casing O.D. 20"

Well No.1A Location Golden Beach Date May 5, 1967

Joints on Location	Feet on Location	Casing Weight	Grade	Range	Thread	Threads & Couplings	Make	Joints Run	Depth Landed	Feet Run in Well
10	472.84	94	J55	3	Vetco 4 round			10	573.84	472.84

Shoe: Make Baker Type float shoe Length 1.80

Collars: Make Baker Type float collar Length 1.88

Landing Joint (when used) Length ---

Overall Length of Casing String --- 472.84

Feet up from K.B. (Subtract) ---

Setting Depth: 573.84 By Driller By Tally

Shoe Joint: 42.00 Overall (Subtract)

Float Collar Landed: 531.84 By Driller By Tally

CENTRALIZERS:

Make

Number

Positions

SCRATCHERS:

Make

Number

Positions

No. of Joints Welded All jts. fitted with Ventura Tool Co.'s Vetco tool jt. (threaded).

Remarks

Operator's Representative

1-41

B.O.C. OF AUSTRALIA LTD.

CASING RUNNING AND CEMENTING REPORT

Form B - 2

Surface Casing ~~xxxxxxxxxxxxxx~~ O.D. 20"

GENERAL

Well NO.1A Location Golden Beach Date May 6, 1967

K.B./G.S. Elevation 101 K.B./G.S. Csg. Flange ____ Total Depth (Driller) 625'

Hole Size	26"			Casing in Hole	26" x 94.0		
Depth	625'			Depth Set	573 KB		

Mud: Type Gel Wt. 9.3 Visc. 50 W.L. ____

B.O.P.'s ____

RUNNING

Power Tongs ____ Torque: Max. ____ Nom. ____ Min. ____

Time Pipe Started 2200 Time on Bottom 0500 Time Circ. ____

Fill-up Points Every other jt. Btm. by Casing ____ Ft. up from K.B. 573.84

Remarks ____

CEMENTING

Cement Co. Halliburton Operator D. Knackstedt Time on Location Res.

Types & Quantities of Cement 810 Construction & 890 Class B (salt H^2O mix)

Water ahead ____ Bbls. Mix Times: Start 0500 Finish 0630 Slurry Wt. 15.3

Calc. Disp. 134.5 Bbls. Est. Disp. time 15 Mins. Start 0630 Finish 0645

Max. Pumping Press. ____ Bump. Press. ____ Bumped by ____ No. times bump. ____

Cement Returns: Yes/~~No~~. Remarks ____

LANDING

Time Landed 0445 Date May 6, 1967 Init. Wt. of Cem. String (Less Blks.) ____

Wt. Landed in Slips ____ Make of Bowl ____ Nom. Size ____ Series ____

Slip and Seal Assembly ____

Remarks 20" csg. 472.84
Rotary to sea bed 101.00
20" shoe @ 573.84

Operator's Representative ____

B.O.C. OF AUSTRALIA LTD.

Form C - 4

1-42

CASING AND TUBING TALLY

Page 1 of 1 Joint No. 1 to 10 Date 5th May 1967

WELL: Golden Beach No.1A Size 20 Weight 94.0 Grade J55 Range 3 Condition Good

Manufacturer Thyssen Rohrenwerke Threads: On ...... Off ...... No. of Threads 4 round Vetco Coupling: Short .... Long ....

No. of Joints: Received at Well 10 + w/head Used 10 Disposition of Joints not used ....

Length of Cut-Off Joint above casing bowl .... Disposition Landed on 30" at sea bed

Joint No.	Length of Joint		Joint No.	Length of Joint		Joint No.	Length of Joint		Joint No.	Length of Joint	
01	43	88	31			61			91		
02	Pulp 5	54	32			62			92		
03	41	30	33			63			93		
04	41	30	34			64			94		
05	41	30	35			65			95		
06	41	30	36			66			96		
07	41	30	37			67			97		
08	41	30	38			68			98		
09	41	30	39			69			99		
10	41	30	40			70			00		
TOTAL			TOTAL			TOTAL			TOTAL		

Joint No.	Length of Joint		Joint No.	Length of Joint		Joint No.	Length of Joint	
11	41	30	41			71		
12	41	30	42			72		
13	Pulp 5	90	43			73		
14	w/h body 4	52	44			74		
15			45			75		
16			46			76		
17			47			77		
18			48			78		
19			49			79		
20			50			80		
TOTAL	472	84	TOTAL			TOTAL		
21			51			81		
22			52			82		
23			53			83		
24			54			84		
25			55			85		
26			56			86		
27			57			87		
28			58			88		
29			59			89		
30			60			90		
TOTAL			TOTAL			TOTAL		

TALLY SUMMARY

Group No. Ending	Length (Forward)	
10		
20		
30		
40		
50		
60		
70		
80		
90		
00		
TOTAL	472	84

Tally By: ....

Checked By: ....

(Note: Include casing shoe and collar in first joint)

REMARKS: The shoe, F.C. & Pulp Jts. were welded in to make 10 jts.

Plus the well head Venture Tool Co. Vetco threaded tool jt. was used.

20" casing	472.84
Rotary to sea bed	101.00
20" shoe @	573.84

Operator's Representative ....

Form B - 1

B.O.C. OF AUSTRALIA LTD.
CASING INFORMATION

Surface Casing O.D. 13 3/8"

Well 1A Location Golden Beach Date 11th May 1967

Joints on Location	Feet on Location	Casing Weight	Grade	Range	Thread	Threads & Couplings	Make	Joints Run	Depth Landed	Feet Run in Well
44	1735	54.5	J55	3	Butt.	yes		42	1768	1648.4
									w/h bod.	15.20

Shoe: Make Baker Type float Length	1.50
Collars: Make Baker Type float Length	1.70
Landing Joint (when used) Length	109.60
Overall Length of Casing String	1776.40
Feet up from K.B. (Subtract)	87.60
Setting Depth: 1768.8 By Driller — By Tally	1768.80
Shoe Joint: 83.4 Overall — (Subtract)	
Float Collar Landed: 1685.4 By Driller — By Tally	

CENTRALIZERS:

Make

Number 3

Positions 5' above shoe top 3rd & 5th joint

SCRATCHERS:

Make

Number

Positions

No. of Joints Welded two

Remarks

Operator's Representative

1-43

B.O.C. OF AUSTRALIA LTD.

CASING RUNNING AND CEMENTING REPORT

Form B - 2

~~Surface Casing~~
Intermediate Casing O.D. 13 3/8"
Production Casing
Liner

GENERAL

Well 1A Location Golden Beach Date 11th May, 1967

K.B./G.S. Elevation 102 K.B./G.S. Csg. Flange ______ Total Depth (Driller) 1820'

Hole Size	17½"			Casing in Hole	30"	20"	
Depth	1820			Depth Set	182'	573	

Mud: Type Sp. XP20 Wt. 9.2 Visc. 53 W.L. 3.8

B.O.P.'s 20" Hydril

RUNNING

Power Tongs - Torque: Max. - Nom. - Min. -

Time Pipe Started 2230 Time on Bottom 0600 Time Circ. 45 mins.

Fill-up Points Each joint Btm. by Casing 1768.8 Ft. up from K.B. 7.60'

Remarks ______

CEMENTING

Cement Co. Halliburton Operator D. Knackstedt Time on Location Resident

Types & Quantities of Cement 170 sks. 8% gel 1300 sks. total 1470 sks. Construction

Water ahead 40 Bbls. Mix Times: Start 0715 Finish 0800 Slurry Wt. 13.1 / 15.3

Calc. Disp. 260 Bbls. Est. Disp. time 30 Mins. Start 0800 Finish 0820

Max. Pumping Press. 600 Bump. Press. 1000 Bumped by Halliburton No. times bump. 1

Cement Returns: Yes/~~No~~ Remarks Good returns

LANDING

Time Landed 0600 Date 11.5.67 Init. Wt. of Cem. String (Less Blks.) ______

Wt. Landed in Slips ______ Make of Bowl ______ Nom. Size ______ Series ______

Slip and Seal Assembly ______

Remarks ______

Operator's Representative ______

1-44

Form C-4

B.O.C. OF AUSTRALIA LTD.

CASING AND TUBING TALLY

Page 1 of 1 Joint No. 1 to 42 Date 11th May 1967

WELL: Golden Beach No.1A Size 13 3/8 Weight 54.5 Grade J55 Range 3 Condition Good

Manufacturer .... Threads: On ...... Off ...... No. of Threads Butt Coupling: Short ...... Long ......

No. of Joints: Received at Well 44 Used 42 Disposition of Joints not used P. Welshpool.

Length of Cut-Off Joint above casing bowl .... Disposition ....

Joint No.	Length of Joint		Joint No.	Length of Joint		Joint No.	Length of Joint		Joint No.	Length of Joint	
01	43	50	31	41	60	61			91		
02	39	90	32	38	12	62			92		
03	39	13	33	39	10	63			93		
04	34	64	34	38	78	64			94		
05	38	15	35	42	68	65			95		
06	37	30	36	37	62	66			96		
07	36	00	37	37	90	67			97		
08	36	74	38	41	33	68			98		
09	37	95	39	43	10	69			99		
10	38	61	40	38	06	70			00		
TOTAL	381	92	TOTAL	398	29	TOTAL			TOTAL		

Joint No.	Length of Joint		Joint No.	Length of Joint		Joint No.	Length of Joint	
11	37	52	41	37	58	71		
12	38	22	42	38	76	72		
13	37	20	43	w/h 15	20	73		
14	37	90	44	body		74		
15	38	00	45			75		
16	37	92	46			76		
17	36	24	47			77		
18	43	02	48			78		
19	42	25	49			79		
20	42	70	50			80		
TOTAL	390	97	TOTAL	91	54	TOTAL		
21	37	83	51			81		
22	42	53	52			82		
23	38	58	53			83		
24	41	53	54			84		
25	42	54	55			85		
26	42	32	56			86		
27	42	10	57			87		
28	42	58	58			88		
29	37	48	59			89		
30	36	63	60			90		
TOTAL	404	12	TOTAL			TOTAL		

TALLY SUMMARY

Group No. Ending	Length (Forward)	
10	381	92
20	390	97
30	404	12
40	398	29
50	91	54
60		
70		
80		
90		
00		
TOTAL	1666	84

Tally By: ....

Checked By: ....

(Note: Include casing shoe and collar in first joint)

REMARKS: Shoe on 1st joint collar on 2nd joint - centralizers 5' above shoe between 3rd & 4th and 5th & 6th.

13 3/8" casing 1666.84 F.C. @ 1685.4'

B.R.T. 102.00

1768.84

Operator's Representative ....

1-45

Form B - 1

B.O.C. OF AUSTRALIA LTD.

CASING INFORMATION

~~Surface Casing~~
Intermediate Casing O.D. 9 5/8"
~~Production Casing~~
~~Liner~~

Well Golden Beach Location No.1A Date 20th May, 1967

Joints on Location	Feet on Location	Casing Weight	Grade	Range	Thread	Threads & Couplings	Make	Joints Run	Depth Landed	Feet Run in Well
26	1000 32	40	J55	3	Butt.			26		1000.17
86	3327 09	36	J55	3	Butt.			76		2998.78

Shoe: Make Baker Type Model G (Diff.) Length 2.80
Baker Model G (Diff.) 1.90
Collars: Make Baker Type Model J Two Stage Cement Collar Length 1.72

Landing Joint (when used) Length 105.60

Overall Length of Casing String 4110.97

Feet up from K.B. (Subtract) 6.00

Setting Depth: 4105 By Driller R.T. By Tally 4104.97

Shoe Joint: 4105 Overall (Subtract)

Float Collar Landed: 4027 By Driller By Tally

CENTRALIZERS:

Make Baker, Larkin

Number 6, 3

Positions Refer to form C4

SCRATCHERS:

Make

Number Nil

Positions

No. of Joints Welded Nil

Remarks All joints on first three joints of casing Bakerloked. D.V. collar at 2556 ft.

Operator's Representative

1-46

B.O.C. OF AUSTRALIA LTD.
CASING RUNNING AND CEMENTING REPORT

Form B - 2

~~Surface Casing~~
Intermediate Casing O.D. 9 5/8"
~~Production Casing~~
~~Liner~~

FIRST STAGE

GENERAL

Well No.1A Location Golden Beach Date 21st/22nd May, 1967

K.B./G.S. Elevation ______ K.B./G.S. Csg. Flange ______ Total Depth (Driller) 4157

Hole Size	12¼			Casing in Hole	9 5/8		
Depth	4157			Depth Set	4105		

Mud: Type Spersene/XP20 Wt. 10.2 Visc. 48 W.L. 3.4

B.O.P.'s 13 5/8 B.O.P. stack

RUNNING

Power Tongs ______ Torque: Max. ______ Nom. ______ Min. ______

Time Pipe Started 16.30 Time on Bottom 01.00 Time Circ. 1 hour

Fill-up Points Automatic Btm. by Casing 4105 R.T. Ft. up from K.B. 5'-0"

Remarks Checking every 4 joints for fill up.

CEMENTING

Cement Co. Halliburton Operator D. Knackstedt Time on Location Resident

Types & Quantities of Cement 285 sacks 4% Gel. 14.1 lbs. per Gall.
80 sacks Construction 15.3 lbs. per Gall.

Water ahead ______ Bbls. Mix Times: Start 0200 Finish 0400 Slurry Wt. 14.1 15.3

Calc. Disp. 309 Bbls. Est. Disp. time 45 Mins. Start ______ Finish ______

Max. Pumping Press. 400 Bump. Press. 650 Bumped by ______ No. times bump. 1

Cement Returns: ~~Yes~~/No Remarks Two stage cement job

LANDING

Time Landed 00.45 Date 21.5.67 Init. Wt. of Cem. String (Less Blks.) n/a

Wt. Landed in Slips 125,390 Make of Bowl National w/h Nom. Size ______ Series 13 5/8

~~Slip & Pack~~ Seal Assembly National

Remarks

Operator's Representative ______

1-47

B.O.C. OF AUSTRALIA LTD.

CASING RUNNING AND CEMENTING REPORT

Form B - 2

Intermediate Casing O.D. 9 5/8"

SECOND STAGE

GENERAL

Well No.1A Location Golden Beach Date 21st/22nd May, 1967

K.B./G.S. Elevation ______ K.B./G.S. Csg. Flange ______ Total Depth (Driller) ______

Hole Size				Casing in Hole			
Depth				Depth Set			

Mud: Type ______ Wt. ______ Visc. ______ W.L. ______

B.O.P.'s ______

RUNNING

Power Tongs ______ Torque: Max. ______ Nom. ______ Min. ______

Time Pipe Started ______ Time on Bottom ______ Time Circ. ______

Fill-up Points ______ Btm. by Casing ______ Ft. up from K.B. ______

Remarks ______

CEMENTING

Cement Co. Halliburton Operator D. Knackstedt Time on Location Resident

Types & Quantities of Cement 350 sacks 4% Gel. 14.1 lbs. per gall.

Water ahead ______ Bbls. Mix Times: Start 0600 Finish 0830 Slurry Wt. 14.1

Calc. Disp. 198 Bbls. Est. Disp. time 60 Mins. Start ______ Finish ______

Max. Pumping Press. 400 Bump. Press. 800 psi Bumped by ______ No. times bump. 1

Cement Returns: ~~Yes~~/No. Remarks Two stage

Baker stage collar did not close.

LANDING

Time Landed ______ Date ______ Init. Wt. of Cem. String (Less Blks.) ______

Wt. Landed in Slips ______ Make of Bowl ______ Nom. Size ______ Series ______

Slip and Seal Assembly ______

Remarks ______

Operator's Representative ______

B.O.C. OF AUSTRALIA LTD.

CASING AND TUBING TALLY

Form C - 4

1-48

Page 1 of 1   Joint No. 1 to 102   Date 20th May, 1967

WELL: Golden Beach No. 1A   Size 9 5/8 Weight 36.40 Grade J55 Range 3 Condition good

Manufacturer Canadian   Threads: On ...... Off ...... No. of Threads ......   Coupling: ~~xxxx~~ Butt. ~~xxx~~

No. of Joints: Received at Well 112 Used 102 Disposition of Joints not used Port Welshpool

Length of Cut-Off Joint above casing bowl ...... Disposition ......

Joint No.	Length of Joint	
01	44	35
02	39	40
03	39	98
04	39	00
05	38	08
06	37	70
07	36	82
08	39	70
09	37	11
10	39	69
TOTAL	391	83
11	39	42
12	39	08
13	36	60
14	39	05
15	38	30
16	38	70
17	37	45
18	38	69
19	39	60
20	37	57
TOTAL	384	46
21	37	40
22	38	65
23	39	65
24	40	57
25	36	08
26	40	37
27	39	87
28	39	45
29	39	96
30	38	04
TOTAL	390	04

Joint No.	Length of Joint	
31	37	70
32	39	60
33	39	50
34	39	36
35	38	43
36	39	21
37	40	28
38	38	70
39	35	41
40	34	72
TOTAL	382	91
41	40	70
42	40	85
43	38	63
44	40	39
45	40	82
46	38	84
47	39	49
48	38	56
49	38	68
50	40	81
TOTAL	397	77
51	39	42
52	40	53
53	37	87
54	41	38
55	39	31
56	40	61
57	39	98
58	40	39
59	40	27
60	40	32
TOTAL	400	08

Joint No.	Length of Joint	
61	40	05
62	39	35
63	40	11
64	39	33
65	39	98
66	39	17
67	39	96
68	39	72
69	39	88
70	39	29
TOTAL	396	84
71	40	63
72	40	73
73	38	94
74	39	71
75	39	51
76	40	28
77	36	68
78	40	59
79	38	18
80	38	95
TOTAL	394	20
81	39	06
82	40	06
83	39	80
84	40	11
85	41	05
86	40	02
87	39	33
88	39	18
89	39	13
90	39	19
TOTAL	396	93

Joint No.	Length of Joint	
91	40	27
92	39	80
93	40	60
94	40	93
95	39	27
96	40	71
97	37	55
98	38	90
99	38	42
00	39	49
	37	27
	37	10
TOTAL	470	31

TALLY SUMMARY

Group No. Ending	Length (Forward)	
10	391	83
20	384	46
30	390	04
40	382	91
50	397	77
60	400	08
70	396	84
80	394	20
90	396	93
00	470	31
TOTAL	4005	37

Tally By: P. Stockwell

Checked By: D. Langton

(Note: Include casing shoe and collar in first joint)

REMARKS: Shoe on 1st joint, float collar on 2nd joint, stage collar on 4th joint.

First 21 joints 40 lb. casing. Final 5 joints 40 lb. casing. Remainder 36 lb. casing.

Centralizers

(1) 5' above shoe, (2) on first joint, (3) & (4) 3 joints apart above 1st joint,

(5) to (9) one centralizer every 3rd joint above stage collar.

Operator's Representative ......

1-49

Form B - 1

B.O.C. OF AUSTRALIA LTD.

CASING INFORMATION

~~xxxxxxxx~~
~~xxxxxxxxxxxxxxxx~~ 7"
Production Casing
~~xxxx~~

Well Golden Beach Location No.1A Date 22nd July, 1967

Joints on Location	Feet on Location	Casing Weight	Grade	Range	Thread	Threads & Couplings	Make	Joints Run	Depth Landed	Feet Run in Well
50		26	N80		LTC			41		1325 81
31		26	N80		Butt			27		866 04
232		23	N80		Butt			216		6884 41
		26	N80		Butt			4		130 13
1		26	P110		Butt			1		10 50

Shoe: Make Baker Type Model G (Differential) Length 2 15

Collars: Make Baker Type Model G (Differential) Length 1 60

Landing Joint (when used) Length 131 10

Overall Length of Casing String 9351 74

Feet up from K.B. (Subtract) 31 00

Setting Depth: 9320 64 By Driller By Tally 9320 74

Shoe Joint: 70 61 Overall (Subtract)

Float Collar Landed: 9250 03 By Driller By Tally

CENTRALIZERS:

Make NIL

Number

Positions

SCRATCHERS:

Make NIL

Number

Positions

No. of Joints Welded

Remarks Shoe, float collar and pin between second and third joints were Baker-Loked.

's Representative

B.O.C. OF AUSTRALIA LTD.

CASING RUNNING AND CEMENTING REPORT

1-50

Form B - 2

~~Surface Casing~~
~~Intermediate Casing~~ 7"
Production Casing
~~Liner~~

GENERAL

Well Golden Beach Location No.1A Date 22nd-23rd July, 1967

K.B./G.S. Elevation ______ K.B./G.S. Csg. Flange ______ Total Depth (Driller) ______

Hole Size	8 5/8"	8½"		Casing in Hole	7"		
Depth	8182'	9636'		Depth Set	9320 RT		

Mud: Type Lignosulphonate Wt. 10.2 Visc. 49 W.L. 3 8

B.O.P.'s 13 5/8" stack

RUNNING

Power Tongs ______ Torque: Max. ______ Nom. ______ Min. ______

Time Pipe Started 1230 (22/7/67) Time on Bottom 0430 (23/7/67) Time Circ. 105 min

Fill-up Points Automatic Btm. by Casing 9320 RT Ft. up from K.B. 31 ft.

Remarks ______

CEMENTING

Cement Co. Halliburton Operator J. Gloriod Time on Location Resident

Types & Quantities of Cement 500 sacks class B cement with 10 sacks Bentonite (3%) and 500 lbs HR4 (retarder)

Water ahead 10 Bbls. Mix Times: Start 0620 Finish 0642 Slurry Wt. 133,150

Calc. Disp. 360 Bbls. Est. Disp. time 45 Mins. Start 0650 Finish 0745

Max. Pumping Press. 850 Bump. Press. 1500 Bumped by rig pump No. times bump. one

Cement Returns: ~~Yes~~/No. Remarks Of the 113 bbls of fresh water bentonite mix required, 80 bbls only could be pumped due to severe frothing. Pumping was continued using fresh water

LANDING

Time Landed 0430 Date 22nd July, 1967 Init. Wt. of Cem. String (Less Blks.) ______

Wt. Landed in Slips 170,000 Make of Bowl National w/m Nom. Size ______ Series ______

Slip and Seal Assembly National

Remarks ______

...sentative ______

B.O.C. OF AUSTRALIA LTD.
CASING AND TUBING TALLY

Form C - 4

1-51

Page 1 of 4 Joint No. 1 to 100 Date 22nd July, 1967

WELL: Golden Beach No.1A Size 7" Weight 26&23 lb Grade N80 Range .... Condition ....

Manufacturer Canadian Threads: On .... Off .... No. of Threads .... Coupling: Short .... Long ....

No. of Joints: Received at Well 314 Used 289 Disposition of Joints not used Port Welshpool

Length of Cut-Off Joint above casing bowl .... Disposition ....

Joint No.	Length of Joint		Joint No.	Length of Joint		Joint No.	Length of Joint		Joint No.	Length of Joint	
01	37	28	31	33	55	61	32	60	91	30	72
02	33	33	32	33	27	62	32	05	92	32	15
03	33	16	33	31	88	63	30	09	93	31	63
04	32	51	34	32	40	64	30	08	94	32	31
05	33	02	35	33	40	65	32	00	95	33	27
06	32	63	36	31	18	66	31	97	96	30	54
07	32	13	37	33	30	67	32	50	97	33	53
08	33	39	38	28	99	68	32	35	98	32	43
09	32	00	39	31	41	69	32	50	99	33	46
10	32	84	40	33	31	70	31	54	00	32	55
TOTAL	332	29	TOTAL	322	69	TOTAL	317	68	TOTAL	322	59

Joint No.	Length of Joint		Joint No.	Length of Joint		Joint No.	Length of Joint	
11	32	70	41	33	14	71	30	70
12	33	40	42	32	58	72	32	22
13	30	42	43	31	74	73	32	05
14	28	20	44	32	32	74	32	54
15	33	35	45	32	05	75	29	51
16	33	09	46	31	92	76	29	38
17	31	22	47	32	40	77	31	82
18	31	31	48	32	08	78	32	22
19	32	52	49	32	38	79	32	14
20	31	98	50	32	05	80	31	34
TOTAL	318	19	TOTAL	322	66	TOTAL	313	92

Joint No.	Length of Joint		Joint No.	Length of Joint		Joint No.	Length of Joint	
21	32	78	51	31	80	81	33	31
22	32	18	52	32	35	82	32	34
23	32	92	53	31	95	83	32	42
24	32	25	54	32	65	84	31	70
25	32	95	55	32	60	85	32	60
26	32	30	56	31	95	86	31	49
27	32	73	57	33	30	87	32	38
28	33	09	58	32	58	88	31	84
29	31	40	59	32	35	89	32	60
30	30	65	60	31	35	90	32	57
TOTAL	323	25	TOTAL	322	88	TOTAL	323	25

TALLY SUMMARY

Group No. Ending	Length (Forward)	
10	332	29
20	318	19
30	323	25
40	322	69
50	322	66
60	322	88
70	317	68
80	313	92
90	323	25
00	322	59
TOTAL	3219	40

Tally By: P. Stockwell

Checked By: D. Langton

(Note: Include casing shoe and collar in first joint)

REMARKS:

Operator's Representative

B.O.C. OF AUSTRALIA LTD.

CASING AND TUBING TALLY

Form C - 4

1-53

Page 3 of 4   Joint No. 201 to 289   Date 22nd July, 1967

WELL: Golden Beach No.1A   Size 7"   Weight 26,23 lb   Grade N80   Range ......   Condition ......

Manufacturer Canadian   Threads: On ...... Off ......   No. of Threads ......   Coupling: Short ...... Long ......

No. of Joints: Received at Well 314   Used 289   Disposition of Joints not used Port Welshpool

Length of Cut-Off Joint above casing bowl ......   Disposition ......

Joint No.	Length of Joint		Joint No.	Length of Joint		Joint No.	Length of Joint		Joint No.	Length of Joint	
01	33	12	31	30	56	61	31	09	91		
02	32	34	32	32	60	62	32	20	92		
03	33	33	33	31	38	63	32	55	93		
04	32	28	34	32	87	64	31	84	94		
05	32	32	35	32	23	65	31	67	95		
06	32	10	36	30	90	66	31	97	96		
07	30	94	37	32	43	67	31	50	97		
08	31	74	38	29	54	68	31	86	98		
09	32	70	39	32	22	69	32	20	99		
10	30	14	40	30	00	70	32	85	00		
TOTAL	321	01	TOTAL	314	73	TOTAL	319	73	TOTAL		

Joint No.	Length of Joint		Joint No.	Length of Joint		Joint No.	Length of Joint	
11	31	62	41	32	22	71	32	94
12	33	00	42	32	42	72	32	55
13	31	10	43	32	72	73	32	83
14	30	35	44	32	35	74	32	73
15	30	75	45	32	20	75	32	86
16	31	20	46	32	20	76	31	63
17	31	45	47	31	38	77	32	00
18	32	84	48	32	72	78	31	73
19	32	68	49	32	00	79	32	18
20	31	38	50	31	32	80	32	44
TOTAL	316	37	TOTAL	321	53	TOTAL	323	89

Joint No.	Length of Joint		Joint No.	Length of Joint		Joint No.	Length of Joint	
21	33	00	51	31	95	81	31	37
22	32	04	52	31	40	82	31	40
23	30	68	53	31	25	83	32	55
24	32	11	54	29	85	84	32	53
25	33	45	55	31	77	85	32	84
26	31	43	56	32	36	86	32	12
27	31	12	57	32	65	87	32	55
28	32	31	58	33	28	88	32	62
29	31	05	59	33	05	89	10	50
30	31	40	60	32	27	90		
TOTAL	318	59	TOTAL	318	83	TOTAL	268	48

TALLY SUMMARY

Group No. Ending	Length (Forward)	
10	321	01
20	316	37
30	318	59
40	314	73
50	321	53
60	318	83
70	319	73
80	323	89
90	268	48
00		
TOTAL	2823	16

Tally By: P. Stockwell

Checked By: D. Langton

(Note: Include casing shoe and collar in first joint)

REMARKS:

Operator's Representative

Form C-4

1-52

B.O.C. OF AUSTRALIA LTD.
CASING AND TUBING TALLY

Page 2 of 4 Joint No. 101 to 200 Date 22nd July, 19 67

WELL: Golden Beach No.1A Size 7" Weight 26,23 lb Grade N80 Range .... Condition ....

Manufacturer Canadian Threads: On .... Off .... No. of Threads .... Coupling: Short .... Long ....

No. of Joints: Received at Well 314 Used 289 Disposition of Joints not used Port Welshpool

Length of Cut-Off Joint above casing bowl .... Disposition ....

Joint No.	Length of Joint	
101	32	12
02	31	52
03	33	60
04	31	90
05	30	80
06	31	55
07	31	93
08	32	10
09	29	20
10	30	49
TOTAL	315	21

Joint No.	Length of Joint	
111	30	60
12	31	65
13	32	70
14	31	75
15	32	26
16	32	16
17	32	45
18	30	88
19	31	49
20	32	00
TOTAL	317	94

Joint No.	Length of Joint	
121	32	32
22	32	00
23	32	02
24	32	40
25	32	43
26	30	50
27	32	31
28	33	52
29	30	70
30	30	64
TOTAL	318	84

Joint No.	Length of Joint	
31	32	73
32	32	90
33	32	52
34	30	05
35	30	84
36	31	92
37	32	53
38	29	65
39	32	04
40	31	32
TOTAL	316	50

Joint No.	Length of Joint	
141	32	50
42	31	98
43	31	65
44	30	62
45	31	60
46	30	56
47	32	34
48	31	00
49	31	82
50	33	13
TOTAL	317	20

Joint No.	Length of Joint	
151	31	70
52	30	68
53	32	12
54	31	45
55	32	17
56	31	23
57	30	94
58	32	00
59	32	75
60	32	15
TOTAL	317	19

Joint No.	Length of Joint	
61	32	05
62	31	85
63	32	38
64	32	81
65	32	11
66	31	71
67	31	31
68	31	68
69	32	65
70	33	02
TOTAL	321	57

Joint No.	Length of Joint	
171	32	29
72	31	89
73	32	50
74	32	92
75	31	30
76	32	11
77	32	12
78	29	96
79	30	42
80	32	64
TOTAL	318	15

Joint No.	Length of Joint	
181	32	84
82	31	61
83	30	94
84	30	62
85	31	96
86	31	75
87	30	60
88	32	50
89	30	92
90	33	31
TOTAL	317	05

Joint No.	Length of Joint	
191	31	20
92	33	10
93	31	28
94	31	80
95	32	08
96	32	45
97	32	20
98	30	74
99	30	72
200	32	86
TOTAL	318	43

TALLY SUMMARY

Group No. Ending	Length (Forward)	
10	315	21
20	317	94
30	318	84
40	316	50
50	317	20
60	317	19
70	321	57
80	318	15
90	317	05
00	318	43
TOTAL	3178	08

Tally By: P. Stockwell

Checked By: D. Langton

(Note: Include casing shoe and collar in first joint)

REMARKS:

Operator's Representative ....

B.O.C. OF AUSTRALIA LTD.

CASING AND TUBING TALLY

Form C - 4
1-54

Page 4 of 4 Joint No. 1 to 289 Date 22nd July, 1967

WELL: Golden Beach No.1A Size 7" Weight 26,23 lb Grade N80 Range ..... Condition .....

Manufacturer Canadian Threads: On ..... Off ..... No. of Threads ..... Coupling: Short ..... Long .....

No. of Joints: Received at Well 314 Used 289 Disposition of Joints not used Port Welshpool

Length of Cut-Off Joint above casing bowl ..... Disposition .....

Joint No.	Length of Joint	Joint No.	Length of Joint	Joint No.	Length of Joint	Joint No.	Length of Joint
01		31		61		91	
02		32		62		92	
03		33		63		93	
04		34		64		94	
05		35		65		95	
06		36		66		96	
07		37		67		97	
08		38		68		98	
09		39		69		99	
10		40		70		00	
TOTAL		TOTAL		TOTAL		TOTAL	
11		41		71			
12		42		72			
13		43		73			
14		44		74			
15		45		75			
16		46		76			
17		47		77			
18		48		78			
19		49		79			
20		50		80			
TOTAL		TOTAL		TOTAL			
21		51		81			
22		52		82			
23		53		83			
24		54		84			
25		55		85			
26		56		86			
27		57		87			
28		58		88			
29		59		89			
30		60		90			
TOTAL		TOTAL		TOTAL			

TALLY SUMMARY

Group No. Ending	Length (Forward)	
10	3219	40
20	3178	08
30	2823	16
40		
50		
60		
70		
80		
90		
00		
TOTAL	9220	64

Tally By: P. Stockwell

Checked By: D. Langton

(Note: Include casing shoe and collar in first joint)

REMARKS:

Operator's Representative

WELL SUMMARY

Table of Contents

ATTACHMENT 1

FORMATION TEST DATA

GOLDEN BEACH-1A. W.C.R. (PART) 1 of 40.

I. INTRODUCTION

Golden Beach No.1A was drilled 58 feet northeast of No.1 which was abandoned because of a broken well-head after drilling to only 1266 feet. It was drilled by Zapata-O.D.E. Pty. Limited under contract to B.O.C. of Australia Limited, the operating company for a group of companies consisting of:

Woodside (Lakes Entrance) Oil Company N.L.	40%
B.O.C. of Australia Limited	20%
Continental Oil Company of Australia Limited	20%
Australian Oil and Gas Corporation Limited	10%
Planet Exploration Company Pty. Ltd.	10%

The lease, P.E.P.42, is held by Woodside (Lakes Entrance) Oil Company N.L.

II. SUMMARY

(a) DRILLING:

Spudded in on 3.5.67.
Reached total depth of 9534 feet on 15.7.67.
Well capped on 29.8.67
Barge moved off location on 2.9.67.

(b) GEOLOGICAL:

The following succession was penetrated:

Formation	Depth (top) (below Guide Base)	Thickness (ft.)
Gippsland Lst.	above 525	1177+
Lakes Entrance	1702	312
Latrobe Valley C.M.	2014 (2020-2045)	3573
Golden Beach	5587	1949 approx.
Pre-Golden Beach	~~7636~~ 7536? approx.	1998
Total Depth	9534	

(c) INDICATIONS OF HYDROCARBONS:

A number of low permeability sandstones below 8600 ft. produced insignificant quantities of gas during drill stem tests.

A sand, range 2014-2077 ft., was indicated gas-bearing by Schlumberger logs and yielded good gas flows in a D.S.T., giving an absolute open flow potential of 28 MMCFD.

III. WELL HISTORY

(1) General Data

(a) Well name and number: Golden Beach No.1A

(b) Name and address of operator: B.O.C. of Australia Limited, 8-12 Bridge Street, Sydney, N.S.W.

(c) Name and address of tenement holder: Woodside (Lakes Entrance) Oil Co. N.L., 792 Elizabeth Street, Melbourne, Vic.

(d) Petroleum tenement: Petroleum Exploration Permit 42 Victoria. Tenable over an area of 1507 square miles.

(e) District: Offshore Gippsland, Eastern Victorian waters, Warragul 4 mile sheet.

(f) Location: Latitude 38°15'32.62" South
Longitude 147°25'20.13" East

(g) Elevation: Permanent Datum: Mean sea level
Well Datum (Guide Base): 62 feet below mean sea level.

(h) Total Depth: 9534 feet.

(i) Date Drilling Commenced: 3rd May, 1967.

(j) Date Drilling Completed: 15th July, 1967.

(k) Date Well Capped: 29th August, 1967.

(l) Date Barge Moved off Location: 2nd September, 1967.

(m) Drilling Time to Total Depth: 73 days (including 23 days shut down due to weather).

(n) Status: Temporarily abandoned. Plugged and capped.

(o) Total Cost: Forwarded separately.

(2) Drilling Data

(a) Drilling Contractor: Zapata-O.D.E. Pty. Limited
39-41 York Street
Sydney, N.S.W.

(b) Draw-works:

Make:	Ideco
Type:	H2500
Rated Capacity:	20,000 ft.
Motors:	2 x 1000 H.P. Caterpillar D 398

(c) Derrick: Lee C. Moore 140' x 30' x 14'
1,100,000 lb. hookload capacity.

(d) Pump (2):

Make:	Ideco
Type:	1450
Size:	18" stroke
Motors:	3 x 1000 H.P. Caterpillar D 398

(e) BOP Equipment:

Make:	Hydril	Hydril	Cameron
Size:	20"	13 5/8"	13 5/8"
Working pressure:	2000 psi	5000 psi	5000 psi

(f) Hole sizes and depths (from Guide Base):

36"	to	88 feet
26"	to	523 feet
17½"	to	1718 feet
12¼"	to	4055 feet
8 5/8"	to	8080 feet
8½"	to	9534 feet.

(g) Casing and Cementing Details:

Size	30"	20"	13 3/8"	9 5/8"	7"
Weight	319	94	545	36 & 40	23 & 26
Grade	B	J55	J55	J55	N80
Range	3	3	3	3	3
Setting Depth	80	472	1666	4003	9218
Cement (sks)	800	810 890	1470	715	
and type	Const.	Const. Class B	Const.	Const.	Class B
Cemented to	Surface	Surface	Surface	1826	7004
Method used	Gravity	Displacement	Two plug displacement	Two stage cementation	Two plug displacement

(h) Drilling Mud:

Salt water with returns to sea bed was used to drill to 523 feet prior to setting 20 inch casing. A fresh water bentonite, spersene XP20 mud with caustic soda for pH control and barytes for weight control was then used to drill to total depth, with the addition of diesel oil below 1718 ft.

Consumptions and properties are listed in Appendix 3.

(i) Water and Fuel:

Transported by supply boat from Port Welshpool.

Consumptions:

Water: Barge 31,700 bls.
Fuel: Barge 3,600 bls.
Service boats 1,300 bls.

(j) Perforation Reocrd:

Casing Size	Intervals (ft.)	Type of Charge	Holes/ft.
7"	9102-07	Shaped charge	2
7"	8968-73	" "	2
7"	(8808-15.5	" "	2
7"	(8828-38	" "	2
7"	(8632-47	" "	2
7"	(8660-80	" "	2
7"	5648	" "	4
9 5/8"	2070	" "	4
9 5/8"	2040-45	" "	4

(k) Plugging Back and Squeeze Cementations:

(i) During drilling phase:

Type	Casing	Depth	No. of Sacks	Squeeze Results	Tested
Squeeze through 2 stage collar which had failed to close	9 5/8"	2460	200	160 sacks at max. 1000 psi	Pressure tested to 1500 psi for ¼ hr.
Safety plugs while repairing	9 5/8"	3440-3280	60	-	No.
BOP's Later drilled out again.	9 5/8	2270-	50	-	With bit.

(ii) During testing and abandonment:

Refer to "Plug-Back and Abandonment Report" (Appendix 5).

(l) Fishing Operations:

4482 ft.: 2 cones of 8 5/8" bit left in hole
Two runs with junk basket were unsuccessful.
Two runs with junk sub above a bit recovered about 2 lbs. of metal. Any remaining junk was pushed into the side of the hole and drilling was continued.

(m) Side-tracked hole: Nil.

(3) Logging and Testing

(a) Flush samples: Samples were taken from a vibrating screen at 10 ft. intervals while drilling. All samples were lagged and caught by the mud logging personnel under the supervision of B.O.C. Geologists and are representative of the labelled depth. Representative suites of samples are stored with the Victorian Mines Department and Woodside in Melbourne and with B.O.C. in Sydney.

(b) Coring: Nil.

(c) Side-wall Sampling: 113 cores were recovered out of 120 attempted.

(d) Electrical and Other Logging: All wire-line logs were run by Schlumberger Seaco Inc. The following logs were run either separately or combined:

Induction Electrical Log
Laterolog 7
Microlog
Microlaterolog
Gamma Ray Log
Neutron Log
Borehole Compensated Sonic Log
Borehole Compensated Formation Density Log
Uncompensated Formation Density Log
Continuous Dipmeter
Cement Bond Log
Casing Collar Locator Log

A special device was used on all runs to compensate for barge movement.

(e) Penetration Rate Log: Included as part of the Geoservices Masterlog.

(f) Gas Log: A continuous hot wire mud gas detector and recorder was used. The cuttings were examined for stain and fluorescence. The gas log is included as part of the Geoservices log.

(g) Schlumberger Tests:

No.	Depth	Result
1	8973	1.3 cu.ft. gas and 3000 cc. mud filtrate from low permeability sand.
2	9105	60 cc. mud filtrate from almost impermeable sand.
3	8837	8,200 cc. mud filtrate from low permeability sand.
4	8647	19,000 cc. mud filtrate from low permeability sand.

2-5

(h) Deviation Surveys:

Depth (ft.)	Angle (degrees)	Depth (ft.)	Angle (degrees)
588	1	5927	3/4
1098	¼	6299	3/4
1718	3/4	6463	3/4
2720	0	6630	3/4
3808	3/4	7198	1
4677	1	7398	3/4
4866	2	7637	1
5263	1	8374	1½
5451	1	9534	2
5607	3/4		

(i) Temperature Surveys: Nil.

(j) Velocity Surveys: A velocity survey was run on the 18th July 1967 by Western Geophysical Company.

(k) Other Well Surveys: Nil.

(l) Production Tests:

No.	Perforation Intervals	Flow	Recovery from Pipe
1	9102-07	Gas, quantity insignificant	2.3 bl. gas-cut mud
2	8968-73	Gas, quantity insignificant	4.3 bl. mud and filtrate
3	8808-15.5 8828-38	Gas, quantity insignificant	3.9 bl. mud and filtrate
4	8808-15.5 8828-38	Gas, quantity insignificant	7.7 bl. mud and filtrate
5	8632-47 8660-80	Gas, quantity insignificant	20 bl. water, analysis indicated mud filtrate
6	8632-47 8660-80	Gas, quantity insignificant	45 bl. water (including 12 bl. swabbed), analysis indicated mud filtrate
7	8632-47 8660-80	Gas, quantity insignificant	82 bl. water (including 54 bl. swabbed), analysis indicated mud filtrate with trace formation water
8	2040-45	Gas. Absolute open flow potential 28 MMCFD.	-

3—143 Pages

GEOLOGY: SUMMARY AND CONCLUSIONS

STRATIGRAPHY

Age	Formation	Depth to top (ft.) Guide Base	M.S.L.	Thickness (ft.)
Miocene	Gippsland Limestone	above 525	above -578	1177+
Oligocene	Lakes Entrance	1702	-1764	312
Eocene	Latrobe Valley C.M.	2014	-2076	3573
Palaeocene) U. Cretaceous)	Golden Beach	5587	-5649	1949
Cretaceous	Undifferentiated	1636? ~~7536~~	-7598	1998
	TOTAL DEPTH	9534	-9596	

Gippsland Limestone: Soft white limestones and grey marls with abundant fragments of Bryozoa. Grades downwards into Lakes Entrance Formation.

Lakes Entrance Formation: Soft greenish grey calcareous clay, with abundant glauconite towards the base.

Latrobe Valley Coal Measures: 2220 mKB TLCC

2014-3100: Alternations of unconsolidated sands and brown coals with subordinate brown carbonaceous clays. Rw = about 4.6 ohms.

3100-5587: Sand with minor beds of light grey clay and calcareous and dolomitic sandstone. Sands have increasing kaolinitic matrix downwards. Rw = 2.0 ohms decreasing downwards to 0.6 ohms.

Golden Beach Formation: Alternations of light grey sandstone and siltstone and buff to brownish grey clay and shale, with rare thin black coals. Sandstones are quartzose with occasional traces of lithic grains and have kaolinitic, sometimes dolomitic, matrix. Rw = 0.28 ohms decreasing downwards to 0.095 ohms.

Undifferentiated Cretaceous: Alternations of light grey occasionally greenish grey sandstone, dark grey siltstone and brown and grey carbonaceous shale, with rare thin black coals. Sandstones vary, from almost 100% quartz grains with 5% kaolinitic matrix, to 50% quartz, 30% lithic and 20% feldspar grains with up to 30% kaolinitic matrix. Sandstones become rarer and tighter downwards. Very weathered rhyolite occurs in interval 9208-9248 feet. Rw variable between 0.09 and 0.20 ohms.

PALYNOLOGY

Plant remains were identified in some side-wall cores of clays. These indicated Palaeocene-Upper Cretaceous age from 5793 to 7690 feet, Lower Albian (top of Lower Cretaceous) at 7932 feet, Albian to lower Upper Cretaceous at 9282 feet and Neocomian to Lower Albian (Lower Cretaceous) at 9472 feet.

STRUCTURE

Correlation with Golden Beach West No.1 does not confirm the thinning which was expected in the Lakes Entrance Formation in Golden Beach No.1A, which was based on seismic evidence. As a result the top of the Latrobe Valley Coal Measures was penetrated about 156 feet lower than was predicted, and only 165 feet stratigraphically higher than it was found in Golden Beach West No.1.

The Continuous Dipmeter indicates a fault, downthrown towards the SE, at 1910 feet, and below 8400 feet the dip appears to be towards the NE. Otherwise the dipmeter yields no consistent information.

Review of the Hydrosonde data after the well was drilled suggests that the crest of the Latrobe Valley C.M. may be about one mile NW of the well.

INDICATIONS OF HYDROCARBONS

613.9-632.8 Shows while drilling and interpretation of Schlumberger logs indicated a good gas sand in the interval 2014-2076 feet and a number of doubtful gas sands between 8300 feet and 9110 feet.

Tests of 4 sands below 8600 feet yielded insignificant flows of gas and indicated very poor permeabilities. A test of the 2000 ft. sand yielded good gas flows, indicating an absolute open flow potential of 28 MMCFD.

CONCLUSIONS

The well found the top of the Latrobe Valley Coal Measures disappointingly low. However, the thinness of the Latrobe Valley C.M. above the main coal when compared with neighbouring wells suggests that some 300 feet of section is missing. This and the fault indicated by the dipmeter at 1910 feet suggest that the area is more complicated than the loose seismic control indicates. Other locations may find the Latrobe Valley C.M. at a higher structural elevation, and a review of the Hydrosonde data has shown this to be possible to the NW of Golden Beach No.1A.

The succession below 7536 feet contains some sandstones which are dirtier and contain more lithics than the Golden Beach Formation as it has been described onshore, but they are much cleaner than the onshore Strzelecki Formation. Palynology is inconclusive but tends to date these beds as somewhat younger than, or equivalent to, the top of Strzelecki in its type area. The variations in both lithology and formation water resistivity suggest that this formation is transitional between "type Golden Beach" and type Strzelecki.

History of Exploration:

(a) Geological and Drilling

A large number of holes have been drilled onshore in the Gippsland area, originally for coal and water; but since 1924 a number of deeper holes have been drilled for oil. Small amounts of crude oil were intermittently produced, along with fresh water, in the Lakes Entrance area, but not in commercial quantities.

Since 1954 a number of onshore wells were drilled by Woodside, Frome Lakes and Arco. The only indications of hydrocarbons were shows of gas in North Seaspray No.1, Golden Beach West No.1 and Dutson Downs No.1. These were in the Eocene Latrobe Valley Coal Measures and the Upper Cretaceous "Golden Beach Formation".

In 1965 commercial quantities of gas were discovered by the first well drilled offshore in the area, Esso's Barracouta No.1, in the Latrobe Valley Coal Measures. Since then Esso have drilled a second gas well in the Barracouta field, a dry hole on the Cod structure and 3 oil and gas wells on the Marlin Structure. At Marlin there is oil and gas in the Latrobe Valley Coal Measures and gas in the Upper Cretaceous.

Surface geological mapping of the Gippsland region has largely been done by the Victorian State Mines Department and some by the Commonwealth Bureau of Mineral Resources.

(b) Geophysical

Much of the onshore part of the Gippsland Basin has been covered by gravity and aeromagnetic surveys by the Bureau of Mineral Resources; an aeromagnetic survey of part of the offshore area of the basin was conducted for Haematite Explorations Pty. Ltd. The gravity and aeromagnetic results broadly define the major geometry of the basin.

Seismic surveys have delineated structures within the basin, onshore and offshore. An offshore seismic survey by Western Geophysical Company in tenement P.E.P.42 defined the Golden Beach structure down to the upper part of the Latrobe Valley Coal Measures; coal seams in this unit reduce the qualify of deeper reflections so that structural control is limited below the upper part of the unit. A hydrosonde survey by Australian Hydrographics was conducted in early 1967 to relate the Golden Beach structure to onshore land survey control.

Regional Geology

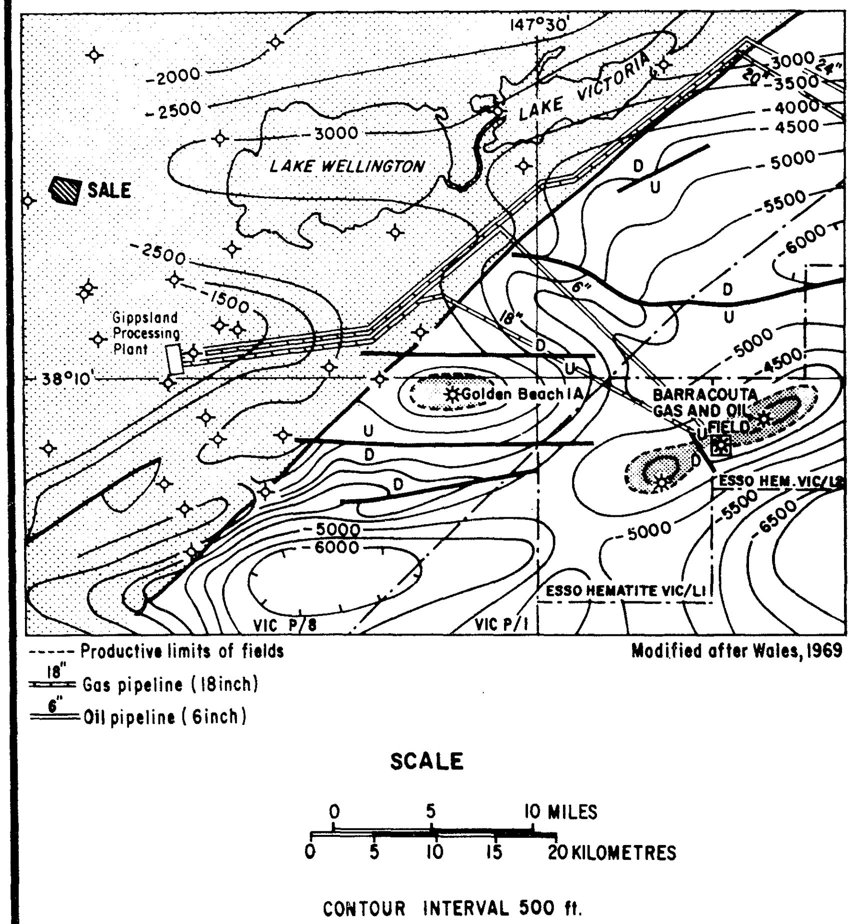
The Gippsland Basin is a relatively small area of Jurassic to Tertiary deposition. The generalised stratigraphy of the basin is as follows:

Time Scale	Formation	Environment & Lithology
Quaternary/Recent	Haunted Hill Gravels	Fluviatile gravels
Pliocene	Jimmy's Point Formation	Brackish water sands and gravels.
Miocene	Tambo River Formation Gippsland Limestone	Marine fossiliferous marls. Marine limestones and marls.
Oligocene	Lakes Entrance Formation	Marine marls and sands.
UNCONFORMITY		
Palaeocene/Eocene	Latrobe Valley Coal Measures	Continental sands, coals and clays.
Upper Cretaceous	"Golden Beach Formation"	Marine and brackish water sandstones, siltstones and clays.
Jurassic/Lr. Cretaceous	Strzelecki Group	Fluviatile siltstones, sandstones and clays.

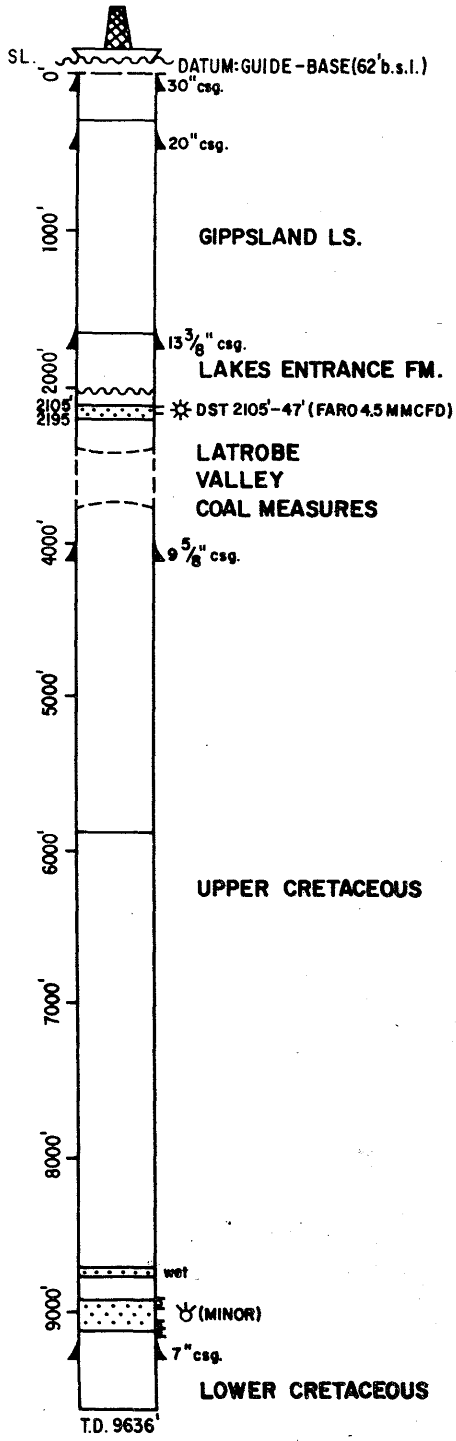
Page 1 of 2

GOLDEN BEACH GAS DISCOVERY
OFFSHORE GIPPSLAND BASIN, VICTORIA

STRUCTURE MAP
TOP OF LATROBE VALLEY COAL MEASURES

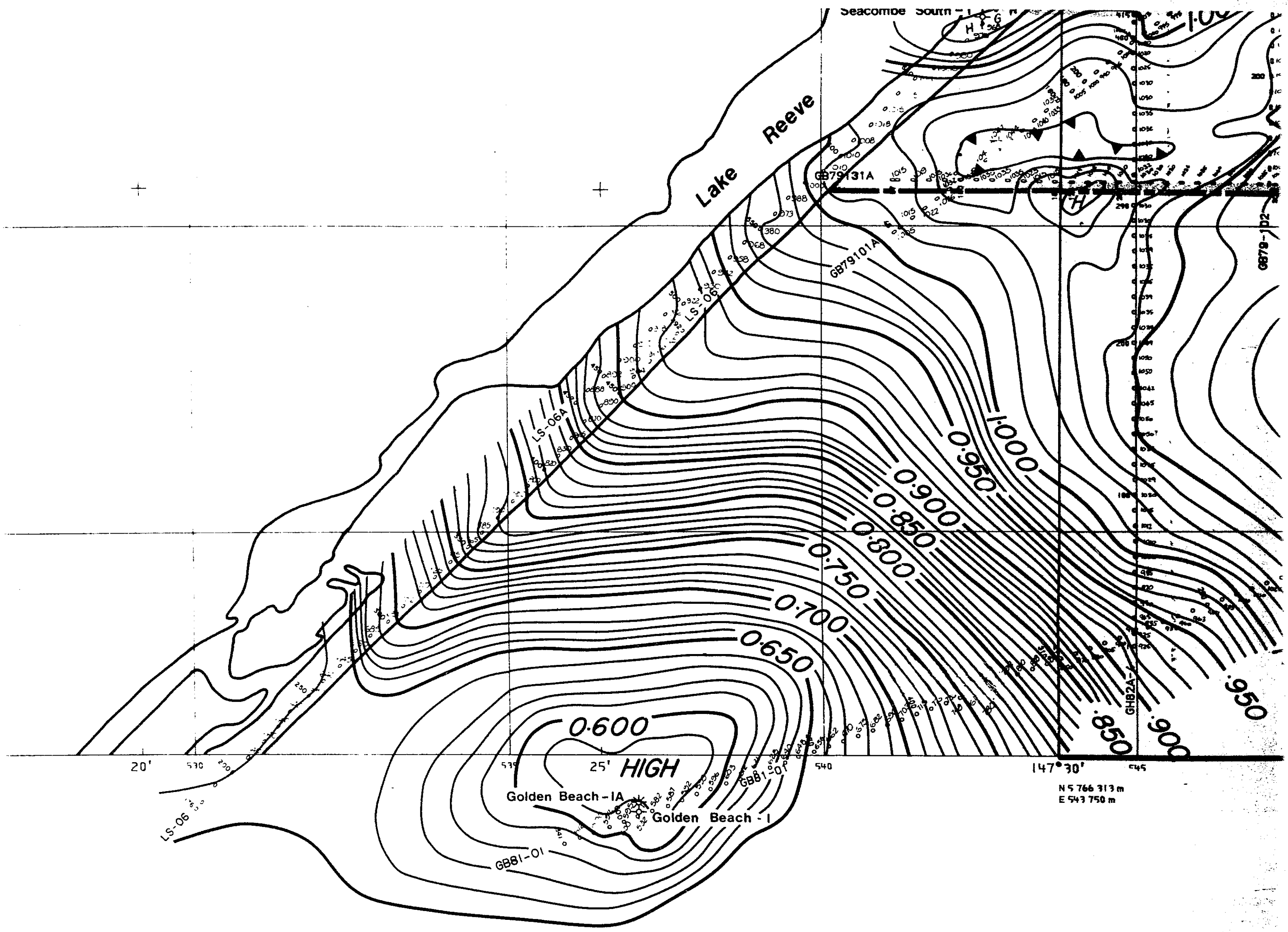


GOLDEN BEACH NO. 1A



After Woodside Director's Report, 1967

GOLDEN BEACH GAS DISCOVERY



1 : 100000 SCALE.

B.O.C. OF AUSTRALIA L[redacted]
PLUG-BACK AND ABANDONME[redacted]REPORT

Form B - 6
2-6

Well: Golden Bea[redacted] No.1A

Location: [redacted]

K.B. Elevation:

Hole Size	
Depth	Total 9636

F.T.D.:

Fluid in Hole: Mud

Plug Back String: 2 7/8" drill pipe

Service Company: Halliburton & Schlumberger

Cons. Bd. Approval:

Casing in Hole	Size	Set At	Top of Cement
Surface Casing			
Prod. String	7	9320	7102

Cons. Bd. Witness:

	Bridge Plug 7" PLUG #1	Bridge Plug 7" PLUG #2	Bridge Plug 7" PLUG #3	Bridge Plug 7" PLUG #4	PLUG #5
Date	1.8.67	4.8.67	7.8.67	15.8.67	15.8.67
Interval - Top					5172
Bottom (from R.T.).	9130	9002	8852	8682	5760
Felt Plug Depth					
Formation - Name					
Depth					
Caliper Hole Size (Avg.)					7"
Type of Mud					
No. of Sacks					100
Additives					
Bbls. of Water Ahead					8
Displacement - Bbls. Water					1
Bbls. Mud					21
Slurry Weight					- 15
Mixing Times - Start					13.40
Finish					13.50
Displacing Times - Start					13.50
Finish					13.57
Felt Plug Time					

7" ~~Sur.~~ Csg. Cut 2620 Ft. Below R.T. ~~Grd.~~ Surf. Plug ______ Sacks. Plate Welded Yes/No

Casing Salvage: Shot off at ______ No. of Jts. Recovered ______

Remarks: No.5 plug: squeezed 2 bbls into perforations at 5760 with 1400 p.s.i.

Pressure test plugs No.1, No.2, No.3, No.4, No.5 to 2000 p.s.i.

All depths are from rotary table.

Operator's Representative ______

[redacted]

B.O.C. OF AUSTRALIA L[redacted]

PLUG-BACK AND ABANDONME[redacted] REPORT

Form B - 6

2-7

Well Golden B[redacted]ch No.1A

Location [redacted]

K.B. Elevation

F.T.D.

Fluid in Hole Mud

Plug Back String 4½" drill pipe

Service Company Halliburton & Schlumberger

Cons. Bd. Approval

Cons. Bd. Witness

Hole Size	
Depth	

Casing in Hole	Size	Set At	Top of Cement
Surface Casing			
Prod. String	9 5/8	4105	1826

Bridge plug 9 5/8" (Plug #7)

	PLUG #6	PLUG #7	PLUG #8	PLUG #9	PLUG #10
Date	16.8.67	21.8.67	26.8.67	27.8.67	28.8.67
Interval - Top / Bottom (from R.T.)	2300 / 2642	2165	1734 / 2165	1100 / 1350	120 / 450
Felt Plug Depth	2386		1793		
Formation - Name / Depth					
Caliper Hole Size (Avg.)	7"&9 5/8"		9 5/8"	9 5/8"	9 5/8"
Type of Mud					
No. of Sacks	110		146	100	107
Additives					
Bbls. of Water Ahead	7		8	8	
Displacement - Bbls. Water / Bbls. Mud	1½ / 31½		2 / 21	2 / 13	2
Slurry Weight	15		15	15	15
Mixing Times - Start / Finish	1630 / 1636		1630 / 1642	0335 / 0345	2047 / 2100
Displacing Times - Start / Finish	1636 / 1644		1642 / 1655	0345 / 0355	
Felt Plug Time	1200 (17/8)		0230 (27/8)		

7" Csg. Cut 2620 Ft. Below R.T. Surf. Plug ______ Sacks. Plate Welded Yes/No

Casing Salvage: Shot off at ______ No. of Jts. Recovered ______

Remarks: No.6 plug:squeezed 6 bbls into formation with 200 p.s.i.

No.8 plug;squeezed 2 bbls into perforations at 2147-2142 with 1000 p.s.i.

over a period of 30 minutes.

All depths are from rotary table.

Rotary table to wellhead 100'.

Operator's Representative

STATUS OF GOLDEN BEACH NO.1A

SEA BED

30" casing (80')
36" hole (88')

20" casing shoe (472')
26" hole (523')

13 3/8" casing shoe(1666')
$17\frac{1}{2}$" hole (1718')

Perforations (2040-45')
Perforations (2070')

9 5/8" 2-stage collar (2460')
Top 7" casing (2518')

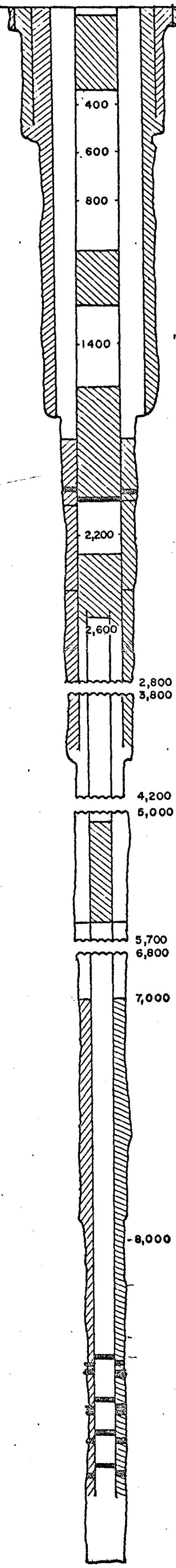
9 5/8" casing shoe (4003')
$12\frac{1}{4}$" hole (4055')

Perforations (5658')

8 5/8" hole (8080')

Perforations (8632-47,60-80)
Perforations (8808-15,5,28-38)
Perforations (8968-73)
Perforations (9102-07)
7" casing shoe (9218')

$8\frac{1}{2}$" hole (9534')



30" casing cemented to 0'
20" casing cemented to 0'
13 3/8" casing cemented to 0'
Cement plug 350-20'

Cement plug (1250'-1000')

9 5/8" casing cemented to 1826'
Cement plug 2063'-1589'
(2 bls squeezed thru' 2040-45')

Bridge plug 2063'
30 bls. cement squeezed thru' 2070'

Cement plug 2540'-2284'
(6 bls squeezed)

Cement plug 5658'-5070'
(2 bls squeezed)

7" casing cemented to 7000'

Bridge plug (8580')
Bridge plug (8750')
Bridge plug (8900')
Bridge plug (9028')

DRILLING RECORD

Form A-3
2-10

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 1 for week ending 2400 hours Saturday 6th May 19 67

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
inch hole to ft.; inch casing to ft.
inch hole to ft.; inch casing to ft.

inch hole to ft.; Operation installing 20 inch BOP stack

II. DRILLING SUMMARY

Progress 523 ft.

Time Analysis (hrs.)

Drilling / reaming	Circulating	Tripping	Shut Down		~~xxxxx~~ misc.	Testing
			Mechanical	Weather		
13	½	13½	3		81	

No. of bits used during week 2 ; Total 2 (re-runs from Golden Beach No.1)

Weight on bit 10,000 ; R.P.M. 75

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
7	120	2000	1200

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
9.3	50					

Coring

Drill Stem Testing

Electrical Logging

Remarks

Golden Beach No.1A, located 58 ft. NE of Golden Beach No.1, was spudded at 1600 hrs. on 3rd May 1967. Thirty and 20 inch casings were set to 80 and 472 ft. respectively. At the end of the period under review the 20 inch BOP stack was being installed.

III. MATERIALS

Item	Unit	Consumption		Stocks on	
		Weekly	Cumulative	Vessel	Shorebase
Barytes	Sks (x100 lb.)	0	0	2540	4000
Bentonite	(do)	296	296	397	723
Spersene	Sks (x50 lb.)	0	0	316	920
XP20	(do)	0	0	190	491
C.M.C.	(do)	0	0	60	40
L.C.M.	(do)	0	0	383	100
H.S.D.	bls				
Caustic Drums	(x 140 lb)	2	2	35	40
Sod Bicarb Sks	(x 93 lb)	0	0	24	0
Sod Ash Sks	(x 93 lb)	0	0	10	0
Cement	Sks (x94 lb.)	2500	2500	136	
Fuel - rig	bls	85	85	1739	
Water	bls	4292	4292	2653	

Active Mud Volumes

Circulation	hole	0	bls
	tank	650	bls
Stock	tank	250	bls
Total		900	bls

Made during week	1020	bls
Total last week	880	bls
Consumption/losses	1000	bls

Remarks

Form A-3

2-12

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 2 for week ending 2400 hours Saturday 13th May 1967

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
inch hole to ft.; inch casing to ft.

12¼ inch hole to 1836 ft.; Operation barge secured in rough seas

II. DRILLING SUMMARY

Progress 1313 ft.

Time Analysis (hrs.)

Drilling/ reaming/D.O cement	Circulating	Tripping	Shut Down		Logging	Misc.
			Mechanical	Weather		
28	8	16	24	20	11	61

No. of bits used during week 2 ; Total 3

Weight on bit 15-30,000 ; R.P.M. 170-200

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
7	72	2000-2500	800

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel (1min/ 10 min)	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
9.2-10.0	51	1-3	3.5	1.5	9.3	Tr.

Coring

NIL

Drill Stem Testing

NIL

Electrical Logging

IES Run 1 473-1718
Microlog/Caliper Run 1 473-1719
Sonic Run 1 473-1709

Remarks

A 12¼ inch hole was drilled to 1718 ft., Schlumberger surveys taken, the hole opened to 17½ inch and 13 3/8 inch casing was run and cemented at 1666 ft.

Drilling of 12¼ inch hole was continued to 1836 ft., when six foot seas developed from the SW. at the end of the period under review the barge was secured in rough seas.

III. MATERIALS

Item	Unit	Consumption		Stocks on	
		Weekly	Cumulative	Vessel	Shorebase
Barytes	Sks (x100 lb.)	600	600	2948	4000
Bentonite	(do)	395	691	501	1439
Spersene	Sks (x50 lb.)	202	202	314	720
XP20	(do)	101	101	189	391
C.M.C.	(do)			60	40
L.C.M.	(do)			383	100
H.S.D.	bls				
Caustic Drums (x 140)		6	8	29	40
Soda Bi Carb Sks (x 93)		5	5	19	
Soda Ash		3	3	7	
Cement	Sks (x94 lb.)	1470	3970	603	726
Fuel (barge)	bls	300	479	809	
(service boats)		135	220	1774	
Water	bls	2793	7085	2740	

Active Mud Volumes

Circulation	hole	285	bls
	tank	415	bls
Stock	tank	300	bls
Total		1000	bls

Made during week	700	bls
Total last week	900	bls
Consumption/losses	600	bls

Remarks

Most mud was lost across the vibrating screen which persistently clogged up with large quantities of the clay drilled.

Form A-3

2-14

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 3 for week ending 2400 hours Saturday 20th May, 1967

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.

26 inch hole to 523 ft.; 20 inch casing to 472 ft.

17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.

___ inch hole to ___ ft.; ___ inch casing to ___ ft.

12¼ inch hole to 4055 ft.; Operation running 9 5/8 inch casing

II. DRILLING SUMMARY

Progress 2219 ft.

Time Analysis (hrs.)

Drilling	Circulating	Tripping	Shut Down		Logging	Testing
			Mechanical	Weather		
35½	17	28 3/4	10½	30	29¼	17

No. of bits used during week 3 ; Total 5

Weight on bit 20-30,000 ; R.P.M. 140-170

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
7"	60,(2 x 30)	2,300	660

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
10.0-10.4	47-50	1/3	2.6-3.4	1.5	9.0-9.4	½-1½

Coring

30 side wall cores were attempted: 29 were recovered. For descriptions see attached coring summary.

Drill Stem Testing

NIL

Electrical Logging

Log	Interval	Log	Interval
Induction	1664-40[illegible]	Laterolog 7	1554-4053
Microlog/Microlat	1665-40[illegible]	Gamma/Neutron	1664-4056
Formation Density	1664-40[illegible]7	Sonic	1664-4046

Remarks

After the seas abated, drilling was continued in 12¼ inch hole to 4055 ft. Schlumberger surveys were taken and at the end of the period under review, 9 5/8 inch casing was being run.

III. MATERIALS

Item	Unit	Consumption Weekly	Consumption Cumulative	Stocks on ______ Vessel	Stocks on ______ Shorebase
Barytes	Sks (x100 lb.)	430	1030	2518	4000
Bentonite	(do)	240	931	562	818
Spersene	Sks (x50 lb.)	114	316	300	758
XP20	(do)	57	158	182	341
C.M.C.	(do)			60	40
L.C.M.	(do)			473	100
H.S.D.	bls	62	62		
Caustic Drums (x 140 lbs)		13	21	26	30
Sod Bi Carb (x 93 lbs)			5	19	
Sod Ash Sacks			3	7	
Cement	Sks (x94 lb.)		3970	1800	726
Fuel (barge)	bls	not available		932	
(service boats)		60	280	1879	
Water	bls	not available		4410	

Active Mud Volumes

Circulation hole 550 bls

tank 450 bls

Stock tank ______ bls

Total 1000 bls

Made during week 700 bls

Total last week 1000 bls

Consumption/losses 700 bls

Remarks

Mud was again lost over the vibrating screens.

Form A-3
2-16

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 4 for week ending 2400 hours Saturday 27th May 1967

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4055 ft.; 9 5/8 inch casing to 4003 ft.

inch hole to ft.; Operation waiting on weather

II. DRILLING SUMMARY

Progress nil ft.

Time Analysis (hrs.)

Drilling	Circulating	Tripping	Shut Down		Logging	~~Testing~~ Misc.
			Mechanical	Weather		
				155 hrs.		13 hours

No. of bits used during week nil ; Total 5

Weight on bit - ; R.P.M. -

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
7"		-	

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %

Coring

NIL

Drill Stem Testing

NIL

Electrical Logging

NIL

Remarks

After 9 5/8 inch casing was cemented at 4003 ft., the barge was secured for rough weather. No further progress was made during the week because of rough seas.

III. MATERIALS

Item	Unit	Consumption Weekly	Consumption Cumulative	Stocks on Vessel	Stocks on Shorebase
Barytes	Sks (x100 lb.)	0	1030	2518	4000
Bentonite	(do)	0	931	562	818
Spersene	Sks (x50 lb.)	0	316	300	758
XP20	(do)	0	158	182	341
C.M.C.	(do)	0	0	60	40
L.C.M.	(do)	0	0	473	100
H.S.D.	bls	0	62	-	-
Caustic Sod.		0	21	26	30
Sod Bicarb.		0	5	19	-
Sod Ash		0	3	7	-
Cement	Sks (x94 lb.)	715	4685	1285	726
Fuel (barge)	bls	154	1271	1121	-
(service boats)		95	375	1473	-
Water (barge	bls	900	8692	3305	-

Active Mud Volumes

Circulation	hole 300	bls	Made during week	nil	bls
	tank 400	bls	Total last week	1000	bls
Stock	tank	bls	Consumption/losses	300	bls
Total	700	bls			

Remarks

Form A-3

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 5 for week ending 2400 hours Saturday 3rd June 1967

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4055 ft.; 9 5/8 inch casing to 4003 ft.

8 5/8 inch hole to 4785 ft.; Operation drilling

II. DRILLING SUMMARY

Progress 730 ft.

Time Analysis (hrs.)

Drilling	Circulating	Tripping	Shut Down		Logging	~~Xxxxx~~ Misc.
			Mechanical	Weather		
20	4	45		51½	4½	43

No. of bits used during week 6 ; Total 10

Weight on bit 10-12000 ; R.P.M. 100

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6"	55 (one pump only)	2450	350

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
9.6	41-46	0/4	5.8-6.8	1.5	9.7-10.4	1.0

Coring

NIL

Drill Stem Testing

NIL

Electrical Logging

Cement Bond Log (1000-3915 ft.)

Remarks

Cement was cleaned to the float collar at 4027 ft. and a CBL was taken. A test of the 9 5/8" casing confirmed that the ports of the D V collar had remained open. Cement was squeezed through these ports and the casing successfully tested to 1500 PSI. Drilling was continued in 8 5/8" hole but the first bit pulled had lost two cones most of which were recovered in a Reed Junk sub run above subsequent bits. However some metal still remained in the side of the hole. Deviation:

4584 ft.	2 degrees
4779	1=
4968	2

III. MATERIALS

Item	Unit	Consumption Weekly	Consumption Cumulative	Stocks on Vessel	Stocks on Shorebase
Barytes	Sks (x100 lb.)	680	1710	1838	4000
Bentonite	(do)	197	1128	365	818
Spersene	Sks (x50 lb.)	61	377	239	758
XP20	(do)	28	186	154	341
C.M.C.	(do)	5	5	55	40
L.C.M.	(do)	0	0	473	100
H.S.D.	bls	24	86	-	-
Caustic	(drums x 140 lbs)	0	21	26	30
Soda Bicarb	(sacks x 93 lbs)	19	24	-	28
Sod. Ash	(sacks)	7	10	-	-
Cement	Sks (x94 lb.)	200	4885	2200	726
Fuel (barge)	bls	not known		1050	-
Fuel (service boats)	bls	60	435	1816	θ
Water	bls	not known		2793	-

Active Mud Volumes

Circulation	hole 330 bls	Made during week	560 bls
	tank 630 bls	Total last week	700 bls
Stock	tank 300 bls	Consumption/losses	0 bls
Total	1260 bls		

Remarks

A large percentage of the amount (made during week) was water added to decrease the mud weight from 10.2 to 9.5 lb/gal.

2-20

Form A-3

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 6 for week ending 2400 hours Saturday 10th June 1967

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4055 ft.; 9 5/8 inch casing to 4003 ft.

8 5/8 inch hole to 6391 ft.; Operation drilling

II. DRILLING SUMMARY

Progress 1706 ft.

Time Analysis (hrs.)

Drilling	Circulating	Tripping	Shut Down Mechanical	Shut Down Weather	~~xxxxxx~~ reaming	Testing
60½	13½	69	½	23	1½	0

No. of bits used during week 11 ; Total 20

Weight on bit 10-30,000 ; R.P.M. 50-75

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6	50	2400	340

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
9.5-9.8	42-51	1/3	4.4-5.2	1.5	9.5-9.8	0.25

Coring

NIL

Drill Stem Testing

NIL

Electrical Logging

NIL

Remarks

Drilling of 8 5/8" hole continued throughout the week from 4785 to 6391 ft.

The following deviations were recorded:

1 degree at	5220 ft.
1	5365
1	5553
3/4	5709
3/4	6029

III. MATERIALS

Item	Unit	Consumption Weekly	Consumption Cumulative	Stocks on Vessel	Stocks on Shorebase
Barytes	Sks (x100 lb.)	210	1920	479	4000
Bentonite	(do)	168	1296	2468	538
Spersene	Sks (x50 lb.)	98	475	341	558
XP20	(do)	49	235	205	241
C.M.C.	(do)	0	5	55	40
L.C.M.	(do)	0	0	473	100
H.S.D.	bls	74	160	-	-
Caustic Drums (x 140 lb)		6	27	445	25
Soda Bicarb Sks (x 93 1/3 lb)		0	24		4
Soda Ash Sks (x 93 1/3 lb)		0	10		24
Cement	Sks (x94 lb.)	0	4885	2200	726
Fuel (barge)	bls	183	1525	867	-
Fuel (service boats)	bls	60	495	1772	-
Water	bls	3091	116113	3063	-

Active Mud Volumes

Circulation	hole	490	bls
	tank	480	bls
Stock	tank	280	bls
Total		1250	bls

Made during week 0 bls

Total last week 1260 bls

Consumption/losses 10 bls

Remarks

2-22

Form A-3

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No. 1A

Report No. 7 for week ending 2400 hours Saturday 17th June, 19 67

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.

26 inch hole to 523 ft.; 20 inch casing to 472 ft.

17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.

12¼ inch hole to 4055 ft.; 9 5/8 inch casing to 4003 ft.

8 5/8 inch hole to 6887 ft.; Operation waiting on weather

II. DRILLING SUMMARY

Progress 496 ft.

Time Analysis (hrs.)

Drilling	Circulating	Tripping	Shut Down		Logging	Testing
			Mechanical	Weather		
27¼	4½	20¼	0	108	8	0

No. of bits used during week 4 ; Total 23

Weight on bit 20-30,000 ; R.P.M. 70-75

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6	50	2400	340

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
9.7-9.8	44-47	1/4	4.5-4.7	1.5	9.5	¼ - ½

Coring

NIL

Drill Stem Testing

NIL

Electrical Logging

Induction Electrical Log 4011 - 6460

Microlog-Microlaterolog Caliper 4011 - 6459

Remarks

Drilling of 8-5/8 inch hole continued to 6887 ft. on the 13th June. For the remainder of the week the barge was secured in rough seas.

Deviations:

6401 ft.	3/4 degree
6565	3/4
6732	3/4

III. MATERIALS

Item	Unit	Consumption Weekly	Consumption Cumulative	Stocks on Vessel	Stocks on Shorebase
Barytes	Sks (x100 lb.)	0	1920	497	4000
Bentonite	(do)	45	1341	2423	538
Spersene	Sks (x50 lb.)	40	515	301	558
XP20	(do)	20	255	185	241
C.M.C.	(do)	0	5	55	40
L.C.M.	(do)	0	0	473	100
H.S.D.	bls	12	172	-	-
Caustic Drums (x 140 lb)		4	31	41	25
Soda Bicarb Sks (x 93 lb)		0	24	24	4
Soda Ash Sks (x 93 lb)		0	10	-	24
Cement	Sks (x94 lb.)	0	4885	2926	66
Fuel (barge)	bls	153	1678	834	-
Fuel (service boats)	bls	66	561	1881	-
Water	bls	649	16762	3254	-

Active Mud Volumes

Circulation	hole	500	bls
	tank	470	bls
Stock	tank	280	bls
Total		1250	bls

Made during week 0 bls
Total last week 1250 bls
Consumption/losses 0 bls

Remarks

2-24

Form A-3

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No. 1A

Report No. 8 for week ending 2400 hours Saturday 24th June, 19 67

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4055 ft.; 9 5/8 inch casing to 4003 ft.

8 5/8 inch hole to 7408 ft.; Operation waiting on weather

II. DRILLING SUMMARY

Progress 521 ft.

Time Analysis (hrs.)

Drilling	Circulating	Tripping	Shut Down		Logging	~~Testing~~
			Mechanical	Weather		
36½	4½	19	71½	33		3½

No. of bits used during week 4 ; Total 26

Weight on bit 30,000 ; R.P.M. 70-80

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6	50	2500	350

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
9.6-9.8	45-47	0/3	4.2-5.0	1.5	9.5-12	Trace

Coring

NIL

Drill Stem Testing

NIL

Electrical Logging

NIL

Remarks

When the weather improved drilling of 8-5/8 inch hole was continued to 7398 ft. On discovery of a leak in the B.O.P. stack between the hydril and the top set of pipe rams, two cement plugs were set in the 9-5/9 inch casing and the stack pulled to the surface and repaired. When this was completed the seas became rough again and the barge was secured.

Deviations: 1 degree at 7300 ft. 3/4 degree at 7500 ft.

III. MATERIALS

Item	Unit	Consumption		Stocks on	
		Weekly	Cumulative	Vessel	Shorebase
Barytes	Sks (x100 lb.)	775	2695	2490	4000
Bentonite	(do)	84	1425	468	1238
Spersene	Sks (x50 lb.)	108	623	293	508
XP20	(do)	54	309	181	216
C.M.C.	(do)	0	5	55	40
L.C.M.	(do)	0	0	473	100
H.S.D.	bls	72	244	-	-
Caustic Dms.	(X140 lbs)	4	35	37	25
Soda Bi Carb	(94 lbs)	24	48	0	28
Soda Ash Sks	(94 lbs)	0	10	24	-
Cement	Sks (x94 lb.)	110	4995	2816	66
Fuel	barge	281	1959	955	-
	service boats	97	658	1946	-
Water	bls	2527	19289	3630	-

Active Mud Volumes

Circulation	hole	530	bls
	tank	440	bls
Stock	tank	280	bls
Total		1250	bls

Made during week	200	bls
Total last week	1250	bls
Consumption/losses	200	bls

Remarks

200 barrels of drilling mud were pumped overboard because of cement contamination.

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No. 1A

Report No. 9 for week ending 2400 hours Saturday 1st July, 1967

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4055 ft.; 9 5/8 inch casing to 4003 ft.

8 5/8 inch hole to 7926 ft.; Operation waiting on weather

II. DRILLING SUMMARY

Progress 528 ft.

Time Analysis (hrs.)

Drilling	Circulating	Tripping	Shut Down: Mechanical	Shut Down: Weather	Logging	~~XXXXXX~~ Reaming
31	10¼	28 3/4	7 1/4	78 1/4	9½	3

No. of bits used during week 5 ; Total 31

Weight on bit 30,000 ; R.P.M. 80

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6	50	2500	350

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
9.8	47	0/1	4.5	1.5	9.8	0.5

Coring

NIL

Drill Stem Testing

NIL

Electrical Logging

Induction Electrical 6275-7914 ft. Microlog/Microlaterolog/Caliper 6250-7903 ft. (Microlog 7506-7903 ft. only).

Remarks

There were intermittent shut-downs as a result of rough weather. However, during the week drilling of 8-5/8 inch hole was continued to 7926 ft. and two Schlumberger logs were taken.

Deviation: 1 degree at 7637 feet.

III. MATERIALS

Item	Unit	Consumption		Stocks on	
		Weekly	Cumulative	Vessel	Shorebase
Barytes	Sks (x100 lb.)	175	2770	2315	4000
Bentonite	(do)	151	1576	617	938
Spersene	Sks (x50 lb.)	116	739	362	358
XP20	(do)	53	362	193	141
C.M.C.	(do)	0	5	55	40
L.C.M.	(do)	0	0	438	100
H.S.D.	bls	36	280	-	-
Caustic	(x140 lb)	1	36	36	25
Soda Bi Carb	(x93 lb)	0	48	28	0
Soda Ash	(x93 lb)	0	10	22	0
Cement	Sks (x94 lb.)	0	4995	2816	66
Fuel	barge bls	165	2124	1119	Nil
	boats	128	786	1903	Nil
Water	bls	1410	20699	3277	Nil

Active Mud Volumes

Circulation	hole	590	bls
	tank	500	bls
Stock	tank	250	bls
Total		1340	bls

Made during week	90	bls
Total last week	1250	bls
Consumption/losses	0	bls

Remarks

Form A-3

2-28

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 11 for week ending 2400 hours Saturday 15th July 1967

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4055 ft.; 9 5/8 inch casing to 4003 ft.
8 5/8 8080

8½ inch hole to 9534 ft.; Operation logging

II. DRILLING SUMMARY

Progress 1160 ft.

Time Analysis (hrs.)

Drilling	Circulating	Tripping	Shut Down		Logging	Testing
			Mechanical	Weather		
83	19½	44¼		18	3¼	

No. of bits used during week 6 ; Total 39

Weight on bit 30,000 ; R.P.M. 60-80

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6	37-50	2500-2900	260-350

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
10.0-10.2	46-50	0/3	3.4-4.2	1.5	9.6-9.7	½-1

Coring

NIL

Drill Stem Testing

NIL

Electrical Logging

Induction Electrical Log Run 5 7700-9545.

2-29

Remarks

Rough seas again prevailed permitting only the running of three Schlumberger logs and the taking of side wall samples during the first half of the week. Weather was good during the remainder of the week and drilling of 8 5/8 and 8½ inch hole was continued to 8374 ft.

III. MATERIALS

Item	Unit	Consumption		Stocks on	
		Weekly	Cumulative	Vessel	Shorebase
Barytes	Sks (x100 lb.)	nil	2770	2315	4000
Bentonite	(do)	59	1635	558	938
Spersene	Sks (x50 lb.)	104	843	258	358
XP20	(do)	52	414	141	141
C.M.C.	(do)		5	55	40
L.C.M.	(do)			438	100
H.S.D.	bls	24	304		
Caustic Soda		5	41	31	25
Soda Bicarb			48	28	
Soda Ash		1	11	21	
Cement	Sks (x94 lb.)		4995	3000	66
Fuel barge	bls	215	2339	904	
Fuel service boats	bls	75	861	70	
Water barge	bls	1497	22196	3306	

Active Mud Volumes

Circulation	hole	580	bls
	tank	360	bls
Stock	tank	350	bls
Total		1290	bls

Made during week	50	bls
Total last week	1340	bls
Consumption/losses	100	bls

Remarks

The loss of mud was a result of pulling the riser twice when full of mud and also dumping the sand trap.

Remarks

With only 18 hrs. lost due to bad weather, drilling of 8½ inch hole was continued to 9534 feet, after which logging was commenced.

III. MATERIALS

Item	Unit	Consumption Weekly	Consumption Cumulative	Stocks on Vessel	Stocks on Shorebase
Barytes	Sks (x100 lb.)	700	3470	1615	4000
Bentonite	(do)	97	1732	461	1938
Spersene	Sks (x50 lb.)	124	967	234	258
XP20	(do)	62	476	129	91
C.M.C.	(do)	-	5	55	40
L.C.M.	(do)	-	-	438	100
H.S.D.	bls	85	389	1	-
Caustic Soda	Drums	13	54	18	25
Soda Bi Carb	Sacks (93 lbs)	-	48	28	-
Soda Ash	(93 lbs)	-	11	21	-
Cement	Sks (x94 lb.)	-	4995	3000	1266
Fuel barge	bls	271	2610	1147	-
Fuel service boats	bls	49	910	77	-
Water barge	bls	2439	24635	3667	-

Active Mud Volumes

Circulation	hole	720	bls
	tank	260	bls
Stock	tank	350	bls
Total		1330	bls

Made during week 100 bls

Total last week 1290 bls

Consumption/losses 60 bls

Remarks

Form A-3

2-31

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 12 for week ending 2400 hours Saturday 22nd July 1967

i. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4055 ft.; 9 5/8 inch casing to 4003 ft.
8 5/8 8080

8 ½ inch hole to 9534 ft.; Operation running casing

ii. DRILLING SUMMARY

Progress ______ ft.

Time Analysis (hrs.)

Drilling	Circulating	Tripping	Shut Down		Logging	~~XXXXX~~ running casing
			Mechanical	Weather		
	23	43		18	72½	11½

No. of bits used during week ______ ; Total 39

Weight on bit ______ ; R.P.M. ______

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6"	50	1250	350

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
10.2	49	1/3	3.8-4.0	1.5	9.6	¼-½

Coring

Of 60 side wall cores attempted, 56 were recovered.

Drill Stem Testing

Schlumberger Formation Testing:
1. 8973 2. 9105 3. 8837 4. 8645
Microlog Run 2 7700-9545. Sonic Gamma Ray Log Run 7700-9528
Formation Density Log Run 7700-9545. Continuous Dipmeter Run 3 7700-9530 &
77[illegible]-9140. Cement Bond Log Run [illegible]340-2740.
~~E[illegible]XXXXXX~~

2-32

Remarks

Schlumberger logging was completed and 4 Schlumberger tests were taken. At the end of the week 7 inch casing was being run.

III. MATERIALS

Item	Unit	Consumption Weekly	Consumption Cumulative	Stocks on Vessel	Stocks on Shorebase
Barytes	Sks (x100 lb.)	100	3570	1515	4000
Bentonite	(do)	12	1744	449	938
Spersene	Sks (x50 lb.)	40	1007	194	258
XP20	(do)	20	496	109	91
C.M.C.	(do)	-	5	55	40
L.C.M.	(do)	-	-	438	100
H.S.D.	bls	28	417	-	-
Caustic Soda		2	56	16	25
Soda Bi Carb		-	48	28	-
Soda Ash		-	11	21	-
Cement	Sks (x94 lb.)	-	4995	3000	1266
Fuel barge	bls	197	2807	950	-
Fuel service boats		84	5079	1899	-
Water barge	bls	1227	25862	2155	-

Active Mud Volumes

Circulation hole 570 bls

tank 370 bls

Stock tank ______ bls

Total 940 bls

Made during week nil bls

Total last week 1290 bls

Consumption/losses 350 bls

Remarks

The contents of the stock tanks were dumped so that the tank could be used to mix the Bentonite, cement retarder (H R 4) and a water necessary for the cementation of the 7 inch casing.

Form A-3

2-33

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 13 for week ending 2400 hours Saturday 29th July 1967

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4005 ft.; 9 5/8 inch casing to 4003 ft.
8 5/8 8080 7 9218

8½ inch hole to 9534 ft.; Operation lowering B.O.P. stack to sea bed

II. DRILLING SUMMARY

Progress nil ft.

Time Analysis (hrs.)

Drilling	Circulating	Tripping	Shut Down		~~xxxxxx~~ misc.	Testing
			Mechanical	Weather		
nil	10	15	7½	57½	78	

No. of bits used during week 1 ; Total 40

Weight on bit ; R.P.M.

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6"	20	2500	150

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
10.2	51	1/4	3.7	1.5	9.6	1/4

Coring

NIL

Drill Stem Testing

NIL

Electrical Logging

NIL

Remarks

The 7 inch casing was run and cemented to 9218 ft. Most of the 4½ inch drill pipe was broken down and 2 7/8 inch drill pipe was picked up. The 4½ inch pipe rams were replaced by 2 7/8 inch rams but subsequent testing of these failed. The stack was pulled and the pipe ram rubbers replaced. At the end of the week the stack was being lowered to the sea bed.

III. MATERIALS

Item	Unit	Consumption Weekly	Consumption Cumulative	Stocks on Vessel	Stocks on Shorebase
Barytes	Sks (x100 lb.)	–	3570	1515	4000
Bentonite	(do)	15	1759	434	838
Spersene	Sks (x50 lb.)	24	1031	170	258
XP20	(do)	12	508	97	91
C.M.C.	(do)		5	55	40
L.C.M.	(do)	–	–	438	100
H.S.D.	bls	–	417	–	–
Caustic Soda		1	57	15	25
Soda Bi Carb		–	48	28	–
Soda Ash		–	11	21	–
Cement	Sks (x94 lb.)	500	5495	2500	1266
Fuel barge	bls	135	2942	825	–
Fuel service	bls	75	5163	1850	–
Water	bls	1557	27419	2912	–

Active Mud Volumes

Circulation	hole	nil	bls
	tank	695	bls
Stock	tank	240	bls
Total		935	bls

Made during week – bls

Total last week 940 bls

Consumption/losses 5 bls

Remarks

All mud in the hole was displaced by water prior to testing of the B.O.P. stack.

Form A-3

2-35

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 14 for week ending 2400 hours Saturday 5th August, 19 67

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4055 ft.; 9 5/8 inch casing to 4003 ft.
8 5/8 8080 7 9218

8½ inch hole to 9534 ft.; Operation running in tester for DST No.4

II. DRILLING SUMMARY

Progress nil ft.

Time Analysis (hrs.)

~~Drilling~~ Misc.	Circulating	Tripping	Shut Down		Logging	Testing
			Mechanical	Weather		
27½	2	4½		33½		88½ (including tripping)

No. of bits used during week ______ ; Total 40

Weight on bit ______ ; R.P.M. ______

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6"	22	2500	150

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
10.2	50	1/4	3.7	1.5	9.6	nil

Coring

NIL

Drill Stem Testing

No.1 9102-07
2 8968-73
3 8808-15.5: 8828-38
(depths relate to gamma ray log) Gamma Ray/Neutron/casing collar locator (inside casing) 8000-9148 ft. Cement Bond Log run No.3: 6800-9318 ft.

Electrical Logging

NIL

Remarks

Schlumberger logs were taken and drill stem tests were carried out on three sandstones. At the end of the week testing was being continued.

III. MATERIALS

Item	Unit	Consumption Weekly	Consumption Cumulative	Stocks on Vessel	Stocks on Shorebase
Barytes	Sks (x100 lb.)	-	3570	1515	4000
Bentonite	(do)	-	1759	444	838
Spersene	Sks (x50 lb.)	-	1031	220	208
XP20	(do)	-	508	122	66
C.M.C.	(do)	-	5	55	40
L.C.M.	(do)	-	-	438	100
H.S.D.	bls	-	417	-	-
Caustic Soda		-	57	25	15
Soda Bi Carb		-	48	28	-
Soda Ash		-	11	21	-
Cement	Sks (x94 lb.)	-	5495	2500	1266
Fuel Barge	bls	277	3219	834	-
Fuel Service boats	bls	67	1136	1842	-
Water Barge	bls	974	28393	2226	-

Active Mud Volumes

Circulation	hole	375	bls
	tank	560	bls
Stock	tank	nil	bls
Total		935	bls

Made during week nil bls

Total last week 935 bls

Consumption/losses nil bls

Remarks

Form A-3

2-37

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 15 for week ending 2400 hours Saturday 12th August 1967

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4055 ft.; 9 5/8 inch casing to 4003 ft.
8 5/8 8080 7 9218

8½ inch hole to 9534 ft.; Operation servicing testing tools

II. DRILLING SUMMARY

Progress nil ft.

Time Analysis (hrs.)

~~Drilling~~ Misc.	Circulating	Tripping	Shut Down		Logging	Testing
			Mechanical	Weather		
13 (perforating & running bridge plug)				90½		64½

No. of bits used during week ______ ; Total 40

Weight on bit ______ ; R.P.M. ______

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6"			

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
not taken during week						

Coring

NIL

Drill Stem Testing

D.S.T. No.4 8808-8815.5 ft. & 8828-38 ft.; packer set at 8758 ft. bridge plug set at 8750 ft.
D.S.T. No.5 8632-47 & 8660-80 ft.; packer set at 8608 ft.
D.S.T. No.6 interval as for D.S.T. No.5

Electrical Logging

NIL

Remarks

Testing was continued during the week when weather would permit.

III. MATERIALS

Item	Unit	Consumption Weekly	Consumption Cumulative	Stocks on Vessel	Stocks on Shorebase
Barytes	Sks (x100 lb.)	-	3750	1515	4000
Bentonite	(do)	-	1759	444	838
Spersene	Sks (x50 lb.)	-	1031	220	208
XP20	(do)	-	508	122	66
C.M.C.	(do)	-	55	55	40
L.C.M.	(do)	-	-	438	100
H.S.D.	bls	-	417	-	-
Caustic Soda		-	57	25	15
Soda Bi Carb		-	48	28	-
Soda Ash		-	11	21	-
Cement	Sks (x94 lb.)	-	5495	2500	1266
Fuel service boats	bls	114	1250	1825	-
Fuel barge	bls	145	3364	1070	-
Water barge	bls	783	30176	3009	-

Active Mud Volumes

Circulation	hole	350	bls
	tank	540	bls
Stock	tank	890	bls
Total			bls

Made during week nil bls

Total last week 935 bls

Consumption/losses 45 bls

Remarks

Most of the mud lost is located in the casing below the bridge plugs.

Remarks

Testing of the deep sands was completed and a cement plug was placed from 5658-5408 ft. and 11 cu.ft. was squeezed through perforations at 5658 ft. The 7" casing was cut at 2518 ft. and another cement plug placed from 2541 to 2284 ft. The 9 5/8" casing was perforated at 2070 ft. and squeeze cementation was carried out to ensure good cement above the gas/water contact and the 2000 ft. sand. The squeeze was only partially successful and will be repeated when weather conditions permit.

III. MATERIALS

Item	Unit	Consumption		Stocks on	
		Weekly	Cumulative	Vessel	Shorebase
Barytes	Sks (x100 lb.)	450	4020	1065	4000
Bentonite	(do)	120	1879	324	838
Spersene	Sks (x50 lb.)	48	1079	172	208
XP20	(do)	24	532	98	66
C.M.C.	(do)	-	5	55	40
L.C.M.	(do)	-	-	438	100
H.S.D.	bls	-	417	-	-
Caustic Soda		4	61	21	15
Soda Bi Carb		-	48	28	-
Soda Ash		-	11	21	-
Cement	Sks (x94 lb.)	310	5305	2190	266
Fuel Serv. boats	bls	46	1296	1800	-
Fuel barge	bls	117	3481	1053	-
Water barge	bls	1371	31547	3443	-

Active Mud Volumes

Circulation	hole	170	bls	Made during week	300	bls
	tank	580	bls	Total last week	890	bls
Stock	tank	750	bls	Consumption/losses	440	bls
Total			bls			

Remarks

The large mud loss can be accounted for the following ways:

I. A large amount of mud was left in the hole below cement plug No.2
II. A large amount of mud was dumped because of cement contamination.
III. Mud was lost following the parting of the 7" casing.

Form A-3

2-39

B.O.C. OF AUSTRALIA LIMITED

WEEKLY PROGRESS REPORT

Well Golden Beach No.1A

Report No. 16 for week ending 2400 hours Saturday 19th August 1967

I. WELL STATUS (All depths relate to sub sea guide base.)

36 inch hole to 88 ft.; 30 inch casing to 80 ft.
26 inch hole to 523 ft.; 20 inch casing to 472 ft.
17½ inch hole to 1718 ft.; 13 3/8 inch casing to 1666 ft.
12¼ inch hole to 4055 ft.; 9 5/8 inch casing to 4003 ft.
8 5/8 8080 7 9218 cut and recovered from 2518 ft. plugged back to 2284 ft.

8½ inch hole to 9534 ft.; Operation waiting on weather

II. DRILLING SUMMARY

Progress ______ ft.

Time Analysis (hrs.)

~~XXXXX~~ Misc.	Circulating	Tripping	Shut Down		Logging	Testing
			Mechanical	Weather		
53	5	22½		28½	9½	49½

No. of bits used during week ______ ; Total 40

Weight on bit ______ ; R.P.M. ______

Pump Performance

Liner Size	Strokes	Pressure (p.s.i.)	Volume (Gals/min)
6			

Mud Properties

Weight (lb/gal)	Viscosity (ccs)	Gel	Water loss (ccs)	Filter Cake (mm)	P.H.	Sand %
10.4-10.5	43-47	0/2	4.0	1.5	9.6-10.5	Tr.

Coring

NIL

Drill Stem Testing

D.S.T. No.7 (8632-47 8660-80) packer set at 8608 ft. bridge plug set at 8580.

Electrical Logging

Gamma-ray neutron casing collar locator run No.2 1790-2297
Cement bond log run No.4 1650-2287.

2-41

DRILL STEM TEST REPORT

D.S.T.

2-42

B.O.C. OF AUSTRALIA LIMITED

SCHLUMBERGER FORMATION TEST

WELL: Golden Beach No.1A Test No.: 1 Date: 17.7.67

Depth (IES): 8973 Hole Size: 8½" Type of Tester: FTM-B

Choke size: 0.020 Sample Unit Size: 20,500 cc.

Mud: Type: Spersene/XP20 Weight: 10.1 lb/gal, Visc.: 46 Secs, W/L 4.0 ccs

Rmf: 0.95 @ 63 °F, Rw: 0.13 @ 210 °F.

OPERATION:	Total Time Mins. Secs.	Time/Operation Mins. Secs.	Pressure Record (psi)
Before Setting Tool	-	0	4880
Set Tool	0.00	0.00	
Shot Shaped Charge	Misfired		
Sampling	1.00	0.00	
	3.00	2.00	28
	9.00	8.00	80
	17.00	16.00	100
	23.00	22.00	100
Shut-in	24.00	1.00	3051
	25.00	2.00	3426
	27.00	4.00	3675
	29.00	6.00	3800
	31.00	8.00	3875
	32.00	9.00	3901
	33.00	10.00	3935
	34.00	11.00	3950
	35.00	12.00	3975
	36.00	13.00	3990
	37.00	14.00	4005
Collapsed Tool	37.00	14.00	4005
Freed Tool	37.45		4880

FLUIDS RECOVERED:

Water 3000 ccs — Resistivity 1.2 @ 62 °F

Oil - ccs — A P I Gravity _____ @ _____ °F

Gas 1.2 cu/ft. — Composition C_1 70-80%, C_2 10%, C_3 1.5, C_4 Nil

G O R -

INTERPRETATION:

Permeability: 0.12 md. Specific Productivity Index _____ bl/day/psi/ft.

CONCLUSION: Low permeability sandstone, which would produce water-free gas in small quantity.

Operator's Representative:

2-43

.O.C. OF AUSTRALIA LIMITED

SCHLUMBERGER FORMATION TEST

WELL: Golden Beach No.1A Test No.: 2 Date: 18.7.67

Depth (IES): 9105 Hole Size: 8½" Type of Tester: FTM-B

Choke size: 4 x 0.020 Sample Unit Size: 20,000 cc

Mud: Type: Spersene/XP20 Weight: 10.1 lb/gal, Visc.: 46 Secs, W/L 4.0 ccs

Rmf: 0.95 @ 63 °F, Rw: 0.15 @ 213 °F.

OPERATION:	Total Time Mins. Secs.	Time/Operation Mins. Secs.	Pressure Record (psi)
Before Setting Tool	-	0	
Set Tool	0.00	0.00	
Sampling	1.40	0.00	36
	4.40	3.00	36
(fired shaped charge)	7.40	6.00	32
	14.40	13.00	32
	17.40	16.00	36
Shut-in	27.30	25.50	36
	28.30	1.00	48
Collapsed tool	34.15	6.45	48
Collapsed Tool			
Freed Tool			

FLUIDS RECOVERED:

Water 60 ccs Resistivity 1.14 @ 54 °F

Oil ccs A P I Gravity @ °F

Gas cu/ft. Composition

G O R

INTERPRETATION:

Permeability: md. Specific Productivity Index bl/day/psi/ft.

CONCLUSION: Sandstone very impermeable.

2-44

B.O.C. OF AUSTRALIA LIMITED

SCHLUMBERGER FORMATION TEST

WELL: Golden Beach No.1A   Test No.: 3   Date: 19.7.67

Depth (IES): 8837   Hole Size: 8½"   Type of Tester: FIT

Choke size: 4 x 0.020   Sample Unit Size: 20,500 cc

Mud: Type: Spersene/XP20   Weight: 10.1 lb/gal, Visc.: 46 Secs, W/L 9.7 ccs

Rmf: 0.95 @ 63 °F, Rw: 0.15 @ 210 °F.

OPERATION:	Total Time Mins. Secs.	Time/Operation Mins. Secs.	Pressure Record (psi)
Before Setting Tool	-	0	
Set Tool	0.00	0.00	
Sampling	0.00	0.00	381
	1.00	1.00	176
	2.00	2.00	164
	3.00	3.00	152
	4.00	4.00	140
	5.00	5.00	140
	39.10	39.10	132
Shut-in	40.00	0.90	3721
	41.00	1.90	3763
	42.00	2.90	3785
	43.00	3.90	3805
	44.00	4.90	3820
	45.00	5.90	3825
	46.00	6.90	3835
	47.00	7.90	3840
	48.00	8.90	3845
Collapsed Tool	48.20	9.10	4778
Freed Tool	48.20	9.10	

FLUIDS RECOVERED:

Water	8200	ccs	Resistivity	1.39 @ 62	°F
Oil		ccs	A P I Gravity	@	°F
Gas		cu/ft.	Composition		
G O R					

INTERPRETATION:

Permeability: 0.11 md. Specific Productivity Index .00034 bl/day/psi/ft.

CONCLUSION: Low permeability sandstone.

2-45

B.O.C. OF AUSTRALIA LIMITED

SCHLUMBERGER FORMATION TEST

WELL: Golden Beach No.1A Test No.: 4 Date: 19.7.67

Depth (IES): 8647 Hole Size: 8½" Type of Tester: FTM-B

Choke size: 4 x 0.020 Sample Unit Size: 20,500 cc

Mud: Type: Spersene/XP20 Weight: 10.1 lb/gal, Visc.: 46 Secs, W/L 4.0 ccs

Rmf: 0.95 @ 63 °F, Rw: 0.15 @ 208 °F.

OPERATION:	Total Time Mins. Secs.	Time/Operation Mins. Secs.	Pressure Record (psi)
Before Setting Tool	-	0	
Set Tool	0.00	0.00	
Sampling	0.00	0.00	
	1.00	1.00	1678
	2.00	1.00	1616
	24.00	24.00	1616
	25.00	25.00	1658
	26.00	26.00	1746
	27.00	27.00	2232
	28.00	28.00	3318
	29.00	29.00	3683
	30.00	30.00	3730
	31.00	31.00	3742
	32.00	32.00	3747
	33.00	33.00	3752
	37.00	37.00	3752
	38.00	38.00	3757
	39.10	39.10	3757
	40.00	0.90	3825
	45.00	5.90	3825
Collapsed Tool	45.00		3825
Freed Tool	48.50		4675

FLUIDS RECOVERED:

Water 19,000 ccs Resistivity 1.27 @ 63 °F

Oil Trace ccs A P I Gravity ______ @ ______ °F

Gas ______ cu/ft. Composition ______

G O R ______

INTERPRETATION:

Permeability: 1.03 md. Specific Productivity Index 0.0037 bl/day/psi/ft.

CONCLUSION: Low permeability sandstone

B.O.C. OF AUSTRALIA LTD.

DST AND PRODUCTION TEST DATA.

1. GENERAL DATA:

Well: GOLDEN BEACH NO. 1A Date 31 - 7 - 67
Formation: Golden Beach Test Interval 9102-07 Datum: Guide Base
Casing OD: 7" lb/ft: 26 Perf/shots/ft: 2
Tbg/DP OD: 2⅞" lb/ft: 10.4 length, ft: 8698
D.Collar OD 4¼" I.D.: 2" length, ft: 447
Packers, No: 1 Make: Halco Type RTTS OD 5¾" Durometer 85
Bottom Recorder, Type: BT Range, psi 8000 clock hrs: 24
Top Records, Type: BT Range, psi 8000 clock, hrs: 24
W.L. Recorder, Type: - Range psi - Clock, hrs: -
Bottom Hole Choke, Size (s) ⅝"
Bottom Hole Thermometer, Type: Max. Recording Range °F
Water Cushion: NO (Yes or No), Amount, ft: -

2. SEPARATOR AND FLOW MEASUREMENT DEVICE DATA:

FIRST STAGE:

Make: B S & B, OD 2' 6" Length: 7' 6"
WP, psig: 1000, Rated Capacity, MCFD: 28,000 B/D 1,600
FCV/Choke, Make: Fisher Type: 667D Size: ½" x 2"
PCV, Make: Fisher Type: 657A Size: 1¼" x 2"
LCV, Make: Climax Type: 70-23-1 Size: ½" x 2"
Meter Run ID, Upstream: 4.036 Downstream: 3.816 Taps: Flange

SECOND STAGE:

Make: B S & B OD: 2' 6" Length: 7' 6"
WP, psig: 100, Rated Capacity MCFD: 6,000 B/D 2,500
Choke, Make: National Type: F(adjustable) Size:
PCV, Make: B S & B Type: 73-22-1 Size:
LCV, Make: Climax Type: 70-55-2 Size:
Oil Meter Make: Floco Type: F-500-3 Size: 3"
Meter Run ID, Upstream: 3.071 Downstream: 3.065 Taps: Flange

INHIBITOR PUMP:

Make: Texstean Model MSM 5005 Single or Double Acting: S
Plunger Size: ¼", Stroke Length: 2".

PRODUCTION TANKS:

Dimensions: I.D: Length or Height:
Positioning (Horizontal or Vertical)

3. REMARKS AND SPECIAL DATA:

Packer was set at 9033 ft.
Two Halliburton volume-compensated slip joints were run at 4060ft.
Otis 'J' Nipple was run at 100 ft (below guide base).

2-47

Test No. 1

Well: GOLDEN BEACH NO. 1A, Date 31 - 7-67

4. TIME RECORDS: (Use 24-hr Clock)

Clocks started, Bottom: 0115, Top: 0115, W.L. -

Tools Started Into Hole: 0145, On Bottom: 0900, Set 0954

Tools Pulled Loose: 1600, At Surface: 2300

Operation	Start	End	Duration, mins.
Initial Flow	0956	1001	5
Initial Shut-in	1001	1043	42
First Flow	1043	1325	162
First Shut-in	1325	1600	155
Second Flow			
Second Shut-in			
Third Flow			
Third Shut-in			
Fourth Flow			
Fourth Shut-in			

5. FIRST STAGE FLOW RATE DATA AND CALCULATIONS:

(Note: Pressure Base 14.7 psia., Temperature Base 60°F)

$F = F_b \cdot F_g \cdot F_{pv}$ = (______) (______) (______) (24)= ________

Time	Wellhead PSIG	Wellhead °F	d in.	F	T_f °F	F_t	h_w	p_f	MCFD
					TOO	SMALL	TO	MEASURE	

Well: GOLDEN BEACH NO. 1A

Date 31 - 7-67

6. SECOND STAGE FLOW RATE DATA AND CALCULATIONS:

$F = F_b \cdot F_g \cdot F_r \cdot Y = (\_\_\_\_)(\_\_\_\_)(\_\_\_\_)(\_\_\_\_)(24) = \_\_\_\_$

Time	Liquid Meter Reading	Liquid Meter B/D	d in.	F	T_f °F	T_t	h_w	p_f	MCFD
					TOO	SMALL	TO	MEASURE	

7. SAMPLING AND MISCELLANEOUS DATA: (tank gauging checks, water measurements, gravity measurements, on-site gas analyses, hydrate inhibitor type and injection rate, etc.)

INITIAL FLOW : weak to fair blow.

FINAL FLOW : no flow for 2 minutes, then weak blow increasing to fair. Inflammable gas reached surface at 1225 hrs, 102 mins after flow started.

ON-SITE GAS ANALYSIS :

C_1	80%
C_2	9
C_3	3
C_4	Trace
CO_2	8
	100

RECOVERED FROM PIPE ABOVE TESTER : 500 ft (2.3 U.S. bls) gas-cut mud, weighing 9.0 lb/gal decreasing downwards to 7.6. No water or mud filtrate.

Supervisor: [signature]

B.O.C. OF AUSTRALIA LTD.

DST AND PRODUCTION TEST DATA.

1. GENERAL DATA:

Well: GOLDEN BEACH NO. 1A Date 3-8-67

Formation: Golden Beach Test Interval: 8968-73 Datum: Guide Base

Casing OD: 7" lb/ft: 26 Perf/shots/ft: 2

Tbg/DP OD: 2 7/8" lb/ft: 10.4 length, ft: 8587

D.Collar OD 4 1/4" I.D.: 2" length, ft: 447

Packers, No: 1 Make: Halco Type RTTS OD 5 3/4" Durometer 85

Bottom Recorder, Type: BT Range, psi 8000 clock hrs: 72

Top Records, Type: BT Range, psi 8000 clock, hrs: 24

W.L. Recorder, Type: Kester Range psi 8000 Clock, hrs: 72

Bottom Hole Choke, Size (s) 5/8"

Bottom Hole Thermometer, Type: Max. Recording Range °F

Water Cushion: NO (Yes or No), Amount, ft: -

2. SEPARATOR AND FLOW MEASUREMENT DEVICE DATA: SAME AS FOR TEST NO.1

FIRST STAGE:

Make: , OD Length:

WP, psig: , Rated Capacity, MCFD: B/D

FCV/Choke, Make: Type: Size:

PCV, Make: Type: Size:

LCV, Make: Type: Size:

Meter Run ID, Upstream: Downstream: Taps:

SECOND STAGE:

Make: OD: Length :

WP, psig: , Rated Capacity MCFD: B/D

Choke, Make: Type: Size:

PCV, Make: Type: Size:

LCV, Make: Type: Size:

Oil Meter Make: Type: Size:

Meter Run ID, Upstream: Downstream: Taps:

INHIBITOR PUMP:

Make: Model Single or Double Acting:

Plunger Size: , Stroke Length: .

PRODUCTION TANKS:

Dimensions: I.D: Length or Height:

Positioning (Horizontal or Vertical)

3. REMARKS AND SPECIAL DATA:

Packer set at 9050 ft.

Two Halliburton volume-compensated slip joints were run at 4482 ft.

Otis 'J' Nipple was run 53 ft above the packer.

NOMENCLATURE

b	=	Approximate Radius of Investigation	Feet
b_1	=	Approximate Radius of Investigation (Net Pay Zone h_1)	Feet
D.R.	=	Damage Ratio	——
El	=	Elevation	Feet
GD	=	B.T. Gauge Depth (From Surface Reference)	Feet
h	=	Interval Tested	Feet
h_1	=	Net Pay Thickness	Feet
K	=	Permeability	md
K_1	=	Permeability (From Net Pay Zone h_1)	md
m	=	Slope Extrapolated Pressure Plot (Psi^2/cycle Gas)	psi/cycle
OF_1	=	Maximum Indicated Flow Rate	MCF/D
OF_2	=	Minimum Indicated Flow Rate	MCF/D
OF_3	=	Theoretical Open Flow Potential with/Damage Removed Max.	MCF/D
OF_4	=	Theoretical Open Flow Potential with/Damage Removed Min.	MCF/D
P_s	=	Extrapolated Static Pressure	Psig.
P_F	=	Final Flow Pressure	Psig.
P_{ot}	=	Potentiometric Surface (Fresh Water*)	Feet
Q	=	Average Adjusted Production Rate During Test	bbls/day
Q_1	=	Theoretical Production w/Damage Removed	bbls/day
Q_g	=	Measured Gas Production Rate	MCF/D
R	=	Corrected Recovery	bbls
r_w	=	Radius of Well Bore	Feet
t	=	Flow Time	Minutes
t_o	=	Total Flow Time	Minutes
T	=	Temperature Rankine	°R
Z	=	Compressibility Factor	——
μ	=	Viscosity Gas or Liquid	CP
Log	=	Common Log	

* Potentiometric Surface Reference to Rotary Table When Elevation Not Given, Fresh Water Corrected to 100° F.

2-51

Flow Time	1st 5 Min.	2nd 162 Min.	Date	7-31-67	Ticket Number	454000 - S
Closed In Press. Time	1st 42 Min.	2nd 155 Min.	Kind of Job	H.W.P.	Halliburton District	MELBOURNE
Pressure Readings	Field	Office Corrected	Tester	GLORIOD	Witness	TYNER
Depth Top Gauge	9128' Ft.	NO Blanked Off	Drilling Contractor	ZAPATA - O.D. & E.		
BT. P.R.D. No.	1857	24 Hour Clock	Elevation	102' MUD F/LINE	Top Packer	-
Initial Hydro Mud Pressure	4837.8	4736	Total Depth	9235' P.B.	Bottom Packer	9135'
Initial Closed in Pres.	1686.5	1662	Interval Tested	9204' - 09'	Formation Tested	WILDCAT - UNKNOWN AT PRESENT.
Initial Flow Pres.	1: 98 2: 178.2	1: 135 2: 183	Casing or Hole Size	7" x 26#	Casing Perfs.	Top 9204' - 2 H.P.F. Bot. 9207'
Final Flow Pres.	1: 98 2: 289.5	1: 93 2: 272	Surface Choke	3/4"	Bottom Choke	5/8"
Final Closed in Pres.	935.4	907	Size & Kind Drill Pipe	2 7/8" x 10.40# x IF	Drill Collars Above Tester (I.D. - Length)	2" x 447'
Final Hydro Mud Pressure	4828.9	4736	Mud Weight	10.2	Mud Viscosity	50 Sec.
Depth Cen. Gauge	Ft.	Blanked Off	Temperature	°F Est. 220 °F Actual	Anchor Size & Length	ID 2" OD 3 3/4" X 10'
BT. P.R.D. No.		Hour Clock	Depths Mea. From	MUD LINE	Depth of Tester Valve	9127' Ft.
Initial Hydro Mud Pres.			Cushion (Type / Amount)	NONE Ft.	Depth Back Pres. Valve	NONE Ft.
Initial Closed in Pres.			Recovered	500' Feet of gas cut mud - 7.6 to 9.6 16/gal.		
Initial Flow Pres.	1 2		Recovered	Feet of		
Final Flow Pres.	1 2		Recovered	Feet of		
Final Closed in Pres.			Recovered	Feet of		
Final Hydro Mud Pres.			Oil A.P.I. Gravity		Water Spec. Gravity	
Depth Bot. Gauge	9148' Ft.	YES Blanked Off	Gas Gravity		Surface Pressure	psi
BT. P.R.D. No.	2181	24 Hour Clock	Tool Opened	9:56 AM	Tool Closed	4:00 PM
Initial Hydro Mud Pres.	4857	4847	Remarks			
Initial Closed in Pres.	1685	1702				
Initial Flow Pres.	1: 127.8 2: 191.6	1: 140 2: 219				
Final Flow Pres.	1: 127.8 2: 290	1: 150 2: 292				
Final Closed in Pres.	933.7	934				
Final Hydro Mud Pres.	4813.6	4847				

Remarks: Tool opened for a 5 minute first flow with a medium blow. Rotated tool for a 42 minute initial closed in pressure. Tool reopened with no blow - increasing to a moderate blow with heading during the 2nd flow. Gas to the surface in 110 minutes - in sufficient amount to measure. Took a 155 minute final closed in pressure. Initial closed in pressure may be supercharged in view of the very short first flow period. Final closed in pressure was questionable. UNABLE TO CALCULATE BECAUSE NO GAS FLOW RATE COULD BE ESTABLISHED DUE TO THE LOW GAS PRODUCTION.

Legal Location Sec. - Twp. - Rng.	-
Lease Name	GOLDEN BEACH
Well No.	A-1
Test No.	1
Lease Owner/Company Name	BURMA OIL COMPANY OF AUSTRALIA, LIMITED
Field Area	WILDCAT
County	-
State	VICTORIA
Owner's District	SALE, VICTORIA

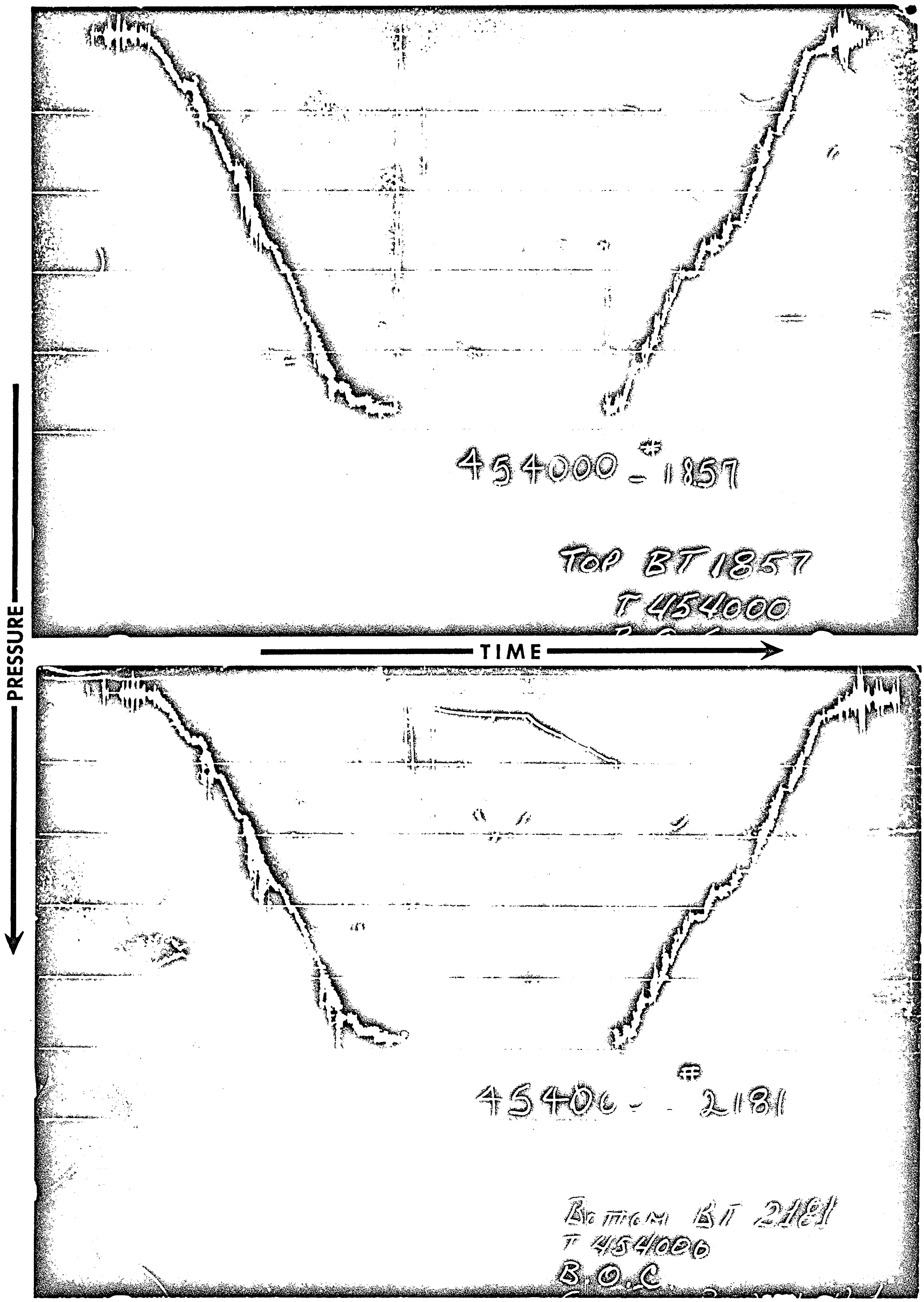
FORMATION TEST DATA

Z-52

Gauge No. 1857	Depth 9128'			Clock 24 hour				Ticket No. 454000			
	First Flow Period		Initial Closed In Pressure			Second Flow Period		Final Closed In Pressure			
	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log (t+θ)/θ	PSIG Temp. Corr.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log (t+θ)/θ	PSIG Temp. Corr.	
P_0	.000	135	.000		93	.000	183	.000		272	
P_1	.020	93	.0228		1087*	.1423	228**	.0513		378	
P_2			.0391		1310	.2440	250	.1026		452	
P_3			.0555		1412	.3457	261	.1539		515	
P_4			.0718		1477	.4473	267	.2052		567	
P_5			.0881		1529	.549	272	.2565		639	
P_6			.1044		1579			.3078		707	
P_7			.1207		1625			.3591		739	
P_8			.137		1662			.4104		809	
P_9								.4617		876	
P_{10}								.513		907	
Gauge No. 2181	Depth 9148'			Clock 24 hour							
P_0	.000	140	.000		150	.000	219	.000		292	
P_1	.016	150	.0242		754*	.1431	253**	.0512		405	
P_2			.0414		1310	.2453	275	.1024		482	
P_3			.0587		1429	.3476	285	.1536		536	
P_4			.0760		1506	.4498	287	.2048		590	
P_5			.0932		1567	.552	292	.2560		661	
P_6			.1105		1622			.3072		727	
P_7			.1277		1666			.3584		762	
P_8			.145		1702			.4096		835	
P_9								.4608		907	
P_{10}								.512		934	
Reading Interval			5			30		15.5			Minutes

REMARKS: * INTERVAL = 7 MINUTES. ** INTERVAL = 42 MINUTES.

SPECIAL PRESSURE DATA



Each Horizontal Line Equal to 1000 p.s.i.

Test No. 2

Well: GOLDEN BEACH NO. 1A, Date 3-8-67

4. TIME RECORDS: (Use 24-hr Clock)

Clocks started, Bottom: 2245 (2/8), Top: 2245, W.L. 0922

Tools Started Into Hole: 2330, On Bottom: 0630, Set 0703½

Tools Pulled Loose: 1700, At Surface: 2400

Operation	Start	End	Duration, mins.
Initial Flow	0705	1029	204
Initial Shut-in	1029	1700	391
First Flow	No other flows	or shut-ins	as Dual CIP valve
First Shut-in		would not rotate.	
Second Flow			
Second Shut-in			
Third Flow			
Third Shut-in			
Fourth Flow			
Fourth Shut-in			

5. FIRST STAGE FLOW RATE DATA AND CALCULATIONS:

(Note: Pressure Base 14.7 psia., Temperature Base 60°F)

$F = F_b \cdot F_g \cdot F_{pv}$ = (______) (______) (______) (24)= ______

Time	Wellhead PSIG	Wellhead °F	d in.	F	T_f °F	F_t	h_w	p_f	MCFD
					TOO SMALL TO MEASURE				

[redacted]

Test No 2

Well: GOLDEN BEACH NO. 1A

D[redacted] 4-8-67

2-55

6. SECOND STAGE FLOW RATE DATA AND CALCULATIONS:

$F = F_b \cdot F_g \cdot F_r \cdot Y =$ (_____) (_____) (_____) (_____) (24)=_____

Time	Liquid Meter		d in.	F	T_f °F	T_t	h_w	p_f	MCFD
	Reading	B/D							
					TOO SMALL TO MEASURE				

7. SAMPLING AND MISCELLANEOUS DATA: (tank gauging checks, water measurements, gravity measurements, on-site gas analyses, hydrate inhibitor type and injection rate, etc.)

INITIAL FLOW : fair blow, inflammable gas reached surface at 0730 hrs, 25 mins after flow started.

ON=SITE GAS ANALYSIS :

C_1 96%

C_2 2%

CO_2 2%

100

RECOVERED FROM PIPE ABOVE TESTER :

220 ft (1.0 bls) mud, slightly gas-cut.

90 ft (0.4bls) muddy water.

650 ft (2.9 bls) water with very slight skim of oil.

960 ft (4.3 bls)

Water resistivity 1.22 ohms @ 58°F.
Oil bluish white fluorescence.

Three feet of silt was found on top of the Otis choke.

Supervisor: [signature]

2-56

GOLDEN BEACH NO.1A

D.S.T. NO.2

PERFORATIONS 8,968' - 73'

FINAL FLOW RATE: 1.2 bls/hr. at 383 p.s.i.

TOTAL PRODUCTION: 4.3 bls.

t (flowing) = 215 minutes.

FINAL SHUT-IN: PRESSURE BUILD UP:

Δt	$\frac{t + \Delta t}{\Delta t}$	Top Recorder 24 hr. clock	Bottom Recorder 72 hr. clock
15	15.3	1,497	1,322
30	8.2	1,938	1,956
45	5.8	2,402	2,329
60	4.6	2,631	2,591
75	3.9	2,795	2,755
90	3.4	2,918	2,862
105	3.05	3,007	2,968
120	2.8	3,086	3,041
150	2.43	3,197	3,162
180	2.2	3,294	3,254
240	1.9	3,409	3,385
300	1.72	3,507	3,472
360	1.6	3,555	3,535
390	1.55	3,566	3,559

FORMATION PRESSURE (P_f) 3940 p.s.i.

m : 2180

$$\frac{Kh}{\mu} = 162.6 \frac{Q}{m}$$

$$= \frac{162.6 \times 28.8}{2180}$$

$$\frac{Kh}{\mu} = 2.15$$

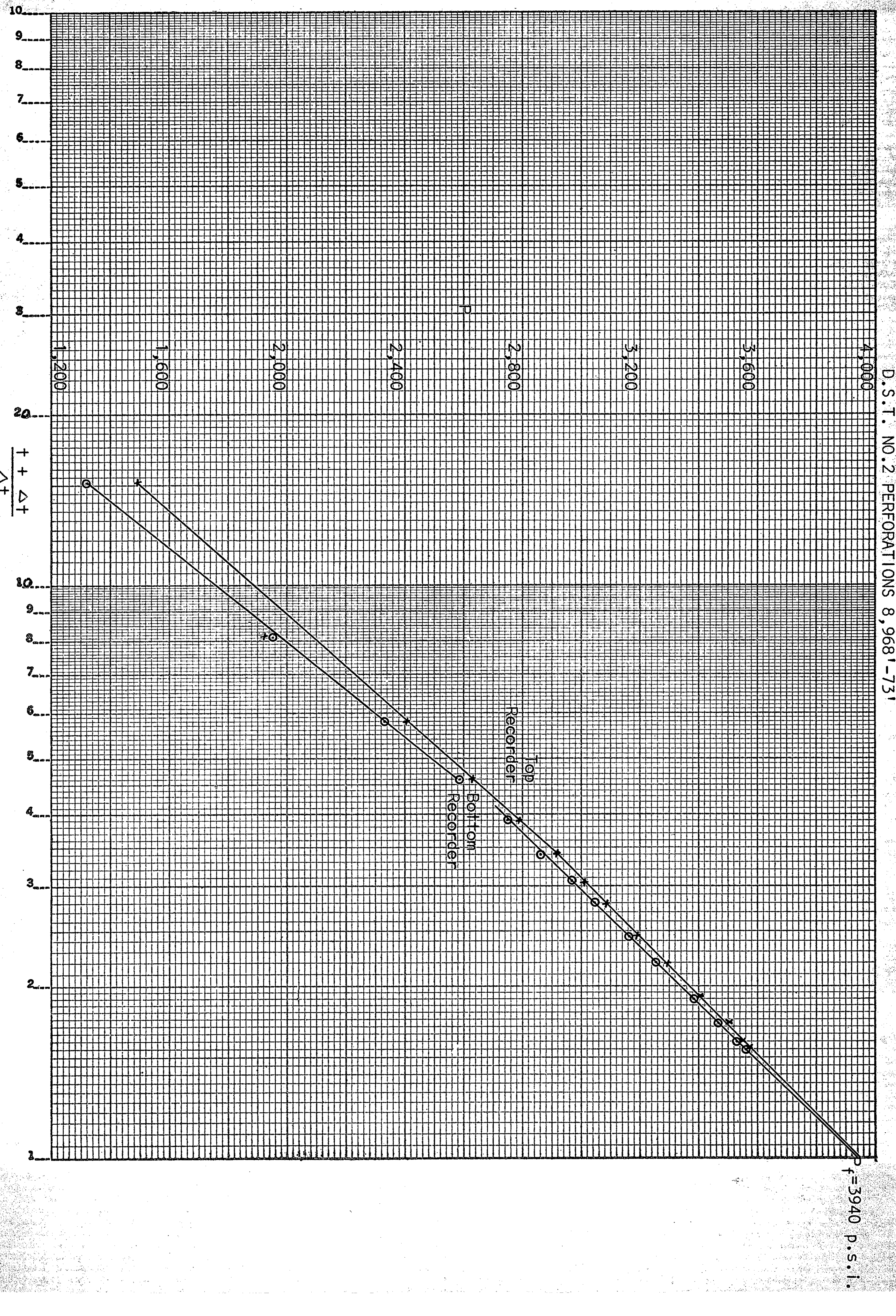
$$D.R. = \frac{0.183 (P_f - P_s)}{m}$$

$$= \frac{0.183 (3940 - 383)}{2180}$$

$$= 0.3$$

GORMACK GRAPH PAPE... STCHURCH N.Z. 0322 Semi-log, 2 c... al (20ths)

2-57



L-58

B O C OF AUSTRALIA LTD.

GOLDEN BEACH No. 1A

Report on
the

Production Testing of The
Latrobe Valley Gas Sand

Chas. R. Hetherington & Associates Pty Ltd September 1967

2-59

TABLE OF CONTENTS

2-60

INTRODUCTION

Golden Beach No. 1A was drilled as an exploration well in the Bass Strait offshore area of Victoria. By the third week of July, 1967, the well completed drilling at a depth in excess of 9,000 ft.

Casing of 7" OD was run to a point near total depth in order to test prospective zones circa 8,000 ft. Following the testing of these zones, the upper portion of the 7" casing was cut-off and retrieved. The Latrobe Valley gas sand, ranging in depth from 2,013 to 2,078, measured from the guide base, had previously been penetrated with a 12-1/4" bit and had been cased with 9-5/8" OD casing.

An interval from 2,040 to 2,045 ft, measured from the guide base was perforated with 10 Schlumberger casing jets. A Halliburton test tool, in conjunction with a hookwall packer was run and a production test was conducted.

This report covers the production testing of the Latrobe Valley gas sand, including the interpretation of flow and formation characteristics.

ABSTRACT

The well was flowed at a total of six rates, varying from 438 to 4,590 MCFD. The higher rate was primarily for clean-out purposes. Apart from the first (clean-out) flow rate, all were held constant, aided by the use of a flow controlled valve at the inlet of the test separator. The duration of the first five flow rates was 75 minutes, and the duration of the sixth was 332 minutes. Wellbore pressures were measured and recorded by an Amerada type subsurface recording pressure gauge. The well was produced into a high pressure separator and the overhead gas from the separator was measured with a conventional orifice meter.

The well exhibited an absolute open flow capacity of 24,270 MCFD. The virgin reservoir pressure was measured as 974 psia at an estimated reservoir temperature of 116°F. Apart from a slug of mud, no measureable liquids, either water or hydrocarbon, were produced during the test.

The test was designed as a modified isochronal, with shut-in periods equalling the flow periods, following each of the flow periods. The sixth and final flow period was extended in order to determine the rate of drawdown for the interpretation of reservoir characteristics.

The formation exhibited a permeability-thickness of 867 md-ft. A Skin Factor of - 1.71 was calculated, evidencing an improved wellbore condition. A marked reservoir heterogeneity was indicated at an approximate distance from the well of 104 feet. The heterogeneity appears to be a large increase in permeability and/or thickness.

Clocks of up to 72-hr duration were run with the test tool in order to permit an extended final flow period as well as a final build-up period. It was necessary to terminate the extended final flow period because of weather conditions. While the final flow period was useful for the interpretation of formation parameters, stabilisation was not achieved and no reservoir boundaries were detected. None of the pressure build-up periods were useful for the checking of formation parameters. Pressure build-up readings in the wellbore were obscured by the presence of liquid in the flow tubing.

2-61

REFERENCES

1. Katz & Associates, "Handbook of Natural Gas Engineering", McGraw Hill Book Company Inc., (1959), Chs. 9 and 10.

2. Matthews C.S., and Russel D.G., "Pressure Build-up and Flow Tests in Wells", Society of Petroleum Engineers of AIME, (1967).

3. Stegemeier, G.L., and Matthews C.S., "A Study of Anomalous Pressure Build-Up Behavior", Trans., AIME (1958) 213, 44-50.

4. Bixel, H.D., Larkin, B.K. and van Poollen, H.K., "Effect of Linear Discontinuities on Pressure Build-Up and Drawdown Behavior," J. Pet. Tech. (Aug. 1963) 885-895.

5. Jones, Park, "Reservoir Limit Test on Gas Wells", J. Pet. Tech. (June 1962) 613.

TEST PROCEDURE

The following procedure was programmed in order to determine the well's modified isochronal back-pressure curve, to be able to position the curve to reflect stabilisation, to determine the formation parameters, and if possible, to detect reservoir limits and discontinuities:

1. Flow the well initially for 1 to 3 minutes and follow with a bottom-hole shut-in from 10 to 30 minutes. This was designed to determine the virgin reservoir pressure.
2. Open the well and flow at a maximum rate, that is surface chokes fully open and minimum back-pressure. Continue to flow until the flowstream is reasonably clean. Shut-in for a period equal to the flow period. This step was designed for a rapid clean-up of the well.
3. Open the well and flow at a rate approximately 10% of the maximum open flow rate (estimated in (2) above). Flow at a constant rate for a period of 1 hour. This step was to be the first point of the modified isochronal back-pressure curve. In the actual test, the flow period was 1.25 hours, resulting from the time required adjust the various instruments associated with the test separator.
4. Shut-in the well for a period equal to the preceeding flow period.
5. Open the well and flow at a rate double that in (3) above. Flow at a constant rate and for the same period as in (3) above. Shut-in the well for an equal period.
6. Repeat (5) for rates of 40% and 80% of the rate in (3).
7. Continue the final flow rate for the maximum period possible, that is until the bottom hole recorder clocks have run out or until weather conditions interrupt.

2-62

CONCLUSIONS & RECOMMENDATIONS

1. The well exhibited an unsteady-state absolute open flow capacity of:

   24,270 MCFD

2. The inverse slope (n) of the conventional back-pressure plot is:

   0.675

3. The well's unsteady-state flow equation is:

   $$P_e^2 - P_w^2 = 5{,}050 (\ln t_D - 2.61) Q + 2.025 \times 10^{-3} Q^2$$

4. The conventional back-pressure equation is:

   $$Q = 1.99 (P_e^2 - P_w^2)^{0.675}$$

5. The well's steady-state flow equation is:

   $$P_e^2 - P_w^2 = 10{,}100 (\ln 1.19 r_e - 1.71) Q + 2.025 \times 10^{-3} Q^2$$

6. The well's permeability thickness, k h, is:

   867 md-ft

7. The well's turbulence (non-Darcy) coefficient is:

   2.025×10^{-3} $(psi/MCFD)^2$

8. The well's Skin Factor, S, is:

   - 1.71 (indicates improved wellbore condition)

9. Stimulation would be unlikely to increase the well's flow capacity.

10. No boundaries were detected in a five-hour flow period.

11. A marked reservoir heterogeneity is located about 104 feet from the well. The heterogeneity is likely a marked increase in permeability and/or thickness. The flow test was of insufficient duration in order to determine the formation parameters in the zone of increased permeability-thickness.

12. For more precise and conclusive interpretations of reservoir parameters and absolute open flow capacity, flow rates in excess of 4,000 MCFD are required.

13. To achieve flow rates in excess of 4,000 MCFD, restrictions caused by subsurface completion equipment must be minimised and low pressure, high volume flow metering equipment is required.

14. A negligible amount of free water, either condensed water of saturation, or formation water, was produced during the test.

2-63

DISCUSSION

1. Temporary Completion Method and Subsurface Equipment

During the course of drilling the well, the productive section (2,013 - 78' GB) was penetrated with a 12-1/4" bit and was subsequently cased with 9-5/8" OD casing. After plugging back the well and retrieving the 7" casing which had also been run, an interval from 2,040 - 45' was perforated with 10 Schlumberger casing jets.

A Halliburton test tool consisting of five feet of perforated tail pipe, a 9" type J-20 hookwall casing packer, a 3-7/8" hydrospring testing valve, a 3-7/8" closed-in pressure valve, and a combination 5/8" bottom hole choke and handling sub, was run. The flow string consisted of 4-1/4" OD, 2" ID drill collars and 2-7/8" OD, 10.4 lb/ft drill pipe. Two 0 - 3,000 psi Halliburton type BT subsurface pressure recorders were run, one at the bottom of the test tool to measure and record pressures outside the perforated tail pipe, and the second just above the packer to measure pressure inside the test tool. The bottom recorder was equipped with a 72-hr clock; the top with a 24-hr clock. In addition, an Otis drill pipe landing nipple, machined to accept a 2" type J Otis latch, was run above the test tool. During the fourth, fifth and sixth flow periods of the test, an Amerada RPG-3 pressure recorder with a range of 0 - 3,000 psi and a 36-hr clock was installed in the Otis landing nipple. At an intermediate point in the drill pipe, two Halliburton 4-3/8" volume compensated slip joints were run in order to accomodate vertical movement of the drilling ship.

For the particular conditions of testing a shallow, high productivity, low pressure gas zone, the test tools were not adequate. For example, at a flow rate of 3,990 MCFD, the pressure drop through the perforated tail pipe was a significant 16 psi. At the same flow rate, the pressure loss through the test tool itself was and additional 72 psi. To adequately test the zone, that is at a rate at least 24% of the open flow capacity, a flow rate up to 6,000 MCFD should have been employed. The bottom hole tool restrictions plus the lack of a suitable low pressure, high volume metering device, resulted in the maximum controllable flow rate being restricted to 3,990 MCF/D.

2. Surface Control, Separation and Metering Equipment:

Immediately at the top of the testing string, a swivel and control manifold was installed. The swivel incorporated a master valve and the control manifold incorporated high pressure shut-off valves, a positive and a variable choke. Throughout the test the choke was fully open (3/4" diameter). A laboratory precision (Martin Decker) pressure gauge was installed for the reading of wellhead pressures. The pressure readings are not included in this report since they have no significance whatsoever.

Between the wellhead control manifold, and the B S & B test unit located at the bow of the ship, a high pressure line fabricated of 2-7/8" EU tubing was installed. Prior to the commencement of testing, this flowline and its associated fittings, swivel joints and valves was hydrostatically tested to 7,500 psig.

The production test unit consisted of high and low pressure, two phase separators, automatic flow control device at the inlet of the first stage separator, positive displacement metering on the liquid outlet of the second stage separator, and orifice metering of the overhead gas streams on each stage of separation. A manual choke was also included, the flow from which could be directed to either stage of separation or be bypassed to the ship's flare system. The choke was used only for the initial clean-out flow period. For the remainder of the test, the inlet flow controller was used to enable the automatic maintenance of constant production rate. Surface choke size is therefore not relevant in reporting the well's productivity.

As a consequence of the absence of a liquid hydrocarbon phase in the produced gas, the second stage separator, effectively was not used. The first stage separator has a rated capacity of 28,000 MCFD at its maximum working pressure of 1,000 psig. Its gas metering capacity is however 22,000 MCFD. At the highest flow rate of the test, that is 4,590 MCFD, the separator pressure required reduction to 360 psig., thus reducing the gas metering capacity to 37% of its maximum value.

In the event that another developmental well was to be tested in the same field, and provided that the productivity was the same or higher, a different approach to metering would be advisable.

An adequate method would be to use a critical flow prover, mounted so that it discharges vertically at a maximum distance away from the wellhead. Since the constant flow rate testing method is advisable, a motor control valve, actuated by a pressure pilot, should still be used upstream of the critical flow prover. In such an installation, the pressure sensing line of the pressure pilot, is connected to the pressure tap of the critical flow prover. To eliminate restrictions described in Sec. (1) of this discussion , all bottom hole tools, other than the packer should be eliminated.

For the production testing of a shallow, low pressure dry gas zone, bottom hole pressure recorders are not necessary unless there are restrictions in the flow string. Surface readings, using a precision pressure gauge, and the application of friction pressure drop calculations will provide results just as accurate as those obtained with the Amerada type pressure recorders.

3. Glycol Injection for Hydrate Inhibition:

During the test, a small amount of glycol was injected upstream of the flow control vale, mainly as a precautionary measure. The lowest separator temperature was 38°F, at the fourth flow rate. The separator pressure at that time was 300 psig. The hydrate equilibrium temperature for a 0.57 SG hydrocarbon gas is 34°F.

4. Flow Metering and Calculations:

The flow rate of the gas from each stage of separation is measured using an orifice meter installed in accordance with the specifications of the A.G.A. Gas Measurement Committee Report No. 3. The only unusual features of the installations are the inclusion of straightening vanes in the meter runs and the use of bellows type rather than mercury type orifice meters. The straightening vanes are necessary since the length of the meter runs is restricted. The bellows type meters are now virtually a standard in North America; they are accepted as a legal basis for gas measurements.

The various factors of the A.G.A. Gas Measurement Committe Report No. 3 were used to calculate the flow rates, but with two exceptions. The first is that supercompressibility correction factors were obtained from the Texas Railroad Commission manual on the back pressure testing of natural gas wells. These are more convenient to use than the A.G.A. factors and cover a much wider range of composition, pressure and temperature conditions than the A.G.A. factors. The Kansas State Corporation Commission manual of back pressure tests provides the same supercompressibility compilations. Both the Kansas and the Texas compilations are based upon the Standing & Katz correlations of deviation factors for hydrocarbon gas mixtures. In the event that the gas stream being measured contains non-hydrocarbon components in appreciable quantities, additional corrections are necessary. Adjustment indices for hydrogen sulfide, carbon dioxide and nitrogen are appended to this report for further use. The second variation in the calculation of flow rates has to do with the use of square root charts.

The Barton bellows units which are the basic flow measuring device have interchangeable range springs. By changing the range springs, the differential range of the instrument can be changed to any of the following: 0 - 50" W.C., 0 - 100" W.C., 0 - 200" W.C., and 0 - 400" W.C. The latter were installed in the first stage separator orifice meter used for this test. Rather than to use a different chart for each range, one chart, calibrated from 0 to 10 on a square root scale is used. The square root of a proportional part of the differential pressure is therefore read directly but a chart factor must be included in the calculation. The chart factor is $(0.1)(R_h)^{.5}$ in which R_h is the range of the instrument in inches of water column.

The static pressure element range for the first stage flow recorder was 0 - 1,500 psig, and the recorder chart was calibrated from 0 - 150. For use of the pressure reading in the flow formula, it must first be converted to absolute by adding the barometric pressure and then by taking the square root of the total. This step was eliminated by zeroing the static pressure pen at the square root of the barometric pressure. The chart's square root scale can then be read directly to obtain a value which is proportional to the square root of the static pressure. As for the differential range discussed above, it is necessary to include a chart factor. The chart factor is $0.1(R_p)^{.5}$ in which R_p is the static range of the instrument.

In the flow rate calculations which are appended, a combined chart factor, the L-10 chart factor is used. It is a combination of the differential and the static factors, i.e.

$$F_{L-10} = 0.01\ (R_h \cdot R_p)^{0.5}$$

Included in the appendix are L-10 factors for the various possible combinations of static and differential ranges which can be used with the orifice meters on the test separator unit.

The use of the square root charts for both the static and differential pressure ranges has additional advantages to those already described. The flow rate is directly proportional to the chart readings, thus facilitating rate calculations. Where the differential pressure is fluctuating, accurate average rate calculations may easily be made by determining the average value from the chart directly. Note that if a linear scale was used this is not so since the flow rate is proportional to the average of the square root values of differential and static pressures <u>and not</u> proportional to the square root of the average values.

The flow rates were calculated for a pressure base of 14.65 psia (rounded off to 14.7). This was done to facilitate the reservoir calculations since most of the equations in respect to reservoir flow theory use constants based upon a pressure base of 14.7 psia.

In the flow rate calculations, Expansion Factors (Y) and Reynold's No. (F_r) factors are not used for the first stage of separation since for high pressure metering, and when accuracy is limited to four significant figures, they are equal to 1.000. In the case of the second stage metering, where the static pressure is a maximum of 100 psig., Expansion and Reynold's No. factors become significant but the supercompressibility factor (F_{pv}) reduces to 1.000.

An approximate field analysis of the gas was made by the Geoservices organisation. It was determined that the gas consisted approximately of 98.5% by volume methane and 1.5% carbon dioxide. For this composition, the specific gravity was calculated to be 0.57.

The flow rate calculations are summarised in Appendix II and one detailed calculation is made in Appendix III.

5. <u>Well Performance and Stabilisation</u>:

While the test was designed as a "Modified Isochronal" back pressure test, with one extended flow period to permit the positioning of the back presure curve to stabilisation, in effect each of the flow rates was for a sufficient period to obtain practical wellbore pressure stabilisation.

Unfortunately, flow rates were not as high as desirable in order to reduce the percentage of error in the bottom hole pressure readings. Errors can be, and were caused by such events as liquid slugs in the flow string, and vibration of the subsurface pressure recorders. The vibration of the recorders was caused primarily by the movement of the drilling ship and the consequent action of the slip joints. Normally, errors of several psi in the bottom hole pressure readings have little consequence in a back pressure interpretation. When the magnitude of the pressure drawdowns, is only a few psi, then the percentage errors can be 100 or more.

2-66

[redacted] There were instances during the te[redacted] when the flowing wellbor[redacted] pressures were actually higher th[redacted] shut-in values. During the sixth flow period, approximate[redacted] minutes after flow commenced, one slug of mud was produced. The volume of the slug was not quite sufficient to fill the first stage separator to its normal liquid operating level. The volume of the slug would therefore be about 3 barrels.

During the Modified Isochronal back pressure test of a low to medium permeability reservoir, it is normal for each succeeding shut-in pressure to be lower than the previous one. This was not the case in this test since, as described later, apparent stabilisation was attained in each of the flow periods and also the complete pressure build-up achieved before the termination of each shut-in period. The presence of liquids in the flow tubing caused "humping" in all pressure build-ups except the initial. Humping is due to the segregation of gas and liquids in the tubing subsequent to shut-in at surface. The rise of gas bubbles through the liquid increases the bottom hole pressure so much that liquid in the well will be forced back into the formation thus decreasing the bottom-hole pressure. The phenomenon appears only in wells with a packed off annulus, which have high permeability, and which are closed-in at surface. The explanation of humping is verified by the initial shut-in pressure readings in which no humping was observed; for this shut-in period the well was closed-in at the test tools.

In order to obtain a representative value of shut-in pressure (P_e), to be used in the back pressure calculations and plotting, it was necessary to calculate an average. This was done be calculating the average of the squared pressures. The calculation of the average shut-in pressure is included in Appendix III.

On the following page, two back pressure curves are shown; one based upon pressure readings from the top recorder and the second upon readings from the bottom recorder. Only the back pressure curve from the bottom recorder readings is considered accurate since there were significant pressure drops, increasing with rate, through the perforated tail pipe of the test tools. The bottom recorder reads external to the tail pipe and therefore its readings represent true wellbore pressure.

The back pressure curve extrapolates, at zero wellbore pressure, to a Log Q of 4.385. This is equivalent to an Absolute Open Flow Capacity of 24,270 MCFD. The points of intersection of the curve at Log flow rates of 4.00 and 3.00 are 5.435 and 3.955 respectively, or a difference of 1.480. This difference, divided into 1.00 gives an inverse slope of 0.675. By inserting values of Log Q, Log $(P_e^2 - P_w^2)$ and the inverse slope into the flow equation, the coefficient can be determined:

$$\text{Log } Q = \text{Log } C + n \text{ Log } (P_e^2 - P_w^2)$$

$$4.000 = \text{Log } C + (0.675)(5.435)$$

$$\text{Log } C = 0.330, \therefore C = 1.99$$

The conventional back pressure equation can now be represented by the following: (Where Q is in MCFD and pressures in psia)

$$Q = 1.99\,(P_e^2 - P_w^2)^{0.675}$$

Sufficient data is available from the test to be able write the unsteady state equation relating flow rate, wellbore pressures, reservoir fluid properties and reservoir parameters. In Appendix III the turbulence coefficient and the skin factor are calculated. By substituting these in the constant flow rate, radial flow, solution of the diffusivity equation, the following is obtained:

$$P_e^2 - P_w^2 = \frac{712\ u\ z\ T}{kh}(\ln t_D - 2.61)\ Q + 2.025\times10^{-3}\ Q^2$$

There is no certainty that true stabilisation was obtained hence it would be misleading to write the equation for quasi steady-state flow. The turbulence coefficient used in the equation above is dependent entirely on the slope of the back pressure curve; its calculation is included in Appendix III.

2-67

6. Formation Parameters and Stabilisation:

Methods for the determination of formation parameters from pressure build-up and pressure drawdown curves, are outlined in Appendix I - Theory. Calculations of permeability thickness, skin factor and radius of investigation are included in Appendix III and are based upon the curves of the following page.

There is fair alignment of the points of the pressure drawdown curve on the following page (labelled "sixth flow period"). A sharp break occurs in the curve at Log t = 1.80, equivalent to a flow time of 63 minutes. The feature of the curve following this point is unusual in that where an increase in the slope of the curve would normally be expected, the reverse actually took place. This change can be considered to be a result of alarge change in permeability thickness near the wellbore. Such changes can cause the pressure drop to arrest and become essentially constant. The effect of such reservoir heterogeneities are discussed in detail in the paper by Bixel, Larkin and van Poollen, "Effect of Linear Discontinuities on Pressure Build-Up and Drawdown Behavior".

The distance of the reservoir discontinuity from the well is calculated in Appendix III. The distance is estimated to be 104 feet. Had it been possible to continue the flow test for a much longer period, say 1,000 hours, it then would likely have been possible to determine the permeability thickness of the reservoir in the zone of increased permeability thickness and also to determine the true stabilised flow properties of the well.

From the flow rate, pressure drawdown data and assumed values of reservoir thickness and hydrocarbon porosity, the van Everdingen "Skin Factor" has been determined. The calculation is included in Appendix III. The Skin Factor calculates as - 1.71. Note that the negative value is indicative of an improved wellbore condition. This is likely the result of the effect of perforating in which the effective wellbore radius is increased.

An attempt was made to determine formation parameters from build-up data. The fifth shut-in period was selected for such interpretation. A build-up curve based on this flow period is included in the plot on the following page. It is considered that the build-up data is unreliable for two reasons. There are three reasons for this conclusion. The first is that the flow rates prior to shut-in were insufficient to establish pressure gradients within the reservoir of a sufficient level to overcome measuring deficiency of the Amerada recorders. The second is that the flow rates preceeding shut-in were of insufficient duration to offset the effects of "after Flow"; after flow effects which obscure early pressure build-up behavior can be offset by using the bottom-hole shut-in technique. The third is that the dropping of liquid within the well's flow string caused erroneous values of shut-in pressure to be recorded.

It was the intention in the test programme to achieve bottom-hole shut-in for each of the shut-in periods. The Halliburton service engineer objected however in that bottom-hole shut in required rotation of the drill pipe to the left and that there would be the attendant danger of backing-off the pipe or some of the tool connections. While this objection is a valid one, provided that all tool joints and connections are properly torqued, and that the Halliburton closed-in tool is properly maintained so that it will rotate freely, then the danger is negligible. This is particularly true where the well is shallow and the hole is cased.

2-68

B.O.C. OF AUSTRALIA LIMITED

SCHLUMBERGER FORMATION TEST

WELL: Golden Beach No.1A   Test No.: 1   Date: 17.7.67

Depth (IES): 8973   Hole Size: 8½"   Type of Tester: FTM-B

Choke size: 0.020   Sample Unit Size: 20,500 cc.

Mud: Type: Spersene/XP20   Weight: 10.1 lb/gal, Visc.: 46 Secs, W/L 4.0 ccs

Rmf: 0.95 @ 63 °F, Rw: 0.13 @ 210 °F.

OPERATION:	Total Time Mins. Secs.	Time/Operation Mins. Secs.	Pressure Record (psi)
Before Setting Tool	-	0	4880
Set Tool	0.00	0.00	
Shot Shaped Charge	Misfired		
Sampling	1.00	0.00	
	3.00	2.00	28
	9.00	8.00	80
	17.00	16.00	100
	23.00	22.00	100
Shut-in	24.00	1.00	3051
	25.00	2.00	3426
	27.00	4.00	3675
	29.00	6.00	3800
	31.00	8.00	3875
	32.00	9.00	3901
	33.00	10.00	3935
	34.00	11.00	3950
	35.00	12.00	3975
	36.00	13.00	3990
	37.00	14.00	4005
Collapsed Tool	37.00	14.00	4005
Freed Tool	37.45		4880

FLUIDS RECOVERED:

Water 3000 ccs   Resistivity 1.2 @ 62 °F

Oil - ccs   A P I Gravity ____ @ ____ °F

Gas 1.2 cu/ft.   Composition C_1 70-80%, C_2 10%, C_3 1.5, C_4 Nil

G O R -

INTERPRETATION:

Permeability: 0.12 md. Specific Productivity Index ________ bl/day/psi/ft.

CONCLUSION: Low permeability sandstone, which would produce water-free gas in small quantity.

Operator's Representative:

2-69

B.O.C. OF AUSTRALIA LIMITED

SCHLUMBERGER FORMATION TEST

WELL: Golden Beach No.1A   Test No.: 2   Date: 18.7.67

Depth (IES): 9105   Hole Size: 8½"   Type of Tester: FTM-B

Choke size: 4 x 0.020   Sample Unit Size: 20,000 cc

Mud: Type: Spersene/XP20   Weight: 10.1 lb/gal, Visc.: 46 Secs, W/L 4.0 ccs

Rmf: 0.95 @ 63 °F, Rw: 0.15 @ 213 °F.

OPERATION:	Total Time Mins. Secs.	Time/Operation Mins. Secs.	Pressure Record (psi)
Before Setting Tool	-	0	
Set Tool	0.00	0.00	
Sampling	1.40	0.00	36
	4.40	3.00	36
(fired shaped charge)	7.40	6.00	32
	14.40	13.00	32
	17.40	16.00	36
Shut-in	27.30	25.50	36
	28.30	1.00	48
Collapsed tool	34.15	6.45	48
Collapsed Tool			
Freed Tool			

FLUIDS RECOVERED:

Water 60 ccs   Resistivity 1.14 @ 54 °F

Oil ______ ccs   A P I Gravity ______ @ ______ °F

Gas ______ cu/ft.   Composition ______

G O R ______

INTERPRETATION:

Permeability: ______ md.   Specific Productivity Index ______ bl/day/psi/ft.

CONCLUSION: Sandstone very impermeable.

2-70

B.O.C. OF AUSTRALIA LIMITED

SCHLUMBERGER FORMATION TEST

WELL: Golden Beach No.1A Test No.: 3 Date: 19.7.67

Depth (IES): 8837 Hole Size: 8½" Type of Tester: FIT

Choke size: 4 x 0.020 Sample Unit Size: 20,500 cc

Mud: Type: Spersene/XP20 Weight: 10.1 lb/gal, Visc.: 46 Secs, W/L 9.7 ccs

Rmf: 0.95 @ 63 °F, Rw: 0.15 @ 210 °F.

OPERATION:	Total Time Mins. Secs.	Time/Operation Mins. Secs.	Pressure Record (psi)
Before Setting Tool	-	0	
Set Tool	0.00	0.00	
Sampling	0.00	0.00	381
	1.00	1.00	176
	2.00	2.00	164
	3.00	3.00	152
	4.00	4.00	140
	5.00	5.00	140
	39.10	39.10	132
Shut-in	40.00	0.90	3721
	41.00	1.90	3763
	42.00	2.90	3785
	43.00	3.90	3805
	44.00	4.90	3820
	45.00	5.90	3825
	46.00	6.90	3835
	47.00	7.90	3840
	48.00	8.90	3845
Collapsed Tool	48.20	9.10	4778
Freed Tool	48.20	9.10	

FLUIDS RECOVERED:

Water 8200 ccs Resistivity 1.39 @ 62 °F

Oil ccs A P I Gravity @ °F

Gas cu/ft. Composition

G O R

INTERPRETATION:

Permeability: 0.11 md. Specific Productivity Index .00034 bl/day/psi/ft.

CONCLUSION: Low permeability sandstone.

2-71

B.O.C. OF AUSTRALIA LIMITED

SCHLUMBERGER FORMATION TEST

WELL: Golden Beach No.1A Test No.: 4 Date: 19.7.67

Depth (IES): 8647 Hole Size: 8½" Type of Tester: FTM-B

Choke size: 4 x 0.020 Sample Unit Size: 20,500 cc

Mud: Type: Spersene/XP20 Weight: 10.1 lb/gal, Visc.: 46 Secs, W/L 4.0 ccs

Rmf: 0.95 @ 63 °F, Rw: 0.15 @ 208 °F.

OPERATION:	Total Time Mins. Secs.	Time/Operation Mins. Secs.	Pressure Record (psi)
Before Setting Tool	-	0	
Set Tool	0.00	0.00	
Sampling	0.00	0.00	
	1.00	1.00	1678
	2.00	1.00	1616
	24.00	24.00	1616
	25.00	25.00	1658
	26.00	26.00	1746
	27.00	27.00	2232
	28.00	28.00	3318
	29.00	29.00	3683
	30.00	30.00	3730
	31.00	31.00	3742
	32.00	32.00	3747
	33.00	33.00	3752
	37.00	37.00	3752
	38.00	38.00	3757
	39.10	39.10	3757
	40.00	0.90	3825
	45.00	5.90	3825
Collapsed Tool	45.00		3825
Freed Tool	48.50		4675

FLUIDS RECOVERED:

Water 19,000 ccs Resistivity 1.27 @ 63 °F

Oil Trace ccs A P I Gravity @ °F

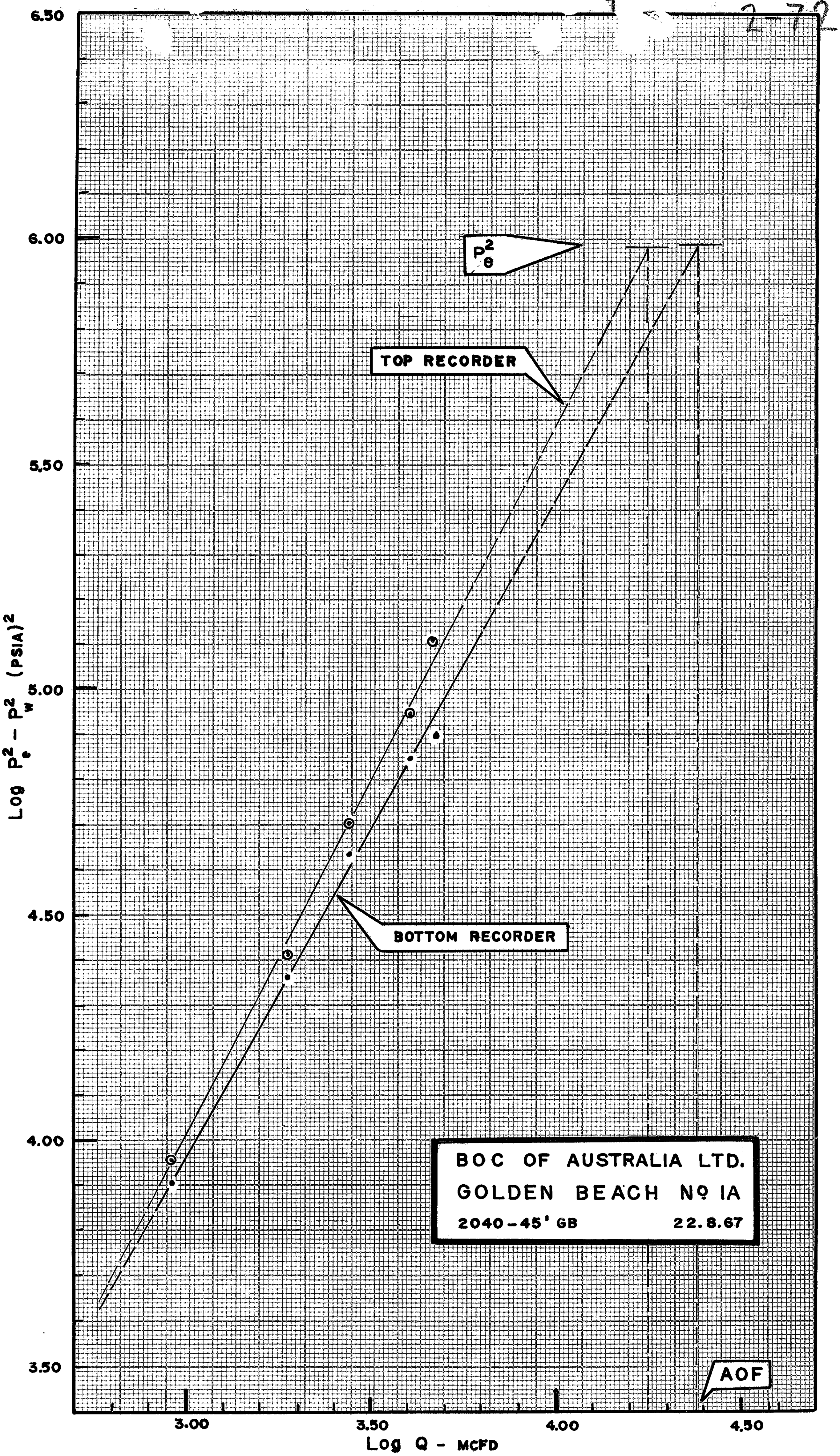
Gas cu/ft. Composition

G O R

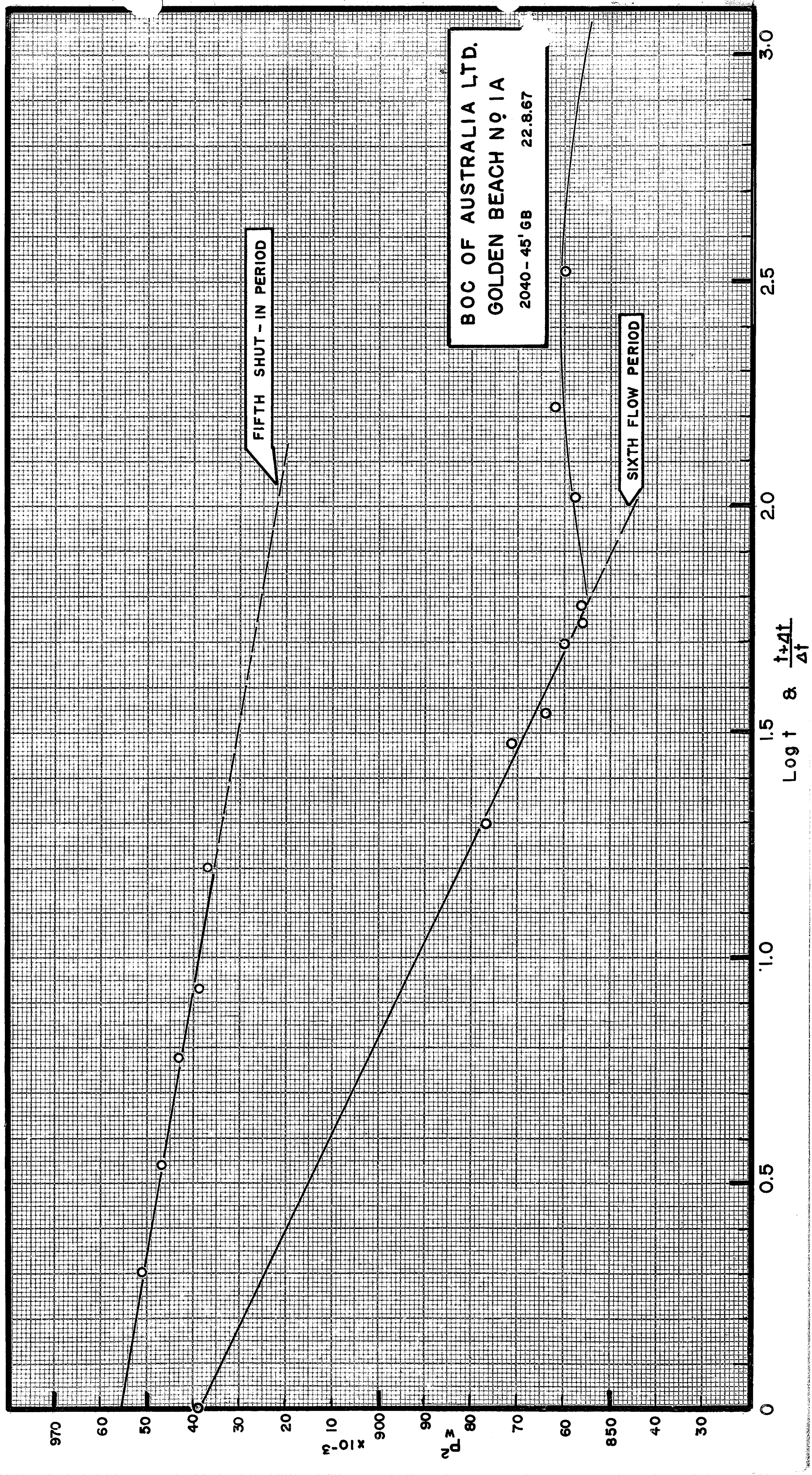
INTERPRETATION:

Permeability: 1.03 md. Specific Productivity Index 0.0037 bl/day/psi/ft.

CONCLUSION: Low permeability sandstone


Pe²
TOP RECORDER
BOTTOM RECORDER
AOF
BOC OF AUSTRALIA LTD.
GOLDEN BEACH Nº 1A
2040-45' GB
22.8.67
6.50
6.00
5.50
5.00
4.50
4.00
3.50
Log Pe² - Pw² (PSIA)²
3.00
3.50
4.00
4.50
Log Q - MCFD

2-73


BOC OF AUSTRALIA LTD.
GOLDEN BEACH No. 1A
2040-45'GB 22.8.67
FIFTH SHUT-IN PERIOD
SIXTH FLOW PERIOD
0
0.5
1.0
1.5
2.0
2.5
3.0
Log t & (t+Δt)/Δt
970
60
50
40
30
20
10
900
90
80
70
60
850
40
30
Pw² x10⁻³

2-74

APPENDICES

2-75

THEORY - APPENDIX I

1. UNSTEADY-STATE RADIAL FLOW:

For constant flow rate of a compressible fluid in a porous media, the diffusivity equation can be solved to yield the following:

$$p_e^2 - p_w^2 = \frac{712\,\bar{\mu}\,\bar{z}\,\bar{T}\,Q}{k\,h}\,(\ln t_D + 0.809 + 2S) + B\,Q^2 \ldots (1)$$

p_e = pressure at the external radius, psia,

p_w = pressure at the wellbore, psia,

$\bar{\mu}$ = average viscosity of flowing fluid, cp,

$\bar{z}$ = average compressibility of flowing fluid,

$\bar{T}$ = average flowing temperature, ^oR,

Q = flow rate, MCFD @ 14.7 psia, 60^oF,

k = formation permeability, md,

h = formation thickness, ft,

t_D = dimensionless time = $\dfrac{2.63 \cdot 10^{-4}\,k\,t\,\bar{p}}{\mu\,\phi\,r_w^2}$

t = time, from commencement of flow, hrs,

$\bar{p}$ = average pressure, psia,

ϕ = hydrocarbon porosity, fraction,

r_w = wellbore radius, ft.

S = Skin Factor, dimensionless, and

B = turbulence coefficient, $(psi/MCFD)^2$

2. STEADY STATE (QUASI) FLOW:

When the external radius reaches the reservoir boundary or interferes with the external radius of an adjacent well, the flow becomes quasi steady-state and is described by the following:

$$p_e^2 - p_w^2 = \frac{1424\,u\,z\,T\,Q}{k\,h}\left(\ln \frac{0.606\,r_e}{r_w} + S\right) + B\,Q^2 \ldots (2)$$

3. TURBULENCE (NON-DARCY) COEFFICIENT:

If the well is flowed at two or more rates, equation (1) can be plotted on log - log paper and the familiar "back pressure" curve is obtained ($p_e^2 - p_w^2$ is plotted vs Q).. By taking two selected values of Q and their respective $p_e^2 - p_w^2$ values, the turbulence coefficient can be calculated:

$$B = \frac{\dfrac{(p_e^2 - p_w^2)_1}{Q_1} - \dfrac{(p_e^2 - p_w^2)_2}{Q_2}}{Q_1 - Q_2} \ldots\ldots\ldots\ldots (3)$$

4. PERMEABILITY THICKNESS:

If $p_e^2 - p_w^2$ is plotted vs log t (or alternatively use semi-log paper), prior to the onset of boundary effects, a straight line will result having a slope, m:

$$k\,h = -\frac{712\,\bar{\mu}\,\bar{z}\,\bar{T}\,Q}{m} \ldots\ldots\ldots\ldots\ldots\ldots (4)$$

$$m = \frac{\text{change in } p_e^2 - p_w^2 \text{ per cycle}}{2.303}$$

2-76

Note: p_w^2 can be plotted instead of $p_e^2 - p_w^2$ since p_e is a constant.

5. SKIN FACTOR:

Once the turbulence coefficient and the permeability thickness have been determined, the Skin Factor can be calculated from the following:

$$S = \frac{k\ h}{1424\ \bar{\mu}\ \bar{z}\ \bar{T}\ Q} \left((p_e^2 - p_w^2) - B\ Q^2 \right) - \tfrac{1}{2} (\ln t_D + 0.809) \quad \ldots\ldots\ldots\ldots (5)$$

The drawdown $(p_e^2 - p_w^2)$ and the flow rate (Q) are taken from the test data at the time (t) used in the evaluation of the dimensionless time (t_D).

If the skin factor is positive, then the wellbore is damaged. If it is negative, then the wellbore condition is improved, such as would result from deep perforating or hydraulic fracturing.

The well's flow equation with the skin factor removed is obtained from equation (2) in which S is made equal to zero.

6. RADIUS OF INVESTIGATION (DURING UNSTEADY-STATE FLOW):

An exact external radius at any given time cannot be determined since any pressure disturbance at the wellbore is felt to at least a slight extent throughout the reservoir. Further, in a practical sense there will be variations in thickness, permeability and porosity throughout the drainage area, all of which will affect the true external radius.

An approximate drainage radius can be estimated, based upon the fact that behavior for a closed reservoir is applicable for an infinite reservoir until a dimensionless time about 0.1. After this, the pressure drop in the infinite reservoir is less than that for a closed reservoir.

Quasi steady-state flow will start in a closed radial reservoir at a dimensionless time of 0.3. Janicek and Katz propose a dimensionless time of 0.25 and Park Jones suggests 0.38. Based upon the Janicek and Katz value, the following can be used:

$$r_e = 2\ r_w\ (t_D)^{0.5} \quad \ldots\ldots\ldots\ldots\ldots\ldots (6)$$

7. PRESSURE BUILD-UP ANALYSES:

For pressure build-up of a well following a constant rate production period, for the case of an infinite reservoir or alternatively for a well in a closed reservoir where the flow period was insufficient to incur boundary effects, pressure build-up as a function of time can be expressed as:

$$p_e^2 - p_w^2 = \frac{712\ \bar{\mu}\ \bar{z}\ \bar{T}\ Q}{k\ h} \ln \frac{t + \Delta t}{\Delta t} \quad \ldots\ldots\ldots\ldots (7)$$

Δt = shut-in time, hrs.

By plotting p_w^2 vs $\ln \frac{t + \Delta t}{\Delta t}$ (or p_w^2 vs $\frac{t + \Delta t}{\Delta t}$ on semi-log graph paper), a straight line is obtained (that is following the "after flow" effects) which extrapolates at $\ln \frac{t + \Delta t}{\Delta t} = 1$ to p_e^2.

Note that p_e in equation (7) is actually p^*, the initial reservoir pressure. In finite reservoirs and in infinite reservoirs containing more than one well, p^* is less than the initial reservoir pressure and the difference is a reflection of depletion. Also, p^* is approximately equal to the average pressure in the drainage area around the well.

For the case of a well in a closed reservoir, p^* must be corrected to determine the initial reservoir pressure. Methods of Horner, and Muskat are outlined in "Theory and Practice of Testing Gas Wells", Oil and Gas Conservation Board, Province of Alberta.

Permeability Thickness (k h) can be determined from the slope of the build-up curve, by using equation (4).

Skin Factor can be evaluated from the following:

$$S = \frac{p_{ws}^2 - p_{wf}^2}{2\ m} - \frac{1}{2}(\ln t_D + 0.809) \qquad (8)$$

p_{ws} = shut-in pressure at $t = 1.0$ sec., psia.,

p_{wf} = final flowing pressure, psia.,

m = slope of build-up curve, $\frac{(\text{psia})^2 \text{ per cycle}}{2.303}$

t_D = dimensionless time evaluated at $t = 1.0$ seconds (1/3600 hrs)

Note that in using the above method, the shut-in pressure at $t = 1.0$ seconds cannot be read from a recorder's pressure chart due to "after flow" and recorder hysteresis effects. It is obtained by extrapolating the linear portion of the build-up curve back to the appropriate value of $\frac{t + \Delta t}{\Delta t}$.

The turbulence or non-Darcy coefficient cannot be obtained from a single build-up plot. Either two build-ups (following differing flow rates) or two flow periods are required.

8. RESERVOIR LIMITS, DRAINAGE AREA AND INITIAL GAS IN-PLACE:

The Park Jones "Y" function is defined as the rate of change of drawdown per reservoir barrel of production rate:

$$Y = \frac{1}{q} \frac{d(p_e^2 - p_w^2)}{dt} \qquad (9)$$

For the case of constant flow rate, radial unsteady state flow:

$Y = D/2t$

$D = 141\ u/kh = m/1.15q$

When viscosity u, permeability k, and thickness h are constant, a plot of log Y vs log t will yield a straight line with a slope of 45°.

2-78

Gas volumes measured in surface u[illegible]t be converted to reservoir barrels by application of the formation volume factor for compressible fluids:

$$B_g = \frac{1}{5.615} \cdot \frac{14.7}{\bar{p}} \cdot \frac{T}{520} \bar{z}$$

The distance to a boundary, r_b is given by:

$$r_b = 2 \, (t_D)^{0.5} \text{ ft}$$

where t_D is evaluated for the time required for the pressure transient to reach the boundary and as evidenced by a break in the drawdown curve.

The effective compressibility of the gas in the reservoir is evaluated by:

$$c_{ge} = \frac{c_g s_g + c_w s_w + c_f}{s_g}$$

The constant of fluid index (fluid available by expansion) is given by:

$$F = 1.119 \, c_{ge} \, \phi \, h$$

The explored pore volume, for a closed system under quasi steady-state flow conditions is given by:

$$V_p = 1/c_{ge} Y_s$$

The volume of gas in place is given by:

$$G = \frac{V_p s_g}{B_g} = \frac{s_g}{c_{ge} \, Y_s \, B_g} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (10)$$

<u>Definition of Symbols</u>:

$\bar{p}$ = average flowing pressure, psia
$\bar{z}$ = average compressibility factor
B_g = gas formation volume factor, res. bbls/MSCF
c_{ge} = effective gas compressibility $(1/\bar{p})$, psi^{-1}
s_g = initial gas saturation $(= 1 - s_w)$
F = reciprocal of total mobility
V_p = pore volume within reservoir, bbls
Y_s = Y factor at stabilisation
G = initial gas in place, MCF

To utilise the Park Jones method, the following tables are prepared:

TABLE 1

T hrs	p_w psia	Δt (n)-(n-1)	Δp_w (n-1)-(n)	$\frac{\Delta p_w}{\Delta t}$	$Y = \frac{\Delta p_w/\Delta t}{Q_g B_g}$

Plot p_w vs log t and log Y vs log t

TABLE 2

Barrier	Detection Time hrs	r_b ft.

2-79

TABLE 3

m - slope psi / cycle	Flow Barrier	m_1/m_i	Angle $\theta = 360\ m_1/m_i$
	1. Radial Flow	1.000	none
	2. First barrier		
	3. Second		
	4. Third		
	5. Steady State (inward curving)		

Reference is made to the original Park Jones paper, and a series of articles in World Oil (Oct. 1965 - Jan. 1966) on application of the Park Jones method in a number of practical cases.

2-80

APPENDIX II

FIELD DATA

Test No 8

1. GENERAL DATA:

Well: Golden Beach No. 1A Date: 22.8.67

Formation: Latrobe Valley Test Interval: 2040-45 Datum: Guide Base

Casing OD: 9-5/8 lb/ft 40 Perf. shots/ft: 2

Tbg/DP OD: 2-7/8 lb/ft 10.4 Length, ft: -

D.Collar OD: 4-1/4 I.D.: 2.0 Length, ft: -

Packers, No: 1 Make: Halco Type: J-20 OD: 9" Duro: 70

Bottom Recorder, Type: BT Range, psi: 0 - 3,000 Clock Hrs: 72

Top Recorder, Type: BT Range, psi: 0 - 3,000 Clock Hrs: 24

W.L. Recorder, Type: RPG3 Range, psi: 0 - 3,000 Clock Hrs: 36

Bottom Hole Choke, Size(s): 5/8"

Bottom Hole Thermometer, Type: Max. Recording Range, ^{o}F 350

Water Cushion No (Yes or No), Amount, ft: -

2. SEPARATOR AND FLOW MEASUREMENT DEVICE DATA:

FIRST STAGE:

Make: B. S. & B. O.D.: 30" Length: 7' 6"

WP, psig: 1,000 Rated Capacity, MCFD: 28,000 B/D: 1600

FCV/~~Choke~~, Make: Fisher Type: 667D Size: 3/4" x 2"

PCV, Make: Fisher Type: 657A Size: 1-1/2" x 2"

LCV, Make: B S & B Type: 70-23-1 Size: 1-1/2" x 1"

Meter Run ID: Upstream: 4.036" Downstream: 3.816" Taps: Flanged

SECOND STAGE:

Make: B. S. & B. O.D.: 30" Length: 7' 6"

WP, psig: 1,000 Rated Capacity, MCFD: 3,000 B/D: 3,000

Choke, Make: National Type: F-Adjustable Size: 2" x 3/4"

PCV, Make: B. S. & B. Type: 73-22-1 Size: -

LCV, Make: B. S. & B. Type: 70-55-2 Size: 2"

Oil Meter, Make: Floco Type: P.D.M. Size: 3""

Meter Run, I.D.: Upstream: 3.071" Downstream: 3.065" Taps: Flanged

INHIBITOR PUMP:

Make: Texsteam Model: MSM 5005 Single/Double Acting: S

Plunger Size: 1/2" Stroke Length: 2" Max. GPH: -

PRODUCTION TANKS:

Dimensions, I.D.: - Length or Height: -

Positioning (Horizontal or Vertical):

3. REMARKS AND SPECIAL DATA:

The first flow period was a clean-out period in which flow was passed through the open choke, thence to flare. Thereafter, the flow control valve was used. No measurable liquids, either water or hydrocarbons were produced. Based on field analysis of the gas, it was essentially methane, with a S.G. of 0.570 (Air = 1.0). The reservoir temperature was estimated to be 116^{o}F - the bottom hole max. recording thermometer was U/S.

2-81

Test No. 8

Well: Golden Beach No. 1A Date: 22.8.67

4. TIME RECORDS: (Use 24-hr Clock)

Clocks Started, Bottom: 0640 Top: 0630 W.L. -

Tools Started Into Hole: 0645 On Bottom: 0800 Set: 0844

Tools Pulled Loose: - At Surface: -

OPERATION	START	END	DURATION, mins.
Initial Flow	0846	0848	2
Initial Shut-In*	0848	0925	37
First Flow	0925	1026	61
First Shut-In	1026	1200	94
Second Flow	1200	1315	75
Second Shut-In	1315	1430	75
Third Flow	1430	1545	75
Third Shut-In	1545	1700	75
Fourth Flow	1700	1815	75
Fourth Shut-In	1815	1930	75
Fifth Flow	1930	2045	75
Fifth Shut-In	2045	2200	75
Sixth Flow	2200	0332	332
Sixth Shut-In	0332	0342	10

*Note: Initial Shut-in by closing test tool. Others by closing-in the well at surface.

5. FIRST STAGE FLOW RATE DATA & CALCULATIONS: (Basis 14.7 psia, $60^{o}F$)

$F = 0.024 \cdot F_b \cdot F_g \cdot F_{pv} \cdot F_{L-10}$ $\quad Q = F \cdot F_t \cdot h_w^{.5} \cdot p_f^{.5}$ MCFD

TIME	WELLHEAD psig	WELLHEAD ^{o}F	d in.	F	T_f ^{o}F	F_t	$h_w^{0.5}$	$p_f^{0.5}$	Q MCFD
1020	-	-	1.500	116.5	61	0.999	7.87	5.02	4,590
1314	-	-	0.500	12.7	48	1.012	7.40	4.60	438
1544	-	-	0.750	28.6	40	1.020	6.60	4.70	905
1814	-	-	1.000	51.1	38	1.022	7.75	4.60	1,860
2044	-	-	1.250	80.3	41	1.019	7.70	4.35	2,740
0331	-	-	1.500	116.5	54	1.006	7.48	4.55	3,990

2-82

Test No. 8

Well: Golden Beach No. 1A Date 22.8.67

6. BOTTOM HOLE PRESSURE RECORDS AND DATA FOR PLOTTING:

BOTTOM RECORDER: Halliburton BT, Set At: 1985' Datum: Guide Base

t min.	Δt min.	$\frac{t+\Delta t}{\Delta t}$ –	P_w psig	P_w psia	P_w^2 (psia)^2 (x10^{-3})	$P_e^2-P_w^2$ (psia)^2 (x10^{-3})	Q MCFD
Initial Shut-In			967	982	964	–	–
First Flow Period			932	947	897	77	4,590
First Shut-In Period			970	985	970	–	–
Second Flow Period			971	986	972	2	438
Sec. Shut-In Period			973	988	976	–	–
Third Flow Period			968	983	966	8	905
Third Shut-In Period			971	986	972	–	–
Fourth Flow Period			960	975	951	23	1,860
Fourth Shut-In Period			973	988	976	–	–
Fifth Flow Period			950	965	931	43	2,740
Fifth Shut-In Period			975	990	980	–	–
Sixth Flow Period			936	951	904	70	3,990
Sixth Shut-In Period			975	990	980	–	–

TOP RECORDER: Halliburton BT Set At: 1970' Datum: guide Base

Initial Shut-In Period							
0	0	–	900	915	837	–	–
5	–	–	963	978	956	–	–
10	–	–	964	979	958	–	–
First Flow Period			914	929	835	130	4,590
First Shut-In Period			965	980	960	–	–
Sec. Flow Period			967	982	964	1	438
Sec. Shut-In Period			968	983	966	–	–
Third Flow Period			963	978	956	9	905
Fourth Flow Period							
5	5	–	954	969	939	–	–
25	25	–	953	968	937	–	–
30	30	–	951	966	933	–	–
60	60	–	953	968	937	–	–
75	75	–	954	969	939	26	1,860

Date: 22.8.67

Well: Golden Beach No. 1A

Test No. 8

t min.	Δt min.	$\frac{t+\Delta t}{\Delta t}$ -	P_w psig	P_w psia	P_w^2 $(psia)^2$ $(x10^{-3})$	$P_e^2-P_w^2$ $(psia)^2$ $(x10^{-3})$	Q MCFD
Fourth Shut-In Period							
75	0	-	954	969	938	-	-
	5	16.0	966	981	962	-	-
	10	8.5	967	982	964	-	-
	15	6.0	969	984	968	-	-
	20	4.8	969	984	968	-	-
	25	4.0	969	984	968	-	-
	30	3.5	969	984	968	-	-
	35	3.1	970	985	970	-	-
	40	2.9	969	984	968	-	-
	75	2.0	969	984	968	-	-
Fifth Flow Period			941	956	914	51	2,740
Fifth Shut-In Period							
75	5	16.0	968	983	966	-	-
	10	8.5	969	984	968	-	-
	15	6.0	971	986	972	-	-
	30	3.5	973	988	976	-	-
	40	2.9	971	986	972	-	-
	75	2.0	969	984	968	-	-
Sixth Flow Period							
0	0	-	969	984	968	-	-
20	20	-	931	946	895	-	-
30	30	-	928	943	889	-	-
50	50	-	922	937	878	-	-
75	75	-	921	936	874	89	3,990
105	105	-	920	935	874	-	-
165	165	-	923	938	880	-	-
335	335	-	922	937	878	-	-
Sixth Shut-In Period			970	985	970	-	-

WIRELINE RECORDER*: Amerada RPG-3 Set At: 1870' Datum: Guide Base

Fourth Shut-In Period	964	-	-	-	-
Fifth Flow Period	880	-	-	-	-
Fifth Shut-In Period	965	-	-	-	-
Sixth Flow Period	810	-	-	-	-

* Note: Pressure readings from the wireline recorder are shown for comparative purposes only; they are not involved in the calculations or interpretations.

2-84

APPENDIX III

SAMPLE CALCULATIONS

1. Calculation of Fifth Flow Rate:

(a) Method: A.G.A. Gas Measurement Committee Report No. 3

(b) Basis: Pressure base = 14.7 psia; Temperature base = 60°F

(c) Measurement Devices:

(i) Orifice Meter: 4.036" upstream ID., Flanged Taps, Static pressure tap located downstream of orifice plate.

(ii) Static Element: Taylof helical bourdon spring, range from 0 to 1500 psig. Pressure recording pen zeroed at the square root of 14.7 psia.

(iii) Differential Element: Barton bellows unit, actuating a Taylor flow recorder/controller instrument. Range from 0 to 400" water column.

(iv) Chart Drive: Rockwell spring clock, 3 and 24-hr drives.

(v) Temperature: Taylor, mercury-in-glass thermometer with separable well and range 0 - 120°F in 1°F increments.

(vi) Recorder Chart: Taylor circular chart with 0 - 10 square root and 0 - 150 linear scales; time base 24-hrs.

(d) Data for Calculations:

ITEM	SYMBOL	VALUE	UNITS
Orifice Diameter	d	1.250	ins.
Basic Orifice Factor	F_b	319.2	$ft^3/hr.$
Gas Gravity (Air = 1.0)	G	0.570	-
Gas Gravity Factor	F_g	1.325	-
Flowing Temperature	t_f	41	°F
Flowing Temp. Factor	F_t	1.019	-
Supercompressibility Factor	F_{pv} *	1.027	-
L-10 Chart Factor**	F_{L-10}	7.747	-
Differential Reading***	$h_w^{0.5}$	7.70	-
Static Reading***	$p_f^{0.5}$	4.55	-

(e) Calculation of Flow Rate:(4)

$$Q = 0.024 \cdot F_b \cdot F_g \cdot F_t \cdot F_{pv} \cdot F_{L-10} \cdot (h_w)^{0.5} \cdot (p_f)^{0.5} \text{ MCFD}$$

$$= (0.024)(319.2)(1.325)(1.019)(1.027)(7.747)(7.70)(4.55) \text{ MCFD}$$

$$= \underline{\underline{2,740 \text{ MCFD}}}$$

Notes:

* The correlation of Standing & Katz, deviation factors for hydrocarbon gas mixtures, is used. These are published in convenient digital form by the Texas Railroad Commission, The Kansas State Corporation Commission, and the California Natural Gasoline Association. Note that F_{pv} is the square root of the reciprocal of the deviation factor (z).

** L-10 refers to the use of a chart having a scale from 0 - 10 as a square root scale regardless of the range of the instrument. The L-10 chart factor = $0.01 (R_h \cdot R_p)^{0.5}$ where R_h is the differential range of the instrument in ins. of water column and R_p is the static range in psi.

*** These values are read directly from the chart and are multiplied directly in the calculation of flow rate, without taking square roots.

4. Reynold's No. and Expansion Factors are equal to 1.000 for the metering conditions at hand.

2-85

2. Data for Plotting Isochronal Back-Pressure Curve:

(a) Shut-In Formation Pressure: (P_e)

Resulting from a combination of factors, including a comparatively high permeability in the producing interval, lower flow rates than desirable, and the probability of a small but significant amount of liquid retained within the flow tubing, shut-in bottom hole pressures were irregular. In order to obtain a reasonable alignment of the points on the back pressure curves, an arithmetic average of the squared shut-in pressures was used.

	Shut-In Pressure, P_e		P_e^2	
Shut-In Period	Bottom Recorder	Recorder	Bottom Recorder	Top Recorder
Initial	982	979	964	958
First	985	980	970	960
Second	988	983	976	966
Third	986	982	972	964
Fourth	988	984	976	968
Fifth	990	984	980	968
Sixth	990	985	980	970
TOTALS:			6,818	6,754
AVERAGES:			974	965

(b) Data for Plotting:

			Bottom Recorder				Top Recorder			
Flow Period	MCF/D	Log Q	P_e^2	P_w^2	$P_e^2-P_w^2$	Log J	P_e^2	P_w^2	$P_e^2-P_w^2$	Log J
1	4,590	3.662	974	897	77	4.886	965	835	130	5.114
2	438	2.641	974	972	2	3.301	965	964	1	3.000
3	905	2.957	974	966	8	3.903	965	956	9	3.954
4	1,860	3.270	974	951	23	4.362	965	939	26	4.415
5	2,740	3.438	974	931	43	4.633	965	914	51	4.708
6	3,990	3.601	974	904	70	4.845	965	876	89	4.949
S.I.	-	-	-	974	-	5.989	-	965	-	5.985

(c) Interpretation of Back Pressure Curve:

			Points of Intersection	
Recorder	Log Q_{AOF}	Q_{AOF}	Log Q = 4.000 Q = 10,000	Log Q = 3.000 Q = 1,000
Bottom	4.385	24,270	5.435	3.955
Top	4.250	17,790	5.600	4.010

3. Calculation of Turbulence (Non-Darcy) Coefficient:

Note: Refer to Equation (4) of APPENDIX I - THEORY:

$$Q_1 = 10,000 \qquad (P_e^2 - P_w^2)_1 = \text{Log}^{-1} 5.435 = 272,300$$

$$Q_2 = 1,000 \qquad (P_e^2 - P_w^2)_2 = \text{Log}^{-1} 3.955 = 9,020$$

$$B = \frac{\dfrac{272,300}{10,000} - \dfrac{9,020}{1,000}}{10,000 - 1,000} = \frac{27.23 - 9.02}{9,000} = 2.025 \times 10^{-3}$$

2-86

4. Calc[...]tion of Permeability-Thickness (kh):

Refer to Equation (4) of APPENDIX I - THEORY.

Method: Use slope of sixth flow rate drawdown curve. The pressure^2 over two log cycles, that is from log t values 0 to 2.0, decrease from 938,000 to 845,000.

m = - (938,000 - 845,000)/(2)(2.303) = - 20,150

T = Reservoir Temperature, ^oR = 460 + 116 = 576^oR

T_c = Critical Temperature for 0.57 S.G. Gas = 346^oR
(Refer to correlation provided by the Texas Railroad Commission or the Kansas State Corporation Commission, also for P_c listed below)

T_r = Reduced Temperature, = T/T_c = 576/346 = 1.67

P_e^2 = External Boundary Pressure^2 (psia)^2 = 965,000

$P_{w_i}^2$ = Initial Flowing Pressure^2 (psia)^2 = 938,000

$P_{w_f}^2$ = Final Flowing Pressure^2 (psia)^2 = 845,000

$\bar{P}_w^2$ = Average Flowing Pressure^2 (psia)^2 = 892,000

$\bar{P}^2$ = Average Pressure^2 in Flow Area(psia)^2 = 929,000

$\bar{P}$ = Average Pressure in Flow Area, psia = 964 psia

P_c = Critical Pressure for 0.57 S.G. Gas = 672 psia

P_r = Reduced Pressure, = P/P_c = 964/672 = 1.43

M = Mol Wt of Gas = 29.0(S.G.) = (29.0)(0.57) = 16.5

μ = Gas Viscosity, cp = 0.0115 cp
(Refer to correlation of Carr, Kobayashi & Borrows)

μ/μ_1 = Gas Viscosity Correction Ratio = 1.10
(Refer to correlation of Carr, Kobayashi & Burrows)

$\bar{\mu}$ = Gas Viscosity under reservoir conditions
= (0.0115)(1.10) = 0.0127

$\bar{z}$ = average gas deviation factor = 0.840
(Refer to correlation of Standing & Katz)

Q = Flow Rate, MCF/D = 3,990

$$k\,h = -\frac{712\,\bar{\mu}\,\bar{z}\,\bar{T}\,Q}{m} = \frac{(712)(0.0127)(0.840)(576)(3,990)}{20,150}$$

= 867 md-ft.

Check Calculation: Using slope of Fifth Shut-In Period build-up curve. The pressure^2 over two log cycles, that is dimensionless time from 2.0 to 0, increased from 922,000 psia^2 to 955,000 psia^2.

m = (955,000 - 922,000)/(2)(2.303) = 7,160

Q = 2,740 MCF/D

$$k\,h = \frac{(712)(0.0127)(0.840)(576)(2,740)}{7,160} = 1,670 \text{ md-ft.}$$

Note: The pressure in the build-up area does not change sufficiently to give changed values of the average viscosity and deviation factor.

2-87

5. Calculation of Skin Factor (S):

Refer to Equation (5) of APPENDIX I - THEORY.

$$S = \frac{1}{2m}\left((P_e^2 - P_w^2) - B Q^2\right) - \tfrac{1}{2}(\ln t_D + 0.809)$$

m = 20,150 (Refer to 4.0 of this Appendix)

P_e^2 = 965,000 psia^2 (top pressure recorder, average value)

P_w^2 = 845,000 psia^2 (read from drawdown curve @ Log t = 2.0)

$B = 2.025 \times 10^{-3}$ (Refer to 3.0 of this Appendix)

$Q^2 = (3,990)^2 = 15.9 \times 10^6$ (sixth constant flow rate)

$$t_D = \frac{2.63 \times 10^{-4}\, k\, t\, \bar{p}}{\mu\, \phi\, r_w^2}$$

Assume that: $h = 60$ ft., therefore $k = \frac{867}{60} = 14.5$ md.
$\phi = 0.28$ (net hydrocarbon porosity)

$\bar{p}$ = 964 psia (Refer to 4.0 of this Appendix)

$\bar{\mu}$ = 0.0127 cp (Refer to 4.0 of this Appendix)

$$r_w^2 = \frac{(12.25)^2}{(4)(12)^2} = 0.26 \text{ ft}^2$$

$t = \text{Log}^{-1}\, 2.0 = 100$ mins (Refer to drawdown curve) (4.17 hrs)

$$t_D = \frac{(2.63)(10^{-4})(14.5)(4.17)(964)}{(0.0127)(0.28)(0.26)} = 1.66 \times 10^4$$

$$\ln t_D = 2.303 \log t_D = (2.303)(4.219) = 9.72$$

$$S = \frac{1}{(2)(20,150)}\left((965,000 - 845,000) - (2.025)(10^{-3})(15.9)(10^6)\right) - 0.5(9.72)$$

$$= -1.71$$

6. Radius of Investigation:

During the sixth flow period, a prominent reservoir discontinuity was traversed by the pressure transient. The effect is most marked on the pressure drawdown curve and was evident at log t = 1.80 or a time of flow of 63 minutes.

The distance of the discontinuity from the wellbore is estimated by using equation (6) presented in APPENDIX I - THEORY.

$$r_e = 2\, r_w\, (t_D)^{0.5}$$

$$t_D = \frac{(2.63)(10^{-4})(14.5)(63)(964)}{(0.0127)(0.28)(0.26)(24)} = 1.04 \times 10^4$$

$$(t_D)^{0.5} = (25.0 \times 10^4)^{0.5} = 102$$

$$r_e = (2)(0.51)(500) = 104 \text{ ft.}$$

2-88

APPENDIX IV

SUPPLEMENTARY METERING DATA

L-10 CHART FACTORS - F_{L-10}

Pressure Range psia	Differential Range - Inches of Water Column				Static Pen Setting *
	50	100	200	400	
100	0.7071	1.000	1.414	2.000	3.80
150	0.8660	1.225	1.732	2.450	3.10
1000	2.236	3.162	4.472	6.326	1.20
1500	2.739	3.873	5.477	7.747	0.98

* Note: These are the zero gauge pressure settings of the static pressure pen on the square root scale.

PSEUDOCRITICAL PROPERTY ADJUSTMENTS*
FOR NON-HYDROCARBON COMPONENTS

Vol. % In Gas	H_2S		CO_2		N_2	
	P_{cr}	T_{cr}	P_{cr}	T_{cr}	P_{cr}	T_{cr}
1			+ 6	- 2	- 2	- 4
2			10	4	4	7
3			15	6	6	10
4			19	8	8	13
5	+ 8	- 5	23	10	10	16
6			+ 27	- 11	- 11	- 18
7			32	13	13	21
8			37	15	15	23
9			42	16	16	26
10	+ 19	- 6	46	18	18	29
11			+ 50	- 20	- 20	- 32
12			55	21	21	34
13			59	23	23	37
14			63	25	25	40
15	+ 37	- 5	68	26	26	43
16			+ 72	- 28	- 28	- 45
17			78	30	30	48
18			81	31	31	51
19			85	33	33	53
20	+ 57	- 2	90	35	35	56
21			+ 94	- 36	- 36	- 59
23			102	40	40	64
25	+ 83	+ 2	111	43	43	70
27			+ 119	- 46	- 46	- 75
29			128	50	50	80
30	+ 110	+ 6	132	51	51	83
32			+ 141	- 55	- 55	- 89
34			149	58	58	94
35	+ 141	+ 13				
36			158	61	61	100
40	+ 176	+ 20				
45	+ 211	+ 31				
50	+ 253	+ 43				

2-89

B O C OF AUSTRALIA LTD.

GOLDEN BEACH NO. 1A

Report

on the

Production Testing of
Miscellaneous Sands

Chas. R. Hetherington
& Associates Pty. Ltd.

September 1967

2-90

TABLE OF CONTENTS

2-91

INTRODUCTION

Golden Beach No. 1A was drilled as an exploration well in the Bass Straight offshore area of Victoria. By the third week of July, 1967, the well had completed drilling at a depth in excess of 9,000 ft.

Casing of 7" OD was run to a point near total depth in order to test four prospective zones. The intervals listed below were perforated, tested and successively plugged:

9102 - 07 ft
8968 - 73 ft
8808 - 38 ft
8632 - 80 ft

This report covers the production testing of the intervals listed, and includes the interpretation of some of the formation parameters.

ABSTRACT

Each zone of interest was perforated and tested separately, and at the conclusion of each test was plugged back by running a bridge plug on the Schlumberger electric wireline.

Testing was accomplished by running a conventional test tool string in conjunction with a hookwall packer. Subsurface wellbore pressures were measured with Amerada-type pressure recorders.

The first and second intervals tested yielded small but immeasurable quantities of hydrocarbon gas as well as mud and water; it cannot be ascertained from the test results whether the produced water was representative reservoir fluid or if it was mud or cement filtrate. The third interval listed above was tested twice and the fourth interval was given three tests, two of which were swab tests. The swab tests are not covered by this report.

None of the zones were found to be productive of hydrocarbons. Even if hydrocarbons had been present, non of the zones tested displayed sufficient permeability thickness in order to make them economic.

The table below is a summary of the test results.

TEST NO.	INTERVAL -	RECOVERY -	FLOW PERIOD mins	SHUT-IN PERIOD mins	PERMEABILITY THICKNESS md-ft	DAMAGE RATIO -
1	9102-07	Gas, Mud	162	155	-	-
2	8868-73	Gas, Mud Water	204	391	0.46	0.29
3	8808-38	Gas, Mud Water	220	379	0.60	0.42
4	8808-38	Gas, Mud Water	624	180	0.59	0.53
5	8632-80	Mud, Water	99	66	29.2	1.41

The hydrostatic pressure gradients, calculated by the extrapolated build-up pressures and the recorder depths, below sea level, ranged from 0.435 psi/foot for the interval 8968-73, to 0.421 psi/foot for the interval 8632-80.

REFERENCES

1. Dolan, J. P., Einarsen, C.A., & Hill, G. A., "Special Applications of Drill-Stem Test Pressure Data", Trans. A.I.M.E. T.P. 4667, May, 1957.

2. Matthews, C.S., and Russel, D. G., "Pressure Build-Up and Flow Tests in Wells", Society of Petroleum Engineers of AIME, (1967).

TEST PROCEDURE

The following procedure was programmed in order to determine the productivity index of liquid-producing zones, and to determine the formation parameters. The extended flow periods were programmed so that stabilised flow characteristics of the zones could be predicted, and if possible, to detect reservoir limits and discontinuities.

1. Flow the well initially for 1 to 3 minutes and follow with a bottom-hole shut-in from 10 to 30 minutes. This is required to determine the virgin reservoir pressure (P_e).

2. Open the well and flow at a maximum rate, that is with the surface choke fully open. Continue to flow until the wellstream isreasonably clean. Shut-in for a period equal to the flow period. This step is required for the rapid clean-up of the well.

3. Open the well and flow at a rate from 20 to 25% of the maximum. Flow at a constant rate for a period of 1 hour. This step enables the calculation of the productivity index.

4. Increase the flow rate to 40 - 50% of the maximum and continue the flow for 36 hours or until weather conditions require the cessation of testing.

5. Shut-in the well for a period equal to the second or final flow period.

CONCLUSIONS & RECOMMENDATIONS

1. Permeability-Thickness for each of the zones covered by this test report are as follows:

TEST NO. -	INTERVAL ft	k h md.ft.
1	9102 - 07	-
2	8968 - 73	0.46
3	8808 - 38	0.60
4	8808 - 38	0.59
5	8632 - 80	29.2

2. Damage Ratio for each of the zones covered in this test report are as follows:

TEST NO. -	INTERVAL ft	D.R. -
1	9102 - 07	-
2	8968 - 73	0.29
3	8808 - 38	0.42
4	8808 - 38	0.53
5	8632 - 80	1.41

3. Each of the zones tested, other than the first, produced water from the drainage area.

4. Tests 6 and 7 which are not considered in this report, were swab tests of the interval 8632 - 80. The substantial amount of water recovered, coupled with the fact that the resistivity of the water was relatively constant, would suggest that formation water rather than mud or cement filtrate was produced.

5. None of the zones, even if hydrocarbon bearing could be considered economic. Even the fifth zone for example, has insufficient permeability thickness to warrant stimulation.

6. The results indicate that all the zones perforated were adequately tested.

DISCUSSION

1. Temporary Completion Method and Subsurface Equipment:

For all the zones considered in this report, 8-3/4" hole was drilled and 7" OD production casing was run. Each zone was perforated with Schlumberger casing jets at a shot density of 2 per ft.

For each of the tests, a Halliburton test tool, consisting of five feet of perforated tail pipe, a $6\frac{1}{2}$" RTTS packer, a 3-7/8" hydrospring testing valve, a 3-7/8" dual closed-in pressure valve, and a combination 5/8" bottom hole choke and handling sub, was used. The production string consisted of $4\frac{1}{4}$" OD drill collars and 2-7/8", 10.4 lb/ft drill pipe. Two 0 - 10,000 psi Halliburton type BT subsurface recorders were included, one at the bottom of the tail pipe to measure and record pressures outside the perforated tail pipe, and the second just above the packer, measuring pressures inside the test tool. In all cases, the bottom recorder was equipped with a 72-hr clock, and the top with a 24-hr clock. An Otis type "J" drill pipe landing nipple was located 55 ft above the packer in all of the tests. Two volume compensated slip joints were used at an intermediate point in the drill pipe in order to accomodate vertical movement of the drilling ship. During each of the tests, an Amerada RPG-3 pressure recorder was run on wireline and set in the Otis "J" nipple. In one of the tests (Test No. 3), the Halliburton closed-in pressure valve failed to function. Shut-In was achieved by running an Otis "DJ" plug, immediately above the Amerada recorder, and setting it in the Otis "J" nipple.

2. Surface Control, Separation and Metering Equipment:

Immediately at the top of the testing string, a swivel and control manifold was installed. The swivel incorporated a master valve. The control manifold incorporated high pressure shut-off valves, a positive choke and a variable choke. Throughout all of the tests, the choke was fully open. A laboratory precision (Martin Decker) pressure gauge was installed to enable reading of wellhead pressure.

A high pressure flowline was used to connect the testing manifold to a two-stage test separator. The separator unit incorporated facilities for the metering of each of the overhead gas streams, plus a positive displacement meter for measuring liquid flow rates. In none of the tests was fluid obtained to surface, nor were gas flow rates sufficient to measure. Liquid volumes were therefore calculated by measuring the amount of rise in the drill collars and drill pipe and converting to barrels by the factor 0.00389 bbls/ft.

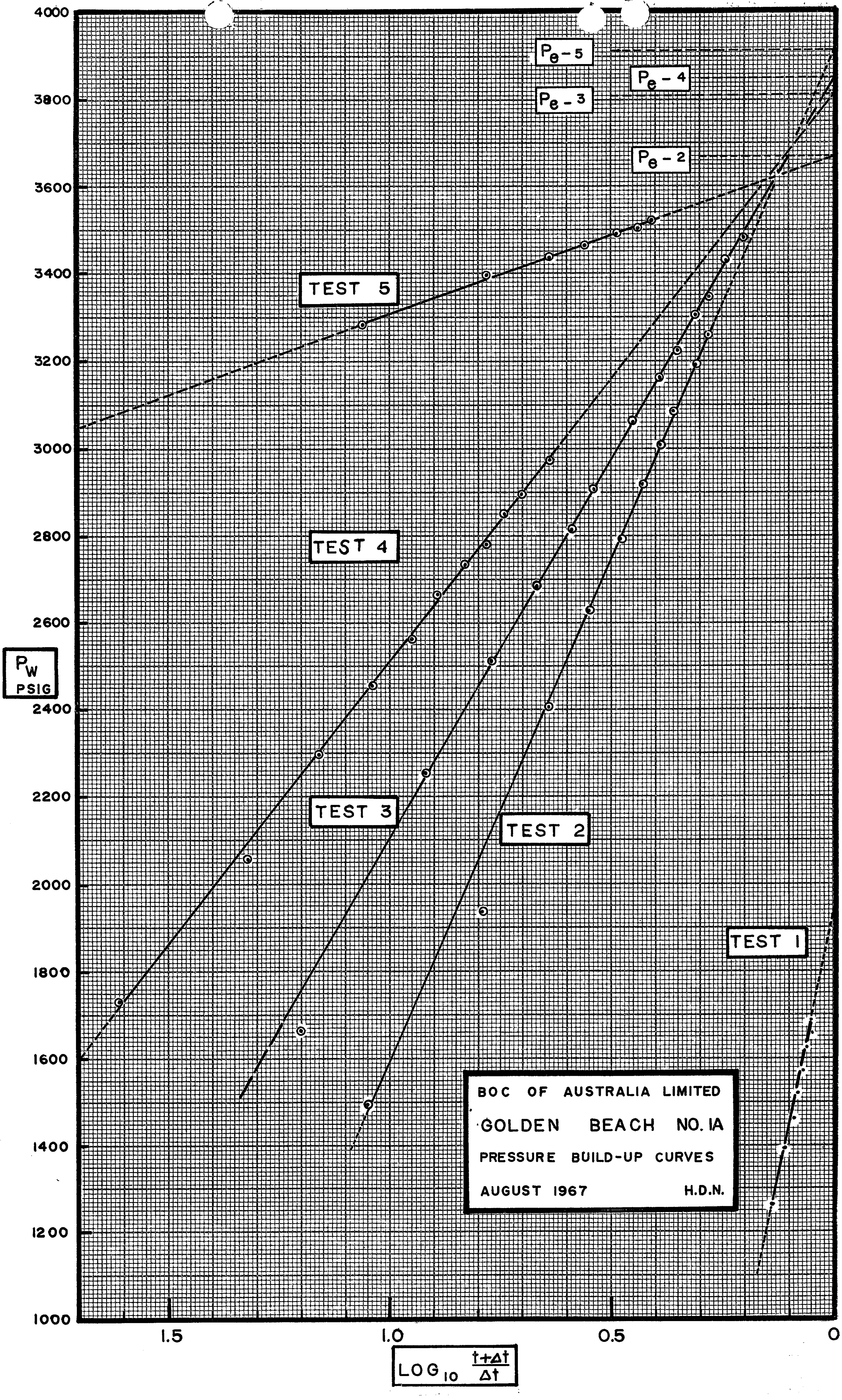
3. Formation Flow Properties and Stabilisation:

The testing programme was designed so that zones producing liquids would be produced at two constant rates; the first for the determination of productivity index, and the second for a more lengthy period in order to detect possible reservoir boundaries or other heterogeneities. In none of the intervals tested, was there sufficient productivity to lift reservoir fluid to surface and to enable the establishment of consntant rate flow conditions.

It was not possible to determine the unsteady-state flow equation parameters for any of the four zones tested. It was not possible either, to determine permeability-thickness from a constant flow rate drawdown peridfor any of the tests.

For all of the zones tested, other than the first, the permeability-thickness was determined by the build-up method. Pressure build-up curves are shown in the plot on the following page. Equation (3), in conjunction with the measured slopes of the curves was used. The flow rate used in the calculations was the average, determined by taking the total production during the flow period, extrapolated to 24 hours.

2-95


4000
3800
3600
3400
3200
3000
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
Pe - 5
Pe - 4
Pe - 3
Pe - 2
TEST 5
TEST 4
TEST 3
TEST 2
TEST 1
PW PSIG
1.5
1.0
0.5
0
LOG10 t+Δt / Δt
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GOLDEN BEACH NO. 1A
PRESSURE BUILD-UP CURVES
AUGUST 1967
H.D.N.

2-96

The formation tested in Test No. 1 displayed insufficient flow capacity to make any interpretations meaningful.

Skin Factors were not calculated by the normal methods since the pressure build-up periods were not preceeded by constant rate flow periods. Instead, empirical Damage Factors were calculated, using the methods outlined in Appendix I.

For Tests 2 to 4 inclusive, it was assumed that the reservoir fluid was water. The zones were within a limited depth range, and it was assumed that the formation temperature for all the tests was 220°F. At this temperature water has a viscosity of 0.25 cp.

The following are the summarised results:

PERMEABILITY-THICKNESS

TEST NO. -	INTERVAL ft	k h md-ft
2	8968 - 73	0.46
3	8808 - 38	0.60
4	8808 - 38	0.59
5	8632 - 80	29.2

DAMAGE RATIO

TEST NO. -	INTERVAL ft	DR -
2	8868 - 73	0.29
3	8808 - 38	0.42
4	8808 - 38	0.53
5	8632 - 80	1.41

Test No. 4 was a re-test of the same interval as was tested in Test No. 3. Interpretation of the build-up curves gave permeability-thickness interpretations which were almost identical. A difference showed however in the damage ratio calculations. The uncertainty in the damage ratio calculation is the representative flow rate, and a representative flow pressure. Arithmetic averages which were used in each case are not a rigorous approach but are valid only if the drawdown of pressure is of low magnitude.

For tests 2 - 4 inclusive, an insignificant damage ratio was determined. Damage ratios of less than 1.0 are indicative of the absence of formation damage. Only a slight amount of damage was evident in the zone tested in Test No. 5.

2-97

APPENDIX I

THEORY

1. UNSTEADY-STATE RADIAL FLOW:

For constant flow rate of a slightly compressible fluid in a porous media, the diffusivity equation can be solved to yield the following:

$$P_e - P_w = \frac{70.5 \mu q}{k h} (\ln t_D + 0.809) \ldots\ldots\ldots\ldots (1)$$

P_e = pressure at the external radius, psia,
P_w = pressure at the wellbore, psia,
μ = viscosity of the flowing fluid, cp,
q = flow rate, reservoir barrels per day
k = formation permeability, md,
h = formation thickness, ft,
t_D = dimensionless time = $\frac{2.634 \times 10^{-4} k t}{u c \phi r_w^2}$
t = time, from commencement of flow, hrs,
c = compressibility of fluid, bbl/bbl/psia
ϕ = hydrocarbon porosity, fraction.

2. QUASI STEADY-STATE RADIAL FLOW:

When the external radius reaches the reservoir boundary or interferes with the external radius of an adjacent well, the flow becomes quasi steady-state and can be described by the following:

$$P_e - P_w = \frac{141 u q}{k h} (\ln \frac{0.606 r_e}{r_w}) \ldots\ldots\ldots\ldots (2)$$

3. PERMEABILITY THICKNESS (k h):

If the pressure drawdown, J, ($P_e - P_w$) is plotted vs log t (or alternatively using semi-log graph paper), prior to the onset of boundary effects, a straight line will result having a slope, m:

$$k h = \frac{70.5 \mu q}{m} \ldots\ldots\ldots\ldots (3)$$

$$m = \frac{\text{change in } P_e - P_w \text{ per cycle}}{2.303}$$

Note that p_w can be plotted instead of $P_e - P_w$ since P_e is a constant.

4. SKIN FACTOR:

Equations (1) and (2) above are based upon the assumption formation properties are homogenious throughout the drainage radius, including that portion of the formation immediately adjacent to the well bore. Where the formation has been blocked or damaged, an additional pressure drop results and it is necessary to modify equations (1) and (2) by including a "Skin Factor" in the equation. In each case, the term 2S is added inside the brackets. The Skin Factor may be determined by rearrangement of equation (1) as follows:

$$S = \frac{P_e - P_w}{2m} - \frac{1}{2} (\ln t_D + 0.809) \ldots\ldots\ldots (4)$$

The drawdown $(P_e - P_w)$ and the flow rate (q) are taken from the test data at the time (t) used in the calculation of dimensionless time, (t_D).

If the skin factor is positive, then the wellbore is damaged. If it is negative, then the wellbore condition is improved; such as would result from deep perforating or hydraulic fracturing.

5. RADIUS OF INVESTIGATION (DURING UNSTEADY-STATE FLOW):

An exact external radius at any given time cannot be determined since any pressure disturbance at the wellbore is felt to at least a slight extent throughout the reservoir. Further, in a practical sense, there will be variations in thickness, permeability and porosity throughout the drainage area, all of which will affect the true external radius.

An approximate radius of drainage can ne estimated, based upon the fact that behavior for a closed reservoir is applicable for an infinite reservoir until a dimensionless time about 0.1. After this, the pressure drop in the infinite reservoir is less than that for a closed reservoir.

Quasi steady-state flow will start in a closed radial reservoir at a dimensionless time of 0.3. Janicek and Katz propose a dimensionless time of 0.25 and Park Jones suggests 0.38. Based upon the Janicek and Katz value, the following can be used:

$$r_e = 2\, r_w\, (t_D)^{0.5} \quad \ldots\ldots\ldots\ldots\ldots\ldots (5)$$

6. PRODUCTIVITY INDEX:

Productivity Index is defined as the production rate per unit of pressure drawdown; that is barrels per day per psi. During the period of unsteady-state flow, it is given by:

$$PI = \frac{q}{P_e - P_w} = \frac{k\,h}{141\,\mu\,(\ln t_D + 0.809 + 2S)} \quad \ldots (6)$$

During a period of quasi steady-state flow, it is given by:

$$PI = \frac{q}{P_e - P_w} = \frac{k\,h}{141\,\mu\,(\ln 0.606\, r_e/r_w)} \quad \ldots\ldots (7)$$

7. DAMAGE RATIO:

Damage ratio is defined as the productivity index with skin factor equal to zero, divided by the actual productivity index:

$$DR = \frac{P_e - P_{wf}}{(P_e - P_{wf}) - \Delta P_{skin}}$$

P_{wf} = flowing wellbore pressure, psia, and

ΔP_s = additional pressure drop due to skin effect.

The pressure drop due to skin effect is equal to 2S (m), where m is the slope of the build-up or drawdown curve, psia per cycle divided by 2.303. The equation for Damage Ratio then becomes:

$$DR = \frac{P_e - P_{wf}}{(P_e - P_{wf}) - 2\,S\,m} \quad \ldots\ldots\ldots\ldots (8)$$

Note that the productivity index is not a constant until steady-state flow conditions are established. Equation (7) then is the only one strictly applicable. Note als, that the true damage ratio can be calculated only for the drawdown ($P_e - P_w$) which exists at stabilisation or steady-state conditions.

For drillstem test interpretations, where limited data only is usually available, the determination of damage ratio is simplified. A formation parameter called "Transmissibility" is defined as: $(k\ h)/\mu$ md. ft. To convert this into units of barrels per day per psi, multiply by the factor 1.125×10^{-3}. Transmissibility is then equivalent to a theoretical or "inherent" productivity index.

Damage ratio is defined as the ratio of the theoretical productivity index divided by the actual:

$$DR = \frac{1.125 \times 10^{-3}\ (k\ h)\ /\ \mu}{q\ /\ (P_e - P_{wf})}$$

This can be simplified by substituting $70.5/m$ for $(k\ h)/q\ u$, and simplified to give:

$$DR = \frac{0.0794\ (P_e - P_{wf})}{m} \quad \ldots\ldots\ldots\ldots\ldots (9)$$

8. <u>PRESSURE BUILD-UP ANALYSES</u>:

For pressure build-up of a well following a constant rate production period, for the case of an infinite reservoir or alternatively for a well in a closed reservoir where the flow period was insufficient to incur boundary effects, pressure build-up as a function of time can be expressed by:

$$P_e - P_w = \frac{70.5\ \mu\ q}{k\ h} \ln \frac{t + \Delta t}{\Delta t} \quad \ldots\ldots\ldots\ldots\ldots (10)$$

$$t = \text{shut-in time, hrs.}$$

By plotting P_w vs $\ln \frac{t + \Delta t}{\Delta t}$ (or p_w vs $\frac{t + \Delta t}{\Delta t}$ on semi-log graph paper), a straight line is obtained, that is following the "after flow" effects, which extrapolates at $\frac{t + \Delta t}{\Delta t} = 1$ to P_e.

Permeability thickness can be obtained from the slope of the build-up curve, using the same equation as outlined in (3) above. Skin Factor is obtained by using equation (4). The time at which drawdown is determined is used for the determination of dimensionless time.

2-100

APPENDIX II

FIELD DATA

Test No. 1

WELL: Golden Beach No. 1A Date: 31.7.67

GENERAL DATA:

Perforated Interval: 9102-07' Datum: Guide Base Shots per foot: 2

Packer & Tools: Halliburton 6½" RTTS, 3-7/8 testing string, hydrospring and dual closed-in pressure valve, 5/8" bottom hole choke, type BT recorders (2) one in tail pipe, one above packer, packer set at 9033±, Otis "J" drill pipe nipple and Amerada RPG-3 wireline recorder set above test tool, 2" ID drill collars above tool.

RECOVERY DATA:

Gas, too small to measure, field analysis: 80% methane, 9% ethane, 3% propane, 8% carbon dioxide, 500 ft of gas-cut mud.

TIME RECORDS:

Initial Flow Period: 0956 - 1001 Initial Shut-In Period: 1001 - 1043

First Flow Period: 1043 - 1325 First Shut-In Period: 1325 - 1600

PRESSURE RECORDS:

OPERATION	TIME min.	PRESSURE psig	OPERATION	TIME min.	PRESSURE psig
Initial Flow	0	128	Final Flow	0	194
	5	128		162	295
Initial Shut-In	0	128	Final Shut-In	15.5	398
	8.6	759		31.0	474
	12.9	1264		46.5	536
	17.2	1397		62.0	583
	21.5	1462		77.5	657
	25.8	1521		93.0	722
	30.1	1576		108.5	759
	34.4	1627		124.0	828
	38.7	1661		139.5	896
	43.0	1688		155.0	931

2-101

Test No. 2

WELL: Golden Beach No. 1A Date: 31.7.67

GENERAL DATA:

Perforated Interval: 8968-73' Datum: Guide Base Shots per foot: 2

Packer & Tools: Same as for Test No. 1

RECOVERY DATA:

Gas, too small to measure; field analysis: 96% methane, 2% ethane, 2" carbon dioxide, 960 feet of gas-cut mud and water. $R_W = 1.22$ @ 58°F

TIME RECORDS:

Initial Flow Period: 0705 - 1029 Initial Shut-In Period: 1029 - 1700

First Flow Period: First Shut-In Period:

PRESSURE RECORDS

OPERATION	TIME min.	PRESSURE psig	OPERATION	TIME MIN.	PRESSURE psig
Initial Flow	-	82	Initial Shut-In	140	3007
	-	131		160	3086
	-	162		180	3153
	-	229		200	3197
	-	281		220	3259
	-	338		240	3294
	-	401		260	3365
Initial Shut-In	20	1497		280	3409
	40	1938		300	3471
	60	2402		320	3507
	80	2631		340	3538
	100	2795		360	3555
	120	2918		380	3566

2-102

Test No. 3

WELL: Golden Beach No. 1A

Date: 6.8.67

GENERAL DATA:

Perforated Interval: 8808-15½ 8828-38 Datum: Guide Base Shots per foot: 2

Packer & Tools: Refer to Test No. 1 , packer set @ 8770'.

RECOVERY DATA:

Gas, too small to measure; field analysis: methane 92%, methane 2.5%, propane 0.5%, carbon dioxide 5%. 900 ft gas-cut & watery mud, muddy water. R_W = 1.14 ohm-meters @ 65°F

TIME RECORDS:

Initial Flow Period: 0516 - 0856 Initial Shut-In Period: 0856 - 1515

First Flow Period: First Shut-In Period:

PRESSURE RECORDS:

OPERATION	TIME mins	PRESSURE psig	OPERATION	TIME min.	PRESSURE psig
Final Flow	-	413	Initial Shut-In	150	3162
In. Shut-In	15	1668		180	3226
	30	2251		210	3307
	45	2510		240	3348
	60	2684		270	3392
	75	2814		300	3433
	90	2907		330	3465
	120	3061		365	3486

NOTE: The well was shut-in by running on wireline, a plug in the Otis "J" drill pipe nipple. The Amerada wireline recorder was suspended below the plug. The above pressure records are from the wireline recorder.

2-103

Test No. 4

WELL: Golden Beach No. 1A Date: 7.8.67

GENERAL DATA:

Perforated Interval: 8808-15½ 8828-38' Datum: Guide Base Shots per foot: 2

Packer & Tools: Refer to Test No. 1; packer set @ 8860'.

RECOVERY DATA:

Gas, too small to measure; field analysis: 84% methane, 7% ethane, 1% propane, 8% carbon dioxide. 1880 ft gas-cut mud, muddy water, and water with trace of oil emulsion. R_w = 0.93 ohm-meters @ 62°F.

TIME RECORDS:

Initial Flow Period: 0334 - 0336 Initial Shut-In Period: 0336 - 0406

First Flow Period: 0406 - 1430 First Shut-In Period: 1430 - 1730

PRESSURE RECORDS:

OPERATION	TIME min.	PRESSURE psig	OPERATION	TIME min.	PRESSURE psig
Initial Flow	-	78	First Flow	540	755
Initial Shut-In	-	3186		600	802
First Flow	0	125	First Shut-In	15	1731
	30	196		30	2059
	60	254		45	2298
	90	296		60	2457
	120	334		75	2565
	150	374		90	2669
	180	405		105	2735
	210	437		120	2782
	240	470		135	2852
	300	526		150	2896
	360	590		165	2932
	420	644		180	2973
	480	695			

2-106

Test No. 5

WELL: Golden Beach No. 1A Date: 10.8.67

GENERAL DATA:

Perforated Interval: 8632-47' 8660-80' Datum: Guide Base Shots per foot: 2

Packer & Tools: Refer to Test No. 1; packer set @ 8610'.

RECOVERY DATA:

Gas? too small to measure; on-site analysis: 12.0% methane, 0.3% ethane 0.1% propane, 86.8% air; 4500 ft mud, muddy water & water, R_w ranges from 0.90 to 1.12 ohm meters.

TIME RECORDS:

Initial Flow Period: 1105 - 1107 Initial Shut-In Period: 1107 - 1207

First Flow Period: 1207 - 1346 First Shut-In Period: 1346 - 1452

PRESSURE RECORDS:

OPERATION	TIME MIN.	PRESSURE psig	OPERATION	TIME MIN.	PRESSURE psig
Initial Flow	-	199	First Flow	105	2261
Initial Shut-In	-	3724	First Shut-In	0	2261
First Flow	0	321		10	3288
	15	518		20	3399
	30	1162		30	3438
	45	1429		40	3464
	60	1771		50	3490
	75	1891		60	3506
	90	2092		67	3523

2-105

APPENDIX III

DATA FOR PLOTTING DRAWDOWN & BUILD-UP CURVES

t min	Δt min	log Δt -	$\frac{t+\Delta t}{\Delta t}$ -	log $\frac{t+\Delta t}{\Delta t}$ -	P_w psia	P_w^2 $(psia)^2$ $(x10^{-3})$
TEST NO. 1						
5	8.6	0.93	1.58	0.20	759	585
	12.9	1.11	1.39	0.14	1264	1600
	17.2	1.24	1.29	0.11	1397	1943
	21.5	1.33	1.23	0.09	1462	2140
	25.8	1.41	1.19	0.08	1521	2310
	30.1	1.48	1.17	0.07	1576	2490
	34.4	1.54	1.15	0.06	1627	2640
	38.7	1.59	1.13	0.05	1661	2760
	43.0	1.63	1.12	0.05	1688	2850
162	15.5	1.19	11.45	1.06	398	158
	31.0	1.49	6.22	0.79	474	224
	46.5	1.67	4.49	0.65	536	288
	62.0	1.79	3.62	0.56	583	340
	77.5	1.89	3.09	0.49	657	432
	93.0	1.97	2.69	0.43	722	521
	108.5	2.04	2.50	0.40	759	575
	124.0	2.09	2.30	0.36	828	686
	139.5	2.14	2.16	0.33	896	805
	155.0	2.19	2.04	0.31	931	870
Test No. 2						
204	20	1.30	11.20	1.05	1497	2240
	40	1.60	6.10	0.79	1938	3750
	60	1.78	4.40	0.64	2402	5790
	80	1.90	3.55	0.55	2631	6910
	100	2.00	3.04	0.48	2795	7800
	120	2.08	2.70	0.43	2918	8500
	140	2.15	2.46	0.39	3007	9010
	160	2.20	2.27	0.36	3086	9530
	180	2.26	2.13	0.33	3153	9910
	200	2.30	2.02	0.31	3197	10200
	220	2.34	1.93	0.28	3259	10600
	240	2.38	1.85	0.27	3294	10800
	260	2.42	1.78	0.25	3365	11350
	280	2.45	1.73	0.24	3409	11610
	300	2.48	1.68	0.23	3471	12030
	320	2.51	1.64	0.21	3507	12300
	340	2.53	1.60	0.20	3538	12500
	360	2.56	1.56	0.19	3555	12600
	380	2.58	1.54	0.19	3566	12700

2-10b

t min	Δt min	log Δt –	$\frac{t+\Delta t}{\Delta t}$ –	log $\frac{t+\Delta t}{\Delta t}$ –	P_w psia	P_w^2 $(psia)^2$ $(x10^{-3})$
TEST NO. 3						
220	15	1.18	15.66	1.20	1668	2780
	30	1.48	8.34	0.92	2251	5080
	45	1.65	5.90	0.77	2510	6300
	60	1.78	4.67	0.67	2684	7210
	75	1.88	3.94	0.59	2814	7900
	90	1.95	3.44	0.54	2907	8450
	120	2.08	2.83	0.45	3061	9400
	150	2.18	2.46	0.39	3162	10000
	180	2.26	2.22	0.35	3226	10400
	210	2.32	2.05	0.31	3307	10950
	240	2.38	1.92	0.28	3348	11200
	270	2.43	1.81	0.26	3392	11500
	300	2.48	1.73	0.24	3433	11800
	330	2.52	1.67	0.22	3465	12000
	365	2.56	1.60	0.20	3486	12180
TEST NO. 4 – Drawdown						
0	0	–	–	–	125	15
30	30	1.48	–	–	196	39
60	60	1.78	–	–	254	65
90	90	1.95	–	–	296	88
120	120	2.08	–	–	334	112
150	150	2.18	–	–	374	140
180	180	2.26	–	–	405	160
210	210	2.32	–	–	437	191
240	240	2.38	–	–	470	221
300	300	2.48	–	–	526	277
360	360	2.56	–	–	590	348
420	420	2.62	–	–	644	414
480	480	2.68	–	–	695	482
540	540	2.73	–	–	755	570
600	600	2.78	–	–	802	643
Test No. 4 – Build-up						
600	15	1.18	41.00	1.61	1731	3000
	30	1.48	21.00	1.32	2059	4230
	45	1.65	14.33	1.16	2298	5280
	60	1.78	11.00	1.04	2457	6020
	75	1.88	9.00	0.95	2565	6590
	90	1.95	7.66	0.89	2669	7120
	105	2.02	6.72	0.83	2735	7470
	120	2.08	6.00	0.78	2782	7750
	135	2.13	5.45	0.74	2852	8130

2-107

t min	Δt min	log Δt –	$\frac{t+\Delta t}{\Delta t}$ –	log $\frac{t+\Delta t}{\Delta t}$ –	P_w psia	P_w^2 $(psia)^2$ $(x10^{-3})$
600	135	2.13	5.45	0.74	2852	8130
	150	2.18	5.00	0.70	2896	8360
	165	2.22	4.64	0.67	2932	8600
	180	2.26	4.33	0.64	2973	8820
TEST NO. 5 – Drawdown						
0	0	–	–	–	321	103
15	15	1.18	–	–	518	268
30	30	1.48	–	–	1162	1360
45	45	1.65	–	–	1429	2040
60	60	1.78	–	–	1771	3150
75	75	1.88	–	–	1891	3580
90	90	1.95	–	–	2092	4380
105	105	2.02	–	–	2261	5120
TEST NO. 5 – Build-Up						
105	10	1.00	11.50	1.06	3288	10800
	20	1.30	6.00	0.78	3399	11550
	30	1.48	4.34	0.64	3438	11800
	40	1.60	3.62	0.56	3464	12000
	50	1.70	3.10	0.49	3490	12200
	60	1.78	2.75	0.44	3506	12300
	67	1.83	2.57	0.41	3523	12400

2-108

APPENDIX IV

SAMPLE CALCULATIONS

TEST NO. 2

1. Calculation of Permeability-Thickness:

P_2 = 3930 psig (pressure @ $\log \frac{t+\Delta t}{\Delta t} = 0$, refer page 5)

P_1 = 1590 psig (pressure @ $\log \frac{t+\Delta t}{\Delta t} = 1$, refer page 5)

$$m = \frac{P_2 - P_1}{2.303} = \frac{3930 - 1590}{2.303} = 1015 \text{ psi/cycle.}$$

Recovery = 960 ft., = (960)(.00389) bbls.

t = 204 mins.

$$q = \frac{(960)(.00389)(24)}{(204)} = 26.3 \text{ bbls/day}$$

Assume that $\mu = 0.25$ md @ 220°F.

$$kh = \frac{70.5\, q\, \mu}{m} = \frac{(70.5)(26.3)(0.25)}{(1015)} = 0.46 \text{ md-ft.}$$

2. Calculation of Damage Ratio:

P_e = 3930 psig (refer to extrapolation, page 5)

$$P_{wf} = \frac{401}{2} = 200 \text{ psig (average flowing pressure)}$$

$$DR = \frac{0.0794\,(P_e - P_{wf})}{m} = \frac{(0.0794)(3930 - 200)}{(1015)} = 0.29$$

A damage ratio less than 1 indicates an improved wellbore condition.

2-109

Lease Name	GOLDEN BEACH	
Well No.	1A	
Test No.	2	
Legal Location Sec. - Twp. - Rng.	- - - -	
Field Area	WILDCAT	
County	BASS STRAIT	
Lease Owner/Company Name	BURMAH OIL COMPANY OF AUSTRALIA LTD.	
State	VICTORIA	
Owner's District	SALE	

	1st Min.	2nd Min.
Flow Time	-	146*
Closed In Press. Time	-	210*
Pressure Readings	Field	Office Corrected
Depth Top Gauge	9041 Ft.	Blanked Off: no
BT. P.R.D. No.	1857	Hour Clock: 24
Initial Hydro Mud Pressure	4762	4643
Initial Closed in Pres.	-	-
Initial Flow Pres. 1 / 2	85	57
Final Flow Pres. 1 / 2	396	391
Final Closed in Pres.	3586	3513
Final Hydro Mud Pressure	4740	4627
Depth Cen. Gauge	Ft.	Blanked Off
BT. P.R.D. No.		Hour Clock
Initial Hydro Mud Pres.		
Initial Closed in Pres.		
Initial Flow Pres. 1 / 2		
Final Flow Pres. 1 / 2		
Final Closed in Pres.		
Final Hydro Mud Pres.		
Depth Bot. Gauge	9063 Ft.	Blanked Off: yes
BT. P.R.D. No.	2181	Hour Clock: 72
Initial Hydro Mud Pres.	4717	4731
Initial Closed in Pres.	-	-
Initial Flow Pres. 1 / 2	74	49
Final Flow Pres. 1 / 2	368	383
Final Closed in Pres.	3561	3576
Final Hydro Mud Pres.	4712	4722

Date	8-3-67	Ticket Number	460876 S
Kind of Job	Hook Wall	Halliburton District	MELBOURNE
Tester	GLORIOD	Witness	MR. TYNER
Drilling Contractor	ZAPATA - O.D. & E.		LC
Elevation	102' from mud line	Top Packer	-
Total Depth	PB 9130'	Bottom Packer	9050'
Interval Tested	9070' - 9075'	Formation Tested	--
Casing or Hole Size	7" x 26#	Casing Perfs. Top / Bot.	9070' 2 HPF / 9075'
Surface Choke	3/4"	Bottom Choke	5/8"
Size & Kind Drill Pipe	2 7/8" x 10.4# IF	Drill Collars Above Tester (I.D. - Length)	2" - 449.5'
Mud Weight	10.2# Gal.	Mud Viscosity	50 Sec.
Temperature	°F Est. / 226 °F Actual	Anchor Size & Length	ID 1 3/4" / OD 3 3/4" x 10'
Depths Mea. From	Rotary Table	Depth of Tester Valve	9044 Ft.
Cushion (Type / Amount)	none Ft.	Depth Back Pres. Valve	none Ft.

Mea. From Tester Valve:

Recovered	240	Feet of gas & water cut mud.
Recovered	725	Feet of flitrate water.
Recovered		Feet of
Recovered		Feet of

Oil A.P.I. Gravity	-	Water Spec. Gravity	1.03
Gas Gravity	-	Surface Pressure	0 psi
Tool Opened	7:04 A.M.	Tool Closed	5:00 P.M.

Remarks: Opened tool with good blow for 146* minute flow period. Unable to operate dual closed in pressure valve. Closed well in on Otis "J" type plug.

* Times given & times recorded do not agree.

FORMATION TEST DATA

2-110

Gauge No. 1857			Depth 9041'			Clock 24 hour		Ticket No. 460876		
	First Flow Period		Initial Closed In Pressure			Second Flow Period		Final Closed In Pressure		
	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.
P_0						.000	57***	.000	-	391
P_1						.068	113	.1323	.788	2262
P_2						.136	133	.2646	.552	2747
P_3						.204	161	.3969	.433	3004
P_4						.272	198	.5292	.358	3139
P_5						.340	233	.6615	.307	3260
P_6						.408	267	.7938	.268	3333
P_7						.476	296	.9261	.239	3392
P_8						.554	337	1.0584	.215	3448
P_9						.612	374	1.1907	.196	3481
P_{10}						.680	391**	1.3230	.180	3513**
Gauge No.			Depth			Clock		hour		
P_0						.000	49	.000	-	838
P_1						.024	98	.0467	.788	2310
P_2						.048	125	.0934	.552	2787
P_3						.072	157	.1401	.433	3048
P_4						.096	192	.1868	.358	3191
P_5						.120	224	.2335	.307	3310
P_6						.144	258	.2802	.268	3390
P_7						.168	292	.3269	.239	3450
P_8						.192	337	.3736	.215	3501
P_9						.216	373	.4203	.196	3545
P_{10}						.240	383	.4670	.180	3576
Reading Interval							*		*	Minutes

REMARKS: *** Questionable * Times do not agree. Cut into 10 equal intervals of no time value. Calculated time of final flow approximately 218 minutes.** 204 min Calculated time of final closed in pressure approximately 425 minutes ** 397 minutes

SPECIAL PRESSURE DATA

Liquid Production

		1857	2181		
B.T. Gauge Numbers	Time	PRESSURE	PRESSURE	Ticket Number	460876
Initial Hydrostatic		4643	4731	Elevation	102 ft.
Final Hydrostatic		4627	4722	Indicated Production 1st Flow	- bbls./day
1st Flow Initial	----	-	-	Indicated Production Total Flow	20 bbls./day
1st Flow Final	-	-	-	Drill Collar Length	450 ft.
Initial Closed In Pressure	-	-	-	Drill Collar I.D.	2.0 in.
2nd Flow Initial	----	57	49	Drill Pipe Factor	0.00449 bbls./ft.
2nd Flow Final	146*	391	383	Hole Size	7.0 in.
Final Closed In Pressure	210*	3513	3576	Footage Tested	5 ft.
Extrapolated Static Pressure Initial		-	-	Mud Weight	10.2 lbs./gal.
Extrapolated Static Pressure Final		3887	3948	Viscosity, Oil or Water	0.3 cp
Slope ~~psi/cycle~~ P 10 Initial		-	-	Oil API Gravity	-
Slope Final		1817	1872	Water Specific Gravity	1.03

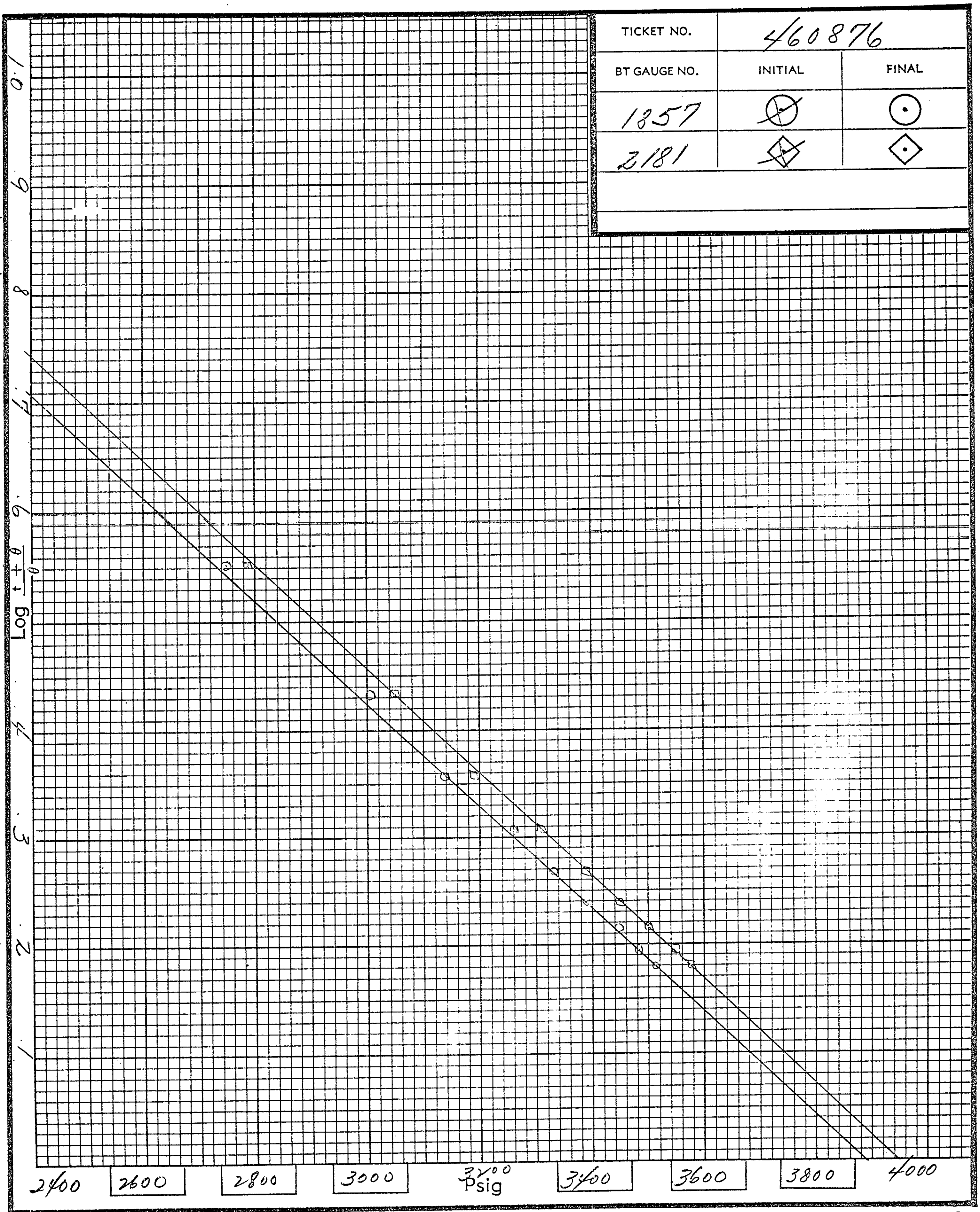
Remarks: * Times shown & times recorded do not agree. Calculated time are 204 min. for flow period & 397 min. for closed in pressure period. Calculations based on water recovery of 1.03 specific gravity.

SUMMARY

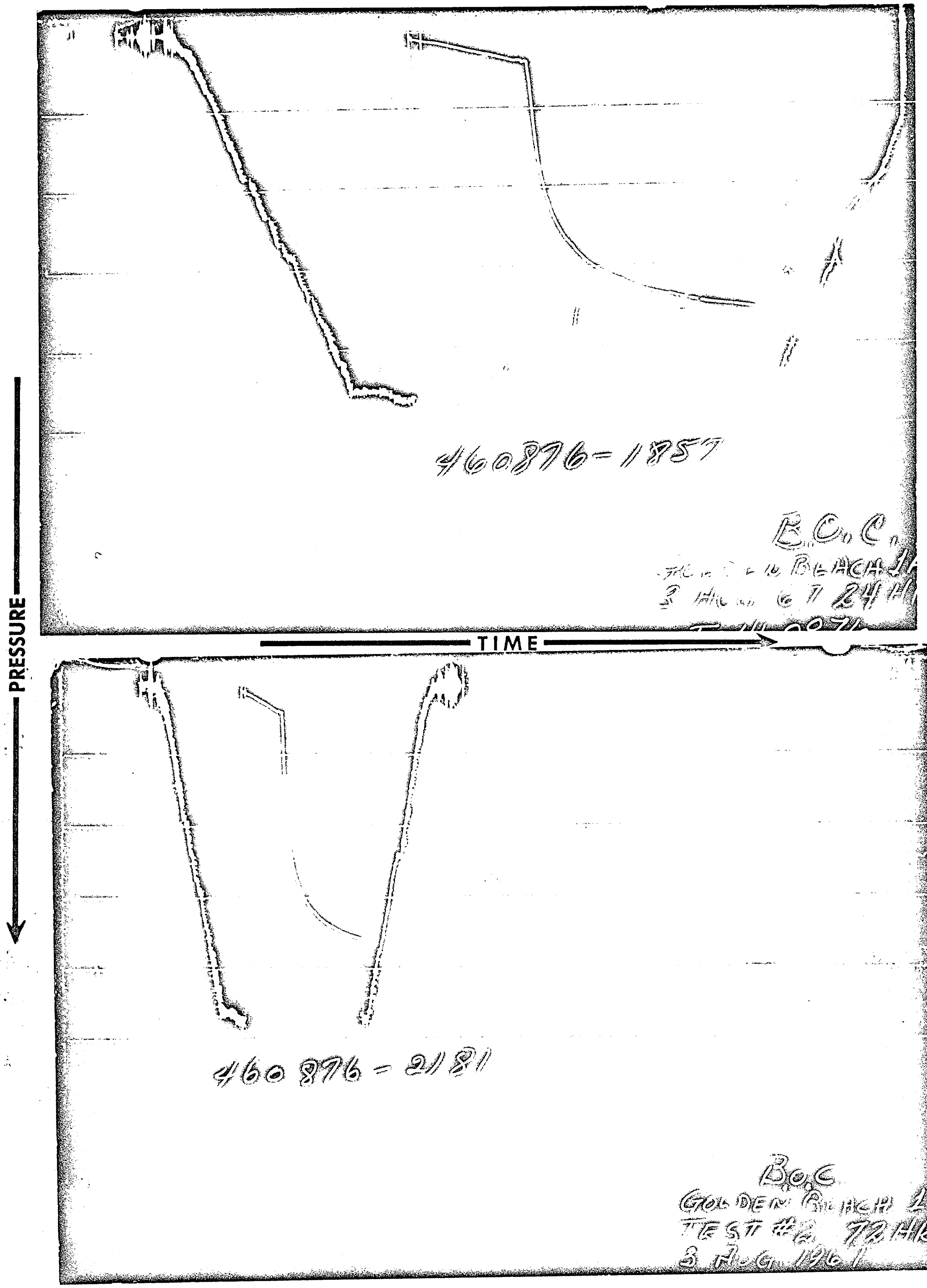
Gauge No. 1857, Depth 9041'; Gauge No. 2181, Depth 9063'

Product	Equation	1857 Initial	1857 Final	2181 Initial	2181 Final	Units
Production	$Q = \frac{1440\ R}{t}$		21.0		20.0	bbls./day
Transmissability	$\frac{Kh}{\mu} = \frac{162.6\ Q}{m}$		1.65		1.58	md. ft./cp
Indicated Flow Capacity	$Kh = \frac{Kh}{\mu}\ \mu$		0.50		0.47	md. ft.
Average Effective	$K = \frac{Kh}{h}$		-		-	md.
Permeability	$K_1 = \frac{Kh}{h_1}$		0.099		0.094	md.
Damage Ratio	$DR = .183\ \frac{Ps - Pf}{m}$		0.3		0.3	—
Theoretical Potential w/Damage Removed	$Q_1 = Q\ DR$		21.0		20.0	bbls./day
Approx. Radius of	$b \fallingdotseq \sqrt{Kt}$ or $\sqrt{Kt_0}$		-		-	ft.
Investigation	$b_1 \fallingdotseq \sqrt{K_1 t}$ or $\sqrt{K_1 t_0}$		4.5		4.5	ft.
Potentiometric Surface *	Pot. = El — GD + 2.319 Ps		75		194	ft.

INTERPRETATIONS AND CALCULATIONS



EXTRAPOLATED PRESSURE GRAPH



Each Horizontal Line Equal to 1000 p.s.i.

Test No 3
Page 1 of 3

2-114

B.O.C. OF AUSTRALIA LTD.

DST AND PRODUCTION TEST DATA.

1. GENERAL DATA:

Well: GOLDEN BEACH NO. 1A Date 5-8-67
Formation: Golden Beach Test Interval: 8808-15.5 Datum: Guide Base
Casing OD: 7" lb/ft: [illegible] Perf/shots/ft: 2
~~Tbg~~/DP OD: 2⅞" lb/ft: 10.4 length, ft: 8340
D.Collar OD 4½" I.D.: 2" length, ft: 450
Packers, No: 1 Make: Halco Type RTTS OD 5⅞" Durometer 85
Bottom Recorder, Type: BT Range, psi 8000 clock hrs: 72
Top Records, Type: BT Range, psi 8000 clock, hrs: 24
W.L. Recorder, Type: Kester Range psi 8000 Clock, hrs: 24
Bottom Hole Choke, Size (s) ⅝"
Bottom Hole Thermometer, Type: Max. Recording Range °F ____
Water Cushion: No (Yes or No), Amount, ft: -

2. SEPARATOR AND FLOW MEASUREMENT DEVICE DATA: SAME AS FOR TEST NO.1

FIRST STAGE:
Make: ____, OD ____ Length: ____
WP, psig: ____, Rated Capacity, MCFD: ____ B/D ____
FCV/Choke, Make: ____ Type: ____ Size: ____
PCV, Make: ____ Type: ____ Size: ____
LCV, Make: ____ Type: ____ Size: ____
Meter Run ID, Upstream: ____ Downstream: ____ Taps: ____

SECOND STAGE:
Make: ____ OD: ____ Length: ____
WP, psig: ____, Rated Capacity MCFD: ____ B/D ____
Choke, Make: ____ Type: ____ Size: ____
PCV, Make: ____ Type: ____ Size: ____
LCV, Make: ____ Type: ____ Size: ____
Oil Meter Make: ____ Type: ____ Size: ____
Meter Run ID, Upstream: ____ Downstream: ____ Taps: ____

INHIBITOR PUMP:
Make: ____ Model ____ Single or Double Acting: ____
Plunger Size: ____, Stroke Length: ____.

PRODUCTION TANKS:
Dimensions: I.D: ____ Length or Height: ____
Positioning (Horizontal or Vertical) ____

3. REMARKS AND SPECIAL DATA:

Packer set at 8770 ft.
Otis 'J' nipple 53 ft above packer.
Two Halliburton volume compensated slip joints 4643 ft above packer.

Test No. 3

Well: GOLDEN BEACH NO. 1A, Date 5-8-67

4. TIME RECORDS: (Use 24-hr Clock)

Clocks started, Bottom: 0045, Top: 0045, W.L. 0805

Tools Started Into Hole: 0110, On Bottom: 0445, Set 0514

Tools Pulled Loose: 1515, At Surface: 2030

Operation	Start	End	Duration, mins.
Initial Flow	0516	0856	220
Initial Shut-in	0856	1515	379
First Flow			
First Shut-in			
Second Flow			
Second Shut-in			
Third Flow			
Third Shut-in			
Fourth Flow			
Fourth Shut-in			

5. FIRST STAGE FLOW RATE DATA AND CALCULATIONS:

(Note: Pressure Base 14.7 psia., Temperature Base 60°F)

$F = F_b \cdot F_g \cdot F_{pv}$ = (______) (______) (______) (24)= ______

Time	Wellhead PSIG	Wellhead °F	d in.	F	T_f °F	F_t	h_w	p_f	MCFD
				TOO	SMALL	TO	MEASURE		

2-11b

Test No 3

Well: GOLDEN BEACH NO. 1A

Date 5-8-67

6. SECOND STAGE FLOW RATE DATA AND CALCULATIONS

$F = F_b \cdot F_g \cdot F_r \cdot Y$ = (_____) (_____) (_____) (_____) (24)= _____

Time	Liquid Meter Reading	Liquid Meter B/D	d in.	F	T_f °F	T_t	h_w	p_f	MCFD
				TOO	SMALL	TO	MEASURE		

7. SAMPLING AND MISCELLANEOUS DATA: (tank gauging checks, water measurements, gravity measurements, on-site gas analyses, hydrate inhibitor type and injection rate, etc.)

INITIAL FLOW : No flow for 2 minutes, then weak blow.

Combustible gas reached surface 74 minutes after well opened.

ON-SITE GAS ANALYSIS:

C_1	92%
C_2	2.5
C_3	0.5
CO_2	5
	100

RECOVERED FROM PIPE ABOVE TESTER:

360 ft (1.5 bls) gas-cut mud

180 ft (0.8 bls) gas-cut watery mud

~~360 ft (1.6 bls) slightly muddy water~~

~~900 ft (3.9 bls) total~~

Water resistivity 1.14 ohms @ 65°F

450 ppm $CaCO_3$

One ft of silty to fine grained sandstone was found on top of the ~~Ohio nipple.~~

Supervisor: [signature]

GOLDEN BEACH NO.1A

D.S[illegible]O.3

PERFORATIONS: 8,808' - 15.5'
8,828' - 38'

FINAL FLOW RATE: 0.86 bl/hr. at 445 p.s.i.

TOTAL PRODUCTION: 3.9 bls.

t = 270 minutes

FINAL SHUT-IN: PRESSURE BUILD UP:

Δt	$\frac{t+\Delta t}{\Delta t}$	Top Recorder 24 hr. clock	Bottom Recorder 72 hr. clock
15	19	1,742	1,458
30	10	2,285	2,126
45	7	2,510	2,412
60	5.5	2,680	2,598
75	4.6	2,817	2,741
90	4	2,910	2,848
105	3.6	2,998	2,935
120	3.25	3,066	2,998
150	2.8	3,162	3,111
180	2.5	3,237	3,196
210	2.3	3,296	3,254
240	2.12	3,350	3,317
300	1.9	3,423	3,400
365	1.74	3,480	3,446
394	1.7	-	3,482

FORMATION PRESSURE (P_f) = 3870 p.s.i. m = 1740

$$\frac{Kh}{\mu} = 162.6\,\frac{Q}{m}$$

$$= \frac{162.6 \times 19.6}{1740}$$

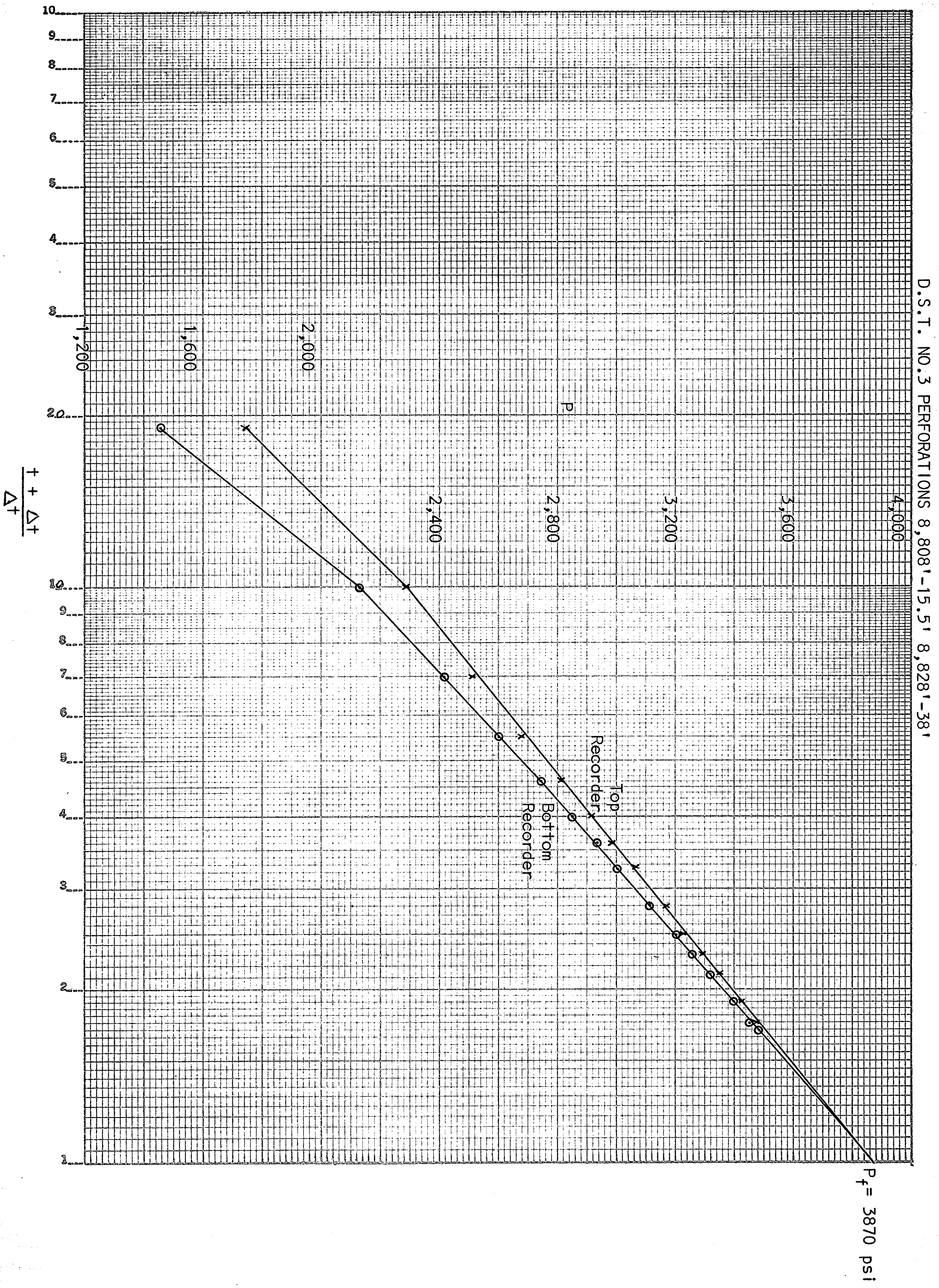
$$= 1.83$$

$$D.R. = \frac{0.183\,(P_f - P_s)}{m}$$

$$= \frac{0.183\,(3870 - 445)}{1740}$$

$$= 0.36$$

2-118



D.S.T. NO.3 PERFORATIONS 8,808'-15.5' 8,828'-38'
P
1,200
1,600
2,000
2,400
2,800
3,200
3,600
4,000
$\frac{t + \Delta t}{\Delta t}$
Top Recorder
Bottom Recorder
P_f = 3870 psi

2-119

Flow Time	1st Min. -	2nd Min. 220	Date	8-5-67	Ticket Number	460878-S
Closed In Press. Time	1st Min. -	2nd Min. 379	Kind of Job	Hook Wall Casing Packer	Halliburton District	Melbourne
Pressure Readings	Field	Office Corrected	Tester	Mr. Gloriod	Witness	Mr. Tyner
Depth Top Gauge	8863 Ft.	no Blanked Off	Drilling Contractor	ZAPATA O D & E		SM
BT. P.R.D. No.	1857	24 Hour Clock	Elevation	102' Guide Base	Top Packer	
Initial Hydro Mud Pressure	4673	4547	Total Depth		Bottom Packer	8872'
Initial Closed in Pres.	-	-	Interval Tested	8910-8917 8930-8940 2 HPF	Formation Tested	Golden Beach
Initial Flow Pres.	1: ~~67~~ 2:	98	Casing or Hole Size	7" x 26#	Casing Perfs.	Top 8910 Bot. 8940
Final Flow Pres.	1: ~~441~~ 2:	437	Surface Choke	3/4"	Bottom Choke	5/8"
Final Closed in Pres.	3498	3433	Size & Kind Drill Pipe	2 7/8" x 10.4# x IF	Drill Collars Above Tester (I.D. - LENGTH)	2" x 450'
Final Hydro Mud Pressure	4651	4547	Mud Weight	10.2 # / Gal.	Mud Viscosity	50 sec.
Depth Cen. Gauge	Ft.	Blanked Off	Temperature	°F Est. 226 °F Actual	Anchor Size & Length	ID 1 3/4 OD 3 3/4 x 10'
BT. P.R.D. No.		Hour Clock	Depths Mea. From	Rotary table	Depth of Tester Valve	8862' Ft.
Initial Hydro Mud Pres.			Cushion (TYPE / AMOUNT)	Ft.	Depth Back Pres. Valve	Ft.
Initial Closed in Pres.			Recovered	360	Feet of	gas cut mud
Initial Flow Pres.	1: 2:		Recovered	180	Feet of	gas cut watery mud
Final Flow Pres.	1: 2:		Recovered	360	Feet of	slightly muddy water
Final Closed in Pres.			Recovered		Feet of	
Final Hydro Mud Pres.			Oil A.P.I. Gravity		Water Spec. Gravity	
Depth Bot. Gauge	8885 Ft.	yes Blanked Off	Gas Gravity		Surface Pressure	psi
BT. P.R.D. No.	2181	72 Hour Clock	Tool Opened	5:14 AM	Tool Closed	3:15 PM
Initial Hydro Mud Pres.	4700	4651	Remarks	Tool opened with no blow for 2 minutes		
Initial Closed in Pres.	-	-		then weak blow with gas to the surface after 74		
Initial Flow Pres.	1: ~~74~~ 2:	~~91~~		minutes. Took a 379 minute final closed in		
Final Flow Pres.	1: ~~442~~ 2:	~~445~~		pressure.		
Final Closed in Pres.	3512	3499				
Final Hydro Mud Pres.	4651	4651				

Legal Location Sec. - Twp. - Rng.: —
Lease Name: GOLDEN BEACH
Well No.: 1-A
Test No.: 3
Field Area: WILDCAT
County: BASS STRAIT
Mea. From Tester Valve
Lease Owner/Company Name: BURMAH OIL COMPANY OF AUSTRALIA LIMITED
State: VICTORIA
Owner's District: SA:E

FORMATION TEST DATA

2-120

Gauge No. 1857	Depth 8863'		Clock 24 hour			Ticket No. 460878				
	First Flow Period		Initial Closed In Pressure			Second Flow Period		Final Closed In Pressure		
	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.
P_0						.000	98	.000		437
P_1						.0674	133	.0636	1.102	1963*
P_2						.1348	172	.1641	.741	2541
P_3						.2022	211	.2645	.579	2792
P_4						.2696	246	.3650	.481	2957
P_5						.3370	272	.4654	.413	3071
P_6						.4044	304	.5659	.363	3154
P_7						.4718	333	.6663	.324	3221
P_8						.5392	357	.7668 .8672	.293 .268	3275 3318
P_9						.6066	380	.9677 1.0681	.246 .228	3353 3385
P_{10}						.6740 .741	402 437	1.1685 1.269	.213 .199	3413 3433

Gauge No. 2181	Depth 8885'		Clock 72 hour							
P_0						.000	91	.000		445
P_1						.0236	133	.0226	1.097	1990*
P_2						.0472	177	.0582	.737	2569
P_3						.0708	214	.0938	.576	2835
P_4						.0944	251	.1294	.478	3005
P_5						.1180	283	.1650	.410	3119
P_6						.1416	314	.2007	.360	3206
P_7						.1652	339	.2363	.322	3271
P_8						.1888	364	.2719 .3075	.291 .266	3329 3373
P_9						.2124	388	.3431 .3788	.244 .226	3414 3448
P_{10}						.2360 .2600	413 445	.4144 .4500	.211 .198	3475 3499
Reading Interval						20		30		Minutes

REMARKS: *19 Minutes.

SPECIAL PRESSURE DATA

2-121

Liquid Production

B.T. Gauge Numbers			1857	2181	Ticket Number		460878	
			PRESSURE	PRESSURE				
Initial Hydrostatic			4547	4651	Elevation		102	ft.
Final Hydrostatic			4547	4651	Indicated Production	1st Flow	-	bbls./day
1st Flow	Initial	Time ----	-	-		Total Flow	24.7	bbls./day
	Final		-	-	Drill Collar Length		450	ft.
Initial Closed In Pressure			-	-	Drill Collar I.D.		2.0	in.
2nd Flow	Initial	----	98	91	Drill Pipe Factor		0.00449	bbls./ft.
	Final	220	437	445	Hole Size		7.0	in.
Final Closed In Pressure		379	3433	3499	Footage Tested		17	ft.
Extrapolated Static Pressure	Initial		-	-	Mud Weight		10.2	lbs./gal.
	Final		3478	3848	Viscosity, Oil or Water		0.3	cp
Slope ~~psi/cycle~~ P10	Initial		-	-	Oil API Gravity		-	—
	Final		2050	2066	Water Specific Gravity Est.		1.036*	—

Remarks: *Calculations based on water recovery of 1.036 specific gravity.

SUMMARY

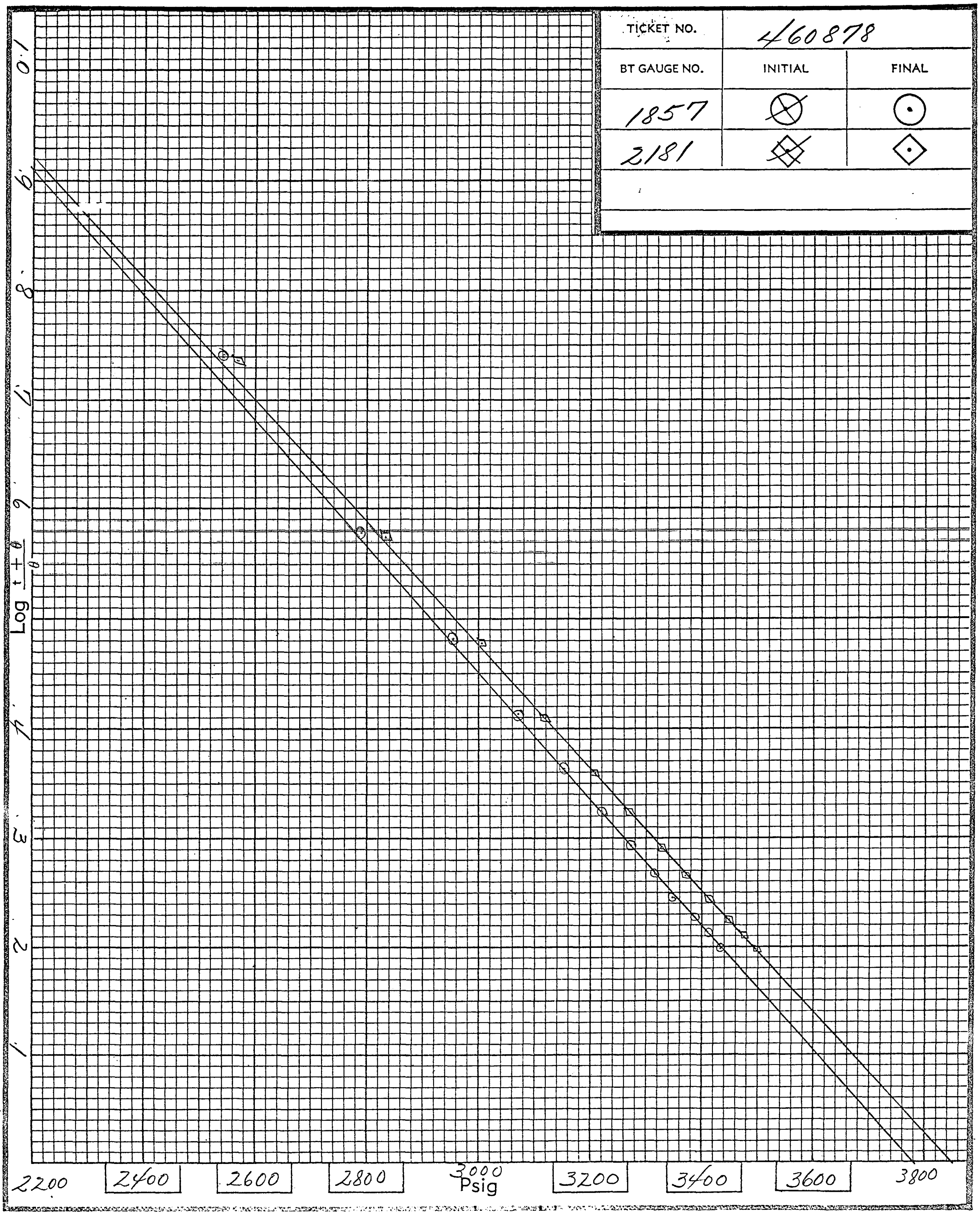
Gauge No. 1857, Depth 8863'; Gauge No. 2181, Depth 8885'

Product	Equation	Gauge 1857 Initial	Gauge 1857 Final	Gauge 2181 Initial	Gauge 2181 Final	Units
Production	$Q = \frac{1440\ R}{t}$		23.3		24.7	bbls./day
Transmissability	$\frac{Kh}{\mu} = \frac{162.6\ Q}{m}$		2.19		2.26	md. ft./cp
Indicated Flow Capacity	$Kh = \frac{Kh}{\mu}\ \mu$		0.66		0.68	md. ft.
Average Effective	$K = \frac{Kh}{h}$		-		-	md.
Permeability	$K_1 = \frac{Kh}{h_1}$		0.039		0.040	md.
Damage Ratio	$DR = .183\ \frac{Ps - Pf}{m}$		0.4		0.4	—
Theoretical Potential w/Damage Removed	$Q_1 = Q\ DR$		23.3		24.7	bbls./day
Approx. Radius of	$b \leftrightarrows \sqrt{Kt}$ or $\sqrt{Kt_0}$		-		-	ft.
Investigation	$b_1 \leftrightarrows \sqrt{K_1 t}$ or $\sqrt{K_1 t_0}$		2.92		2.96	ft.
Potentiometric Surface *	$Pot. = El - GD + 2.319\ Ps$		4.8		140.	ft.

NOTICE: These calculations are based upon information furnished by you and taken from Drill Stem Test pressure charts, and are furnished you for your information. In furnishing such calculations and evaluations based thereon, Halliburton is merely expressing its opinion. You agree that Halliburton makes no warranty express or implied as to the accuracy of such calculations or opinions, and that Halliburton shall not be liable for any loss or damage, whether due to negligence or otherwise, in connection with such calculations and opinions.

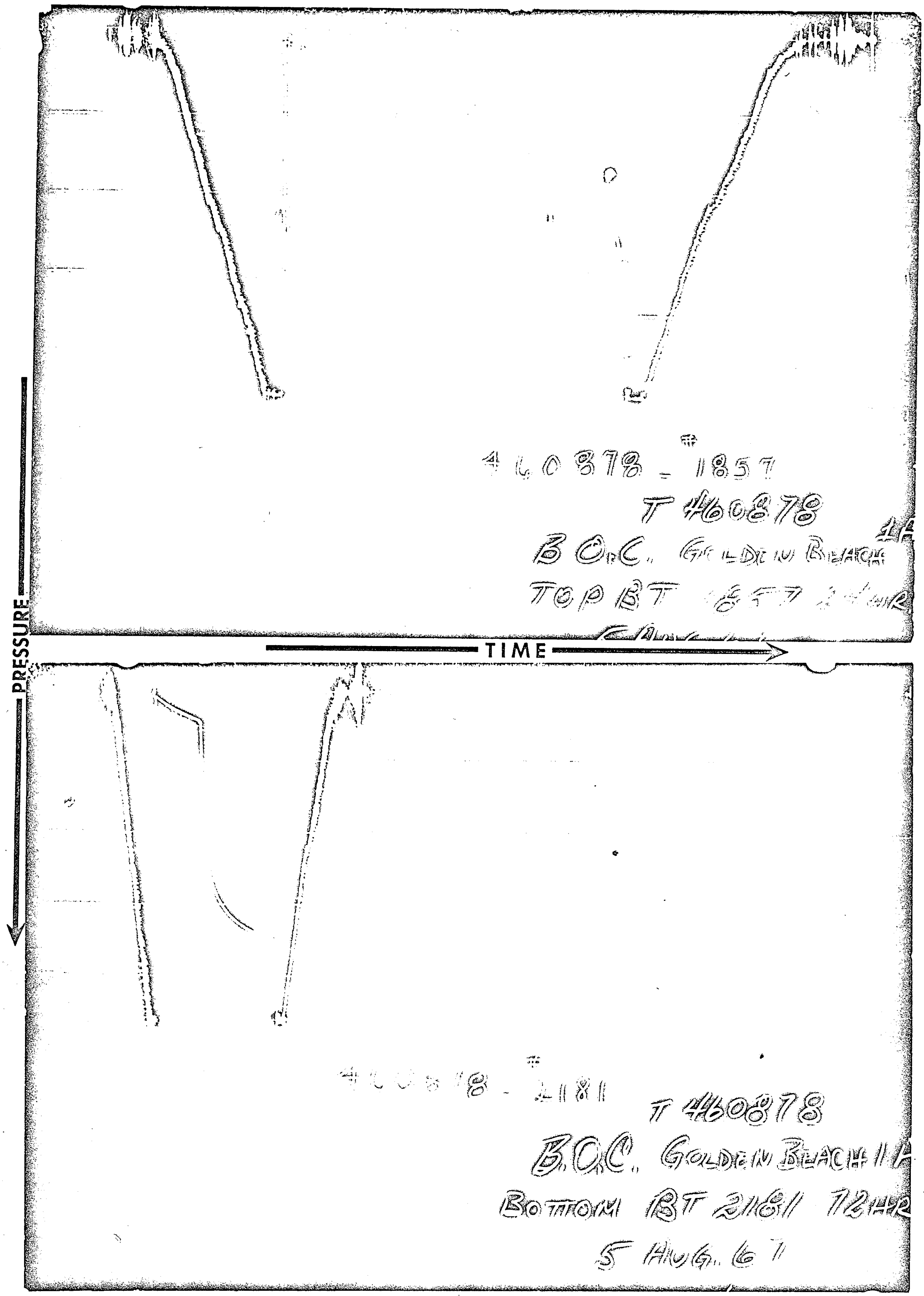
INTERPRETATIONS AND CALCULATIONS

2-121



EXTRAPOLATED PRESSURE GRAPH

2-122



Each Horizontal Line Equal to 1000 p.s.i.

B.O.C. OF AUSTRALIA LTD.

DST AND PRODUCTION TEST DATA.

1. GENERAL DATA:

Well: GOLDEN BEACH NO. 1A Date 6-8-67

Formation: Golden beach Test Interval ~~8828-38~~ 8808-15.5 Datum: Gu ide Base

Casing OD: 7" lb/ft: 26 Perf/shots/ft: 2

~~Tbg~~/DP OD: 2$\frac{7}{8}$" lb/ft: 10.4 length, ft: 8340

D.Collar OD 4$\frac{1}{4}$" I.D.: 2" length, ft: 459

Packers, No: 1 Make: Halco Type RTTS OD 5$\frac{7}{8}$" Durometer 85

Bottom Recorder, Type: BT Range, psi 8000 clock hrs: 72

Top Records, Type: BT Range, psi 8000 clock, hrs: 24

W.L. Recorder, Type: Kester Range psi 8000 Clock, hrs: 36

Bottom Hole Choke, Size (s) $\frac{5}{8}$"

Bottom Hole Thermometer, Type: Max. Recorder Range °F

Water Cushion: No (Yes or No), Amount, ft: -

2. SEPARATOR AND FLOW MEASUREMENT DEVICE DATA: SAME AS FOR TEST NO.1

FIRST STAGE:

Make: , OD Length:

WP, psig: , Rated Capacity, MCFD: B/D

FCV/Choke, Make: Type: Size:

PCV, Make: Type: Size:

LCV, Make: Type: Size:

Meter Run ID, Upstream: Downstream: Taps:

SECOND STAGE:

Make: OD: Length :

WP, psig: , Rated Capacity MCFD: B/D

Choke, Make: Type: Size:

PCV, Make: Type: Size:

LCV, Make: Type: Size:

Oil Meter Make: Type: Size:

Meter Run ID, Upstream: Downstream: Taps:

INHIBITOR PUMP:

Make: Model Single or Double Acting:

Plunger Size: , Stroke Length: .

PRODUCTION TANKS:

Dimensions: I.D: Length or Height:

Positioning (Horizontal or Vertical)

3. REMARKS AND SPECIAL DATA:

Packer set at 8860 ft.

Otis 'J' nipple 53 ft above packer.

Two Halliburton volume compensated slip joints 4553 ft above packer.

Test No. 4

Well: GOLDEN BEACH NO. 1A, Date 6-8-67

4. TIME RECORDS: (Use 24-hr Clock)

Clocks started, Bottom: 2300 (5/8), Top: 2300, W.L. 0342

Tools Started Into Hole: 2345, On Bottom: 0300, Set 0332

Tools Pulled Loose: 1730, At Surface: 2215

Operation	Start	End	Duration, mins.
Initial Flow	0334	0336	2
Initial Shut-in	0336	0406	30
First Flow	0406	1430	624
First Shut-in	1430	1730	180
Second Flow			
Second Shut-in			
Third Flow			
Third Shut-in			
Fourth Flow			
Fourth Shut-in			

5. FIRST STAGE FLOW RATE DATA AND CALCULATIONS:

(Note: Pressure Base 14.7 psia., Temperature Base 60°F.)

$F = F_b \cdot F_g \cdot F_{pv}$ = (______) (______) (______) (24)= ______

Time	Wellhead PSIG	Wellhead °F	d in.	F	T_f °F	F_t	h_w	p_f	MCFD
				TOO	SMALL	TO	MEASURE		

Test No 4
Date 6-8-67

Well: GOLDEN BEACH NO. 1A

6. SECOND STAGE FLOW RATE DATA AND CALCULATIONS:

$F = F_b \cdot F_g \cdot F_r \cdot Y = (\_\_\_)(\_\_\_)(\_\_\_)(\_\_\_)(24) = \_\_\_$

Time	Liquid Meter Reading	B/D	d in.	F	T_f °F	T_t	h_w	p_f	MCFD
				TOO SMALL TO MEASURE					

7. SAMPLING AND MISCELLANEOUS DATA: (tank gauging checks, water measurements, gravity measurements, on-site gas analyses, hydrate inhibitor type and injection rate, etc.)

INITIAL FLOW : Weak blow.

FIRST FLOW : Weak blow. Combustible gas to surface after 75 minutes flow.

ON-SITE GAS ANALYSIS:

C_1	84%
C_2	7
C_3	1
CO_2	8
	100

RECOVERED FROM PIPE ABOVE TESTER:

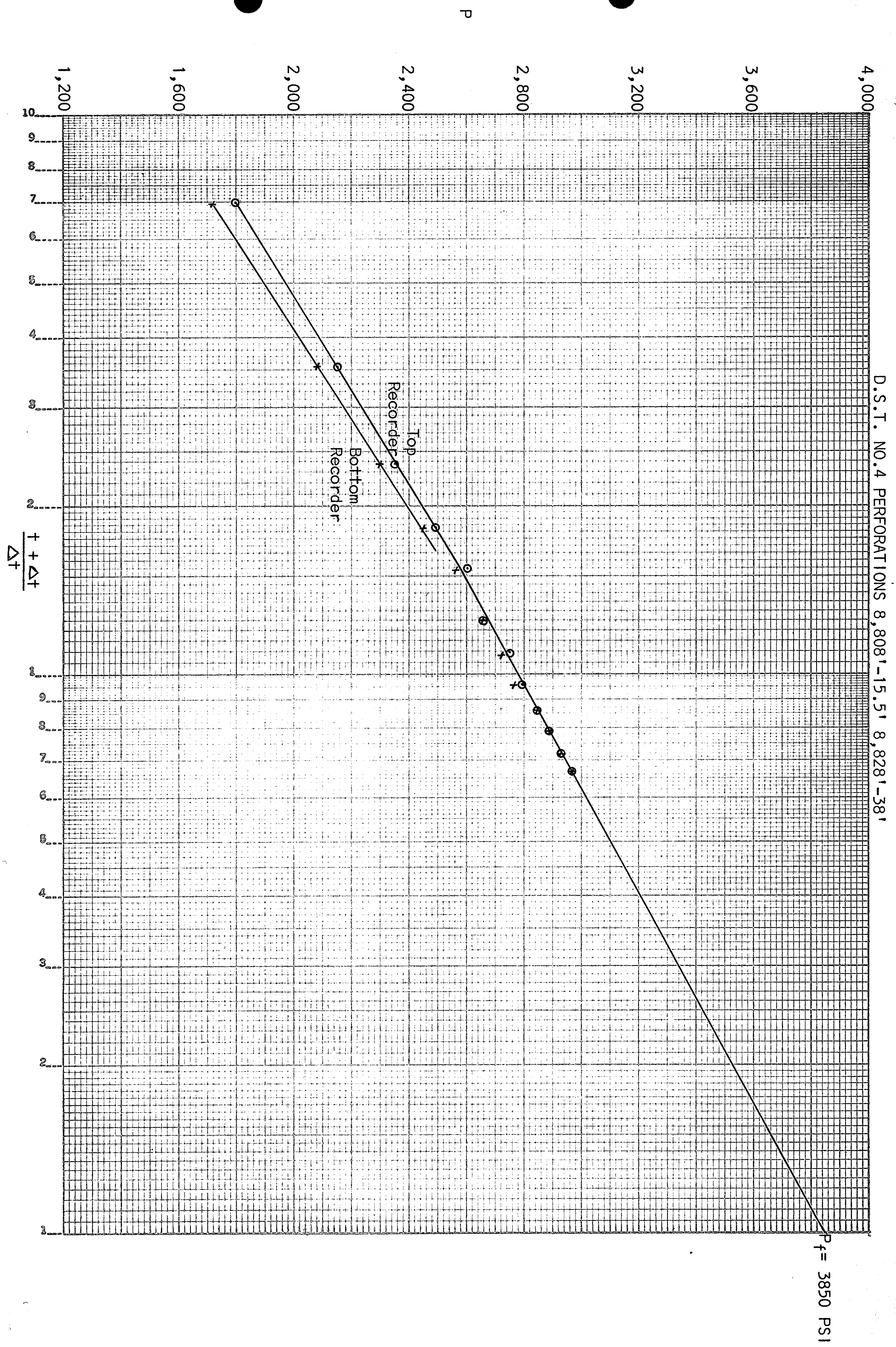
360 ft (1.6 bls) gas-cut mud
360 ft (1.6 bls) muddy water
1080 ft (4.5 bls) water, with trace of oil emulsion 700 ft above tester.
1880 ft (7.7 bls) total

Water resistivity 0.93 ohms @ 62°F
400 ppm $CaCO_3$

Supervisor: [signature]

GORMACK GRAPH PAPER · CHRISTCHURCH N.Z. 0322 Semi-log, 2 cycles X natural (20ths)

2-127



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2-126

GOLDEN BEACH NO.1A

D.S.T. NO.4

PERFORATIONS: 8,808' - 15.5'; 8,828' - 38'

FINAL FLOW RATE = 0.45 bl/hr. at 802 p.s.i.

TOTAL PRODUCTION = 7.7 bls.

t = 1030 minutes.

FINAL SHUT IN = PRESSURE BUILD UP:

Δt	$\frac{t + \Delta t}{\Delta t}$	Top Recorder 24 hr. clock	Bottom Recorder 72 hr. clock
15	69.5	1731	1801
30	35.3	2059	2155
45	23.9	2298	2353
60	18.2	2457	2489
75	15.4	2565	2598
90	12.4	2669	2668
105	10.8	2735	2743
120	9.6	2782	2799
135	8.6	2852	2855
150	7.9	2896	2896
165	7.2	2932	2937
180	6.7	2973	2968

FORMATION PRESSURE (P_f) = 3850 p.s.i. m = 1070 p.s.i.

$$\frac{Kh}{\mu} = 162.6 \frac{Q}{m} = \frac{162.6 \times 10.8}{1070} = 1.64$$

$$D.R. = \frac{0.183 (P_f - P_s)}{m} = \frac{0.183 (3850 - 802)}{1070} = 0.5$$

2-128

Flow Time	1st 2 Min.	2nd 624 Min.
Closed In Press. Time	1st 30 Min.	2nd 180 Min.
Pressure Readings	Field	Office Corrected
Depth Top Gauge	8851 Ft.	Blanked Off no
BT. P.R.D. No.	1857	Hour Clock 24
Initial Hydro Mud Pressure	4669	4545
Initial Closed in Pres.	3188	3141
Initial Flow Pres.	1: 76 2: 111	1: 107 2: 115
Final Flow Pres.	1: 76 2: 802	1: 80 2: 780
Final Closed in Pres.	3007	2942
Final Hydro Mud Pressure	4647	4545
Depth Cen. Gauge	Ft.	Blanked Off
BT. P.R.D. No.		Hour Clock
Initial Hydro Mud Pres.		
Initial Closed in Pres.		
Initial Flow Pres.	1 2	
Final Flow Pres.	1 2	
Final Closed in Pres.		
Final Hydro Mud Pres.		
Depth Bot. Gauge	8873 Ft.	Blanked Off yes
BT. P.R.D. No.	2181	Hour Clock 72
Initial Hydro Mud Pres.	4671	4613
Initial Closed in Pres.	3211	3203
Initial Flow Pres.	1: 74 2: 98	1: 91 2: 125
Final Flow Pres.	1: 74 2: 786	1: 91 2: 791
Final Closed in Pres.	3012	2988
Final Hydro Mud Pres.	4637	4613

Date	8-6-67	Ticket Number	460879-S
Kind of Job	Hook Wall Casing Packer	Halliburton District	Melbourne
Tester	Mr. Gloriod	Witness	Mr. Tyner
Drilling Contractor	ZAPATA - O D & E.		BM/sm
Elevation	102' guide base	Top Packer	
Total Depth		Bottom Packer	8860'
Interval Tested	8910-8917 8930-8940' 2 HPF	Formation Tested	GOLDEN BEACH
Casing or Hole Size	7" x 26#	Casing Perfs. Top / Bot.	8910 8940
Surface Choke	3/4"	Bottom Choke	5/8"
Size & Kind Drill Pipe	2 7/8" x 10.4#XIF	Drill Collars Above Tester (I.D. - LENGTH)	2" x 450'
Mud Weight	10.2#/ Gal.	Mud Viscosity	50 Sec.
Temperature	°F Est. 226 °F Actual	Anchor Size & Length	ID 1.75" OD 3.75" x 10'
Depths Mea. From	Rotary table	Depth of Tester Valve	8850 Ft.
Cushion (TYPE, AMOUNT)	Ft.	Depth Back Pres. Valve	Ft.
Recovered	360 Feet of gas cut mud		
Recovered	360 Feet of muddy water		
Recovered	1080 Feet of water with trace of oil emulsion		
Recovered	Feet of		
Oil A.P.I. Gravity		Water Spec. Gravity	
Gas Gravity		Surface Pressure	psi
Tool Opened	3:32 AM	Tool Closed	5:30 PM

Mea. From Tester Valve

Remarks Tool opened for a 2 minute first flow. Rotated tool for a 30 minute initial closed in pressure. Tool re-opened with a very weak blow with gas to the surface in 75 minutes. Took a 180 minute final closed in pressure.

Legal Location Sec. - Twp. - Rng.
Lease Name: GOLDEN BEACH
Well No.: 1-A
Test No.: 4
Field Area: ~~WILDCAT~~ BASS STRAIT
County
Lease Owner/Company Name: BURMAH OIL COMPANY OF AUSTRALIA LIMITED
State: VICTORIA
Owner's District: SALE

FORMATION TEST DATA

2-129

Gauge No. 1857	Depth 8851'		Clock 24 hour					Ticket No. 460879		
	First Flow Period		Initial Closed In Pressure			Second Flow Period		Final Closed In Pressure		
	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.
P_0	.000	107	.000		80	.000	115	.000		780
P_1	.007	80	.0101	.228	235	.4027	313	.0594	1.560	1885
P_2			.0202	.129	572	.8054	448	.1188	1.271	2236
P_3			.0303	.090	1421	1.2081	567	.1782	1.106	2424
P_4			.0404	.069	2058	1.6108	665	.2386	.993	2554
P_5			.0505	.056	2476	2.0135	765	.2970	.907	2647
P_6			.0606	.047	2721	2.094	780*	.3564	.838	2725
P_7			.0707	.041	2887			.4158	.781	2792
P_8			.0808	.036	3004			.4752	.734	2844
P_9			.0909	.032	3084			.5346	.692	2896
P_{10}			.1010	.029	3141			.594	.656	2942
Gauge No. 2181	Depth 8873'		Clock 72 hour							
P_0	.000	91	.000		91	.000	125	.000		791
P_1	.004	91	.0035	.330	359	.1413	314	.021	1.558	1918
P_2			.0070	.196	887	.2826	447	.042	1.269	2266
P_3			.0105	.140	1683	.4239	565	.063	1.104	2467
P_4			.0140	.109	2223	.5652	671	.084	.991	2593
P_5			.0175	.089	2571	.7065	771	.105	.905	3690
P_6			.0210	.075	2804	.7350	791 *	.126	.836	2770
P_7			.0245	.065	2903			.147	.780	2838
P_8			.0280	.057	3051			.168	.732	2893
P_9			.0315	.051	3128			.189	.691	2944
P_{10}			.0350	.046	3203			.210	.655	2988
Reading Interval			3			120		18		Minutes

REMARKS: *Last interval is equal to 24 minutes.

SPECIAL PRESSURE DATA

2-130

Liquid Production

		Time					
B.T. Gauge Numbers			1857	2181	Ticket Number	460879	
Initial Hydrostatic			PRESSURE 4545	PRESSURE 4613	Elevation	102	ft.
Final Hydrostatic			4545	4613	Indicated Production — 1st Flow	-	bbls./day
1st Flow	Initial	————	107	91	Indicated Production — Total Flow	13.7	bbls./day
1st Flow	Final	2	80	91	Drill Collar Length	450	ft.
Initial Closed In Pressure		30	3141	3203	Drill Collar I.D.	2.0	in.
2nd Flow	Initial	————	115	125	Drill Pipe Factor	0.00449	bbls./ft.
2nd Flow	Final	624	780	791	Hole Size	7.0	in.
Final Closed In Pressure		180	2942	2988	Footage Tested	17	ft.
Extrapolated Static Pressure	Initial		-	-	Mud Weight	10.2	lbs./gal.
Extrapolated Static Pressure	Final		3730	3776	Viscosity, ~~Oil or~~ Water	0.3	cp
Slope psi/cycle	Initial		-	-	Oil API Gravity	-	—
Slope psi/cycle	Final		3525	3569	Water Specific Gravity Est.	1.036*	—

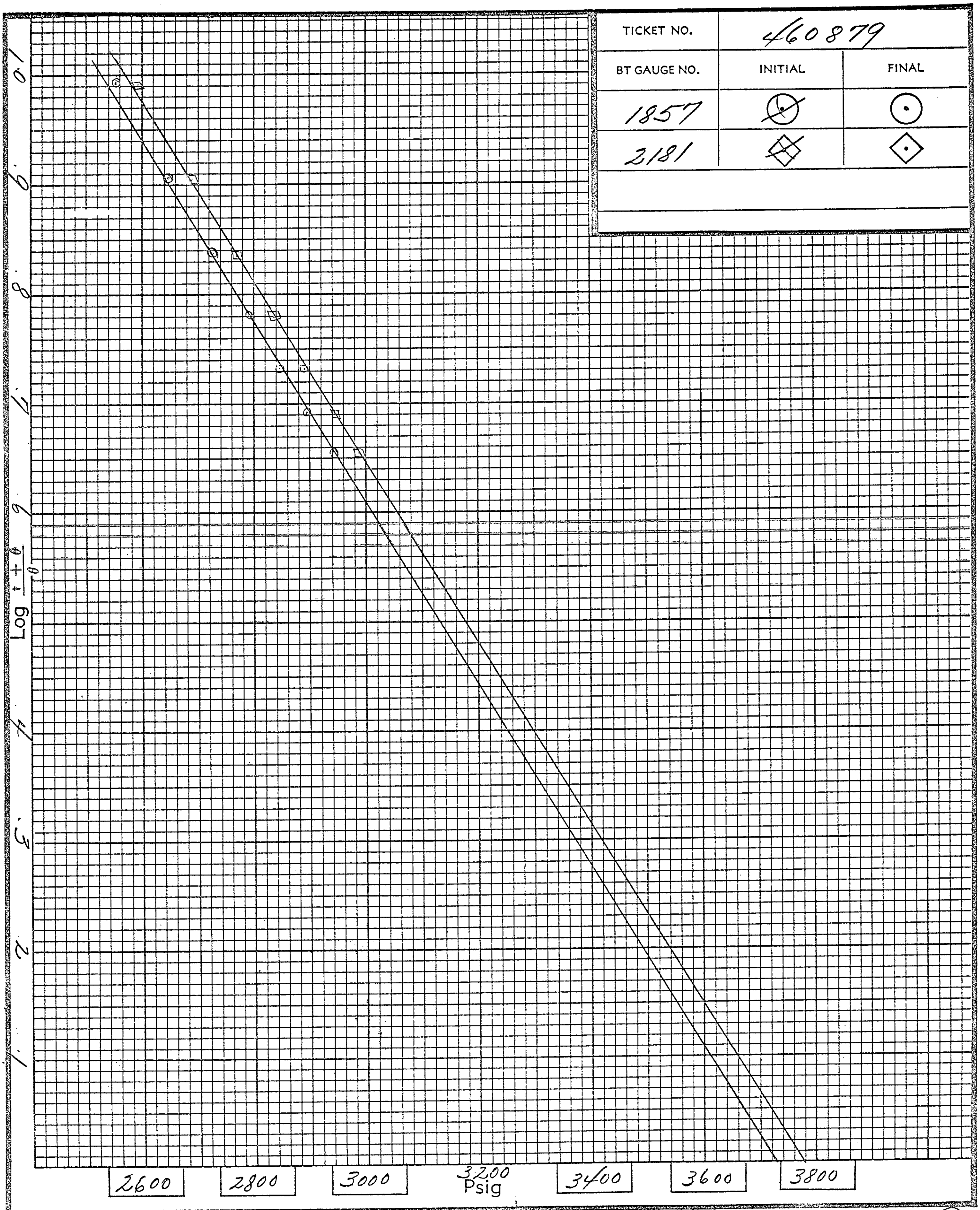
Remarks: *Calculations based on water of 1.036 specific gravity.
Initial CIP's not used in calculation due to the short first flow period, which may have relieved the supercharge forces.

SUMMARY

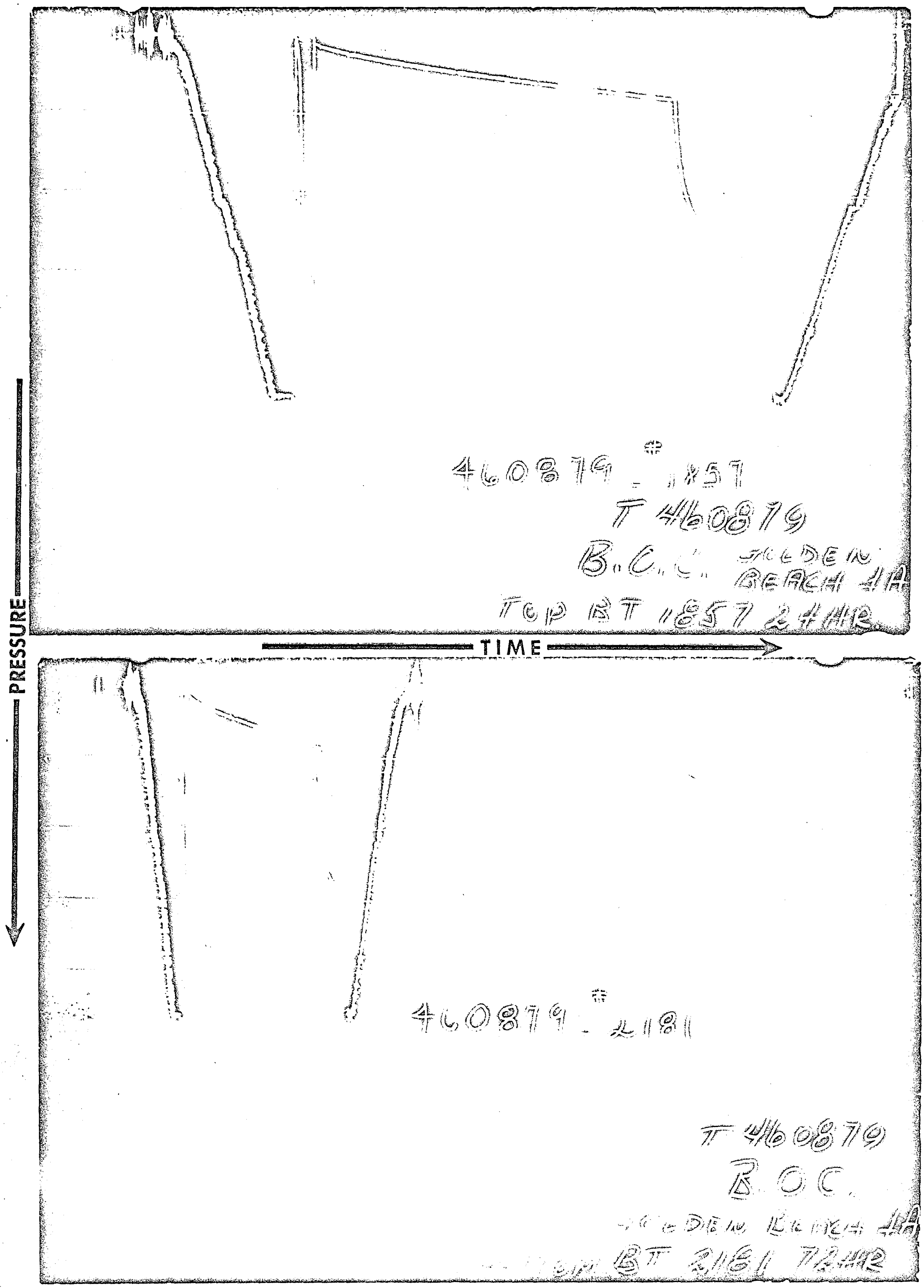
Gauge No. 1857, Depth 8851' — Gauge No. 2181, Depth 8873'

Product	Equation	1857 Initial	1857 Final	2181 Initial	2181 Final	Units
Production	$Q = \frac{1440\ R}{t}$		13.6		13.7	bbls./day
Transmissability	$\frac{Kh}{\mu} = \frac{162.6\ Q}{m}$		1.83		1.85	md. ft./cp
Indicated Flow Capacity	$Kh = \frac{Kh}{\mu}\ \mu$		0.55		0.55	md. ft.
Average Effective	$K = \frac{Kh}{h}$		-		-	md.
Permeability	$K_1 = \frac{Kh}{h_1}$		0.032		0.033	md.
Damage Ratio	$DR = .183\ \frac{Ps - Pf}{m}$		0.4		0.4	—
Theoretical Potential w/Damage Removed	$Q_1 = Q\ DR$		13.6		13.7	bbls./day
Approx. Radius of	$b \backsimeq \sqrt{Kt}$ or $\sqrt{Kt_0}$		-		-	ft.
Investigation	$b_1 \backsimeq \sqrt{K_1 t}$ or $\sqrt{K_1 t_0}$		4.5		4.5	ft.
Potentiometric Surface *	$Pot. = El - GD + 2.319\ Ps$		-99.		-14.	ft.

INTERPRETATIONS AND CALCULATIONS



EXTRAPOLATED PRESSURE GRAPH



Each Horizontal Line Equal to 1000 p.s.i.

2-133

Test No 5

Page 1 of 3

B.O.C. OF AUSTRALIA LTD.

DST AND PRODUCTION TEST DATA.

1. GENERAL DATA:

Well: GOLDEN BEACH NO. 1A Date 10-8-67

Formation: Golden Beach Test Interval: 8632-47 8660-80 Datum: Guide base

Casing OD: 7" lb/ft: 26 Perf/shots/ft: 2

~~Tbg~~/DP OD: $2\frac{7}{8}$" lb/ft: 10.4 length, ft: 8280

D.Collar OD $4\frac{1}{4}$" I.D.: 2" length, ft: 450

Packers, No: 1 Make: Halco Type RTTS OD $5\frac{7}{8}$" Durometer 85

Bottom Recorder, Type: BT Range, psi 8000 clock hrs: 72

Top Records, Type: BT Range, psi 8000 clock, hrs: 24

W.L. Recorder, Type: Kuster Range psi 8000 Clock, hrs: 36

Bottom Hole Choke, Size (s) $\frac{5}{8}$"

Bottom Hole Thermometer, Type: Max. recording Range °F

Water Cushion: NO (Yes or No), Amount, ft: -

2. SEPARATOR AND FLOW MEASUREMENT DEVICE DATA: SAME AS FOR TEST NO.1

FIRST STAGE:

Make: , OD Length:

WP, psig: , Rated Capacity, MCFD: B/D

FCV/Choke, Make: Type: Size:

PCV, Make: Type: Size:

LCV, Make: Type: Size:

Meter Run ID, Upstream: Downstream: Taps:

SECOND STAGE:

Make: OD: Length :

WP, psig: , Rated Capacity MCFD: B/D

Choke, Make: Type: Size:

PCV, Make: Type: Size:

LCV, Make: Type: Size:

Oil Meter Make: Type: Size:

Meter Run ID, Upstream: Downstream: Taps:

INHIBITOR PUMP:

Make: Model Single or Double Acting:

Plunger Size: , Stroke Length: .

PRODUCTION TANKS:

Dimensions: I.D: Length or Height:

Positioning (Horizontal or Vertical)

3. REMARKS AND SPECIAL DATA:

~~Packer set at 8610 ft~~

~~Otis 'J' nipple 53 ft above packer.~~

~~2 Halliburton volu me compensated slip joints 4050 ft above packer.~~

2-134

Test No. 5

Well: GOLDEN BEACH NO. 1A ,Date 10-8-67

4. TIME RECORDS: (Use 24-hr Clock)

Clocks started, Bottom: 0315, Top: 0320, W.L. 1214

Tools Started Into Hole: 0415, On Bottom: 0900, Set 1104

Tools Pulled Loose: 1452, At Surface: 1830 (11/8)

Operation	Start	End	Duration, mins.
Initial Flow	1105	1107	2
Initial Shut-in	1107	1207	60
First Flow	1207	1346	99
First Shut-in	1346	1452	66
Second Flow			
Second Shut-in			
Third Flow			
Third Shut-in			
Fourth Flow			
Fourth Shut-in			

5. FIRST STAGE FLOW RATE DATA AND CALCULATIONS:

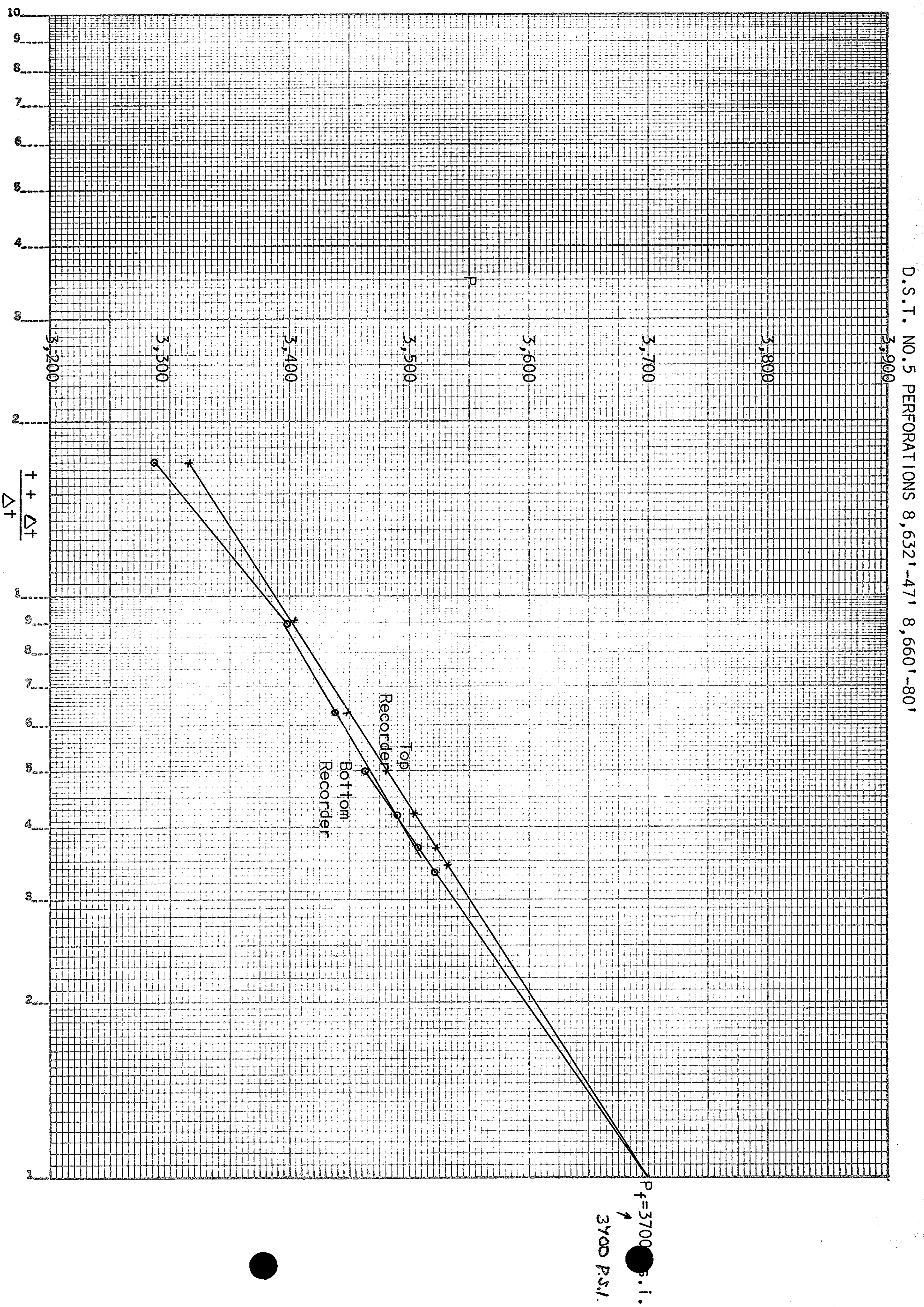
(Note: Pressure Base 14.7 psia., Temperature Base 60°F)

$F = F_b \cdot F_g : F_{pv}$ = (______) (______) (______) (24)= ______

Time	Wellhead PSIG	Wellhead °F	d in.	F	T_f °F	F_t	h_w	p_f	MCFD
				TOO SMALL TO MEASURE					

GORMACK GRAPH PAPERS ... RISTCHURCH N.Z. 0322 Semi-log, 2 cycles X natural (20ths)

2-137



2-138

Flow Time	1st 2 Min.	2nd 99 Min.
Closed In Press. Time	1st 60 Min.	2nd 66 Min.
Pressure Readings	Field	Office Corrected
Depth Top Gauge	8701 Ft.	no Blanked Off
BT. P.R.D. No.	1857	24 Hour Clock
Initial Hydro Mud Pressure	4518	4451
Initial Closed in Pres.	3719	3677
Initial Flow Pres.	1 156	152
	2 303	302
Final Flow Pres.	1 156	222
	2 2243	2203
Final Closed in Pres.	3564	3485
Final Hydro Mud Pressure	4513	4451
Depth Cen. Gauge	Ft.	Blanked Off
BT. P.R.D. No.		Hour Clock
Initial Hydro Mud Pres.		
Initial Closed in Pres.		
Initial Flow Pres.	1	
	2	
Final Flow Pres.	1	
	2	
Final Closed in Pres.		
Final Hydro Mud Pres.		
Depth Bot. Gauge	8723 Ft.	yes Blanked Off
BT. P.R.D. No.	2181	72 Hour Clock
Initial Hydro Mud Pres.	4576	4489
Initial Closed in Pres.	3747	3748
Initial Flow Pres.	1 187	*
	2 334	317
Final Flow Pres.	1 187	*
	2 2221	2237
Final Closed in Pres.	3549	3540
Final Hydro Mud Pres.	4548	4489

Date	8-10-67	Ticket Number	460880 S
Kind of Job	HOOK WALL	Halliburton District	MELBOURNE
Tester	GLORIOD	Witness	MR. TYNER
Drilling Contractor	ZAPATA - O. D. & E. LC		
Elevation	102' Guide Base	Top Packer	-
Total Depth	-	Bottom Packer	8710'
Interval Tested	8734'-8749' 8762'-8782' 2 HPF	Formation Tested	Golden Beach
Casing or Hole Size	7" x 26#	Casing Perfs.	Top 8734' / Bot. 8782'
Surface Choke	3/4"	Bottom Choke	5/8"
Size & Kind Drill Pipe	2 7/8" x 10.4# IF	Drill Collars Above Tester (I.D. - LENGTH)	2" - 450'
Mud Weight	10.2#/Gal.	Mud Viscosity	50 Sec.
Temperature	°F Est. 220 °F Actual	Anchor Size & Length	ID 1.75" OD 3.75" X 10'
Depths Mea. From	Rotary Table	Depth of Tester Valve	8700 Ft.
Cushion (TYPE / AMOUNT)	none Ft.	Depth Back Pres. Valve	none Ft.
Recovered	270 Feet of mud.		
Recovered	450 Feet of muddy water.		
Recovered	2080 Feet of water 1.12 OHMS		
Recovered	1700 Feet of water .90 OHMS		
Oil A.P.I. Gravity	-	Water Spec. Gravity	-
Gas Gravity	-	Surface Pressure	0 psi
Tool Opened	11:04 A.M.	Tool Closed	14:52 P.M.

(Recovered: Mea. From Tester Valve)

Remarks Opened tool for a 2 minute first flow. Took a 60 minute initial closed in pressure. Re-opened tool for a 99 minute final flow with very weak blow increasing some during 2nd. flow period. No gas to surface. Closed tool for a 66 minute final closed in pressure. * Unable to read.

Lease Name	GOLDEN BEACH
Well No.	1 A
Test No.	5
Legal Location Sec. - Twp. - Rng.	- - - -
Field Area	WILDCAT BASS STRAIT
County	- -
State	VICTORIA
Lease Owner/Company Name	BURMAH OIL COMPANY OF AUSTRALIA LTD.
Owner's District	SALE

FORMATION TEST DATA

9

2-135

Test No 5

Date 10-8-67

Well: GOLDEN BEACH NO. 1A

6. SECOND STAGE FLOW RATE DATA AND CALCULATIONS:

$F = F_b \cdot F_g \cdot F_r \cdot Y = (\_\_\_)(\_\_\_)(\_\_\_)(\_\_\_)(24) = \_\_\_$

Time	Liquid Meter Reading	B/D	d in.	F	T_f °F	T_t	h_w	p_f	MCFD
				TOO	SMALL	TO	MEASURE		

7. SAMPLING AND MISCELLANEOUS DATA: (tank gauging checks, water measurements, gravity measurements, on-site gas analyses, hydrate inhibitor type and injection rate, etc.)

INITIAL FLOW: Weak Blow

FINAL FLOW : Fair blow. No combustible gas.

ON-SITE GAS ANALYSIS:

C_1	12.0%
~~C_2~~	~~0.3~~
C_3	0.09
Air	86.8
	99.19

RECOVERED FROM PIPE ABOVE TESTER:

~~Quantity~~	~~Resistivity @ 57°F.~~
270 ft (1.2 bls) mud.	
450 ft (2.0 bls) muddy water.	1.29 ohms
2080 ft (9.4 bls) water.	1.12 decreasing to 0.91 ohms
1700 ft (7.4 bls) water.	0.90 ohms
4500 ft (20.0 bls) total	

Pockets of gas and trace fluorescent scum.

3 ft silt above Otis nipple: light grey, 90% quartz, 10% coal grains, trace felspar and mica.

Supervisor: [signature]

GOLDEN BEACH [illegible].1A

D.S.T. NO.5

PERFORATIONS: 8,632' - 47'; 8,660' - 80'

FINAL FLOW RATE: 7.5 bl/hr. at 2225 p.s.i.

TOTAL PRODUCTION: 20 bls.

$t = 160$ minutes

INITIAL SHUT-IN: 3728 (top 24 hrs.) 3724 (bottom 72 hr.)

FINAL SHUT-IN:

PRESSURE BUILD UP:

Δt	$\frac{t + \Delta t}{\Delta t}$	Top Recorder 24 hr. clock	Bottom Recorder 72 hr. clock
10	17	3,316	3,288
20	9	3,402	3,399
30	6.3	3,449	3,438
40	5	3,480	3,464
50	4.2	3,507	3,490
60	3.7	3,524	3,506
66	3.43	3,533	-
68	3.35	-	3,523

FORMATION PRESSURE (P_f) = 3700 p.s.i. $m = 320$

$$\frac{Kh}{\mu} = 162.6 \frac{Q}{m}$$

$$= \frac{162.6 \times 180}{320}$$

$$= 91$$

$$D.R. = \frac{0.183\ (P_f - P_s)}{m}$$

$$= \frac{0.183\ (3725 - 2225)}{320}$$

$$= 0.86$$

Gauge No. 1857 | Depth 8701' | Clock 24 hour | Ticket No. 460880

	First Flow Period		Initial Closed In Pressure			Second Flow Period		Final Closed In Pressure		
	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log (t+⊖)/⊖	PSIG Temp. Corr.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log (t+⊖)/⊖	PSIG Temp. Corr.
P0	.000	152	.000	-	222	.000	302	.000	-	2203
P1	.007	222	.0205	.127	3478	.0338	633	.0202	1.253	3234
P2			.0410	.068	3602	.0676	924	.0404	.976	3305
P3			.0615	.046	3636	.1015	1169	.0606	.822	3351
P4			.0820	.035	3654	.1354	1382	.0808	.718	3383
P5			.1025	.028	3665	.1692	1579	.1010	.642	3405
P6			.1230	.024	3671	.2030	1742	.1212	.582	3426
P7			.1435	.020	3675	.2369	1866	.1414	.533	3422
P8			.1640	.018	3675	.2707	1991	.1616	.493	3455
P9			.1845	.016	3677	.3045	2110	.1818 .2020	.459 .430	3465 3474
P10			.2050	.014	3677	.3350	2203*	.2220	.404	3485

Gauge No. 2181 | Depth 8723' | Clock 72 hour

	First Flow Period		Initial Closed In Pressure			Second Flow Period		Final Closed In Pressure		
P0	UNABLE	TO READ	.000	-	194	.000	317	.000	-	2237
P1			.0075	.124	3123	.0121	649	.007	1.267	3288
P2			.0150	.066	3605	.0242	953	.014	.989	3361
P3			.0225	.045	3668	.0364	1189	.021	.834	3375
P4			.0300	.034	3702	.0485	1402	.028	.730	3433
P5			.0375	.028	3722	.0606	1608	.035	.653	3458
P6			.0450	.023	3731	.0727	1758	.042	.592	3477
P7			.0525	.020	3736	.0848	1889	.049	.544	3494
P8			.0600	.017	3743	.0970	2022	.056	.503	3508
P9			.0675	.015	3746	.1091	2145	.063 .070	.469 .439	3518 3528
P10			.0750	.014	3748	.1200	2237*	.077	.413	3540
Reading Interval			6			10		6		Minutes

REMARKS: * Last interval equalto 9 minutes

SPECIAL PRESSURE DATA

2-140

Liquid Production

B.T. Gauge Numbers			1857	2181	Ticket Number		460880	
			PRESSURE	PRESSURE				
Initial Hydrostatic			4451	4489	Elevation		102	ft.
Final Hydrostatic			4451	4489	Indicated Production	1st Flow	-	bbls./day
		Time				Total Flow	361	bbls./day
1st Flow	Initial	————	152	**	Drill Collar Length		450	ft.
	Final	2	222	**				
Initial Closed In Pressure		60	3677	3748	Drill Collar I.D.		2.0	in.
2nd Flow	Initial	————	302	317	Drill Pipe Factor		0.00449	bbls./ft.
	Final	99	2203	2237	Hole Size		7.0	in.
Final Closed In Pressure		66	3485	3540	Footage Tested		35	ft.
Extrapolated Static Pressure	Initial		-	0	Mud Weight		10.2	lbs./gal.
	Final		3616	3673	Viscosity, Oil or Water		0.31	cp
Slope ~~psi/cycle~~ P 10	Initial		-	0	Oil API Gravity		-	—
	Final		3287	3342	Water Specific Gravity Est.		1.036*	—

Remarks: * Calculations based on water of 1.036 specific gravity ** Unable to read Initial closed in pressure no used in calculations due to the short first flow period which may not have relieved the supercharge forces.

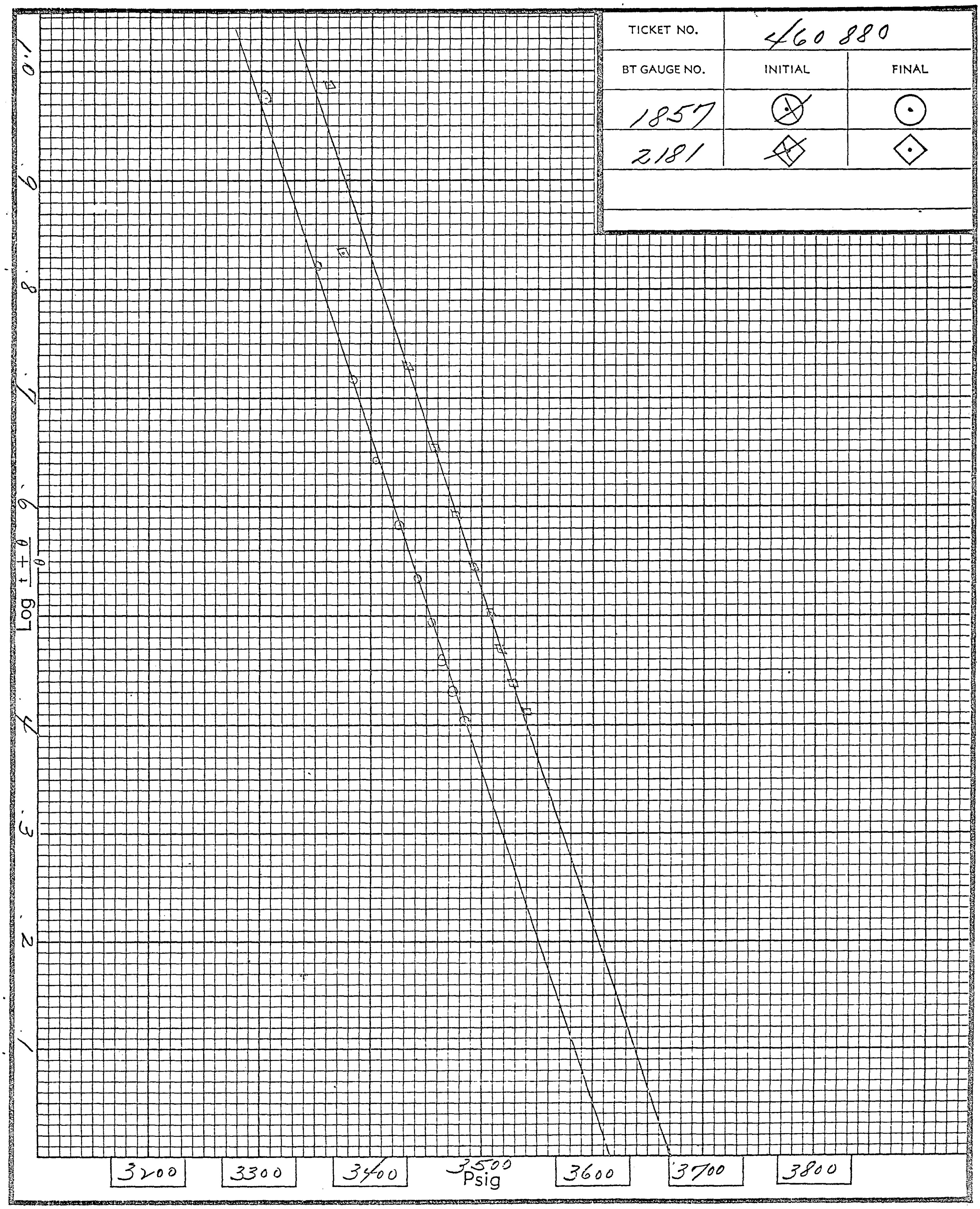
SUMMARY

Gauge No. 1857 Depth 8701'

Gauge No. 2181 Depth 8723'

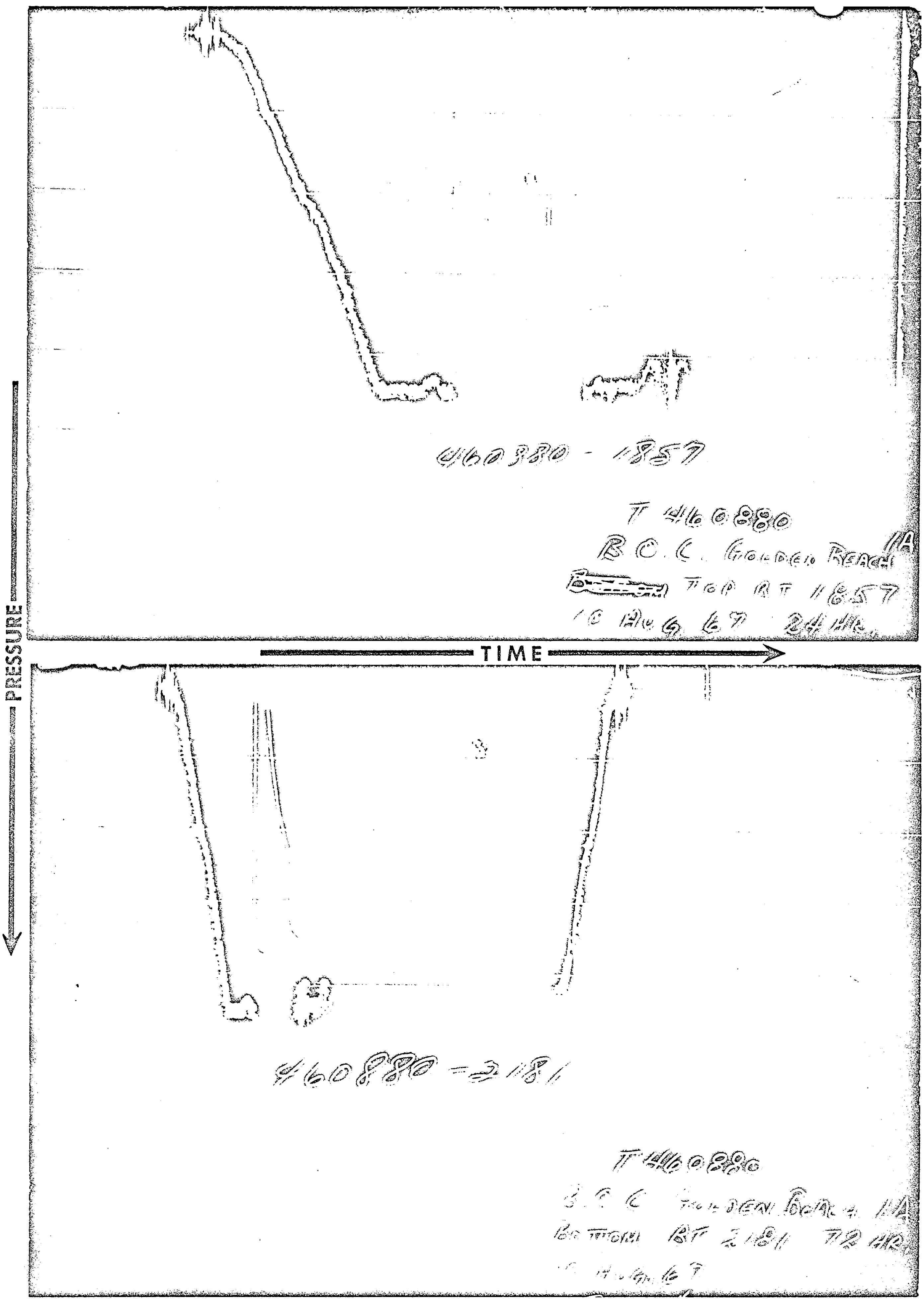
Product	Equation	Initial (1857)	Final (1857)	Initial (2181)	Final (2181)	Units
Production	$Q = \frac{1440\ R}{t}$		359		361	bbls. day
Transmissibility	$\frac{Kh}{\mu} = \frac{162.6\ Q}{m}$		177.9		177.6	md. ft. cp
Indicated Flow Capacity	$Kh = \frac{Kh}{\mu}\ \mu$		55.08		55.04	md. ft.
Average Effective	$K = \frac{Kh}{h}$		-		-	md.
Permeability	$K_1 = \frac{Kh}{h_1}$		1.574		1.573	md.
Damage Ratio	$DR = .183\ \frac{Ps - Pf}{m}$		0.8		0.8	—
Theoretical Potential w/Damage Removed	$Q_1 = Q\ DR$		359		361	bbls. day
Approx. Radius of	$b \leftrightarrows \sqrt{Kt}$ or $\sqrt{Kt_0}$		-		-	ft.
Investigation	$b_1 \leftrightarrows \sqrt{K_1 t}$ or $\sqrt{K_1 t_0}$		12.6		12.6	ft.
Potentiometric Surface *	Pot. = El — GD + 2.319 Ps		-213		-103	ft.

INTERPRETATIONS AND CALCULATIONS



EXTRAPOLATED PRESSURE GRAPH

2-142



Each Horizontal Line Equal to 1000 p.s.i.

2-143

B.O.C. OF AUSTRALIA LTD

DST AND PRODUCTION TEST DATA.

1. GENERAL DATA:

Well: GOLDEN BEACH NO. 1A Date 12-8-67

Formation: Golden Beach Test Interval 8632-47 8660-80 Datum: Guide base

Casing OD: 7" lb/ft: 26 Perf/shots/ft: 2

~~Tbg~~/DP OD: $2\frac{7}{8}$" lb/ft: 10.4 length, ft: 8280

D.Collar OD $4\frac{1}{4}$" I.D.: 2" length, ft: 450

Packers, No: 1 Make: Halco Type RTTS OD $5\frac{7}{8}$" Durometer 85

Bottom Recorder, Type: BT Range, psi 8000 clock hrs: 72

Top Records, Type: BT Range, psi 8000 clock, hrs: 24

W.L. Recorder, Type: Kuster Range psi 8000 Clock, hrs: 36

Bottom Hole Choke, Size (s) $\frac{5}{8}$"

Bottom Hole Thermometer, Type: Max. recording Range °F

Water Cushion: NO (Yes or No), Amount, ft: -

2. SEPARATOR AND FLOW MEASUREMENT DEVICE DATA:

FIRST STAGE:

Make: , OD Length:

WP, psig: , Rated Capacity, MCFD: B/D

FCV/Choke, Make: Type: Size:

PCV, Make: Type: Size:

LCV, Make: Type: Size:

Meter Run ID, Upstream: Downstream: Taps:

SECOND STAGE:

Make: OD: Length :

WP, psig: , Rated Capacity MCFD: B/D

Choke, Make: Type: Size:

PCV, Make: Type: Size:

LCV, Make: Type: Size:

Oil Meter Make: Type: Size:

Meter Run ID, Upstream: Downstream: Taps:

INHIBITOR PUMP:

Make: Model Single or Double Acting:

Plunger Size: , Stroke Length: .

PRODUCTION TANKS:

Dimensions: I.D: Length or Height:

Positioning (Horizontal or Vertical)

3. REMARKS AND SPECIAL DATA:

Packer set at 8610 ft.

Otis 'J' n ipple 53 ft above packer.

2 Halliburton volume compensated slip-joints 4050 ft above tester.

2-164

Test No. 6

Well: GOLDEN BEACH NO. 1A ,Date 12-8-67

4. TIME RECORDS: (Use 24-hr Clock)

Clocks started, Bottom: 2015 (11/8), Top: 2020 ,W.L. 0120

Tools Started Into Hole: 2030 , On Bottom: 0015 , Set 0036½

Tools Pulled Loose: 1843 , At Surface: 2330

Operation	Start	End	Duration, mins.
Initial Flow	0038	0039½	1½
Initial Shut-in	0039½	0137	57½
First Flow	0137	1813	696
First Shut-in	1813	1843	30
Second Flow			
Second Shut-in			
Third Flow			
Third Shut-in			
Fourth Flow			
Fourth Shut-in			

5. FIRST STAGE FLOW RATE DATA AND CALCULATIONS:

(Note: Pressure Base 14.7 psia., Temperature Base 60°F)

$F = F_b \cdot F_g \cdot F_{pv}$ = (______) (______) (______) (24)= ______

Time	Wellhead PSIG	Wellhead °F	d in.	F	T_f °F	F_t	h_w	P_f	MCFD
				TOO	SMALL	TO	MEASURE		

Test No 6
Date 12-8-67

2-145

Well: GOLDEN BEAC[illegible] NO. 1A

6. SECOND STAGE FLOW RATE DATA AND CALCULATIONS:

$F = F_b \cdot F_g \cdot F_r \cdot Y =$ (____) (____) (____) (____) (24)= ____

~~Time~~	~~Liquid Meter~~ ~~Reading~~	~~B/D~~	~~d in.~~	~~XR~~	~~T_f °F~~	~~T_t~~	~~h_w~~	~~P_f~~	~~MCFD~~
SWAB NO.	DEPTH	BLS.							
1	2500	0.0	(Fluid level 1000 ft)						
2-5	2500	0.75							
6-17	3300	4.25							
Took bottom sample of water with bailer.									
18-22	3300	7.0							

7. SAMPLING AND MISCELLANEOUS DATA:

(tank gauging checks, water measurements, gravity measurements, on-site gas analyses, hydrate inhibitor type and injection rate, etc.)

INITIAL FLOW: Weak blow.

FINAL FLOW: Weak blow for 6 hrs, then no blow. Combustible gas reached surface after 2 hrs.

ON-SITE GAS ANALYSIS:

- C_1 45.0%
- C_2 2.2
- C_3 0.5
- CO_2 1.5
- N_2 38.0
- Air 12.0
- 99.2

LIQUID RECOVERED: Bls

- From swab nos. 1-17: 5.0
- From swab nos. 18-22: 7.0
- 7500 ft in pipe above tester: 33.0
- Total recovered (all water) 45.0 bls

WATER ANALYSIS:

- Resistivity 0.89-0.93 ohms @ 64°F.
- Salinity 5000-7000 ppm Cl
- $CaCO_3$ 200-280 ppm

RECOVERED FROM CIP VALVE:

From initial flow: 50 cc silt, light grey, 90% quartz, 10% coal grains, trace felspar and mica.

From final flow: 20 cc coal and sand. Coal dark brown and black. Sand fine to medium grained, subangular to angular, clear quartz. Coal 80% Sand 20%

Supervisor: [signature]

2-146

	Field	Office Corrected
Flow Time	1st 2 Min.	2nd 16 HR. 51 Min.
Closed In Press. Time	1st 60 Min.	2nd 30 Min.
Pressure Readings	Field	Office Corrected
Depth Top Gauge	8701 Ft.	Blanked Off NO
BT. P.R.D. No.	1857	24 Hour Clock
Initial Hydro Mud Pressure	4518	4447
Initial Closed in Pres.	3724	3671
Initial Flow Pres. 1	187	222
Initial Flow Pres. 2	312	309
Final Flow Pres. 1	187	191
Final Flow Pres. 2	3586	3184
Final Closed in Pres.	CHART TIME EXPIRED	
Final Hydro Mud Pressure	AFTER SECOND FLOW	
Depth Cen. Gauge	Ft.	Blanked Off
BT. P.R.D. No.		Hour Clock
Initial Hydro Mud Pres.		
Initial Closed in Pres.		
Initial Flow Pres. 1		
Initial Flow Pres. 2		
Final Flow Pres. 1		
Final Flow Pres. 2		
Final Closed in Pres.		
Final Hydro Mud Pres.		
Depth Bot. Gauge	8723 Ft.	Blanked Off YES
BT. P.R.D. No.	2181	72 Hour Clock
Initial Hydro Mud Pres.	4571	4562
Initial Closed in Pres.	3719	3736
Initial Flow Pres. 1	202	*
Initial Flow Pres. 2	319	334
Final Flow Pres. 1	202	*
Final Flow Pres. 2	3525	3259
Final Closed in Pres.	3574	3567
Final Hydro Mud Pres.	4567	4562

Date	8-12-67	Ticket Number	460881 - S
Kind of Job	HOOK WALL	Halliburton District	MELBOURNE
Tester	MR. GLORIOD	Witness	MR. TYNER
Drilling Contractor	ZAPATA - O. D. & E. IC		
Elevation	102' GUIDE BASE	Top Packer	-
Total Depth	8852'	Bottom Packer	8710'
Interval Tested	8710'-8852'	Formation Tested	GOLDEN BEACH
Casing or Hole Size	7" x 26#	Casing Perfs.	Top 8734' Bot. 8782'
Surface Choke	3/4"	Bottom Choke	5/8"
Size & Kind Drill Pipe	2 7/8" x 10.4#IF	Drill Collars Above Tester (I.D. - LENGTH)	2" x 450'
Mud Weight	10.2	Mud Viscosity	50
Temperature	°F Est.; 220 °F Actual	Anchor Size & Length	ID 1.75" OD 3.75" x 10'
Depths Mea. From	ROTARY TABLE	Depth of Tester Valve	8700' Ft.
Cushion (TYPE / AMOUNT)	- Ft.	Depth Back Pres. Valve	- Ft.
Recovered	+- 7500 Feet of Mud & filtrate water		
Recovered	Feet of		
Recovered	Feet of		
Recovered	Feet of		
Oil A.P.I. Gravity	-	Water Spec. Gravity	-
Gas Gravity	-	Surface Pressure	- psi
Tool Opened	12:50 AM	Tool Closed	6:43 PM

Mea. From Tester Valve

Remarks Opened tool for 2 minute 1st flow. Closed tool for 60 minute initial closed in pressure. Reopened tool for 16 hour 51 minute 2nd flow with a good blow gradually increasing. Rigged up and swabbed well. Closed tool for 30 minute final closed in pressure. *Unable to read

Legal Location Sec. - Twp. - Rng.: ----
Lease Name: GOLDEN BEACH
Well No.: 1-A
Test No.: 6
Field Area: BASS STRAIT WILDCAT
Lease Owner/Company Name: BURMAH OIL COMPANY OF AUSTRALIA LIMITED
County: ---
State: VICTORIA
Owner's District: SALE

FORMATION TEST DATA

2-147

Gauge No. 1857	Depth 8701'		Clock 24 hour					Ticket No. 460881		
	First Flow Period		Initial Closed In Pressure			Second Flow Period		Final Closed In Pressure		
	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log (t+Θ)/Θ	PSIG Temp. Corr.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log (t+Θ)/Θ	PSIG Temp. Corr.
P0	.000	222	.000	---	191	.000	309			
P1	.006	191	.0194	.117	3550	.0364	591			
P2			.0388	.062	3620	.0728	839	CHART TIME EXPIRED AFTER SECOND FLOW PERIOD		
P3			.0582	.042	3639	.1092	1061			
P4			.0776	.032	3652	.1456	1254			
P5			.0970	.026	3658	.1820	1419			
P6			.1164	.021	3662	.2184	1586			
P7			.1358	.018	3665	.2550	1731			
P8			.1552	.016	3667					
P9			.1746	.014	3669	TOTAL	TIME			
P10			.1940	.013	3671	3.323	3184			

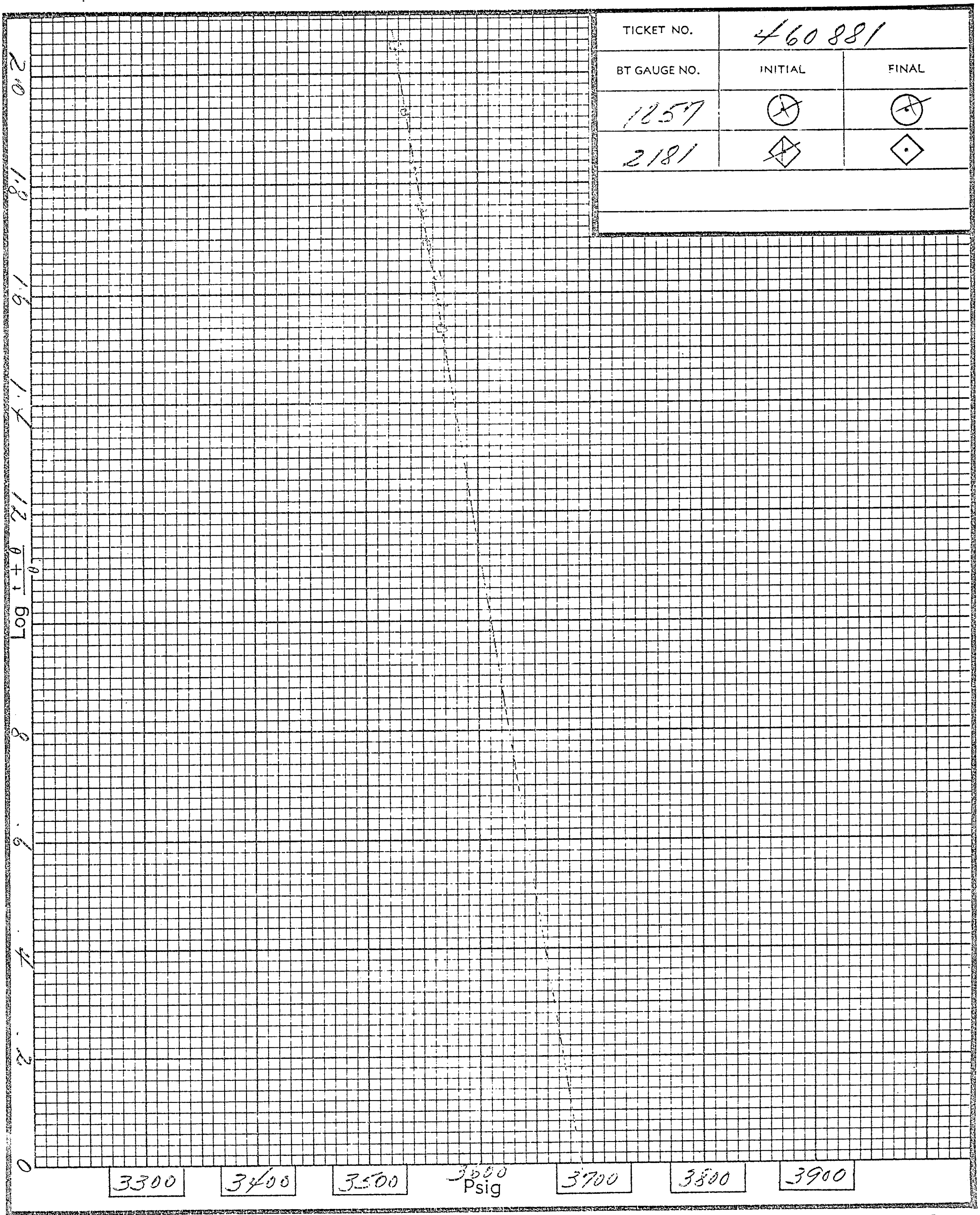
Gauge No. 2181	Depth 8723'		Clock 72 hour							
P0	UNABLE	TO READ	.000	---	221	.000	334	.000	----	3259
P1			.0072	.124	3441	.0111	565	.0035	2.527	3489
P2			.0144	.066	3659	.0222	789	.0070	2.227	3518
P3			.0216	.045	3697	.0333	1000	.0105	2.052	3528
P4			.0288	.034	3709	.0444	1167	.0140	1.928	3535
P5			.0360	.028	3719	.0555	1337	.0175	1.833	3545
P6			.0432	.023	3724	.0666	1479	.0210	1.755	3550
P7			.0504	.020	3729	.0780	1627	.0245	1.689	3554
P8			.0576	.017	3731			.0280	1.632	3562
P9			.0648	.015	3734	TOTAL	TIME	.0315	1.583	3567
P10			.0720	.014	3736	1.172	3259	.0350	1.538	3567
Reading Interval				6		10 *			3	Minutes

REMARKS: *Approximately 70 minutes segmented at the beginning of flow before swabbing began.

SPECIAL PRESSURE DATA

2-148

TICKET NO.	460881	
BT GAUGE NO.	INITIAL	FINAL
1257		
2181		



EXTRAPOLATED PRESSURE GRAPH

Liquid Production

B.T. Gauge Numbers		1857	2181	Ticket Number		460881
		PRESSURE	PRESSURE			
Initial Hydrostatic		4447	4562	Elevation		102 ft.
Final Hydrostatic		**	4562	Indicated Production	1st Flow	- bbls./day
	Time				Total Flow	278 bbls./day
1st Flow Initial	----	222	***			
1st Flow Final	2	191	***	Drill Collar Length		450 ft.
Initial Closed In Pressure	60	3671	3736	Drill Collar I.D.		2.0 in.
2nd Flow Initial	----	309	334	Drill Pipe Factor		0.00449 bbls./ft.
2nd Flow Final	1011	3184	3259	Hole Size		7.0 in.
Final Closed In Pressure	30	*	3586	Footage Tested		48 ft.
Extrapolated Static Pressure Initial		-	-	Mud Weight		10.2 lbs./gal.
Extrapolated Static Pressure Final		-	3690	Viscosity, Oil or Water		0.31 cp
Slope psi/cycle Initial		-	-	Oil API Gravity		-
Slope psi/cycle P10 Final		-	3610	Water Specific Gravity EST.		1.036

Remarks: *Calculations based on water of 1.036 specific gravity.
**Chart time expired
***Unable to read

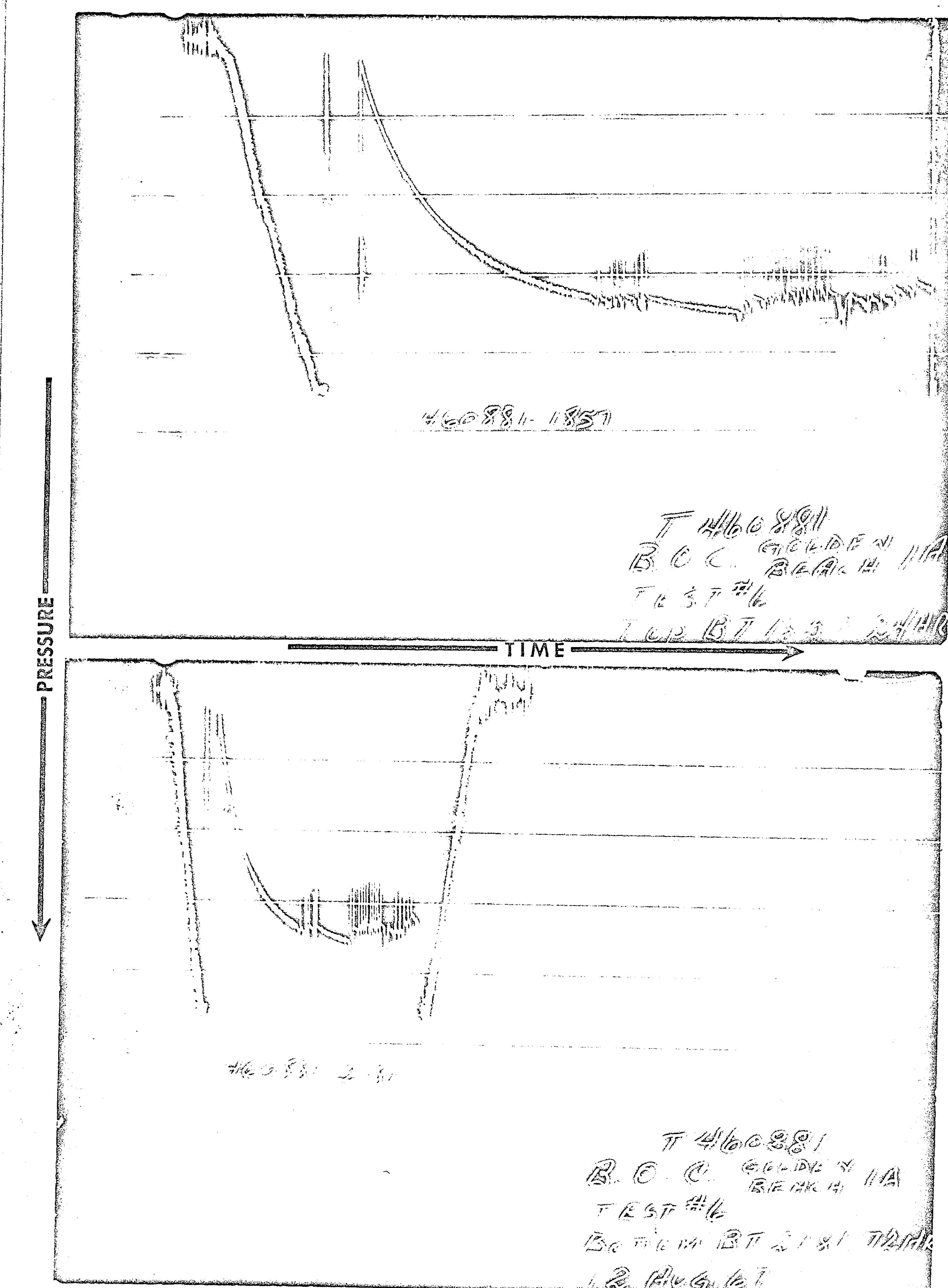
Initial closed in pressure not used in calculations due to short first flow period which may not have relieved the supercharge.

SUMMARY

Gauge No. Depth 1857/8701' — Gauge No. Depth 2181/8723'

Product	Equation	1857 Initial	1857 Final	2181 Initial	2181 Final	Units
Production	$Q = \frac{1440\ R}{t}$				278.	bbls./day
Transmissability	$\frac{Kh}{\mu} = \frac{162.6\ Q}{m}$				564.9	md. ft./cp
Indicated Flow Capacity	$Kh = \frac{Kh}{\mu}\ \mu$				175.1	md. ft.
Average Effective	$K = \frac{Kh}{h}$				-	md.
Permeability	$K_1 = \frac{Kh}{h_1}$				3.648	md.
Damage Ratio	$DR = .183\ \frac{Ps - Pf}{m}$				0.99	—
Theoretical Potential w/Damage Removed	$Q_1 = Q\ DR$				278	bbls./day
Approx. Radius of Investigation	$b \cong \sqrt{Kt}$ or $\sqrt{Kt_0}$				-	ft.
	$b_1 \cong \sqrt{K_1 t}$ or $\sqrt{K_1 t_0}$				60.8	ft.
Potentiometric Surface *	$Pot. = El - GD + 2.319\ Ps$				-64.	ft.

INTERPRETATIONS AND CALCULATIONS



Each Horizontal Line Equal to 1000 p.s.i.

2751

Test No 7

Page 1 of 3

B.O.C. OF AUSTRALIA LTD

DST AND PRODUCTION TEST DATA.

1. GENERAL DATA:

Well: GOLDEN BEACH NO. 1A Date 13-8-67

Formation: Golden Beach Test Interval: 8632-47 8660-80 Datum: Guide base

Casing OD: 7" lb/ft: 26 Perf. shots/ft: 2

Tbg/DP OD: 2⅞" lb/ft: 10.4 length, ft: 8270

D.Collar OD 4½" I.D.: 2" length, ft: 450

Packers, No: 1 Make: Halco Type RTTS OD 5⅞" Durometer 85

Bottom Recorder, Type: BT Range,psi 8000 clock hrs: 72

Top Records, Type: BT Range,psi 8000 clock, hrs: 24

W.L. Recorder, Type: - Range psi - Clock,hrs: -

Bottom Hole Choke, Size (s) ⅝"

Bottom Hole Thermometer, Type: Max. recording Range °F

Water Cushion: No (Yes or No), Amount, ft: -

2. SEPARATOR AND FLOW MEASUREMENT DEVICE DATA: SAME AS TEST NO. 1

FIRST STAGE:

Make: , OD Length:

WP,psig: , Rated Capacity,MCFD: B/D

FCV/Choke, Make: Type: Size:

PCV, Make: Type: Size:

LCV, Make: Type: Size:

Meter Run ID, Upstream: Downstream: Taps:

SECOND STAGE:

Make: OD: Length :

WP,psig: , Rated Capacity MCFD: B/D

Choke, Make: Type: Size:

PCV, Make: Type: Size:

LCV, Make: Type: Size:

Oil Meter Make: Type: Size:

Meter Run ID, Upstream: Downstream: Taps:

INHIBITOR PUMP:

Make: Model Single or Double Acting:

Plunger Size: , Stroke Length: .

PRODUCTION TANKS:

Dimensions: I.D: Length or Height:

Positioning (Horizontal or Vertical)

3. REMARKS AND SPECIAL DATA:

Packer set at 8610 ft.

Otis nipple run at 48 ft above packer.

2 Halliburton volume compensated slip joints run 4045 ft above packer.

C.I.P. Valve not run.

Z-152

Page 1 Of 3

Test No. 7

Well: GOLDEN BEACH NO. 1A, Date 13/14-8-67

4. TIME RECORDS: (Use 24-hr Clock)

Clocks started, Bottom: 0115, Top: 0120, W.L. -

Tools Started Into Hole: 0140, On Bottom: 0630, Set 0714

Tools Pulled Loose: 1845, At Surface: 2400

Operation	Start	End	Duration, mins.
Initial Flow	0715 (13/8)	1845 (14/8)	2130
Initial Shut-in			
First Flow			
First Shut-in			
Second Flow			
Second Shut-in			
Third Flow			
Third Shut-in			
Fourth Flow			
Fourth Shut-in			

5. FIRST STAGE FLOW RATE DATA AND CALCULATIONS:

(Note: Pressure Base 14.7 psia., Temperature Base 60°F)

$F = F_b \cdot F_g \cdot F_{pv}$ = (_____) (_____) (_____) (24)= _____

Time	Wellhead PSIG	Wellhead °F	d in.	F	T_f °F	F_t	h_w	P_f	MCFD
SWAB NO.	DEPTH	BLS							
1-16	4160	2.0							
17-29	2000	2.0							
LEFT WELL OPEN OVERNIGHT									
30-57	1560-3500	27.0							
LEFT WELL OPEN FOR 2¼ HRS									
58-73	2080-~~3480~~	23.0							

Test No 7

Well: GOLDEN BEACH No. 1A

Date 13/14-8-67

6. SECOND STAGE FLOW RATE DATA AND CALCULATIONS: NONE

$F = F_b \cdot F_g \cdot F_r \cdot Y = (\_\_\_\_)(\_\_\_\_)(\_\_\_\_)(\_\_\_\_)(24) = \_\_\_\_$

Time	Liquid Meter Reading	Liquid Meter B/D	d in.	F	T_f °F	T_t	h_w	p_f	MCFD

7. SAMPLING AND MISCELLANEOUS DATA: (tank gauging checks, water measurements, gravity measurements, on-site gas analyses, hydrate inhibitor type and injection rate, etc.)

FLOW: Weak blow for only 2 hrs. Combustible gas reached surface after 40 minutes of flow, but in very small quantity.

SWABBING: Recovered 54 bls water from 73 swabs in 2 days.

ON-SITE GAS ANALYSIS:

C_1	34%
~~C_2~~	~~3.8~~
C_3	0.85
CO_2	0.8
N_2	20.0
~~AIR~~	~~40.0~~
	99.45%

WATER RECOVERED: (resistivities all adjusted ~~to 63°F)~~

First 31 bls swabbed	0.93 ohms
Sample from 4600 ft	0.78
~~Next 9 bls swabbed~~	~~0.86~~
Last 14 bls swabbed	0.82
Sample from 8660 ft	0.77
From pipe above tester (fluid level 1440 ft)	
~~2200 ft (9.3 bls)~~	~~0.86~~
5070 ft (22.7 bls)	0.88 - 0.92
7270 ft (32.0 bls) total	

TOTAL WATER RECOVERY:

Swabbed 54 bls

In pipe 32 bls

~~Supervisor~~: 82 bls total

[signature]

2-154

	1st Min.	2nd Min.
Flow Time	-	2130
Closed In Press. Time	-	-

Pressure Readings	Field	Office Corrected
Depth Top Gauge	8701 Ft.	Blanked Off NO
BT. P.R.D. No.	1857	Hour Clock 24
Initial Hydro Mud Pressure	4518	4425
Initial Closed in Pres.	-	-
Initial Flow Pres. 1		
Initial Flow Pres. 2	263	254
Final Flow Pres. 1		
Final Flow Pres. 2	3586	3502
Final Closed in Pres.	CHART TIME EXPIRED	
Final Hydro Mud Pressure	AFTER APPROXIMATELY 15½ HOURS OF FLOW	
Depth Cen. Gauge	Ft.	Blanked Off
BT. P.R.D. No.		Hour Clock
Initial Hydro Mud Pres.		
Initial Closed in Pres.		
Initial Flow Pres. 1		
Initial Flow Pres. 2		
Final Flow Pres. 1		
Final Flow Pres. 2		
Final Closed in Pres.		
Final Hydro Mud Pres.		
Depth Bot. Gauge	8723 Ft.	Blanked Off YES
BT. P.R.D. No.	2181	Hour Clock 72
Initial Hydro Mud Pres.	4591	4494
Initial Closed in Pres.	-	-
Initial Flow Pres. 1		
Initial Flow Pres. 2	285	270
Final Flow Pres. 1		
Final Flow Pres. 2	3646	3085
Final Closed in Pres.	-	-
Final Hydro Mud Pres.	4567	4494

Date	8-15-67	Ticket Number	460882
Kind of Job	HOOK WALL	Halliburton District	MELBOURNE
Tester	MR. GLORIOD	Witness	MR. TYNER
Drilling Contractor	ZAPATA - O. D. & E. IC		
Elevation	102' ABOVE GUIDE BASE	Top Packer	-
Total Depth	8852'	Bottom Packer	8710'
Interval Tested	8710'-8852'	Formation Tested	GOLDEN BEACH
Casing or Hole Size	7" x 26#	Casing Perfs. Top / Bot.	8734' / 8782'
Surface Choke	3/4"	Bottom Choke	5/8"
Size & Kind Drill Pipe	2 7/8" x 10.4#IF	Drill Collars Above Tester (I.D. - LENGTH)	2" x 450'
Mud Weight	10.2	Mud Viscosity	50
Temperature	°F Est. / 220 °F Actual	Anchor Size & Length	ID 1.75" OD 3.75" x 10'
Depths Mea. From	ROTARY TABLE	Depth of Tester Valve	8700' Ft.
Cushion (Type / Amount)	- Ft.	Depth Back Pres. Valve	- Ft.
Recovered	Feet of		
Recovered	Feet of		
Recovered	Feet of		
Recovered	Feet of		
Oil A.P.I. Gravity	-	Water Spec. Gravity	-
Gas Gravity	-	Surface Pressure	- psi
Tool Opened	8-13-67 7:15 AM	Tool Closed	8-14-67 6:45 PM

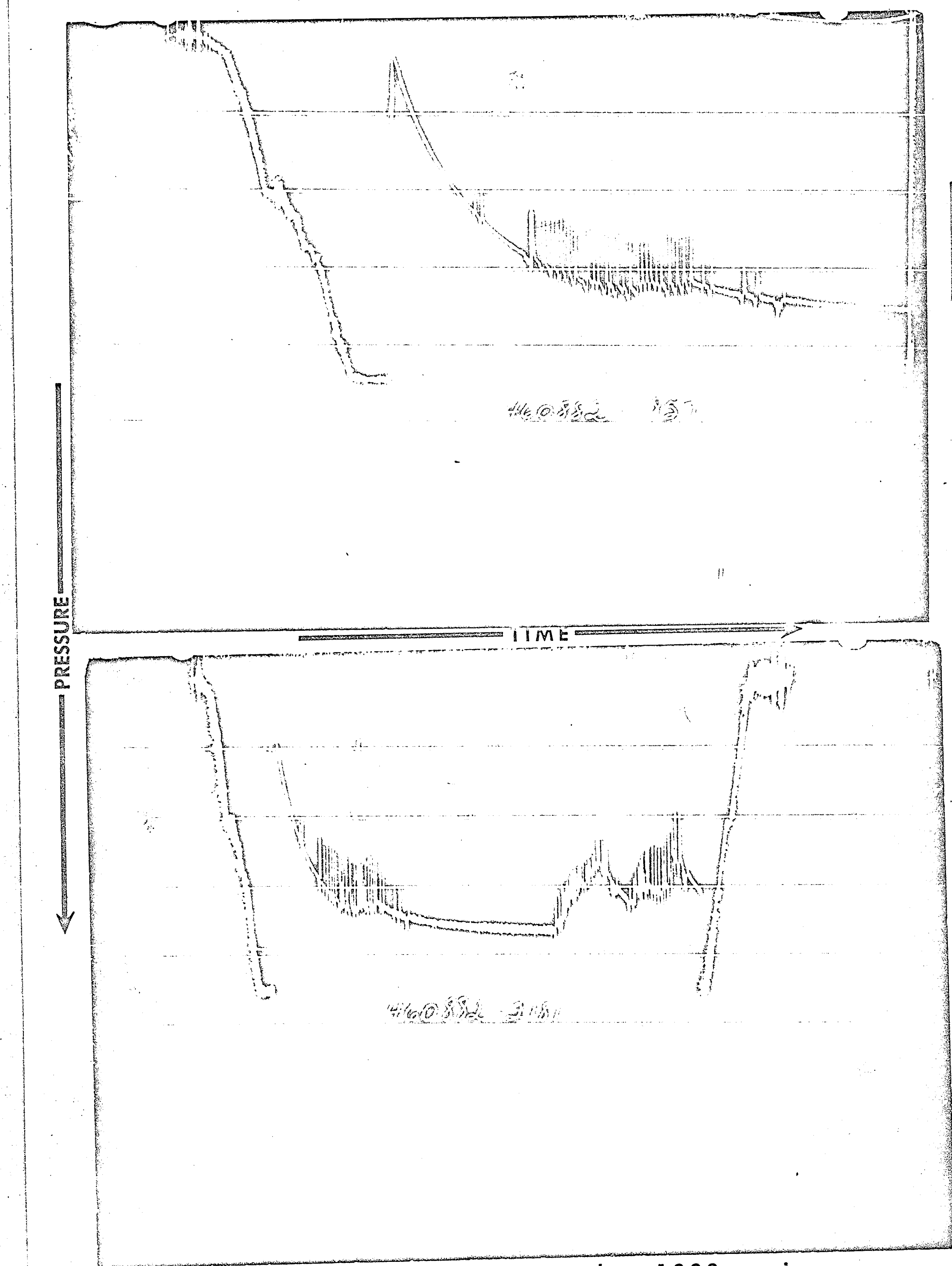
(Recovered: Mea. From Tester Valve)

Remarks: Opened tool for 2130 minute flow period. No Dual Closed in Pressure Valve run on this test.

Unable to calculate since no closed in pressure was attempted.

Legal Location Sec. - Twp. - Rng.	----
Lease Name	GOLDEN BEACH
Well No.	1-A
Test No.	7
Field Area	BASS STRAIT WILDCAT
Lease Owner/Company Name	BURMAH OIL COMPANY OF AUSTRALIA LIMITED
County	----
State	VICTORIA
Owner's District	SALE

FORMATION TEST DATA



Each Horizontal Line Equal to 1000 p.s.i.

2-156

B.O.C. OF AUSTRALIA LTD

DST AND PRODUCTION TEST DATA.

1. GENERAL DATA:

Well: GOLDEN BEACH NO. 1A Date 22/23-8-67

Formation: Latrobe Valley C.M. Test Interval: 2040-45 Datum: Guide base

Casing OD: 9⅝" lb/ft: 36 Perf/shots/ft: 2

~~Tbg~~/DP OD: 4½" lb/ft: 16.6 length, ft: 2000

D.Collar OD 6¼" I.D.: 2" length, ft: 60

Packers, No: 4 Make: HALCO Type J20 OD 8.35" Durometer 70-90

Bottom Recorder, Type: BT Range, psi 3000 clock hrs: 72

Top Records, Type: BT Range, psi 3000 clock, hrs: 24

W.L. Recorder, Type: KUSTER Range psi 3000 Clock, hrs: 36

Bottom Hole Choke, Size (s) ⅝"

Bottom Hole Thermometer, Type: None Range °F

Water Cushion: NO (Yes or No), Amount, ft: -

2. SEPARATOR AND FLOW MEASUREMENT DEVICE DATA:

FIRST STAGE:

Make: B.S.&B., OD 2' 6" Length: 7' 6"

WP, psig: 1000, Rated Capacity, MCFD: 28,000 B/D 1600

FCV/~~Choke~~, Make: Fisher Type: 667D Size: ¾" x 2"

PCV, Make: Fisher Type: 657A Size: 1¼" x 2"

LCV, Make: Climax Type: 7 0-23-1 Size: ½" x 2"

Meter Run ID, Upstream: 4.036 Downstream: 3.816 Taps: Flange

SECOND STAGE:

Make: B.S.& B. OD: 2' 6" Length: 7' 6"

WP, psig: 100, Rated Capacity MCFD: 6000 B/D 2500

Choke, Make: National Type: F (adjust.) Size: 1" x 2"

PCV, Make: B.S.& B. Type: 73-22-1 Size:

LCV, Make: Climax Type: 70-55-2 Size:

Oil Meter Make: Floco Type: F-500-3 Size: 3"

Meter Run ID, Upstream: 3.071 Downstream: 3.065 Taps: Flange

INHIBITOR PUMP:

Make: Texsteam Model MSM5005 Single or Double Acting: S

Plunger Size: ½", Stroke Length: 1¼".

PRODUCTION TANKS:

Dimensions: I.D: Length or Height:

Positioning (Horizontal or Vertical)

3. REMARKS AND SPECIAL DATA:

Packer set at 1975 feet.

Otis 'J' nipple 115 ft above packer.

2 Halliburton volume compensated slip joints 1735 ft above packer.

2-157

Page 2 Of 3

Test No. 8

Well: GOLDEN BEACH NO. 1A, Date 22/23-8-67

4. TIME RECORDS: (Use 24-hr Clock)

Clocks started, Bottom: 0640 (22/8), Top: 0630, W.L. 1743

Tools Started Into Hole: 0645, On Bottom: 0800, Set 0844

Tools Pulled Loose: 0342 (23/8), At Surface: 1130 (26/8)

Operation	Start	End	Duration, mins.
Initial Flow	0846 (22/8)	0848	2
Initial Shut-in	0848	0925½	37½
First Flow	0925½	1026	60½
First Shut-in	1026	1200	94
Second Flow	1200	1315	75
Second Shut-in	1315	1430	75
Third Flow	1430	1545	75
Third Shut-in	1545	1700	75
Fourth Flow	1700	1815	75
Fourth Shut-in	1815 (W.L. Recorder on bottom at 1827)	1930	75
Fifth Flow	1930	2045	75
Fifth Shut-in	2045	2200	75
~~Sixth Flow~~	~~2200~~	~~0332(23/8)~~	~~332~~
Sixth Shut-in	0332	0342	10

5. FIRST STAGE FLOW RATE DATA AND CALCULATIONS:

(Note: Pressure Base 14.7 psia., Temperature Base 60°F)

~~F = Fb x Fg x Fpv~~ = (Chart factor 7.747) (F_g 1.325) (F_{pv} 1.027) (24) = 252.9

F = 252.9 x F_b

FLOW NO.	Time	Separator ~~Wellhead~~ PSIG	Separator ~~Wellhead~~ Fb	d in.	F/1000	T_f °F	F_t	$\sqrt{h_w}$	$\sqrt{p_f}$	MCFD
1	0925½-1005			WELL CLEANING UP. FLOW RATE NOT MEASURED.						
1	1005 - 1026	375	460.8	1.5	116.5	61	0.999	7.85	5.02	4,590
2	1200 - 1315	320	50.22	0.5	12.71	48	1.012	7.4	4.6	438
3	1430 - 1545	330	113.1	0.75	28.61	40	1.020	6.6	4.7	905
4	1700 - 1815	320	202.0	1.0	51.10	38	1.022	7.75	4.6	1,860
5	1930 - 2045	285	317.5	1.25	80.32	41	1.019	7.7	4.35	2,740
6	2200 - 0332	310	460.8	1.5	116.5	54	1.006	7.48	4.55	3,990

Test No 8

Well: GOLDEN BEACH NO. 1A

Date 22/23-8-67

2-158

6. SECOND STAGE FLOW RATE DATA AND CALCULATIONS:

$F = F_b \cdot F_g \cdot F_r \cdot Y =$ (____) (____) (____) (____) (24)=____

Time	Liquid Meter Reading	Liquid Meter B/D	d in.	F	T_f °F	T_t	h_w	p_f	MCFD
			NOT	USED					

7. SAMPLING AND MISCELLANEOUS DATA: (tank gauging checks, water measurements, gravity measurements, on-site gas analyses, hydrate inhibitor type and injection rate, etc.)

INITIAL FLOW: Good blow. Combustible gas reached surface in 2 minutes.

ON-SITE GAS ANALYSIS:

C_1 99%

C_2 Trace

CO_2 1

100

LIQUIDS RECOVERED:

From separator: 5 gallons mud.

Supervisor: [illegible signature]

GOLDEN BEACH NO.1A

D.S.T. NO.8

PERFORATIONS: 2,040' - 45'

2-159

ISOCHRONAL BACK PRESSURE TEST PLOT

		Top Recorder 24 hr. clock				Bottom Recorder 72 hr. clock			
	Q(MCFD)	PSIG	PSIA	$\frac{(P)^2}{1000}$	$\frac{P_f^2-P_s^2}{1000}$	PSIG	PSIA	$\frac{(P)^2}{1000}$	$\frac{P_f^2-P_s^2}{1000}$
Shut-In Pressure (P_f)		969	984	968	-	975	990	980	-
Flow 3 (P_s)	905	963	978	956	12	968	983	966	14
Flow 4	1860	954	969	939	29	960	975	951	29
Flow 5	2740	941	956	914	54	950	965	931	49
Flow 6	3990	920	935	874	94	936	951	904	76

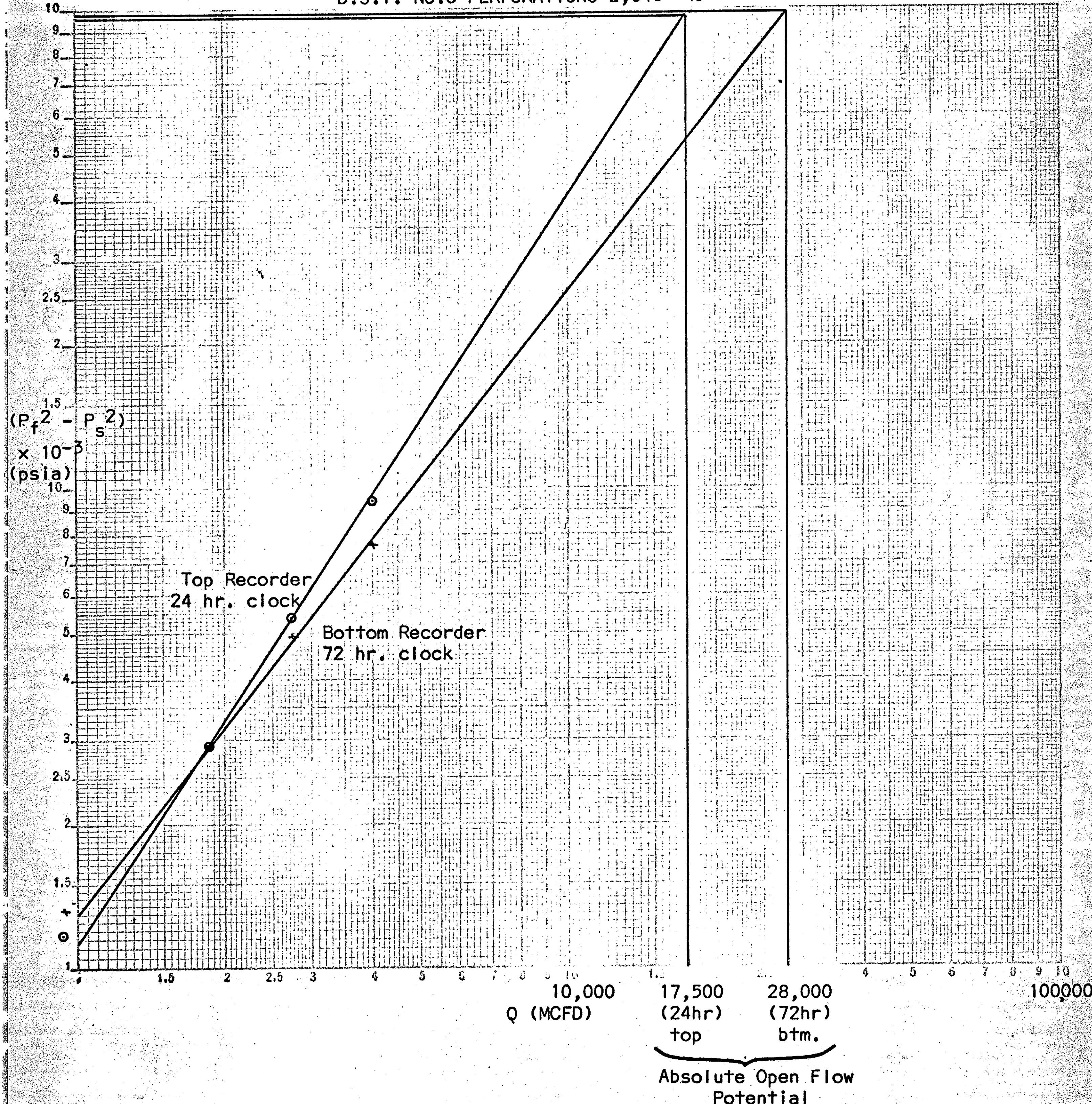
ABSOLUTE OPEN FLOW POTENTIAL:

From Top Recorder Pressures 17.5 MMCFD

From Bottom Recorder Pressures 28.0 MMCFD

Z-160

D.S.T. NO.8 PERFORATIONS 2,040'-45'



2-61

Flow Time	1st * Min.	2nd * Min.
Closed In Press. Time	1st * Min.	2nd * Min.
Pressure Readings	Field	Office Corrected
Depth Top Gauge	2066 Ft.	Blanked Off NO
BT. P.R.D. No.	2269	Hour Clock 24
Initial Hydro Mud Pressure	SEE SPECIAL READING	
Initial Closed in Pres.	SHEET	
Initial Flow Pres. 1		
Initial Flow Pres. 2		
Final Flow Pres. 1		
Final Flow Pres. 2		
Final Closed in Pres.		
Final Hydro Mud Pressure		
Depth Cen. Gauge	Ft.	Blanked Off
BT. P.R.D. No.		Hour Clock
Initial Hydro Mud Pres.		
Initial Closed in Pres.		
Initial Flow Pres. 1		
Initial Flow Pres. 2		
Final Flow Pres. 1		
Final Flow Pres. 2		
Final Closed in Pres.		
Final Hydro Mud Pres.		
Depth Bot. Gauge	2092 Ft.	Blanked Off YES
BT. P.R.D. No.	2270	Hour Clock 72
Initial Hydro Mud Pres.	SEE SPECIAL READING	
Initial Closed in Pres.	SHEET	
Initial Flow Pres. 1		
Initial Flow Pres. 2		
Final Flow Pres. 1		
Final Flow Pres. 2		
Final Closed in Pres.		
Final Hydro Mud Pres.		

Date	8-26-67	Ticket Number	460885 - S
Kind of Job	HOOK WALL	Halliburton District	MELBOURNE
Tester	MR. NORMAN	Witness	MR. TYNER
Drilling Contractor	ZAPATA - O.D. & E.		IC
Elevation	102' ABOVE GUIDE BASE	Top Packer	-
Total Depth	2165' R.B.	Bottom Packer	2075'
Interval Tested	2075'-2165'	Formation Tested	-
Casing or Hole Size	9 5/8" 36#	Casing Perfs. Top / Bot.	2142' / 2147'
Surface Choke	1" & 6/64"	Bottom Choke	5/8"
Size & Kind Drill Pipe	16.60# 4 1/2" F.H.	Drill Collars Above Tester (I.D. - LENGTH)	2 3/4" x 60'
Mud Weight	10.5	Mud Viscosity	46
Temperature	°F Est. / 116 °F Actual	Anchor Size & Length	ID 2.37" OD 5.00" X 10'
Depths Mea. From	ROTARY KELLY BUSHINGS	Depth of Tester Valve	2061' Ft.
Cushion (Type / Amount)	- Ft.	Depth Back Pres. Valve	2055' Ft.
Recovered	- Feet of		
Recovered	Feet of		
Recovered	Feet of		
Recovered	Feet of		
Oil A.P.I. Gravity	-	Water Spec. Gravity	-
Gas Gravity	-	Surface Pressure	930# psi
Tool Opened	8:46 AM	Tool Closed	3:32 AM
Remarks	*See attached sheet for remarks and times.		

Legal Location Sec. - Twp. - Rng.: - - - -

Lease Name: GOLDEN BEACH

Well No.: 1-A

Test No.: 8

Field Area: WILDCAT (BASS STRAIT)

County: - - -

Lease Owner/Company Name: BURMAH OIL COMPANY OF AUSTRALIA LIMITED

State: VICTORIA

Owner's District: SALE

(Mea. From Tester Valve)

FORMATION TEST DATA

2-162

BURMAH OIL COMPANY OF AUSTRALIA LIMITED
TICKET #460885
WELL #1-A
TEST #8

B.T. #2269

	TIME DEFL. .000"	PSI TEMP. CORR.	
1st flow period	.000 .005	902 903	
1st closed in pressure	.000 .126	903 970	INITIAL HYDROSTATIC 1147
2nd flow period	.000 .203	882 918	
2nd closed in pressure	.000 .293	918 976	FINAL HYDROSTATIC 1120
3rd flow period	.000 .275	976 972	
3rd closed in pressure	.000 .250	972 974	
4th flow period	.000 .247	966 969	
4th closed in pressure	.000 .254	969 973	
5th flow period	.000 .249	966 958	
5th closed in pressure	.000 .250	958 974	
6th flow period	.000 .248	949 945	
6th closed in pressure	.000 .252	945 975	
7th flow period	.000 1.097	948 927	
7th closed in pressure.	.000 .041	927 975	

2-163

BURMAH OIL COMPANY OF AUSTRALIA LIMITED
TICKET #460885
WELL #1-A
TEST #8

REMARKS

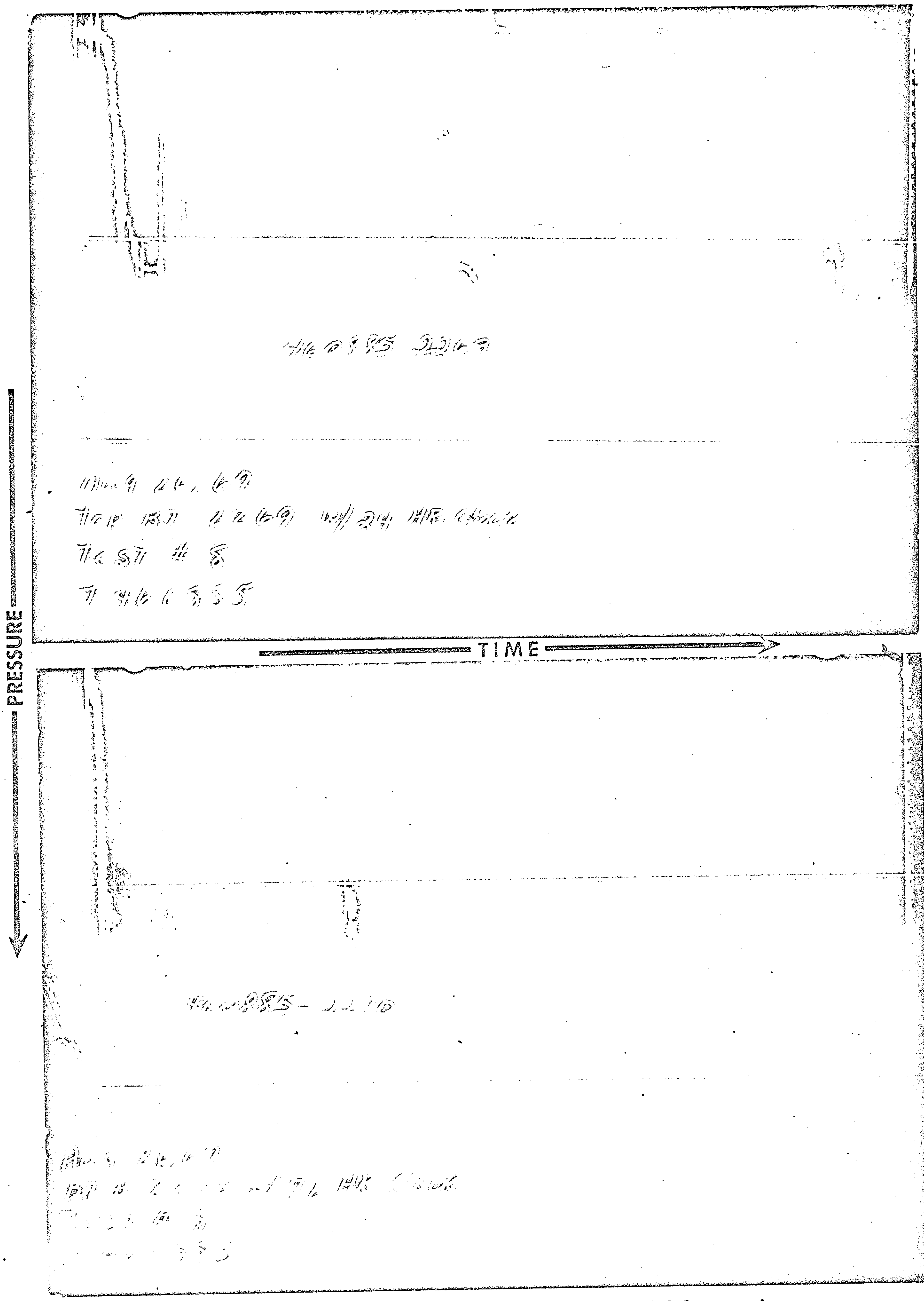
Opened tool at 8:46 AM for initial flow period with gas to surface in 2 minutes. Closed tool for 41 minute initial closed in pressure. Reopened tool at 9:29 for 2nd flow. Flowed well through flare line until flowing through gas separator at 9:58. Measured 4.58 MCF, through 1" choke at surface. Closed well in at surface at 10:26 for 2nd closed in pressure for 94 minutes. Opened well at surface for 3rd flow period at 12:00 noon through 6/64" choke for 75 minutes. Measured 4430 cubic feet per day. Closed well in at surface for 3rd closed in pressure for 75 minutes at 1:15 PM. Opened well at surface for 4th flow period at 2:30 PM for 75 minutes through 6/64" surface choke. Measured .927 cubic feet per day. Closed well in at surface for 4th closed in pressure at 3:45 PM for 75 minutes. Opened well at surface for 5th flow period at 5:00 PM through 6/64" choke for 75 minutes. Measured 1.862 MCF/D. Closed well at surface at 6:15 PM for 5th closed in pressure for 75 minutes. Opened well at surface for 6th flow period at 7:30 PM for 75 minutes. Measured 2.92 MCF/D. Closed well in at surface for 6th closed in pressure at 8:45 PM for 75 minutes. Opened well at surface through 6/64" choke. Measured 3.99 MCF/D. Closed well with dual closed in pressure valve at 3:32 AM for 7th closed in pressure for 10 minutes. Released packer at 3:42 AM to hang off drill pipe in well head and secure for rough seas.

BURMAH OIL COMPANY OF AUSTRALIA LIMITED
TICKET #460885
WELL #1-A
TEST #8

B.T. #2270

	TIME DEFL. .000"	PSI TEMP. CORR.	
1st flow period	UNABLE TO READ		
			INITIAL HYDROSTATIC 1162
1st closed in pressure	.000 .046	914 972	
2nd flow period	.000 .071	944 937	
2nd closed in pressure	.000 .070	937 981	FINAL HYDROSTATIC 1133
3rd flow period	.000 .122	974 976	
3rd closed in pressure	.000 .089	976 977	
4th flow period	.000 .086	971 971	
4th closed in pressure	.000 .089	971 976	
5th flow period	.000 .087	972 965	
5th closed in pressure	.000 .088	965 978	
6th flow period	.000 .087	963 954	
6th closed in pressure	.000 .088	954 980	
7th flow period	.000 .386	961 941	
7th closed in pressure	.000 .015	941 980	

2-165



Each Horizontal Line Equal to 1000 p.s.i.

GEOLOGY AND TESTING

Table of Contents

MISSING PARTS IN OTHER FILE W.C.R.

VELOCITY SURVEY

GOLDEN BEACH NO.1A WELL

by

B.O.C. OF AUSTRALIA LIMITED

Introduction

B.O.C. of Australia Limited contracted Western Geophysical Company of America to perform the velocity survey. Under the contract Western agreed to furnish the following:

- Two Gulf-type Model GCE101 Pressure Sensitive Well Geophones
- One Amplifier case including 12 S.I.E. P-11 Amplifier channels
- One S.I.E. PRO-11 Camera with 12 galvanometer elements
- Two battery type blasters
- Two Kaar TR327 radios (Citizens Band type)
- One portable developing system
- Necessary batteries, battery chargers, power supplies, cabling etc.

In addition Western furnished one observer and one shooter. Western also chartered a licensed boat from Desma Engineering Pty. Ltd. to act as a shooting boat.

The equipment and explosives were loaded on the shooting boat at Point Wilson on 14th July and taken to the well location. The personnel went to the drilling barge, the "Investigator", on 16th July and prepared the equipment for the survey. The velocity survey was conducted on the 17th and 18th July at times convenient for the well operation.

Survey Procedures

Before the commencement of the survey on 17th July, the sea was calm and there was a moderate offshore, northwesterly breeze. During the survey the weather rapidly deteriorated, the wind backed to the west and gusts up to 40 knots were measured. Poor communications with the shooting boat and the excessive extraneous energy level at the well geophone caused the survey to be temporarily abandoned.

The survey was completed on the 18th July. The waves were about four feet high from the southwest and the wind, from the same direction, averaged 25 knots.

1. Shot Positioning

At the beginning of the survey a buoy was placed approximately 1200 feet southeast of the well and all down run shots were fired in the vicinity of the buoy. For the up run, check shots, a marker buoy was placed approximately 1200 feet northnorthwest of the well.

A reference geophone was lowered 25 feet below the water in the moon-pool and was used to record the water break.

2. Explosives

Fifty pound charges were fired at distances of 1200 to 1500 feet from the well, for all well geophone stations. In addition twenty five (25) pound charges were used at distances between 1000 and 1200 feet with the geophone at the upper two stations.

Twenty caps and boosters were taken to the survey and all were used.

VELOCITY SURVEY DATA SHEET — B.O.C. AUSTRALIA LIMITED — OPERATOR : J.A. RASMUSSEN

SURVEYED BY : WESTERN GEOPHYSICAL CO. — SEISMIC PARTY :

SURVEYED FOR : B.O.C. AUSTRALIA LTD. — DATE : 17 JULY, 1967

WELL NAME : GOLDEN BEACH No. 1A — LOCATION : Latitude 38° 15' 32.62" South; Long. 147° 25' 20.13" EAST

WELL DETECTOR MODEL No :- GULF-TYPE GCE 101 PRESSURE SENSITIVE SERIAL No :- —

S.I.E. P-11 AMP. MODEL

~~U.H.~~ / W.H. DET. DIST. 25' below water surface in Moonpool

WELL CASED TO 4003 FT.

TRACE	USE	FILTER	A.V.C.	TRACE	USE	FILTER	A.V.C.
1	WELL GEOPHONE LOWEST GAIN	NONE	NONE	7	TIME BREAK TRACE		
2	" "	"	"	8	100~ CHECKER TRACE		
3	" "	"	"				
4	" " HIGHEST GAIN	"	"				
5	REFERENCE GEOPHONE LOW G.	"	"				
6	" " HIGH G.	"	"				

DETECTOR DEPTH BELOW ~~R.T.~~ G.B.	RECORD NUMBER	TIME SHOT	SHOT POINT No.	DISTANCE	CHG.	DEPTH	AMP. GAINS			RESISTANCE TO GROUND	REMARKS
1328	—	1500	SE	1200'	25 lb	6'					No record
1328	—	1506	SE	1200'	25 lb	6'					No record
1328	1	1512	SE	1200'	25 lb	6'					No Time Break
1328	2	1522	SE	1200'	25 lb	6'					Poor Time Break
1328	3	1533	SE	1200'	50 lb	6'					Terminated Survey
											because of high
											noise level from
											Well geophone.
Guide Base is 62 ft											High wind &
below M.S.L.											heavy seas.

N.B. The Schlumberger motion compensating device was used to keep the geophone stationary in the bore hole when shots were fired. This device was unsatisfactory.

VELOCITY SURVEY DATA SHEET

B.O.C. AUSTRALIA LIMITED

SURVEYED BY: WESTERN GEOPHYSICAL CO.
SURVEYED FOR: B.O.C. AUSTRALIA LTD.

OPERATOR: J.A. RASMUSSEN
SEISMIC PARTY:
DATE: 18 JULY, 1967

WELL NAME: GOLDEN BEACH No. 1A
LOCATION: Lat. 38° 15' 32.62" SOUTH; Long. 147° 25' 20.13" EAST

WELL DETECTOR MODEL No:- GULF-TYPE PRESSURE SENSITIVE GCE 101 SERIAL No:-
S.I.E. AMP. MODEL P-11
~~U.H.~~ / W.H. DET. DIST. 25' deep 4th Moonpool
WELL CASED TO 4003' FT.

TRACE	USE	FILTER	A.V.C.	TRACE	USE	FILTER	A.V.C.
1	WELL GEOPHONE LOWEST GAIN	NONE	NONE	7	TIME BREAK TRACE		
2	" "	"	"	8	100 ~ CHECKER TRACE		
3	" "	"	"				
4	" " HIGHEST GAIN	"	"				
5	REFERENCE GEOPHONE LOW GAIN	"	"				
6	" " HIGH "	"	"				

DETECTOR DEPTH BELOW ~~R.T.~~ G.B.	RECORD NUMBER	TIME SHOT	SHOT POINT No.	DISTANCE	CHG.	DEPTH	AMP. GAINS			RESISTANCE TO GROUND	REMARKS
2014	1	1111	SE	1200'	50 lb	6'				INFINITY	Wind 25 knots
2658	2	1138	SE	1300'	50 lb	6'					from Southwest
4071	3	1208	SE	1200'	50 lb	6'					during survey
5588	4	1237	SE	1200'	50 lb	6'				2 MΩ	
6798	5	1300	SE	1200'	50 lb	6'					partially spoiled record
7998	6	1328	SE	1200'	50 lb	6'					
9200	7	1350	SE	1200'	50 lb	6'					
9200	8	1406	NW	1500'	50 lb	6'					no timing lines
9200	9	1420	NW	1500'	50 lb	6'					misfire
9200	10	1430	NW	1500'	50 lb	6'					
6798	11	1504	NW	1300'	50 lb	6'				500 Ω	
4070	12	1532	NW	1200'	50 lb	6'					
4070	13	1546	NW	1200'	50 lb	6'					
2014	14	1606	NW	1000'	25 lb	6'					
2014	15	1617	NW	1000'	25 lb	6'				500 Ω	No T.B.

N.B. The following procedure was used to keep the geophone stationary in the bore hole when shots were fired: the marine riser was lowered to the casing top; the schlumberger cable was clamped with a T-bar device and the cable was lowered until the T-bar rested on top of the marine riser.

3. Well Geophone Positioning

All depth measurements were made using the Schlumberger depth indicator and the readings were checked by the B.O.C. representative on the barge.

For the 17th July portion of the velocity survey, the Schlumberger motion compensating device was used to keep the geophone stationary in the bore hole when shots were fired. In the initial calm weather the device worked adequately; however, as the weather deteriorated and as the barge moved perceptibly in the rising winds and seas, the device proved unsatisfactory.

For the 18th July portion of the survey, the following procedure was used to keep the geophone stationary in the bore hole when shots were fired: the marine riser was disconnected from the derrick floor and lowered to the casing top; the Schlumberger cable was clamped with a T-bar device and the cable was lowered until the T-bar rested on top of the marine riser.

Instrumentation

The seismic instruments were set up on the starboard side of the upper deck on the "Investigator", immediately aft of the geologist's shack and across the deck from the Schlumberger logging unit. The location permitted good communication with Schlumberger and the derrick floor.

Eight traces were utilised on the survey records. Traces 1 through 4 monitored the well geophone at four different recording levels. Traces 5 and 6 monitored the well reference geophone in the moonpool. The time break was recorded on trace 7. Trace 8 was used for the 100 cycle timing checker trace. Wide band filtering, no A.G.C., and fixed-gain recording mode were used throughout the survey. The gain levels were varied between shots in anticipation of the signal strengths to be recorded.

Results

On the 17th July, five shots were fired with the well geophone stationed at 1328 feet below the guide base. Only two useable records were obtained because of bad communications with the shooting boat.

On the 18th July, fifteen shots were fired with the well geophone stationed at seven levels, from 2014 feet to 9200 feet below the guide base, and check shots were obtained at four levels. The record quality with the geophone below the casing was superior to that obtained with it in the casing.

The deepest level surveyed, the 9200 foot level, was near the top of a relatively low speed section. This low speed section was reported to be a tight spot in the hole and was considered to be too hazardous to penetrate with the geophone.

The survey yielded an average vertical velocity to the Top of the Latrobe of 6860 feet per second.

Conclusions

While the seismic reflection data have not tied the well location, it is felt that the results of the survey have verified the identification of horizon "H" with the top of the Latrobe. The velocity survey data comparable to the integrated Sonic Log data show fair overall agreement. But there were some significant time differences in the intervals measured.

COMPARISON SONIC LOG INTEGRATED TIMES WITH VELOCITY SURVEY TIMES - GOLDEN BEACH NO.1A WELL

Depth M.S.L.	Interval Thickness	Comparable Interval Times Sonic Log	Comparable Interval Times Velocity Survey	Differences
1390				
	686	.098	.1052	-.0072
2076				
	644	.0826	.0856	-.003
2720				
	1412	.1544	.1482	+.0062
4132				
	1518	.1286	.1245	+.0041
5650				
	1210	.099	.1052	-.0062
6860				
	1200	.0932	.0914	+.0018
8060				
	1202	.0916	.0929	-.0013
9262				
	$\Sigma \Delta t$	.7474	.753	-.0056

3-9

Part of Completion Reports in separate file

LOG OF SAMPLES

GEOLOGY

LITHOLOGICAL DESCRIPTION

GIPPSLAND LIMESTONE FORMATION

525- 740	Limestone, white, bioclastic with bryozoa, lamellibranchs and echinoderm fragments in brown, soft, calcareous matrix.
740- 760	Limestone, white, bioclastic, as above with 30% sand, light brown, ferruginous staining, well rounded, 1-1.5 mm.
760- 870	Limestone, white, bioclastic, fossils as above also with crinoid plates, some quartz.
870- 940	Limestone, light grey, composed very fine to very coarse calcareous fragments, with fossils and very fine quartz.
940-1010	Alternations of Limestone and Marl: Limestone, as before. Marl, light grey, soft. Some glauconite.
1010-1280	Marl with thin Limestones: As before with occasional grains of black coal. 1010-1120. Very fine to siltsized quartz.
1280-1420	Marl, light grey, soft, trace fossil fragments, some glauconite, trace black coal.
1420-1700	Clay, light grey to greenish grey becoming very pale green below 1590, calcareous, soft, with some very fine mica, occasional glauconite, rare fossils, no quartz. Trace pyrite and coal below 1620. (1400-1440. Very fine to siltsized quartz.)

LAKES ENTRANCE FORMATION

1700-1742	Clay, white and light green, soft, calcareous, with occasional fossil fragments, common grains of black coal, rare pyrite.
1742-1900	Clay, light green, soft, calcareous, with occasional fossil fragments, grains black coal, rare glauconite.
1900-2015	Clay, greenish grey, soft, calcareous, common fossil fragments, 5% pyrite below 1930.

LATROBE VALLEY COAL MEASURES

2015-2030	Sand, grey, coarse, rounded to subrounded, moderate sorting, no matrix, common pyrite, trace glauconite.
2030-2150	Sand, grey, fine to medium, subangular moderately sorted, entirely quartzose.
2150-2200	Sand, grey, medium to very coarse, subrounded, moderate sorting, no matrix, quartzose. Minor coal.
2200-2240	Coal, brown, lignitic.
2240-2300	Sand, dominantly medium, partly fine, subangular slightly cloudy quartz grains with thin beds of earthy coal.
2300-2375	Sand, fine and medium grained, subangular clear quartz with minor thin beds of brown argillaceous clay.
2375-2450	Clay, brown, slightly micaceous, carbonaceous, argillaceous.
2450-2475	Sand, medium grained subangular, clear quartz grains.

2475-2550	<u>Coal</u>, with thin beds of brown argillaceous clay.
2550-2600	<u>Sand</u>, fine, medium, and coarse with subangular to rounded quartz grains and minor feldspar with thin beds of coal and clay.
2600-2820	<u>Coal</u>, with minor thin beds of clay and sand.
2820-2870	<u>Sand</u>, medium to coarse grained, subrounded to angular, slightly cloudy quartz grains, good porosity.
2870-3055	<u>Sand with occasional thin clays and coals</u>: <u>Sand</u>, whitish grey, medium to very coarse, subrounded to subangular, moderate to well sorted, no matrix, good porosity. <u>Clay</u>, white, kaolinitic, plastic. <u>Coal</u>, brown, silty grading to black.
3055-3090	<u>Coal</u>, brown to dark brown, silty.
3090-3145	<u>Sand</u>, whitish grey, medium to very coarse, subrounded to angular, moderately sorted, no matrix. 5% sandstone in range 3130-3145 is brownish grey, very fine to medium grained, hard, matrix about 5% (partly dolomitic partly siliceous).
3145-3480	<u>Sandstone with occasional thin beds of clay and coal</u>: <u>Sandstone</u>, white, mostly medium grained, subangular to angular, moderate to good sorting, rare feldspar, mica. <u>Clay</u>, white, kaolinitic, plastic. <u>Coal</u>, black to dark brown.
3480-3505	<u>Coal with minor clay</u>: Both as above.
3505-3560	<u>Clay</u>, white, kaolinitic, plastic with abundant pyrite.
3560-3710	<u>Sandstone</u>, white, mainly coarse grained, angular, poor to moderate sorting, good porosity.
3710-3770	<u>Sandstone with clay</u>: Both as above. Pyrite common.
3770-3860	<u>Sandstone</u>, grey, fine to medium, subrounded to subangular, well sorted with feldspar, mica, pyrite and rare glauconite. Rare white kaolinitic clay.
3860-4460	<u>Sand with minor beds of clay</u>: <u>Sand</u>, grey, medium to coarse, subrounded to subangular, moderately to well sorted with trace pyrite, muscovite, feldspar. No matrix. <u>Clay</u>, white, kaolinitic, plastic and light brown sometimes silty.
4460-4485	<u>Clay</u>, white to light grey, kaolinitic interbedded with sand as before.
4485-4590	<u>Sandstone with minor thin beds of clay and coal</u>: <u>Sandstone</u>, light grey medium and coarse grained, moderate sorting, subangular, slightly carbonaceous, variably pyritic, quartzose, with a light grey dolomitic cement. <u>Clay</u>, light grey, kaolinitic, slightly pyritic, more compacted than previous clays. <u>Coal</u>, black and dark brown.
4590-4760	<u>Sandstone</u>, light grey, medium to coarse grained, well sorted, variably pyritic, dominantly quartzose, no matrix or cement, good porosity.

4760-5150	Sandstone, light grey, coarse to very coarse, moderately sorted, with minor thin beds of coal and light grey very fine to fine grained poorly sorted very carbonaceous sandstone with kaolinitic matrix.
5120-5510	Sandstone, light grey coarse to very coarse, composed of angular to subangular quartz grains, moderately well sorted. Possibly conglomeratic in part with up to 20 per cent quartzitic, shale or siltstone fragments throughout.
5510-5520	Siltstone, light grey to light brown, slightly carbonaceous equally lithic and quartzose with quartz angular and clear to cloudy.
5520-5550	Sandstone, light grey, coarse to very coarse, angular to subangular, some kaolinitic matrix. Pyrite common.

"GOLDEN BEACH" FORMATION

5590-5630	Shale, Clay and Sandy Siltstone: Shale, dark brown, fairly hard, carbonaceous, pyritic. Clay, light grey to buff. Siltstone, medium grey, carbonaceous, with scattered fine quartz grains.
5630-5720	Siltstone and Shale with minor Sand and Clay: Siltstone, light grey, hard, dolomitic and soft, argillaceous, carbonaceous. Shale, dark grey very carbonaceous. Clay, light grey to buff, carbonaceous. Sand, medium to very coarse, subrounded to subangular. Minor pyrite.
5720-5760	Sandstone, white to light grey, fine to very coarse, subrounded to subangular rare dolomitic matrix and pyrite, moderate to good porosity. Thin carbonaceous siltstones.
5760-5800	Alternations of Clay and Siltstone: Siltstone, dark brown, soft, argillaceous, carbonaceous, pyritic. Clay, brown, plastic.
5800-5850	Sandstone, light grey, very fine, angular with some coarse subrounded grains, common feldspar and pyrite, carbonaceous, some kaolinitic and dolomite matrix. Minor beds of brown plastic clay.
5850-5900	Alternations of Sandstone, Clay and Sand: Sand, whitish grey, very coarse with some grains coarse and medium, subrounded, good porosity. Sandstone and Clay, as above.
5900-5950	Alternations of Sandstone and Sand: Sandstone, light grey, very fine, angular, with some coarse and subrounded grains, common feldspar and pyrite, carbonaceous, some kaolinitic and dolomite matrix. Sand, whitish grey, very coarse with some coarse and medium grains, subrounded, good porosity; with some clays, as above.
5950-5980	Alternations of Clay and Siltstone: Clay, beige, plastic. Siltstone, light to dark grey, argillaceous, carbonaceous, feldspathic.

5980-6040	Sand with minor Siltstone: Sand, grey, coarse to granular, subangular to subrounded, moderate to good sorting, minor pyrite, feldspar, with thin grey carbonaceous Siltstones.
6040-6070	Clay, buff, plastic.
6070-6160	Sand with minor Siltstone: Sand, grey, medium to very coarse, subangular to subrounded, moderate sorting, minor pyrite, feldspar, greenish lithics. Siltstone, dark brown, argillaceous, carbonaceous.
6160-6180	Clay, beige, soft, occasionally plastic, carbonaceous, sometimes calcareous.
6180-6230	Sand, grey, unconsolidated, medium to very coarse, subrounded to subangular, well sorted, quartzose, common pyrite, rare lithics, very rare kaolinitic and siliceous cement, good porosity indicated. Clay, beige and grey, plastic, carbonaceous.
6230-6360	Sand with Clay and Siltstone: Sand, light grey, medium to very coarse, subrounded to angular, moderately sorted, unconsolidated, quartzose, feldspathic, pyritic, rare kaolinitic cement, good porosity. Clay, buff to brown, plastic. Siltstone, brown-grey to dark grey, fairly hard to soft, sandy to clayey, carbonaceous, pyritic and kaolinitic.
6360-6415	Sandstone, Sand, Siltstone and Clay: Sandstone, light grey, fine to very fine, angular, moderate sorting, minor cherty lithic grains, mica and pyrite; 10-20% matrix, kaolinitic, dolomitic, sideritic, occasionally calcareous and carbonaceous. Sand, Siltstone and Clay, as above.
6415-6510	Siltstone with Interbedded Shale: Siltstone, greyish brown, clayey, carbonaceous. Shale, medium to dark grey, carbonaceous.
6510-6590	Sandstone, with rare thin Coals and Siltstone: Sandstone, light grey, fine to very fine grained, angular, moderate sorting, minor cherty lithic grains, mica and pyrite; 10-20% matrix, kaolinitic, dolomitic, sideritic, occasionally calcareous and carbonaceous. Siltstone, as above. Coal, black.
6590-6620	Sand, off-white, coarse to granular, subangular to subrounded, moderate sorting, good porosity, pyrite; thin coal beds, shiney, brittle.
6620-6650	Sandstone, light grey, very fine to fine with some coarse to granular grains, subangular to subrounded, moderately sorted, bimodal; 10-20% matrix, kaolinitic, calcareous, rarely dolomitic, hard to semi-friable, porosity poor, trace pyrite, cherty lithics.
6650-6670	Clay with beds of Siltstone: Clay, brownish grey, plastic. Siltstone, brownish grey, clayey, carbonaceous.
6670-6690	Sandstone, as for 6620-6650.

6690-6790	Siltstone with beds of Shale and Clay: Siltstone, brownish grey to grey, clayey, carbonaceous, occasionally sandy, feldspathic, rarely pyritic. Shale, brown to buff, silty, slightly carbonaceous. Clay, buff, plastic; seam of black, brittle coal at 6730 feet.
6790-6820	Sandstone, light grey, very fine to fine, subangular, moderately sorted, quartzose, feldspathic, carbonaceous, pyritic 10% kaolinitic with some dolomitic matrix, fairly hard to friable, porosity appears poor to fair.
6820-6890	Siltstone with beds of Sand and Shale: Siltstone, grey, clayey, carbonaceous, occasionally sandy, feldspathic, very rare pyrite. Sand, medium to coarse, moderately sorted, subangular, no matrix. Porosity good. Shale, brownish grey to buff, slightly carbonaceous, fairly soft.
6890-6960	Sandstone with numerous thin beds of Siltstone and Shale: Sandstone, light grey, fine to very fine grained mainly subrounded, quartzose with minor argillaceous lithics, and coal grains, up to 20% kaolinitic and calcareous matrix. Poor porosity. Siltstone, grey to brownish grey, rarely pyritic, slightly micaceous, feldspathic and carbonaceous, argillaceous. Grades into a light and dark grey Shale.
6960-7100	Siltstone with Interbedded Sandstone and minor Dolomite: Siltstone, dark grey, rarely pyritic, partly feldspathic, variably carbonaceous and quartzose, dominantly argillaceous material. In rare cases it grades into a dark grey silty Shale. Sandstone, light grey to light brown, coarse to very coarse, mainly subangular quartzose, slightly pyritic and feldspathic, cherty lithics with up to 20% kaolinitic and dolomitic matrix, fair to good porosity. Dolomite, brown, microcrystalline with minor inclusions of light brown calcareous material.
7100-7160	Siltstone with thin beds of Sandstone and Shale: Siltstone, grey to brownish grey, rarely pyritic, slightly micaceous, feldspathic and carbonaceous, argillaceous. Grades into a light and dark grey shale. Sandstone, light green to light grey. Fine grained, moderately sorted, subrounded with up to 10% kaolinitic matrix, varying amounts of feldspar, carbonaceous material, argillaceous lithics, mainly slightly cloudy quartz. Porosity is poor.
7160-7200	Sandstone, light grey dominantly coarse grained, moderately sorted angular to subangular, with up to 5% kaolinitic matrix, traces of feldspar and lithics almost entirely composed of clear to slightly cloudy quartz grains. Porosity is good.
7200-7215	Siltstone, grey to brownish grey grading into a shale.
7215-7240	Sandstone, light brown, coarse grained, moderate sorting angular to subangular with up to 10% dolomitic and calcareous cement, quartzose, minor feldspar and pyrite. Porosity is good.
7240-7270	Interbedded Siltstone and Shale: Siltstone, light grey, slightly carbonaceous and micaceous, fairly quartzose, argillaceous, grading into shale. Shale, light grey, rarely carbonaceous, slightly pyritic.

7270-7450 Siltstone and Shale with minor beds of Sandstone and coal:
Siltstone, light grey to grey-brown, slightly feldspathic, micaceous and carbonaceous, argillaceous grading into a Shale.
Sandstone, light grey to light green, fine to very fine, moderate sorting, subrounded with up to 20% kaolinite, equal amounts of light green lithics, feldspar and quartz. Porosity is poor to moderate.
Coal, black (7310 ft.).

7450-7540 Sandstone with minor Siltstone beds and thin Coal seams:
Sandstone, light grey, coarse to very coarse, moderate sorting, angular, slightly feldspathic, almost entirely quartzose with up to 10% kaolinitic matrix or calcareous cement.
Siltstone, light and dark grey, slightly quartzose and feldspathic very carbonaceous in part, argillaceous.
Coal, black.

UNDIFFERENTIATED CRETACEOUS

7540-7610 Interbedded Sandstone, Siltstone and Shale:
Sandstone, light grey to light green, very fine to medium grained, moderate sorting, subrounded, slightly carbonaceous, lithic and feldspathic, mainly quartzose with up to 20% kaolinitic matrix and poor to fair porosity. All sandstone is consolidated.
Siltstone, grey to brown, slightly feldspathic, micaceous and quartzose, carbonaceous, mainly argillaceous.
Shale, grey, grading into Siltstone.

7610-7625 Sandstone, light grey, coarse to very coarse, moderately sorted, subangular to angular, slightly lithic, mainly quartzose with kaolinitic and dolomitic matrix and cement. Porosity is good.

7625-7650 Interbedded Siltstone and Shale:
Siltstone, light grey to brown, grading into Shale, rarely carbonaceous, feldspathic, quartzose, argillaceous.

7650-7760 Interbedded Sandstone and Siltstone with thin Shales:
Sandstone, pale greenish grey, very fine to fine grained, moderately sorted, subangular, 50-80% quartz grains, equal lithics and feldspar, 20% kaolinitic and dolomitic matrix, fairly hard, porosity poor.
Siltstone, grey, slightly feldspathic, micaceous, carbonaceous, argillaceous, fairly hard, mainly quartz.
Shale, brown silty, fairly soft.

7760-7880 Shale with thin Siltstone and a rare thin Sandstone:
Shale, brown silty, fairly soft.
Siltstone and Sandstone, as before.

7880-7925 Sandstone with thin Siltstone and rare Coals:
Sandstone, light greenish grey, very fine to fine grained, moderately sorted, subangular, 50-80% grains quartz, 10-30% lithics 10-20% feldspar. About 20% kaolinitic and dolomitic matrix. Fairly hard, poor porosity. Occasionally carbonaceous.
Siltstone, brown to brownish grey, fairly hard, argillaceous, feldspathic, micaceous, carbonaceous.
Coal, black, hard, brittle.

3-16

7925-8030 <u>Interbedded Siltstone and Shale with minor Sandstone</u>:
<u>Siltstone</u>, dark grey, mainly argillaceous, partly carbonaceous, slightly micaceous and feldspathic.
<u>Shale</u>, light grey with carbonaceous fragments common.
<u>Sandstone</u>, light grey to light green, very fine to fine grained, moderately sorted, subangular, equally quartzose and lithic, slightly feldspathic, poor porosity with up to 20% kaolinitic matrix.

8030-8070 <u>Sandstone with minor beds of Siltstone, Shale and Coal</u>:
<u>Sandstone</u>, light grey, fine to medium grained, with moderate sorting, subangular, mainly quartzose, equally feldspathic and lithic, poor to moderate porosity with a dominantly kaolinitic matrix partly dolomitic.
<u>Siltstone and Shale</u>, as above.
<u>Coal</u>, black with a concoidal fracture.

8070-8410 <u>Sandstone with minor Siltstone and Coal</u>:
<u>Sandstone</u>, two types of sandstone are present:
(1) light grey, fine to medium grained, poorly sorted, subangular, equally quartzose and lithic, partly feldspathic, with up to 20% kaolinitic and calcareous matrix, poor porosity.
(2) light grey, coarse to very coarse, subangular to subrounded, well sorted, dominantly quartzose, slightly lithic and feldspathic, with up to 5% kaolinitic matrix or dolomite cement, semi-friable, porosity good.
<u>Siltstone</u>, dark grey, argillaceous, partly carbonaceous, slightly micaceous and feldspathic.
<u>Coal</u>, black with a concoidal fracture.

8410-8610 <u>Interbedded Siltstone and Shale, minor Sandstone</u>:
<u>Siltstone</u>, dark grey, slightly feldspathic, partly carbonaceous, mainly argillaceous.
<u>Shale</u>, brown and grey, variably carbonaceous.
<u>Sandstone</u>, light grey, very fine to fine grained, moderately sorted, subrounded, equally lithic and quartzose, feldspathic, slightly carbonaceous with up to 25% kaolinitic matrix or dolomitic cement, porosity poor.

8610-8705 <u>Sandstone with minor Siltstone</u>:
<u>Sandstone</u>, light grey, medium to coarse grained, good sorting, subangular, dominantly quartz with varying amounts of feldspar, minor lithics, carbonaceous grains and mica. Porosity fair to good with max 15% kaolinitic and calcareous matrix, semi-friable.
<u>Siltstone</u>; light grey mainly quartzose, variably argillaceous, slightly feldspathic and carbonaceous, compact.

8705-8805 <u>Interbedded Siltstone and Sandstone with minor Shale and Coal</u>:
<u>Siltstone</u>, light and dark grey, variably quartzose and argillaceous, slightly feldspathic and carbonaceous. Compact.
<u>Sandstone</u>, light grey, fine to coarse grained, poorly sorted, subrounded, equally quartzose, lithic and feldspathic, slightly carbonaceous with 20% kaolinitic slightly calcareous matrix. Porosity poor, compact.
<u>Shale</u>, brown and grey, compact.
<u>Coal</u>, black.

8805-8860 <u>Sandstone</u>, two types:
(1) light grey, fine to medium grained, moderately sorted, subrounded, equally quartzose and lithic (grey and light green), feldspathic, with up to 20% kaolinitic matrix, compact, porosity poor.
(2) light grey, medium to very coarse grained, poorly sorted, subangular, mainly clear quartz minor feldspar and green siliceous lithics, up to 10% kaolinitic, partly calcareous matrix, semi-friable good to fair porosity.

8860-8940	Interbedded Siltstone and Shale with thin Dolomites: Siltstone, dark grey, slightly feldspathic and carbonaceous, argillaceous. Shale, grey, partly very carbonaceous. Dolomite, brown, slightly calcareous, cryptocrystalline.
8940-8960	Sandstone, light grey, fine to coarse grained, poorly sorted, subangular to subrounded. Mainly quartzose, equally feldspathic and lithic, slightly carbonaceous, 5-15% kaolinitic, slightly calcareous matrix, semi-friable, porosity moderate to poor.
8960-8970	Interbedded Siltstone, Shale and Coal: Siltstone and Shale as for 8860-8940.
8970-8980	Sandstone, light grey, coarse grained, well sorted, subangular, entirely quartoze, up to 5% kaolinitic matrix, semi-friable to friable, good porosity.
8980-9100	Interbedded Siltstone and Shale with minor Sandstone: Siltstone, dark grey, argillaceous, slightly feldspathic and micaceous, grading into shale. Shale, dark grey with carbonised plant remains. Sandstone, light grey, fine to medium grained, moderately sorted, subrounded, mainly quartzose, equally lithic and feldspathic slightly carbonaceous, up to 20% kaolinitic matrix, consolidated, poor porosity.
9100-9205	Interbedded Sandstone, Siltstone and Shale with minor Coal: Sandstone, two types: (1) similar to above is more frequent. (2) light grey to light brown. Very fine to coarse grained, poor to moderate sorting, subangular, varying amounts of quartz, feldspar and lithics, 5-40% calcareous cement. Where % of cement is low, quartz is coarse and porosity is good. With increasing % of cement amount of quartz and porosity decreased and amount of feldspar and lithics increases. Siltstone and Shale as for 8980-9100.
9205-9245	Weathered Volcanics, white to cream, translucent, very calcareous to non-calcareous, 0 to 10% feldspathic, slightly micaceous (biotite) and carbonaceous, hard though softens in water.
9245-9305	Siltstone with minor thin beds of Sandstone: Siltstone, dark grey slightly quartzose and micaceous, feldspathic argillaceous. Sandstone, light grey fine to medium grained, moderately sorted, subrounded, quartzose, slightly lithic and carbonaceous, very feldspathic in part, up to 30% kaolinitic matrix, consolidated, poor porosity.
9305-9534	Interbedded Siltstone and Shale with minor thin beds of Sandstone, Limestone and Coal: Siltstone, dark grey, argillaceous, carbonaceous, slightly feldspathic and micaceous. Shale, shades of brown and grey. Sandstone, white to light grey, fine to medium grained, moderately sorted, subangular, dominantly quartzose, slightly lithic and feldspathic, carbonaceous, with up to 25% calcareous microcrystalline, cement and poor porosity. Consolidated. Limestone, brown, microcrystalline, impure with up to 20% non-calcareous materials dominantly carbonaceous, partly feldspathic, rarely quartzose. Coal, black.

3-18

LOG OF CORES

CO

SIDE WALL CORE DESCRIPTION - GOLDEN BEACH NO.1A.

RUN NO.1

1986 S.W.C. No.30 Recovery: $2\frac{1}{4}$"
MARL OR CALCAREOUS CLAY: grey-brown made up of clay sized particles, rarely fossiliferous most of these being forams, very glauconitic with glauconite grans well rounded. Slightly pyritic.

1992 S.W.C. No.29 Recovery: $2\frac{1}{2}$"
MARL OR CALCAREOUS CLAY: grey-brown as for previous sample with less glauconite.

1995 S.W.C. No.28 Recovery: $2\frac{1}{2}$"
MARL OR CALCAREOUS CLAY: grey-brown, glauconitic and pyritic as before.

2003 S.W.C. No.27 Recovery: 1"
GLAUCONITIC SANDSTONE: light to dark green, very fine to medium grained, with glauconite coarser than quartz which is coarser than the pyrite present. Porosity is poor to moderate and the sandstone if friable. Quartz is mainly medium grained, clear, angular to subangular. Glauconite is light and dark green, subrounded to rounded. The amount of quartz exceeds the amount of glauconite.
FLUORESCENCE: Nil.

2008 S.W.C. No.26 Recovery: $2\frac{1}{4}$"
GLAUCONITIC SANDSTONE: dark green with few grains exceeding 1/2mm. Glauconite is mainly medium grained, rarely coarse grained and more angular than in previous sample. In colour it grades from light green to black. The quartz is medium grained, angular and generally clear. Rare coarse well rounded grains are also present. Pyrite is present throughout either as very fine fragments or as large clusters of grains.
FLUORESCENCE: Nil.

2022 S.W.C. No.25 Recovery: $1\frac{1}{4}$"
SANDSTONE: light brown, fine grained with rare very coarse grains, subrounded to rounded, moderately sorted, almost entirely quartzose (clear) with rare glauconitic grains. Porosity is good.
FLUORESCENCE: Nil.

2025 S.W.C. No.24 Recovery $1\frac{1}{2}$"
SANDSTONE: grey-brown, very fine to fine grained, rarely medium grained, moderate sorting, subangular to subrounded, mainly quartzose (clear) slightly glauconitic, rarely pyritic. Porosity is good and the sandstone is friable.
FLUORESCENCE: Nil.

2030 S.W.C. No.23 Recovery: 2"
SANDSTONE: grey-brown, very fine to fine grained, subangular to angular with rare medium to coarse rounded quartz grains, moderate sorting, dominantly quartzose (clear) slightly micaceous and glauconitic, rarely pyritic with very little kaolinitic matrix. Porosity is good and the sandstone is friable.
FLUORESCENCE: Nil.

2035 S.W.C. No.22 Recovery: $1\frac{1}{2}$"
SANDSTONE: as previously except medium to coarse grains are absent and grain size is very fine to fine grained. Porosity is good.
FLUORESCENCE: Nil.

2042 S.W.C. No.21 Recovery: $2\frac{1}{4}$"
SANDSTONE: light grey, generally fine grained with more numerous medium and coarse clear quartz grains, subangular to well rounded, poorly sorted, mainly quartzose with glauconite more common. Porosity is good.
FLUORESCENCE: Nil.

2052 S.W.C. No.20 Recovery: 2"
SANDSTONE: light grey, fine grained, angular, well sorted, mainly quartzose (clear), slightly pyritic, glauconitic and micaceous with very little kaolinitic matrix. Porosity is good and the sandstone is friable.
FLUORESCENCE: Nil.

2060 S.W.C. No.19 Recovery: $1\frac{1}{4}$"
SANDSTONE: light grey, very fine to fine grained, angular, well sorted, mainly quartzose (clear) slightly glauconitic and pyritic with an increase in the kaolinitic matrix, good porosity, friable.
FLUORESCENCE: Nil.

2068 S.W.C. No.18 Recovery: 2"
SANDSTONE: light grey to light brown, fine grained, subangular to angular, moderately sorted, mainly quartzose (clear) slightly lithic (grey) and glauconitic. Porosity is good and the sandstone is friable.
FLUORESCENCE: Nil.

2075 S.W.C. No.17 Recovery: 2"
SANDSTONE: light grey, fine grained, subrounded to subangular, moderately sorted, almost entirely quartzose (clear) good porosity.
FLUORESCENCE: Nil.

2079 S.W.C. No.16 Recovery: Misfire.

2083 S.W.C. No.15 Recovery: 2"
SANDSTONE: grey-brown, fine grained, subangular to subrounded, well sorted, mainly quartzose (clear), slightly glauconitic with minor kaolinitic matrix, good porosity, friable.
FLUORESCENCE: Nil.

2088 S.W.C. No.14 Recovery: 2"
SANDSTONE: grey-brown, fine grained, subangular to subrounded, well sorted, mainly quartzose (clear) with up to 15% kaolinitic matrix. Porosity although good is less than in previous samples.
FLUORESCENCE: Nil.

2100 S.W.C. No.13 Recovery: 1-3/4"
SANDSTONE: light grey, fine grained, subangular to angular, well sorted, quartzose (clear) with very little kaolinitic matrix. Good porosity, friable.
FLUORESCENCE: Nil.

2110 S.W.C. No.12 Recovery: 2"
SANDSTONE AND SILTSTONE: grey brown, very fine grained with numerous silt sized grains, angular to rounded, poorly sorted, mainly quartzose (clear), slightly carbonaceous and micaceous with 5% kaolinitic matrix, good porosity but less than previously, friable.
FLUORESCENCE: Nil.

2120 S.W.C. No.11 Recovery: 2"
SANDSTONE AND SILTSTONE: grey brown, very fine and silt sized grains, subangular to subrounded, moderate to poor sorting, dominantly quartzose (clear) very slightly micaceous with good porosity, friable.
FLUORESCENCE: Nil.

2130 S.W.C. No.10 Recovery: 2"
SANDSTONE AND SILTSTONE: grey brown, very fine and silt sized grains, subangular to subrounded, moderate to poor sorting, mainly quartzose (clear), slightly lithic (grey) very slightly glauconitic with very little kaolinitic matrix, good porosity, friable.
FLUORESCENCE: Nil.

2140 S.W.C. No.9 Recovery: 1-3/4"
SANDSTONE AND SILTSTONE: grey brown, very fine and silt sized grains, subangular and subrounded, moderate to poor sorting, mainly quartzose (clear) with a very small amount of kaolinitic matrix, good porosity, friable.
FLUORESCENCE: Nil.

2150 S.W.C. No.8 Recovery: 2"
SILTSTONE: light grey, entirely silt sized grains subangular, well sorted, mainly quartzose, very slightly micaceous, good porosity, friable. Quartz as in all other samples is clear.
FLUORESCENCE: Nil.

2165 S.W.C. No.7 Recovery: 2"
SILTSTONE: grey brown, entirely silt sized grains, subangular, to subrounded, well sorted, entirely quartzose (clear), no matrix, good porosity, friable.
FLUORESCENCE: Nil.

2175 S.W.C. No.6 Recovery: 2"
SILTSTONE: grey brown entirely silt sized grains, subangular, well sorted, entirely quartzose (clear) with up to 10% kaolinitic matrix, good porosity, friable.
FLUORESCENCE: Nil.

2220 Top of Lat. Coarse Clastic
AC

2224 S.W.C. No.5 Recovery: 1-3/4"
COAL: brown, earthy.

3304 S.W.C. No.4 Recovery: 1-3/4"
SANDSTONE: white, very fine grained, angular, well sorted, almost entirely quartzose, slightly lithic with very little kaolinitic matrix, good porosity, friable.
FLUORESCENCE: Nil.

3310 S.W.C. No.3 Recovery: 1½"
SANDSTONE: light grey, fine to medium grained, subangular to subrounded, moderate sorting, mainly quartzose (clear) partly felspathic and carbonaceous with 15% white kaolinitic matrix, moderate porosity, semifriable.
FLUORESCENCE: Nil.

3362 S.W.C. No.2 Recovery: 1½"
CLAY: white to very pale grey, kaolinitic, plastic.

3365 S.W.C. No.1 Recovery: 1-3/4"
CLAY: white to very pale grey, kaolinitic, plastic.

3-22

RUN NO.2

5517 S.W.C. No.30 Recovery: 3/4"
CLAY: brownish grey.

5518 S.W.C. No.29 Recovery: 3/4"
CLAY: brownish grey.

5579 S.W.C. No.28 Recovery: 1¼"
SANDSTONE: white to light grey, medium to very coarse grained, poorly sorted, subrounded to angular, entirely quartzose, rare kaolinitic matrix, good porosity.
FLUORESCENCE: Nil.

5593 S.W.C. No.27 Recovery: 3/4"
CLAY: brownish grey.

5604 S.W.C. No.26 Recovery: 1"
CLAY: brownish grey.

5609 S.W.C. No.25 Recovery: 1"
CLAY: dark grey, carbonaceous.

5630 S.W.C. No.24 Recovery: 1"
SANDSTONE: white to light grey, fine to very coarse, poorly sorted, subrounded to angular, entirely quartz, with a trace of kaolinitic matrix. Poorly consolidated, good porosity.
FLUORESCENCE: Nil.

5792 S.W.C. No.23 Recovery: ½"
CLAY: dark grey, fairly hard.

5795 S.W.C. No.22 Recovery: 1"
CLAY: dark grey, fairly hard.

5837 S.W.C. No.21 Recovery: 3/4"
SANDSTONE: light grey, very fine to medium grained with rare coarse grains, poorly sorted, subangular to subrounded, almost entirely clear to slightly cloudy quartz, rare felspar and pyrite, about 5% kaolinitic matrix, poorly consolidated, good porosity.
FLUORESCENCE: Nil.

5860 S.W.C. No.20 Recovery: 3/4"
SANDSTONE: grey, fine to medium grained, moderate to good sorting, subrounded to subangular, almost entirely quartz with minor felspar and some very fine pyrite, 10% kaolinitic matrix, poor to moderate porosity. Fairly soft.

6409 S.W.C. No.19 Recovery: 1"
SANDSTONE: whitish grey, medium to coarse grained, poor to moderate sorting, subangular to angular, almost entirely quartz with minor lithics and felspar, good to moderate porosity with 10% white kaolinitic matrix, compact. Quartz is generally clear.
FLUORESCENCE: Nil.

6462 S.W.C. No.18 Recovery: ½"
CLAY: dark grey, fairly hard.

6479 S.W.C. No.17 Recovery: Nil

7249 S.W.C. No.16 Recovery: ½"
CLAY: dark grey, fairly hard.

7526 S.W.C. No.15 Recovery: ½"
SANDSTONE: whitish grey, medium to coarse grained, poor to moderate sorting, subangular to angular, almost entirely quartz with minor lithics and felspar, good to moderate porosity with 10% white kaolinitic matrix, compact. Quartz is generally clear.
FLUORESCENCE: Nil.

7543 S.W.C. No.14 Recovery: ½"
CLAY: dark grey, fairly hard.

7545 S.W.C. No.13 Recovery: ½"
CLAY: dark grey, fairly hard.

7603 S.W.C. No.12 Recovery: ½"
SILTY CLAY: fairly hard, carbonaceous.

7605 S.W.C. No.11 Recovery: ½"
CLAY: dark grey, fairly hard.

7607 S.W.C. No.10 Recovery: ½"
SANDSTONE: slightly greenish grey, fine to very fine grained, moderately sorted, subangular, 60% quartz, 30% greenish grey lithics, 10% felspar, 20% kaolinitic matrix, fairly soft, porosity appears to be poor.
FLUORESCENCE: Nil.

7617 S.W.C. No.9 Recovery: ½"
SANDSTONE: light grey, very fine to fine grained, moderate sorting, subangular to angular, 90% quartz, 10% dark grey lithics, 5-10% kaolinitic matrix, fairly soft. Porosity appears to be fair.
FLUORESCENCE: Nil.

7642 S.W.C. No.8 Recovery: ½"
CLAY: dark grey, fairly hard.

7644 S.W.C. No.7 Recovery: ½"
CLAY: dark grey, fairly hard.

7668 S.W.C. No.6 Recovery: ½"
SANDSTONE: light grey, very fine to fine grained, moderate sorting, subangular, 80% quartz, 20% dark grey lithics, 20-30% kaolinitic matrix, fairly soft. Porosity appears to be poor.
FLUORESCENCE: Nil.

7670 S.W.C. No.5 Recovery: ½"
SANDSTONE: light grey, very fine to fine grained, moderate sorting, subangular, 90% quartz, 10% dark grey lithics, 15-20% kaolinitic matrix, fairly soft. Porosity appears to be poor.
FLUORESCENCE: Nil.

7690 S.W.C. No.4 Recovery: ¼"
CLAY: dark grey, fairly hard.

7692 S.W.C. No.3 Recovery: ½"
CLAY: dark grey, fairly hard, carbonaceous.

7789 S.W.C. No.2 Recovery: ½"
SANDSTONE: light grey, very fine to fine grained, moderate sorting, subangular to angular, 90% quartz, 10% dark grey lithics, 10% kaolinitic matrix, fairly soft. Porosity appears to be fair to poor.
FLUORESCENCE: Nil.

7791 S.W.C. No.1 Recovery: Nil

RUN NOS. 3 and 4

7932 S.W.C. No.30 (Run No.4) Recovery: 1½"
CLAY: dark grey, hard.

7933 S.W.C. No.30 (Run No.3) Recovery: ½"
CLAY: dark grey.

7991 S.W.C. No.29 (Run No.4) Recovery: 1¼"
SANDSTONE: brownish grey, very fine to fine grained, moderate sorting, subangular, 80% quartz, 10% felspar, 10% lithics, 10-20% argillaceous matrix, friable, good porosity.
FLUORESCENCE: Nil.

8025 S.W.C. No.29 (Run No.3) Recovery: 3/4"
CLAY: dark grey.

8049 S.W.C. No.28 (Run No.3) Recovery: 3/4"
SANDSTONE: grey, 60% fine, 40% medium grained, moderate sorting, subrounded with 50% quartz, 40% lithic and the remainder felspathic and carbonaceous material. Approximately 20% kaolinitic matrix, poor porosity, consolidated.
FLUORESCENCE: Nil.

8080 S.W.C. No.27 (Run No.3) Recovery: 3/4"
CLAY: dark grey.

8124 S.W.C. No.28 (Run No.4) Recovery: 1¼"
SANDSTONE: light grey, very fine to fine grained, moderately sorted, subangular, 80% quartz, 10% felspar, 10% lithics and 10-20% kaolinitic matrix, semi friable, fair porosity.
FLUORESCENCE: trace dull pale blue. CUT: Nil.

8130 S.W.C. No.26 (Run No.3) Recovery: ½"
SANDSTONE: light brown, very fine to coarse grained (60% very fine) mainly quartzose, rarely lithic, carbonaceous and felspathic with 15% calcareous and kaolinitic matrix, moderate porosity.
FLUORESCENCE: 20% very pale blue CUT: Weak.

8246 S.W.C. No.25 (Run No.3) Recovery: 3/4"
CLAY: dark grey.

8248 S.W.C. No.24 (Run No.3) Recovery: 3/4"
CLAY: dark grey.

8321 S.W.C. No.23 (Run No.3) Recovery: 3/4"
SANDSTONE: light grey, medium grained, well sorted, subrounded with 90% quartz, remainder lithic and felspathic, slightly carbonaceous with 10% kaolinitic matrix, poor porosity, consolidated.
FLUORESCENCE: 10% very pale blue CUT: Weak.

8357 S.W.C. No.22 (Run No.3) Recovery: ½"
SANDSTONE: light brown to grey, fine grained, well sorted, subrounded, equally quartzose and lithic, partly felspathic and carbonaceous with up to 20% kaolinitic matrix, poor porosity.
FLUORESCENCE: Nil.

8394 S.W.C. No.27 (Run No.4) Recovery: Nil.

8495 S.W.C. No.21 (Run No.3) Recovery: 3/4"
CLAY: dark grey.

8607 S.W.C. No.20 (Run No.3) Recovery: 1½"
CLAY: dark grey with a thin coal streak crossing the core.

8609 S.W.C. No.19 (Run No.3) Recovery: 1½"
CLAY: dark grey.

RUN NOS. 3 and 4

8642 S.W.C. No.18 (Run No.3) Recovery: ½"
SANDSTONE: light grey to light brown, coarse to very coarse angular, moderate sorting, 90% quartz, remainder lithic and felspathic with 10-15% kaolinitic and slightly calcareous matrix, poor to moderate porosity.
FLUORESCENCE: 20-30% dull light blue CUT: Fair

8644 S.W.C. No.26 (Run No.4) Recovery: 1"
SANDSTONE: light grey, very fine to medium grained, moderate sorting, subangular, 70% quartz, 15% felspar, 10% green lithics, 5% carbonaceous grains and 5-10% kaolinitic matrix, semifriable, fair porosity. Coal bands and streaks are also present.
FLUORESCENCE: 20% dull pale blue CUT: Fair

8645 S.W.C. No.17 (Run No.3) Recovery: ½"
SANDSTONE: light grey to light brown, coarse to very coarse as for 8642 ft. sample.
FLUORESCENCE: 20% dull light blue. CUT: Fair

8646 S.W.C. No.25 (Run No.4) Recovery: 1¼"
SANDSTONE: light grey, very fine to medium grained with minor coarse grains, moderate to poor sorting, subangular, almost entirely quartz, up to 5% kaolinitic matrix, friable, good porosity, Coal bands and streaks are also present.
FLUORESCENCE: 20% dull pale blue CUT: strong pale blue.

8660 S.W.C. No.16 (Run No.3) Recovery: ½"
SANDSTONE: white to light brown, very fine to coarse with latter dominant (10% fine, 40% medium, 50% coarse) poorly sorted, subangular with up to 90% quartz and the remainder lithic and felspathic with 10-15% kaolinitic slightly calcareous matrix and moderate porosity.
FLUORESCENCE: 40% pale blue CUT: Fair

8675 S.W.C. No.15 (Run No.3) Recovery: 3/4"
SANDSTONE: light brown, fine to medium grained, rarely coarse grained, poorly sorted, subangular to subrounded, mainly quartzose (70%) lithic, slightly carbonaceous, also rarely dolomitic with up to 15% kaolinitic matrix and poor porosity. Semiconsolidated.
FLUORESCENCE: trace very dull pale blue CUT: Weak.

8675 S.W.C. No.24 (Run No.4) Recovery: 1"
SANDSTONE: light grey, very fine to medium grained, moderate sorting, subangular, 70% quartz, 20% green lithics, 10% felspar, 5-10% kaolinitic matrix, semifriable, fair porosity.
FLUORESCENCE: Nil

8708 S.W.C. No.14 (Run No.3) Recovery: 3/4"
CLAY: dark grey, as before.

8784 S.W.C. No.23 (Run No.4) Recovery: 1¼"
CLAY: dark grey, hard.

8785 S.W.C. No.13 (Run No.3) Recovery: ½"
CLAY: dark grey as before.

8810 S.W.C. No.12 (Run No.3) Recovery: ½"
SANDSTONE: grey, fine to medium grained, moderately sorted subrounded, 60% quartz, 30% dark grey lithics and 10% felspar, slightly carbonaceous with approximately 15% kaolinitic matrix. Consolidated with poor porosity.
FLUORESCENCE: Nil.

8813 S.W.C. No.22 (Run No.4) Recovery: 1¼"
SANDSTONE: light grey, very fine to fine grained, moderate sorting, subangular, 60% quartz, 20% felspar, 20% green lithics, 5-10% kaolinitic matrix, semifriable, fair to good porosity.
FLUORESCENCE: Nil.

RUN NOS. 3 and 4

8835 S.W.C. No.11 (Run No.3) Recovery: ½"
SANDSTONE: light grey, dominantly medium grained (80% of grains) 20% coarse grained, moderate sorting, subangular, mainly quartzose (75%) lithic and felspathic with 15% kaolinitic matrix. Porosity is poor to moderate, semi-friable.
FLUORESCENCE: trace light blue CUT: Weak.

8840 S.W.C. No.10 (Run No.3) Recovery: ½"
SANDSTONE: white to light grey, coarse to very coarse, mainly quartzose with up to 20% slightly calcareous, mainly kaolinitic matrix, and poor to moderate porosity, semi-friable.
FLUORESCENCE: 30-40% very dull pale blue. CUT: weak to fair.

8874 S.W.C. No.9 (Run No.3) Recovery: 3/4"
CLAY: dark grey, hard.

8966 S.W.C. No.21 (Run No.4) Recovery: 1½"
CLAY: very dark grey, hard.

8972 S.W.C. No.8 (Run No.3) Recovery: 3/4"
SANDSTONE: white to light grey, coarse to very coarse, angular, poorly sorted, almost entirely quartzose with minor siliceous lithics, white, slightly calcareous, dominantly kaolinitic matrix and minor light brown, dolomitic, crystalline cement. Porosity is poor to moderate.
FLUORESCENCE: trace light blue CUT: slight.

8975 S.W.C. No.7 (Run No.3) Recovery: 3/4"
SANDSTONE: white to light grey, coarse to very coarse with rare granule sized grains, dominantly quartzose as for 8972 ft. sample.
FLUORESCENCE: trace light blue CUT: slight.

9016 S.W.C. No.6 (Run No.3) Recovery: 3/4"
CLAY: dark grey, fairly hard.

9019 S.W.C. No.5 (Run No.3) Recovery: 3/4"
CLAY: dark grey, fairly hard.

9065 S.W.C. No.20 (Run No.4) Recovery: 1½"
CLAY: dark grey, fairly hard.

9074 S.W.C. No.19 (Run No.4) Recovery: 1¼"
CLAY: grey, silty, carbonaceous, hard.

9094 S.W.C. No.4 (Run No.3) Recovery: Nil

9096 S.W.C. No.3 (Run No.3) Recovery: ¼"
CLAY: dark grey, fairly hard.

9105 S.W.C. No.2 (Run No.3) Recovery: ¼"
SANDSTONE: light brown, generally fine to medium grained, rarely very fine grained, subangular to angular, poorly sorted, dominantly quartzose (80% of clastics) slightly lithic, rarely carbonaceous with up to 25% very light brown, slightly calcareous, mainly kaolinitic matrix. Poor porosity.
FLUORESCENCE: Nil.

9106 S.W.C. No.18 (Run No.4) Recovery: 1½"
SANDSTONE: brownish grey, very fine to fine with some medium grains, moderate sorting, subangular, almost entirely quartz with rare carbonaceous and lithic grains, 10-20% argillaceous occasionally kaolinitic matrix, semifriable, fair porosity.
FLUORESCENCE: Nil.

3-27

RUN NOS. 3 and 4

9107 S.W.C. No.1 (Run No.3) Recovery: Nil

9108 S.W.C. No.17 (Run No.4) Recovery: 1¼"
SANDSTONE: brownish grey, very fine to fine grained, moderate sorting, subangular, mainly quartzose with rare carbonaceous, lithic and felspathic grains, 20-40% argillaceous, occasionally kaolinitic matrix, semifriable, poor porosity.
FLUORESCENCE: Nil.

9152 S.W.C. No.16 (Run No.4) Recovery: 2"
CLAY: dark grey, hard.

9154 S.W.C. No.15 (Run No.4) Recovery: 1-3/4"
CLAY: dark grey, carbonaceous, hard.

9210 S.W.C. No.14 (Run No.4) Recovery: 3/4"
CLAY: slightly greenish grey, hard, brittle calcareous.

9220 S.W.C. No.13 (Run No.4) Recovery: 2¼"
CLAY: slightly greenish grey, hard, plastic, calcareous with a vitreous lustre in places.

9235 S.W.C. No.12 (Run No.4) Recovery: 1"
CLAY: slightly greenish grey, hard, plastic, calcareous with a vitreous lustre in places.

9243 S.W.C. No.11 (Run No.4) Recovery: 1½"
SILTSTONE: whitish grey, hard, mostly quartzose, argillaceous with about 5% carbonaceous and lithic grains.

9251 S.W.C. No.10 (Run No.4) Recovery: Nil (misfire)

9280 S.W.C. No.9 (Run No.4) Recovery: 1"
CLAY: dark grey, hard.

9282 S.W.C. No.8 (Run No.4) Recovery: 2"
CLAY: dark grey, hard.

9356 S.W.C. No.7 (Run No.4) Recovery: 2"
CLAY: dark grey, hard and COAL black brittle.

9358 S.W.C. No.6 (Run No.4) Recovery: 1¼"
CLAY: very dark grey, hard.

9391 S.W.C. No.5 (Run No.4) Recovery: 1½"
CLAY: very dark grey, hard.

9399 S.W.C. No.4 (Run No.4) Recovery: 1¼"
CLAY: very dark grey, hard.

9462 S.W.C. No.3 (Run No.4) Recovery: 1½"
CLAY: dark grey, hard.

9472 S.W.C. No.2 (Run No.4) Recovery: 1-3/4"
CLAY: dark grey, hard.

9472 S.W.C. No.1 (Run No.4) Recovery: 1-3/4"
CLAY: dark grey, hard.

CORE AND FLUID ANALYSES

CORE ANALYSIS

Core Analysis carried out by:

GEOSERVICES AUSTRALIA — Run No.1, Run No.2 *

or

CORE LABORATORIES INC. — Run No.3, Run No.4

* grain size analysis of this run carried out by Core Laboratories Inc., Perth.

RUN NO.1

Depth	Permeability (Milledarcy)	Porosity (%)	
2003	N.M.	N.M.	
2008	110	31.0	Fluid saturation,
2022	335	28.5	values were not
2025	126	36.8	determined.
2030	N.M.	35.1	
2035	360	33.1	
2042	510	N.M.	
2052	190	32.4	
2060	276	34.4	
2068	N.M.	N.M.	
2075	460	35.7	
2083	N.M.	N.M.	
2088	196	30.4	
2100	260	31.2	
2110	780	33.1	
2120	N.M.	N.M.	
2130	150	34.5	
2140	32	28.2	
2150	17	30.6	
2165	39	32.9	
2175	37	33.1	
2224	N.M.	28.1	
3304	128	28.3	
3310	51	28.6	

(N.M. - not measurable)

RUN NO.2

Depth	Permeability (Milledarcy)	Porosity (%)	Oil % volume	Oil % Pore	Water % Pore
5579	17	25.9	0.0	0.0	45.6
5630	294	22.9	0.0	0.0	55.5
5837	228	13.5	0.0	0.0	3.7
5860	146	35.6	1.6	4.5	56.2
6409	42	29.7	1.1	3.7	53.2
7526	291	37.4	0.7	1.9	32.1
7607	121	18.6	0.8	4.3	45.7
7617	154	21.9	0.0	0.0	37.0
7668	28	17.6	0.5	2.8	41.5
7670	84	16.2	-	-	-
7789	520	22.9	0.0	0.0	53.7

RUNS NO. 3 and 4

3-30

Depth	Permeability (Milledarcy)	Porosity (%)	Oil % Pore	Water % Pore
7991	255	23.2	0.0	34.5
8049	1107	26.2	0.0	56.5
8124	57	27.5	0.0	62.9
8130	128	24.8	0.0	48.4
8321	297	26.5	6.1	60.6
8357	2350	24.5	5.4	53.9
8642	74	30.5	6.1	53.0
8644	160	29.0	5.9	45.5
8645	50	29.6	6.0	42.2
8646	316	9.9	0.0	27.3
8660	439	18.0	0.0	35.0
8675	42	21.3	5.8	64.5
8813	50	22.8	4.2	45.8
8835	47	16.3	0.0	25.2
8840	1008	20.5	0.0	38.5
8972	222	29.2	8.1	12.2
8975	414	28.1	8.3	8.3
9105	43	10.2	6.4	46.8
9106	16	18.3	0.0	46.4
9108	26	25.8	4.1	46.8

3-34

GEOSERVICES

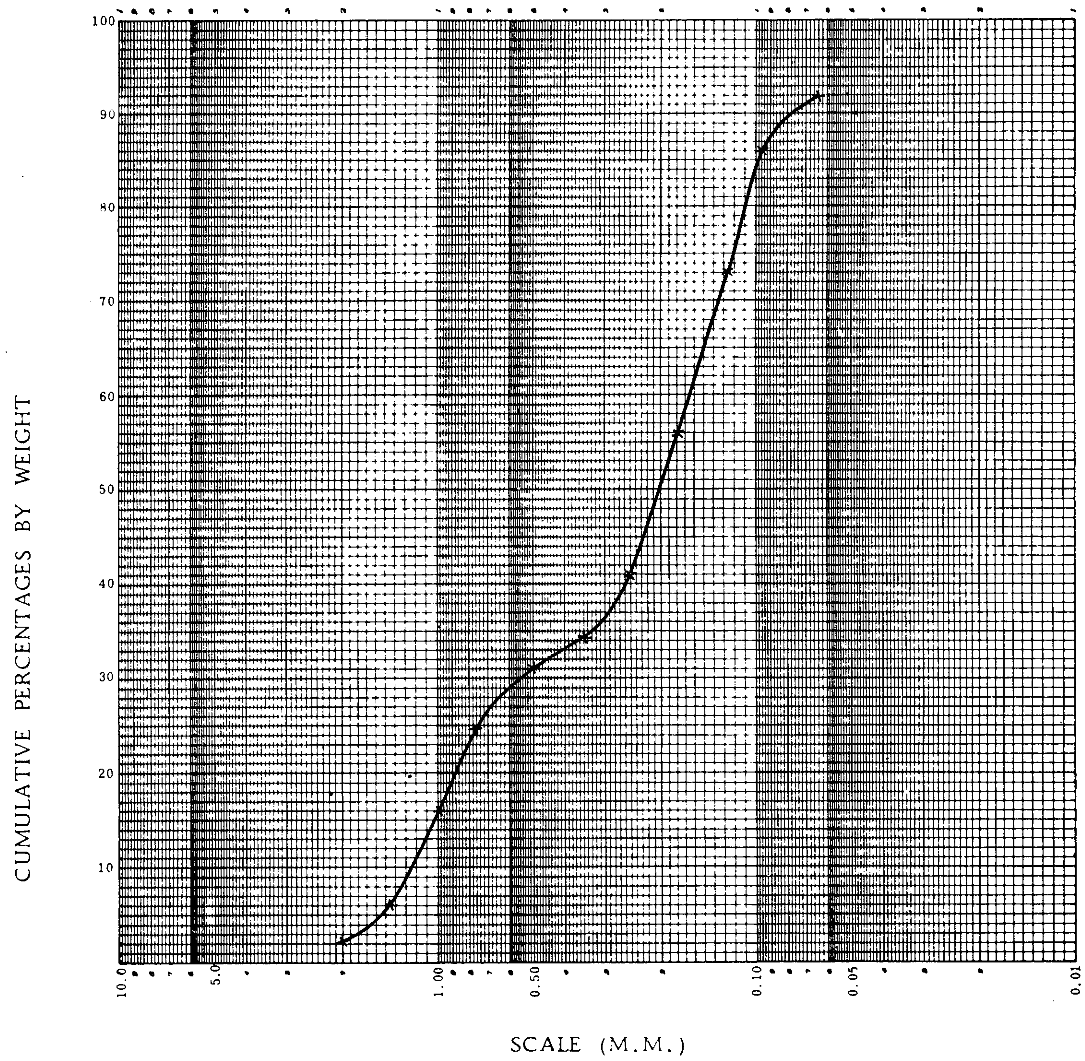
SIEVE ANALYSIS

COMPANY B. O. C. OF AUSTRALIA LIMITED FILE NO.

WELL GOLDEN BEACH IA DATE 19 JUNE 1967 ENGRS.

SAMPLE TYPE SIDE WALL CORE SAMPLE DEPTH 2022 ft. SAMPLE NO. 25

REMARKS TIME (Min.)



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
2. 000				0.504	2.10	2.10	97.90	
1. 148				0.948	3.95	6.05	93.95	
1. 000				2.400	10.00	16.05	83.95	
0. 750				2.048	8.55	24.60	75.40	
0. 490				1.595	6.65	31.25	68.75	
0. 350				0.696	2.90	34.15	65.85	
0. 250				1.642	6.85	41.00	59.00	
0. 180				3.690	15.40	56.40	43.60	
0. 125				4.045	16.85	73.25	26.75	
0. 092				3.210	13.35	86.60	13.40	
0. 063				1.295	5.40	92.00	8.00	
0. 000	0. 0000	PAN	PAN	1.800	7.50	99.50	0.50	
			TOTALS	23.873	99.50			

3-32

GEOSERVICES

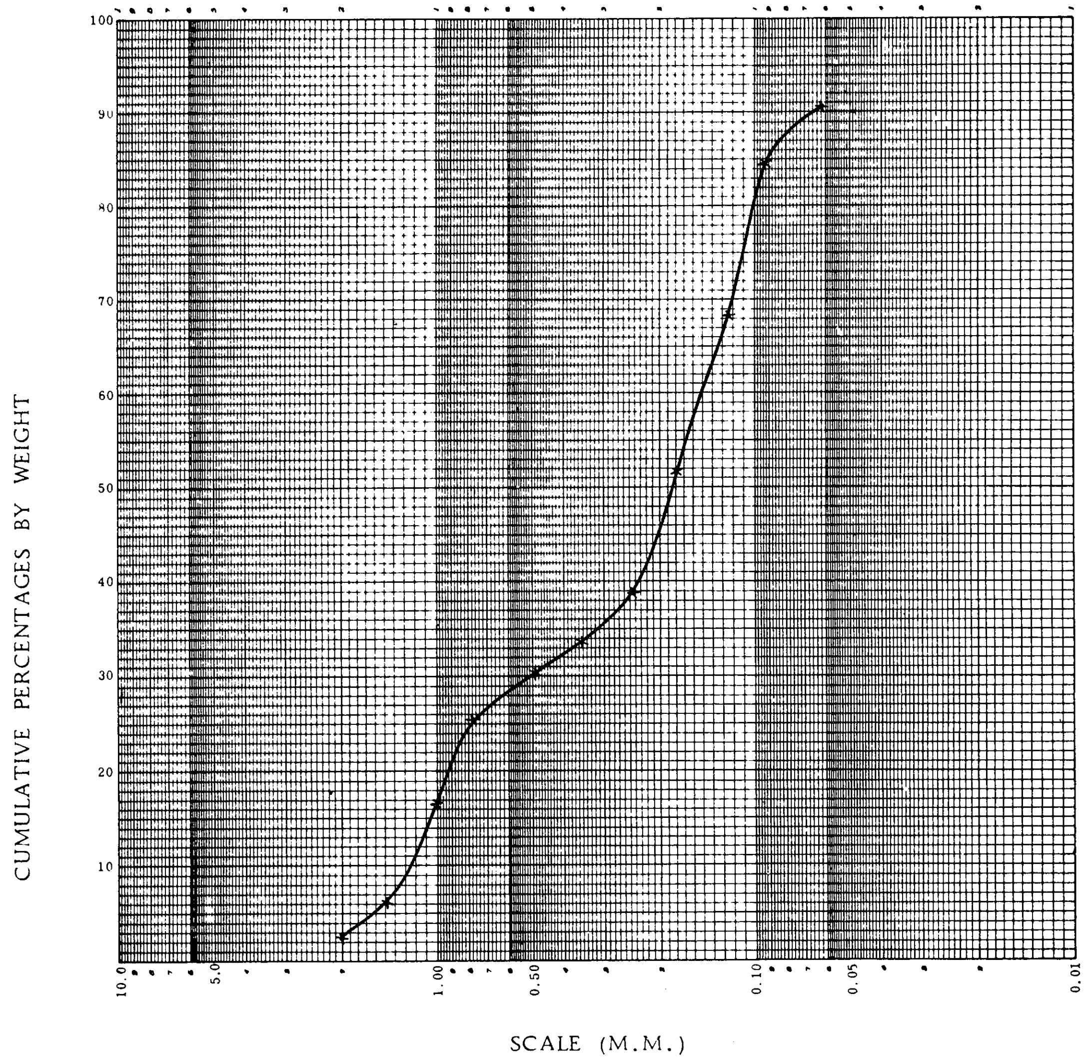
SIEVE ANALYSIS

COMPANY B. O. C. OF AUSTRALIA LIMITED FILE NO.

WELL GOLDEN BEACH IA DATE 19 JUNE 1967 ENGRS.

SAMPLE TYPE SIDE WALL CORE SAMPLE DEPTH 2025 ft. SAMPLE NO. 24

REMARKS TIME (Min.)



TYLER STANDARD SCREEN SCALE SIEVES $\sqrt{2}$ or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
2. 000				.495	2.15	2.15	97.85	
1. 148				.886	3.90	6.05	93.95	
1. 000				2.494	10.85	16.90	83.10	
0. 750				1.943	8.45	25.35	74.65	
0. 490				1.150	5.00	30.35	69.65	
0. 350				.702	3.05	33.40	66.60	
0. 250				1.195	5.20	38.60	61.40	
0. 180				2.900	12.60	51.20	48.80	
0. 125				3.940	17.15	68.35	31.65	
0. 092				3.797	16.50	84.85	15.15	
0. 063				1.334	5.80	90.65	9.35	
0. 000	0. 0000	PAN	PAN	2.046	8.90	99.55	0.45	
			TOTALS	22.882	99.55			

GEOSERVICES

SIEVE ANALYSIS

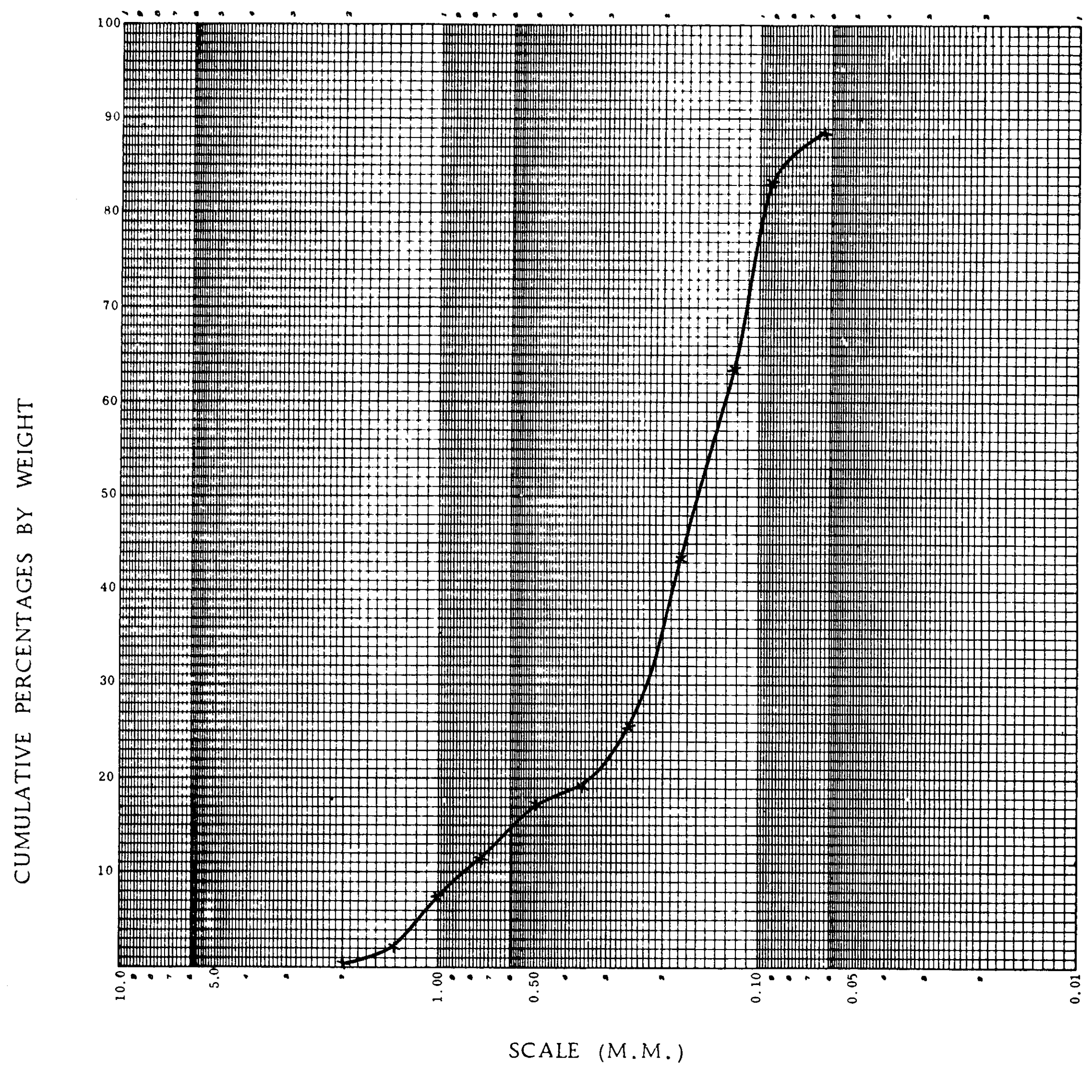
3-33

COMPANY B. O. C. OF AUSTRALIA LIMITED FILE NO.

WELL GOLDEN BEACH IA DATE 19 JUNE 1967 ENGRS.

SAMPLE TYPE SIDE WALL CORE SAMPLE DEPTH 2030 ft. SAMPLE NO. 23

REMARKS TIME (Min.)



TYLER STANDARD SCREEN SCALE SIEVES $\sqrt{2}$ or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
2. 000				0.195	0.75	0.75	99.25	
1. 148				0.443	1.70	2.45	97.55	
1. 000				1.353	5.20	7.65	92.35	
0. 750				.937	3.60	11.25	88.75	
0. 490				1.300	5.00	16.25	83.75	
0. 350				.742	2.85	19.10	80.90	
0. 250				1.652	6.35	25.45	74.55	
0. 180				4.750	18.25	43.70	56.30	
0. 125				5.200	20.00	63.70	36.30	
0. 092				5.100	19.60	83.30	16.70	
0. 063				1.638	6.30	89.60	10.40	
0. 000	0. 0000	PAN	PAN	2.690	10.35	99.95	0.05	
			TOTALS	26.000	99.95			

GEOSERVICES

SIEVE ANALYSIS

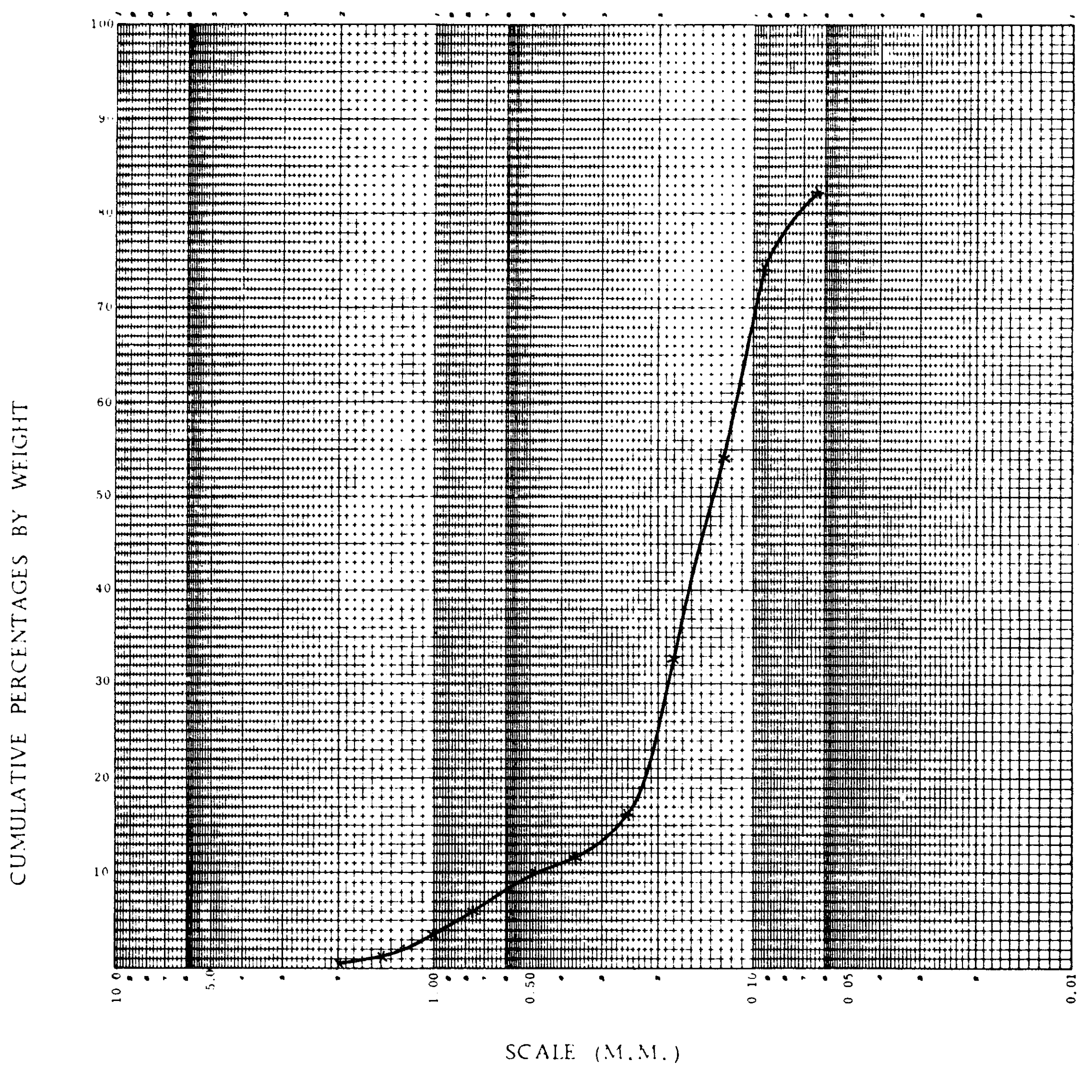
3-34

COMPANY B. O. C. OF AUSTRALIA LIMITED FILE NO.

WELL GOLDEN BEACH IA DATE 19 JUNE 1967 ENGRS.

SAMPLE TYPE SIDE WALL CORE SAMPLE DEPTH 2035 ft. SAMPLE NO. 22

REMARKS TIME (Min.)



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
2.000				0.095	0.50	0.50	99.50	
1.148				.152	0.80	1.30	98.70	
1.000				.503	2.65	3.95	96.05	
0.750				.399	2.10	6.05	93.95	
0.490				.750	3.95	10.00	90.00	
0.350				.352	1.85	11.85	88.15	
0.250				.845	4.45	16.30	83.70	
0.180				3.000	15.80	32.10	67.90	
0.125				4.200	22.10	54.20	45.80	
0.092				3.800	20.00	74.20	25.80	
0.063				1.520	7.90	82.10	17.90	
0.000	0.0000	PAN	PAN	3.400	17.90	100.00	0.00	
			TOTALS	19.016	100.00			

GEOSERVICES

SIEVE ANALYSIS

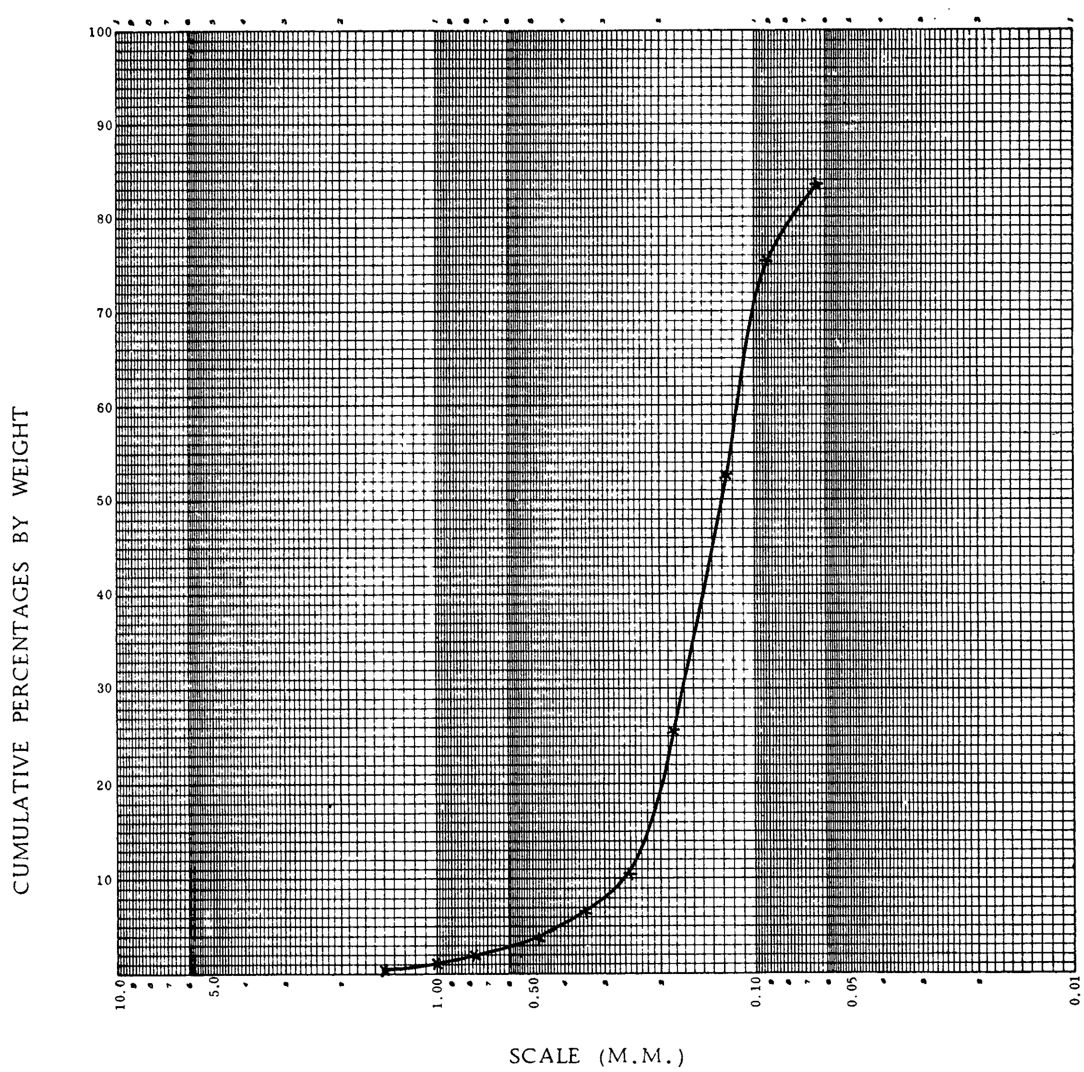
3-35

COMPANY B. O. C. OF AUSTRALIA LIMITED FILE NO.

WELL GOLDEN BEACH IA DATE 19 JUNE 1967 ENGRS.

SAMPLE TYPE SIDE WALL CORE SAMPLE DEPTH 2042 ft. SAMPLE NO. 21

REMARKS TIME (Min.)



TYLER STANDARD SCREEN SCALE SIEVES $\sqrt{2}$ or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
2. 000				0.000	0.00	0.00	100.00	
1. 148				0.042	0.15	0.15	99.85	
1. 000				0.294	1.05	1.20	98.80	
0. 750				.252	0.90	2.10	97.90	
0. 490				0.462	1.65	3.75	96.25	
0. 350				.797	2.85	6.60	93.40	
0. 250				.995	3.55	10.15	89.85	
0. 180				4.300	15.35	25.50	74.50	
0. 125				7.640	27.30	52.80	47.30	
0. 092				6.300	22.50	75.30	24.70	
0. 063				2.295	8.20	83.50	16.50	
0. 000	0. 0000	PAN	PAN	4.515	16.25	99.75	0.25	
			TOTALS	27.883	99.75			

3-36

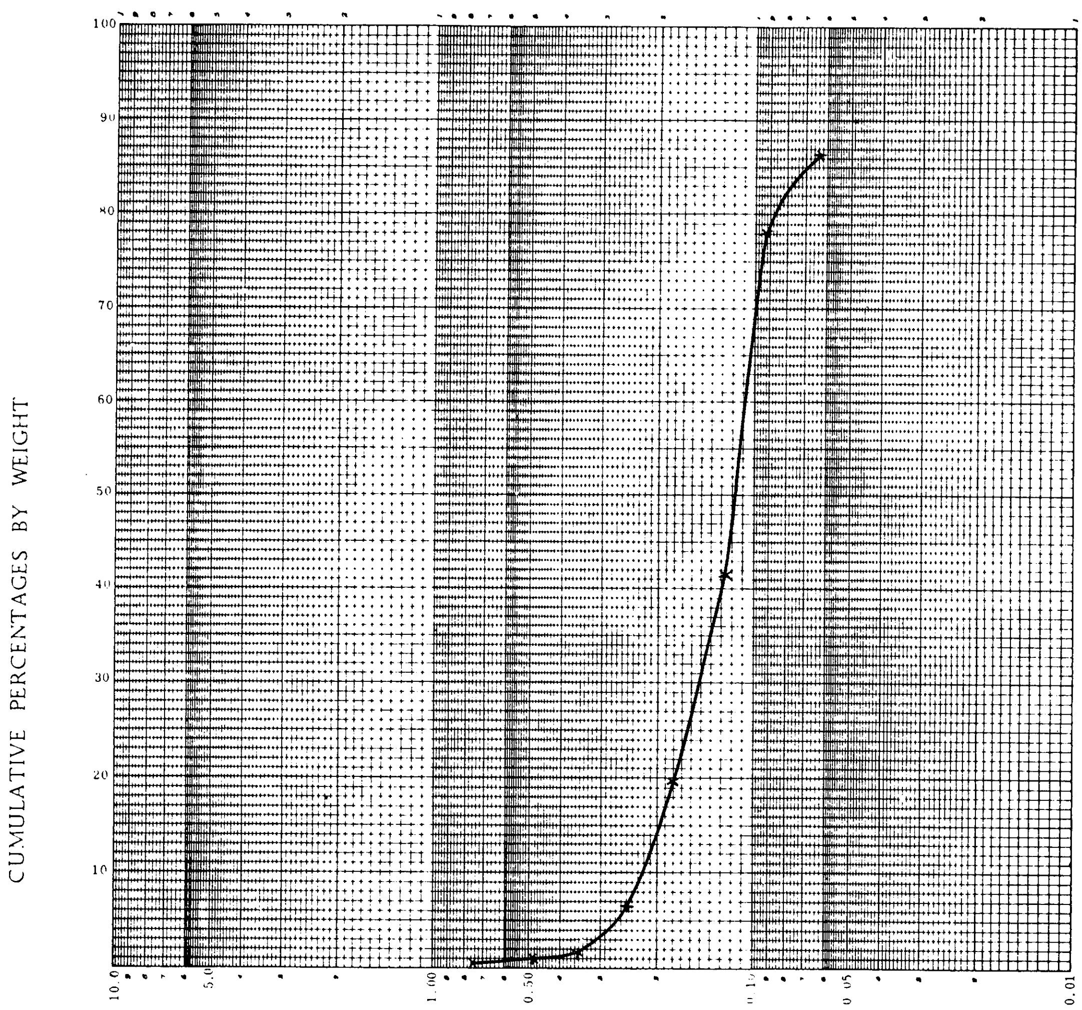
GEOSERVICES
SIEVE ANALYSIS

COMPANY B. O. C. OF AUSTRALIA LIMITED — FILE NO.

WELL GOLDEN BEACH IA — DATE 19 JUNE 1967 — ENGRS.

SAMPLE TYPE SIDE WALL CORE — SAMPLE DEPTH 2052 ft. — SAMPLE NO. 20

REMARKS — TIME (Min.)



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
2. 000								
1. 148								
1. 000				0.000	0.00	0.00	100.00	
0. 750				0.048	0.30	0.30	99.70	
0. 490				0.096	0.60	0.90	99.10	
0. 350				0.144	0.90	1.80	98.20	
0. 250				1.125	4.35	6.15	93.85	
0. 180				2.470	12.80	18.95	81.05	
0. 125				3.647	22.80	41.75	58.25	
0. 092				5.835	36.45	78.20	21.80	
0. 063				1.344	8.40	86.60	13.40	
0.000	0.0000	PAN	PAN	2.142	13.40	100.00	0.00	
			TOTALS	16.851	100.00			

3-37

GEOSERVICES

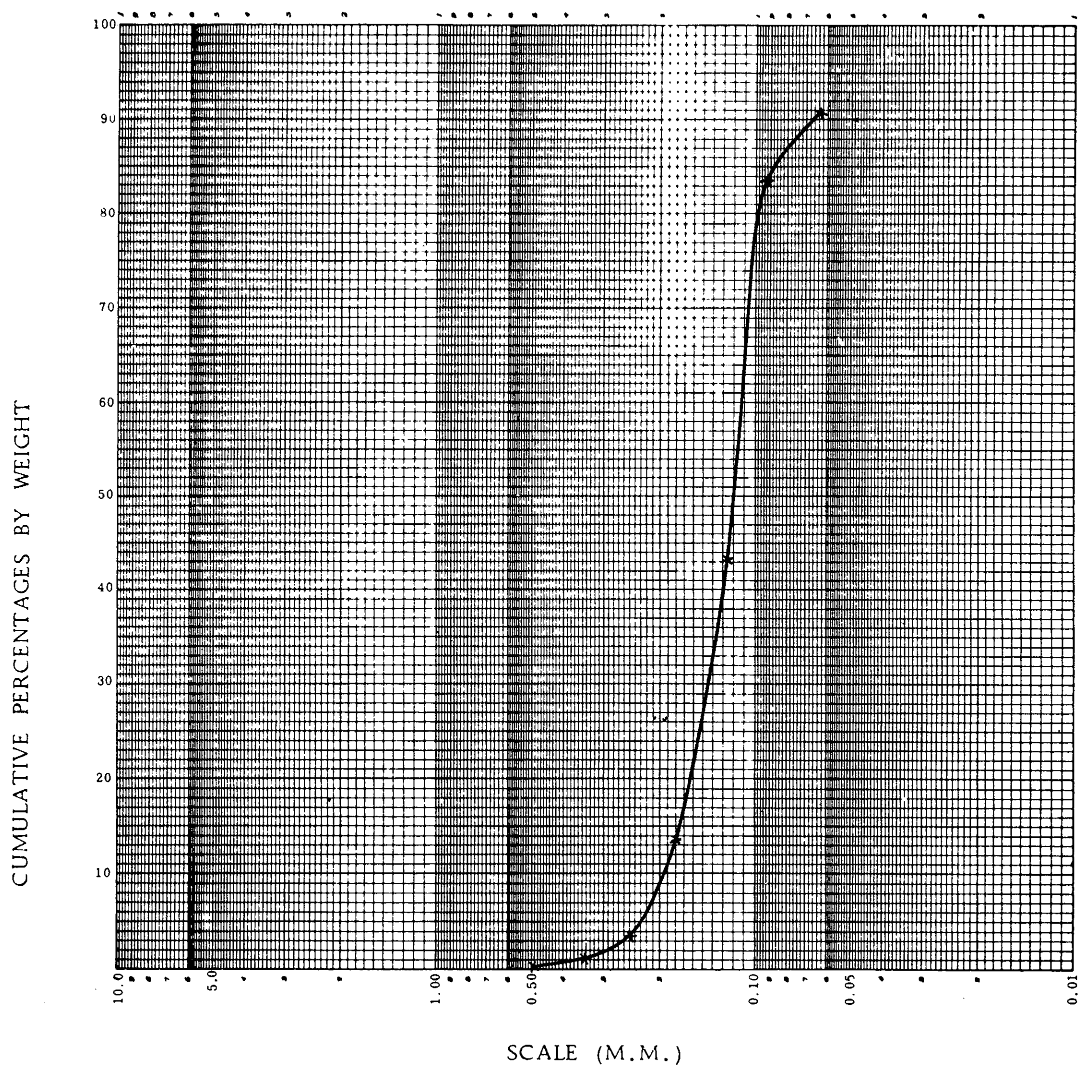
SIEVE ANALYSIS

COMPANY **B. O. C. OF AUSTRALIA LIMITED** FILE NO.

WELL **GOLDEN BEACH IA** DATE **19 JUNE 1967** ENGRS.

SAMPLE TYPE **SIDE WALL CORE** SAMPLE DEPTH 2060 ft. SAMPLE NO. 19

REMARKS TIME (Min.)



TYLER STANDARD SCREEN SCALE SIEVES $\sqrt{2}$ or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
2. 000					0.00			
1. 148					0.00			
1. 000					0.00			
0. 750				0.000	0.00	0.00	100.00	
0. 490				0.053	0.35	0.35	99.65	
0. 350				0.105	0.70	1.05	98.95	
0. 250				0.352	2.35	3.40	96.60	
0. 180				1.500	10.00	13.40	86.60	
0. 125				4.460	29.70	43.10	56.90	
0. 092				6.05	40.35	83.45	16.55	
0. 063				1.05	7.00	90.45	9.55	
0. 000	0. 0000	PAN	PAN	1.402	9.35	99.80	.20	
			TOTALS	14.972	99.80			

-37

3-38

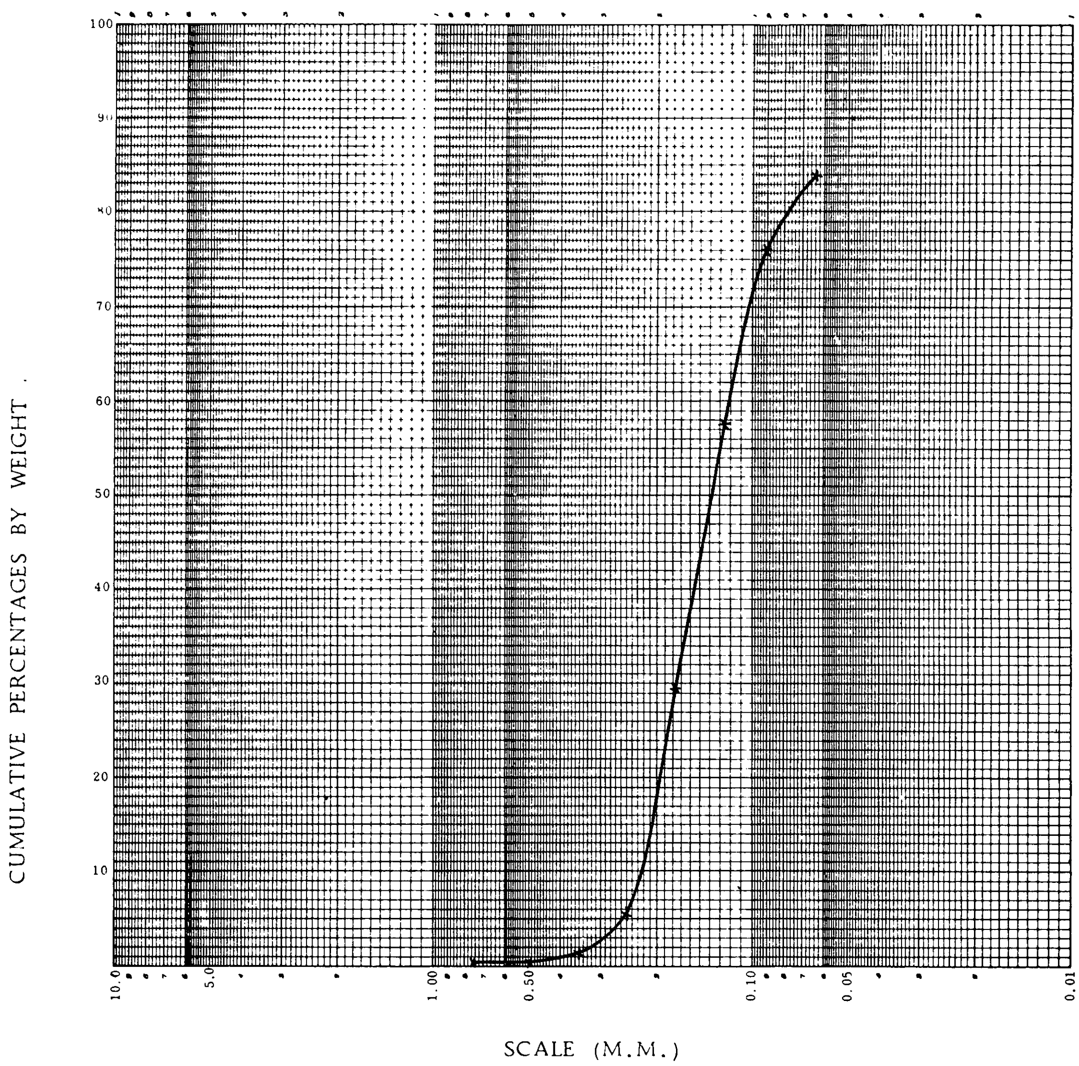
GEOSERVICES
SIEVE ANALYSIS

COMPANY B. O. C. OF AUSTRALIA LIMITED — FILE NO.

WELL GOLDEN BEACH IA — DATE 19 JUNE 1967 — ENGRS.

SAMPLE TYPE SIDE WALL CORE — SAMPLE DEPTH 2068 ft. — SAMPLE NO. 18

REMARKS — TIME (Min.)



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
2.000								
1.148								
1.000				0.00	0.00	0.00	100.00	
0.750				0.051	0.15	0.15	99.85	
0.490				0.102	0.30	0.45	99.55	
0.350				0.254	0.75	1.20	98.80	
0.250				1.544	4.55	5.75	94.25	
0.180				7.720	23.70	29.45	70.55	
0.125				9.650	28.40	57.85	42.15	
0.092				6.360	18.70	76.55	23.45	
0.063				2.542	7.50	84.05	15.95	
0.000	0.0000	PAN	PAN	5.400	15.90	99.95	0.05	
			TOTALS	33.623	99.95			

GEOSERVICES

SIEVE ANALYSIS

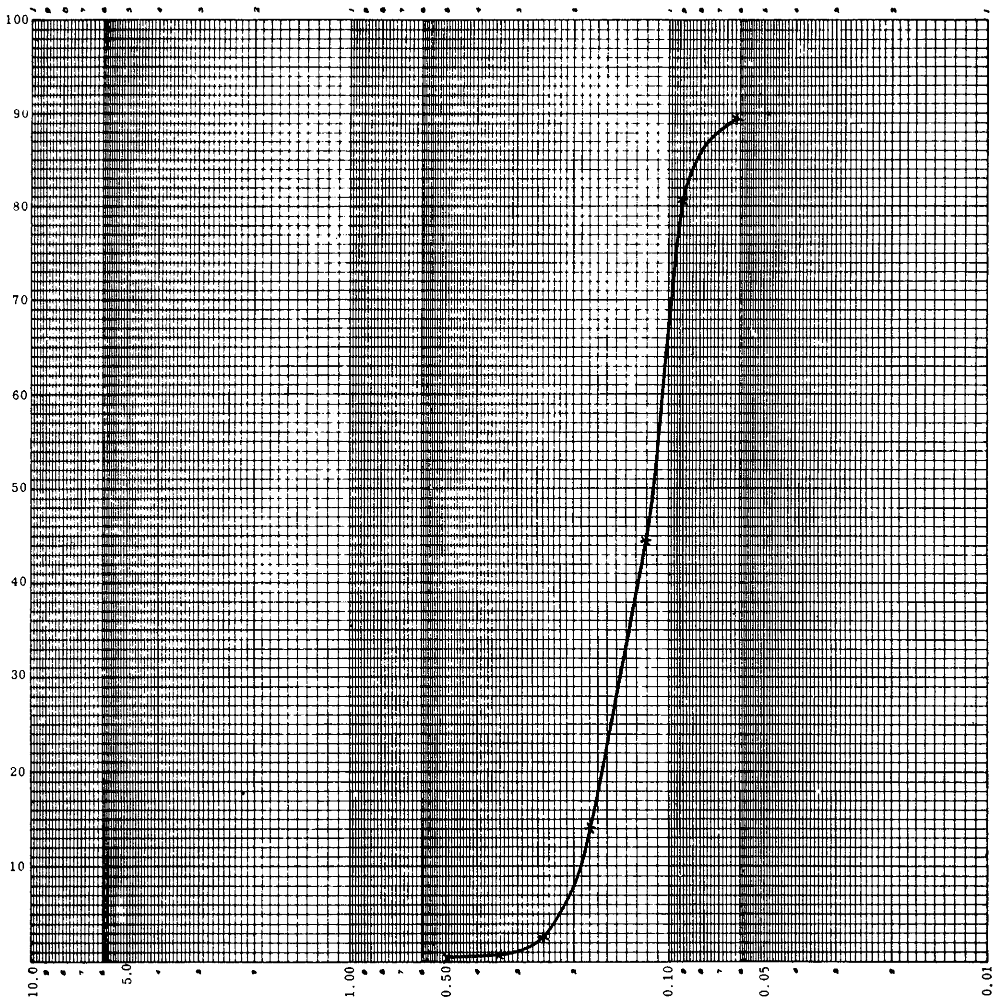
3-39

COMPANY B. O. C. OF AUSTRALIA LIMITED FILE NO.

WELL GOLDEN BEACH IA DATE 19 JUNE 1967 ENGRS.

SAMPLE TYPE SIDE WALL CORE SAMPLE DEPTH 2075 ft. SAMPLE NO. 17

REMARKS TIME (Min.)



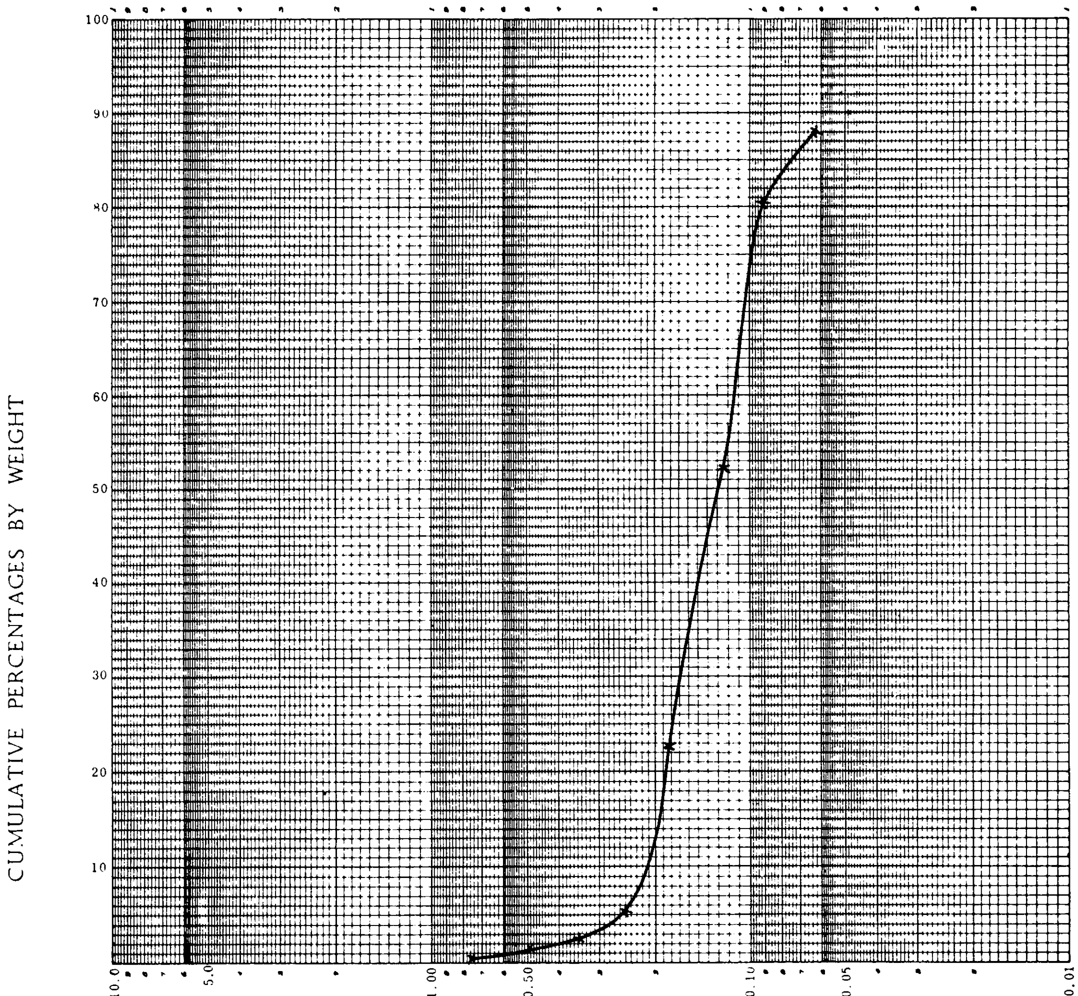
TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
2. 000								
1. 148								
1. 000								
0. 750				0.000	0.00	0.00	100.00	
0. 490				0.052	0.25	0.25	99.75	
0. 350				0.105	0.50	0.75	99.25	
0. 250				0.452	2.15	2.90	97.10	
0. 180				2.355	11.20	14.10	85.90	
0. 125				6.450	30.70	44.80	55.20	
0. 092				7.455	35.50	80.30	19.70	
0. 063				1.890	9.05	89.35	10.65	
0. 000	0. 0000	PAN	PAN	2.196	10.45	99.80	0.20	
			TOTALS	20.953	99.80			

GEOSERVICES

SIEVE ANALYSIS

3-40

COMPANY	B. O. C. OF AUSTRALIA LIMITED		FILE NO.
WELL	GOLDEN BEACH IA	DATE 19 JUNE 1967	ENGRS.
SAMPLE TYPE	SIDE WALL CORE	SAMPLE DEPTH 2088 ft.	SAMPLE NO. 14
REMARKS			TIME (Min.)

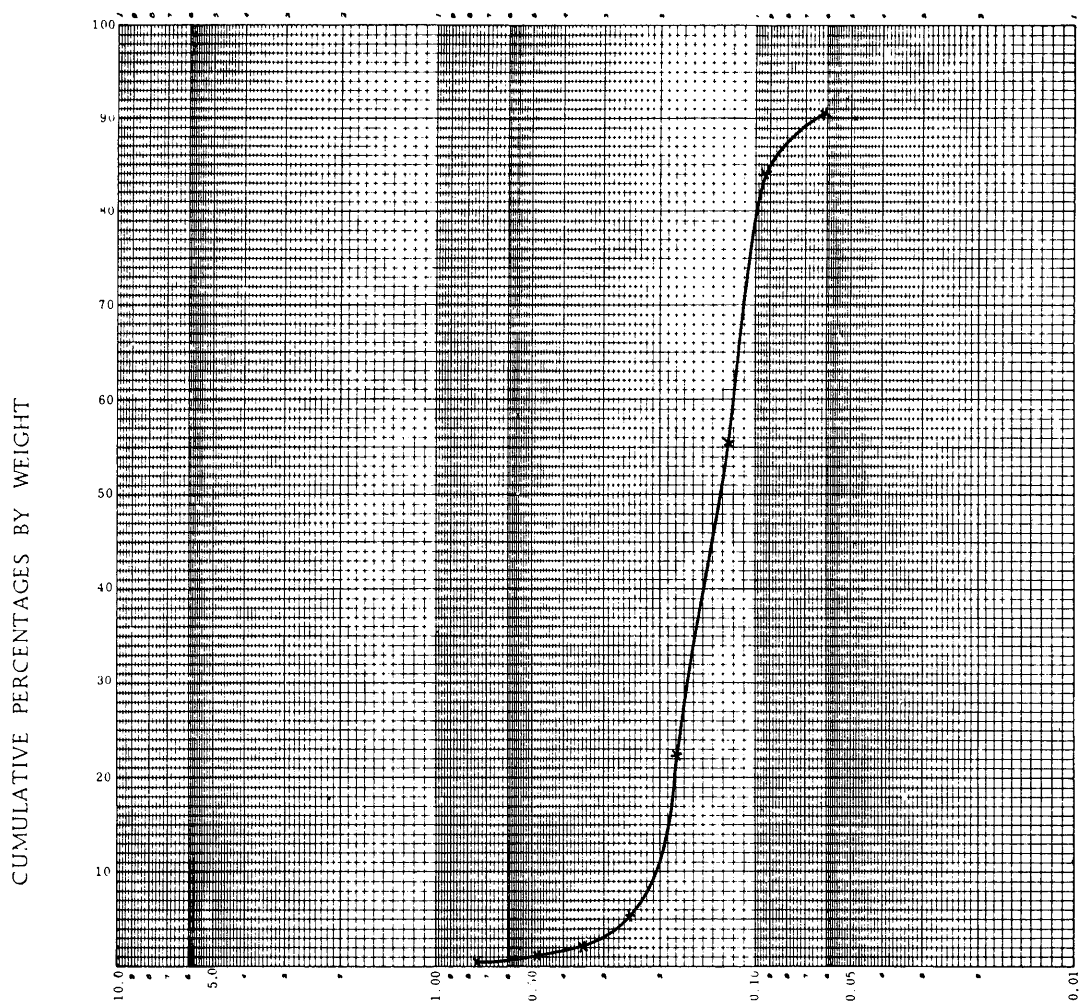


TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
2.000								
1.148								
1.000				0.00	0.00	0.00	100.00	
0.750				0.054	0.30	0.30	99.70	
0.490				0.157	0.85	1.15	98.85	
0.350				0.198	1.10	2.25	97.75	
0.250				0.646	3.60	5.85	94.15	
0.180				3.450	16.95	22.80	77.20	
0.125				5.240	29.15	51.95	48.05	
0.092				5.140	28.60	80.55	19.45	
0.063				1.350	7.50	88.05	11.95	
0.000	0.0000	PAN	PAN	2.145	11.95	100.00	0.00	
			TOTALS	18.380	100.00			

GEOSERVICES
SIEVE ANALYSIS

3-41

COMPANY B. O. C. OF AUSTRALIA LIMITED FILE NO.
WELL GOLDEN BEACH IA DATE 19 JUNE 1967 ENGRS.
SAMPLE TYPE SIDE WALL CORE SAMPLE DEPTH 2100 ft. SAMPLE NO. 13
REMARKS TIME (Min.)



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
2. 000					0.00			
1. 148					0.00			
1. 000					0.00	0.00	100.00	
0. 750				0.053	0.35	0.35	99.65	
0. 490				0.105	0.70	1.05	98.95	
0. 350				0.150	1.00	2.05	97.95	
0. 250				0.503	3.35	5.40	94.60	
0. 180				2.550	17.00	22.40	77.60	
0. 125				5.030	33.35	55.75	44.25	
0. 092				4.250	28.35	84.10	15.90	
0. 063				.900	6.00	90.10	9.90	
0. 000	0. 0000	PAN	PAN	1.450	9.65	99.75	0.25	
			TOTALS	14.991				

3-42

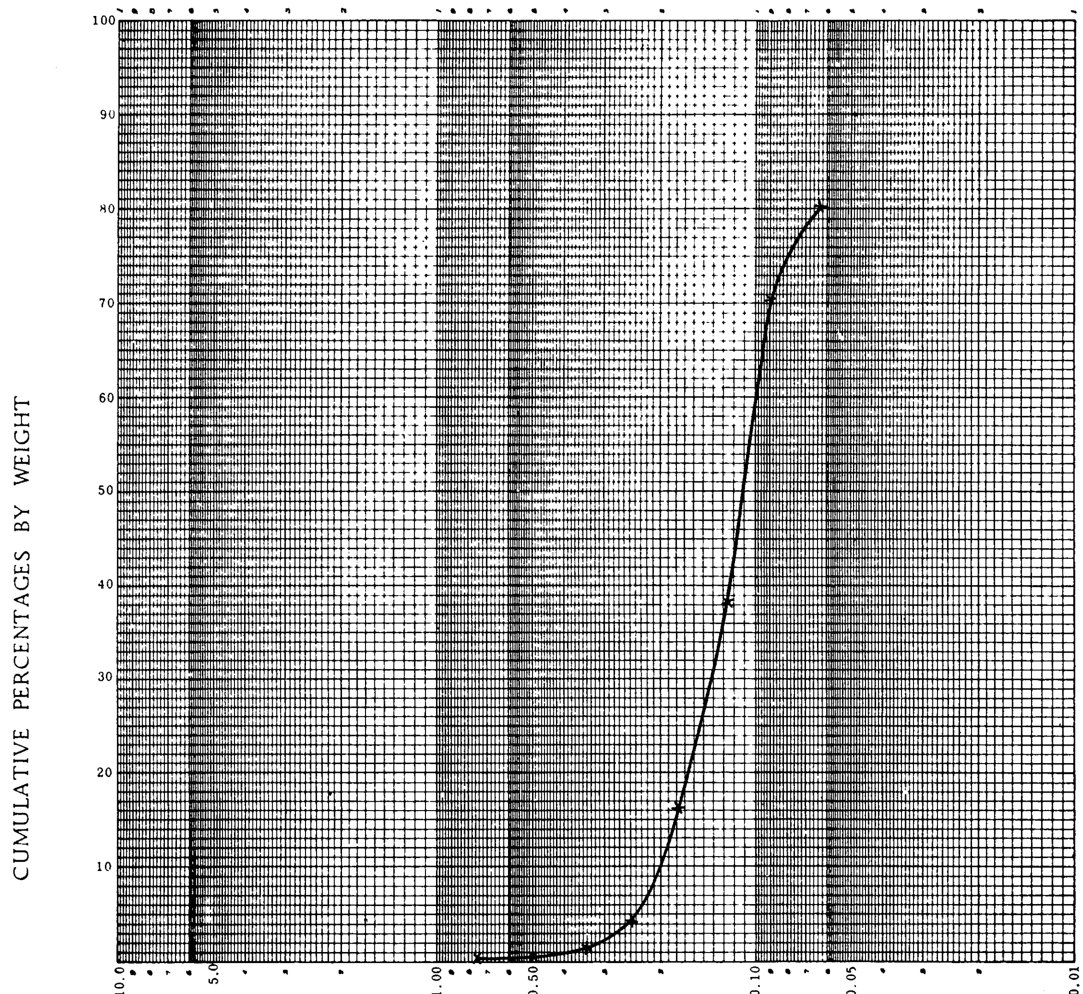
GEOSERVICES
SIEVE ANALYSIS

COMPANY B. O. C. OF AUSTRALIA LIMITED — FILE NO.

WELL GOLDEN BEACH IA — DATE 19 JUNE 1967 — ENGRS.

SAMPLE TYPE SIDE WALL CORE — SAMPLE DEPTH 2110 ft. — SAMPLE NO. 12

REMARKS — TIME (Min.)



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
2. 000								
1. 148								
1. 000				0.00	0.00	0.00	100.00	
0. 750				0.0435	0.15	0.15	99.85	
0. 490				0.145	0.50	0.65	99.35	
0. 350				0.204	0.70	1.35	98.65	
0. 250				0.797	2.75	4.10	95.90	
0. 180				3.558	12.25	16.35	83.65	
0. 125				6.351	21.90	38.25	61.80	
0. 092				9.295	32.05	70.30	29.75	
0. 063				2.900	10.00	80.30	19.75	
0.000	0.0000	PAN	PAN	5.700	19.65	99.95	0.01	
			TOTALS	28.993	99.95			

GEOSERVICES

SIEVE ANALYSIS

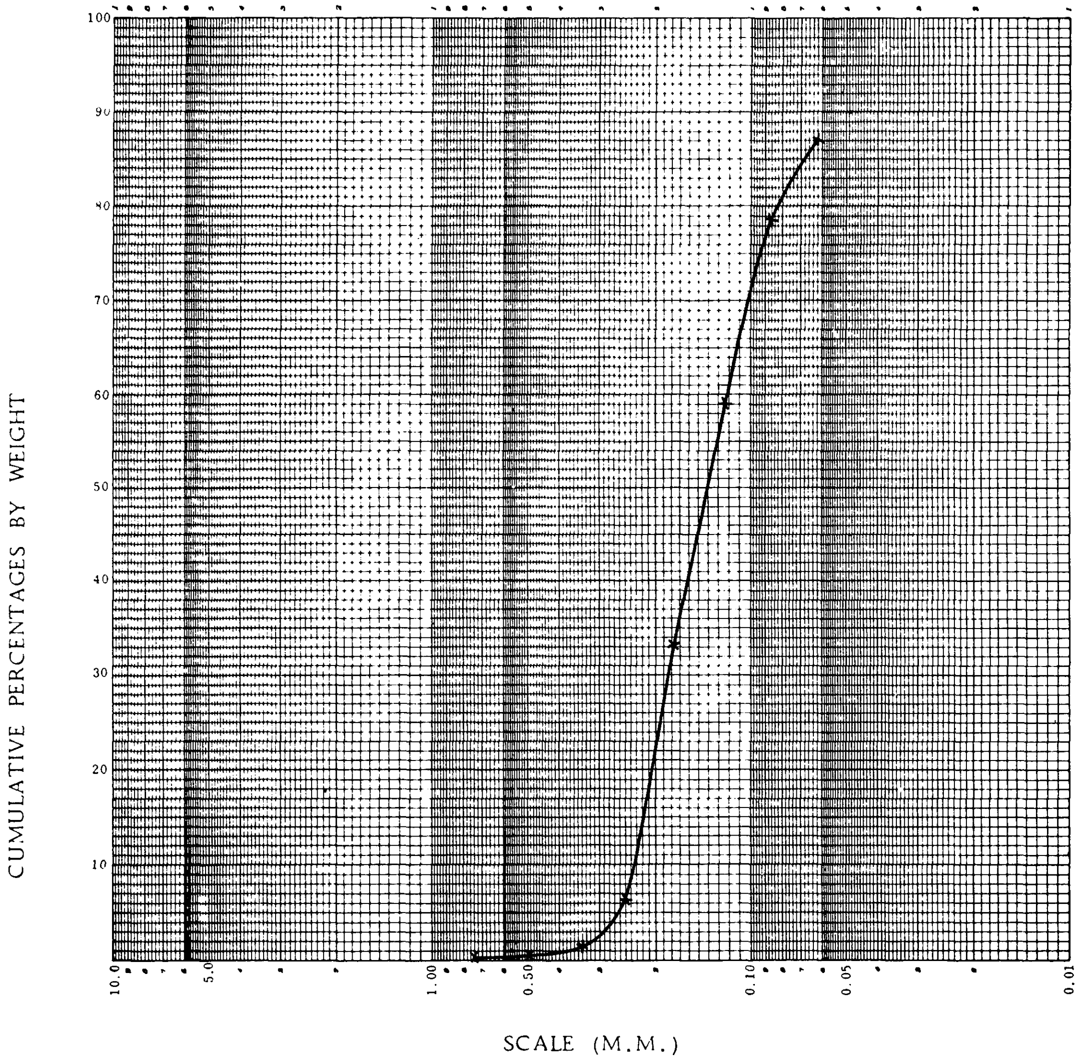
3-43

COMPANY B. O. C. OF AUSTRALIA LIMITED — FILE NO.

WELL GOLDEN BEACH IA — DATE 19 JUNE 1967 — ENGRS.

SAMPLE TYPE SIDE WALL CORE — SAMPLE DEPTH 2120 ft. — SAMPLE NO. 11

REMARKS — TIME (Min.)



TYLER STANDARD SCREEN SCALE SIEVES $\sqrt{2}$ or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
2. 000								
1. 148								
1. 000				0.00	0.00	0.00	100.00	
0. 750				0.096	0.30	0.30	99.70	
0. 490				0.096	0.30	0.60	99.40	
0. 350				0.288	0.90	1.50	98.50	
0. 250				1.550	4.85	6.35	93.65	
0. 180				8.600	26.85	33.20	67.80	
0. 125				8.135	26.40	59.60	40.40	
0. 092				6.145	19.20	78.80	21.20	
0. 063				2.591	8.10	86.90	13.10	
0.000	0.0000	PAN	PAN	4.195	13.10	100.00	0.00	
			TOTALS	31.696				

GEOSERVICES
SIEVE ANALYSIS

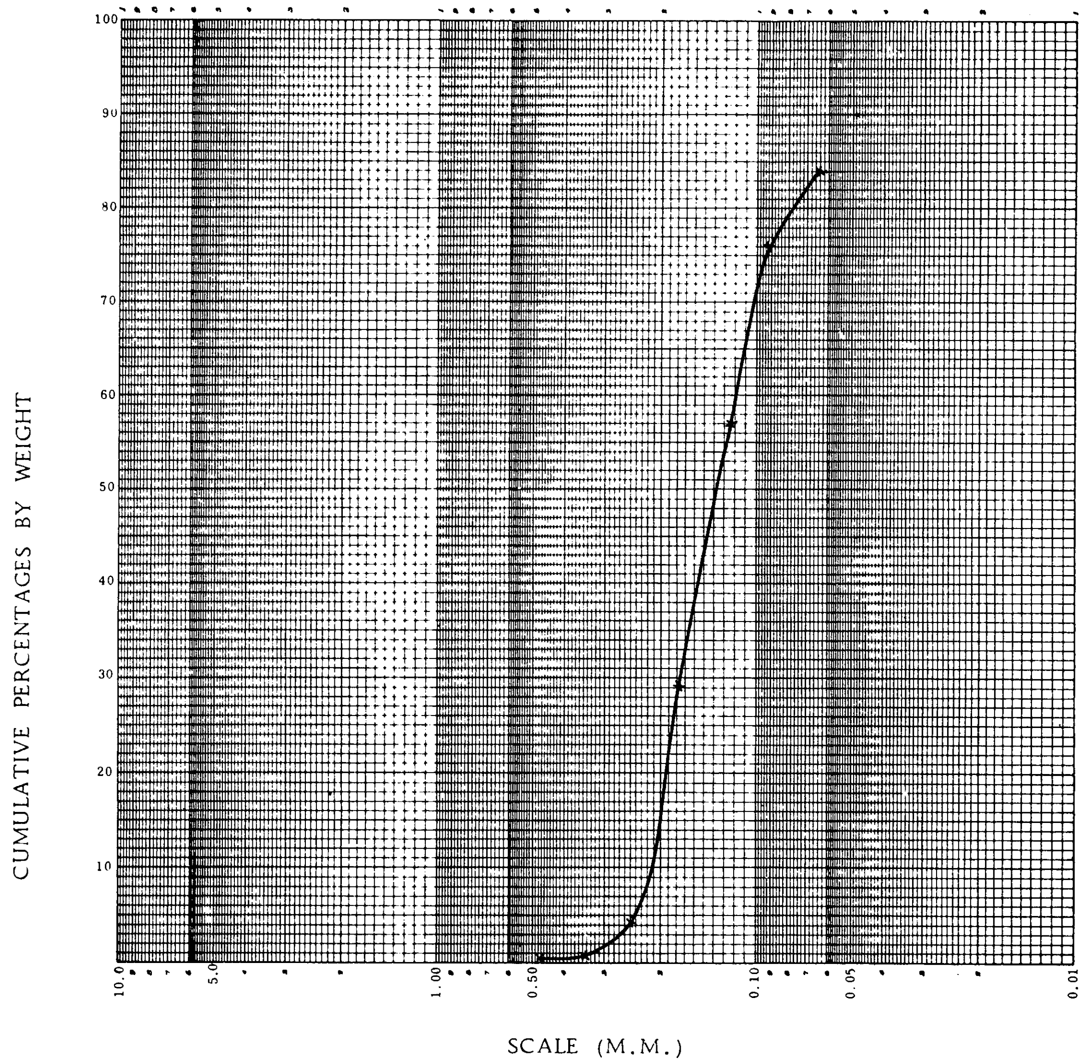
3-44

COMPANY B. O. C. OF AUSTRALIA LIMITED — FILE NO.

WELL GOLDEN BEACH IA — DATE 19 JUNE 1967 — ENGRS.

SAMPLE TYPE SIDE WALL CORE — SAMPLE DEPTH 2130 ft. — SAMPLE NO. 10

REMARKS — TIME (Min.)



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
2. 000								
1. 148								
1. 000								
0. 750				.000	0.00	0.00	100.00	
0. 490				.050	0.25	0.25	99.75	
0. 350				.130	0.65	0.90	99.10	
0. 250				.700	3.50	4.40	95.60	
0. 180				4.900	24.50	28.90	71.10	
0. 125				5.650	28.25	57.15	42.85	
0. 092				3.800	19.00	76.15	23.85	
0. 063				1.650	8.25	84.40	15.60	
0. 000	0. 0000	PAN	PAN	2.950	14.75	99.15	0.85	
			TOTALS	19.830	99.15			

GEOSERVICES
SIEVE ANALYSIS

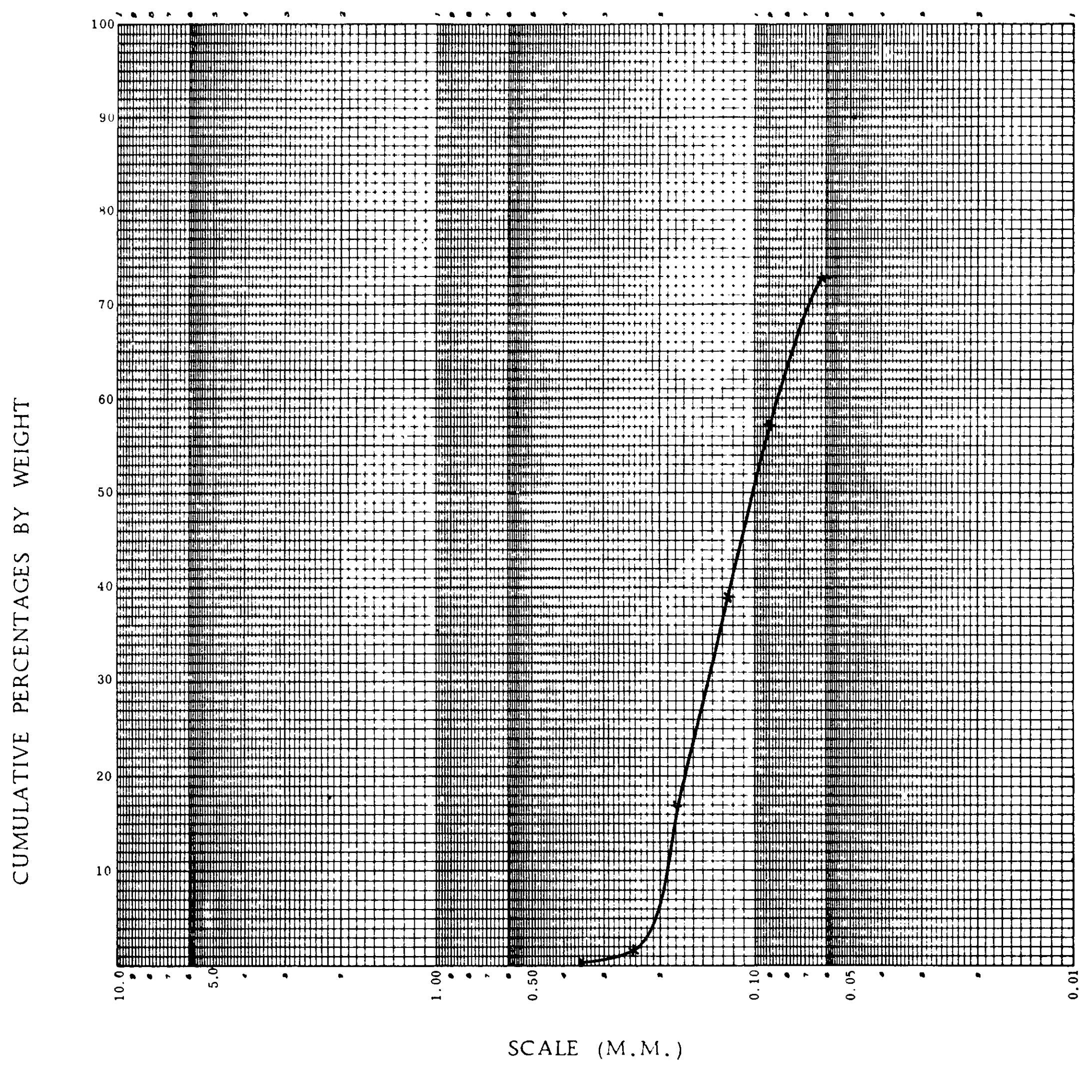
3-45

COMPANY B. O. C. OF AUSTRALIA LIMITED — FILE NO.

WELL GOLDEN BEACH IA — DATE 19 JUNE 1967 — ENGRS.

SAMPLE TYPE SIDE WALL CORE — SAMPLE DEPTH 2140 ft. — SAMPLE NO. 9

REMARKS — TIME (Min.)



TYLER STANDARD SCREEN SCALE SIEVES $\sqrt{2}$ or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
2. 000								
1. 148								
1. 000								
0. 750								
0. 490				0.000	0.00	0.00	100.00	
0. 350				0.052	0.25	0.25	99.75	
0. 250				0.305	1.45	1.70	98.30	
0. 180				3.178	15.25	16.95	83.05	
0. 125				4.600	21.90	38.85	61.15	
0. 092				3.961	18.85	57.70	42.30	
0. 063				3.145	15.00	72.70	27.30	
0. 000	0. 0000	PAN	PAN	5.695	27.15	99.85	00.15	
			TOTALS	20.936	99.85			

GEOSERVICES

SIEVE ANALYSIS

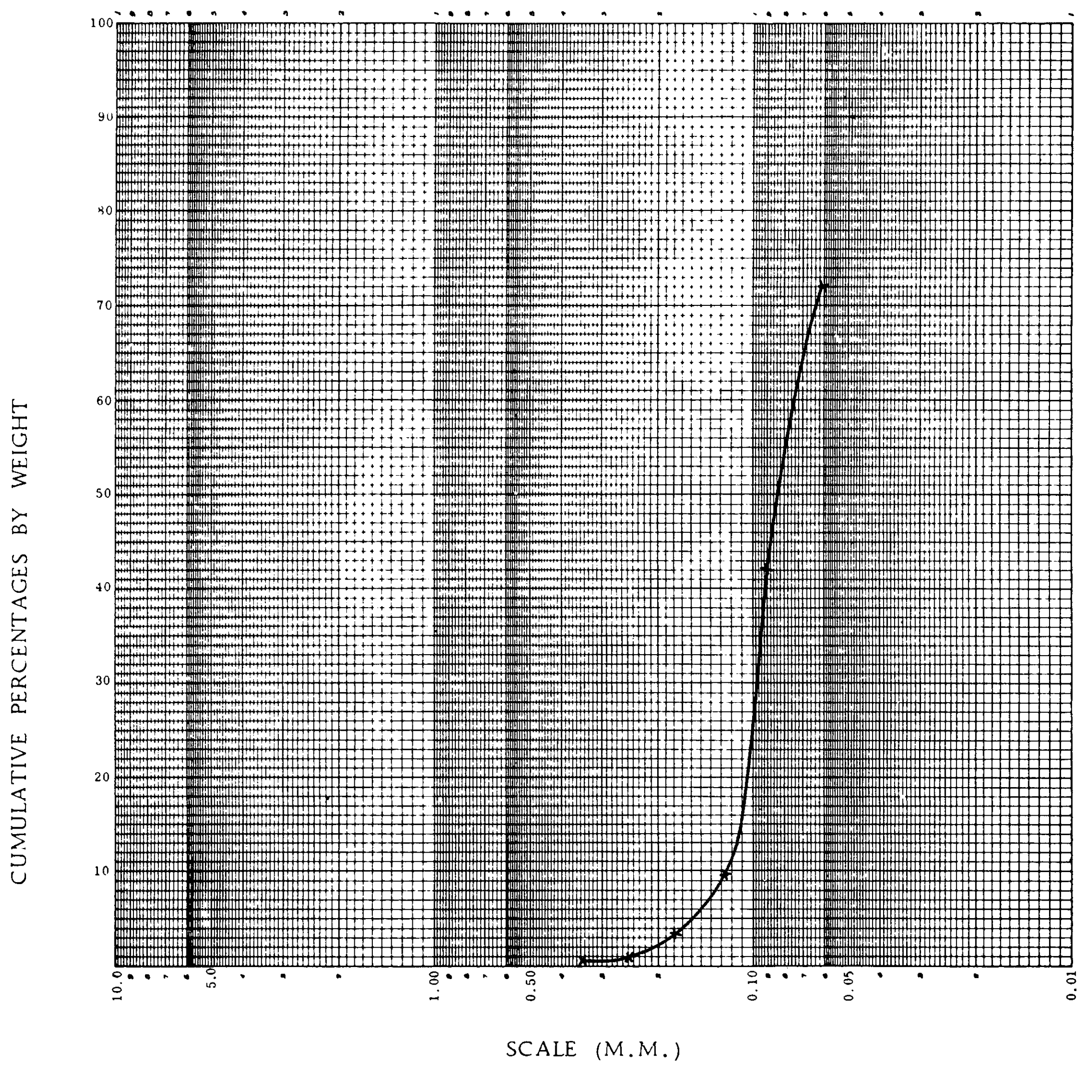
3-46

COMPANY B. O. C. OF AUSTRALIA LIMITED — FILE NO.

WELL GOLDEN BEACH IA — DATE 19 JUNE 1967 — ENGRS.

SAMPLE TYPE SIDE WALL CORE — SAMPLE DEPTH 2150 ft. — SAMPLE NO. 8

REMARKS — TIME (Min.)

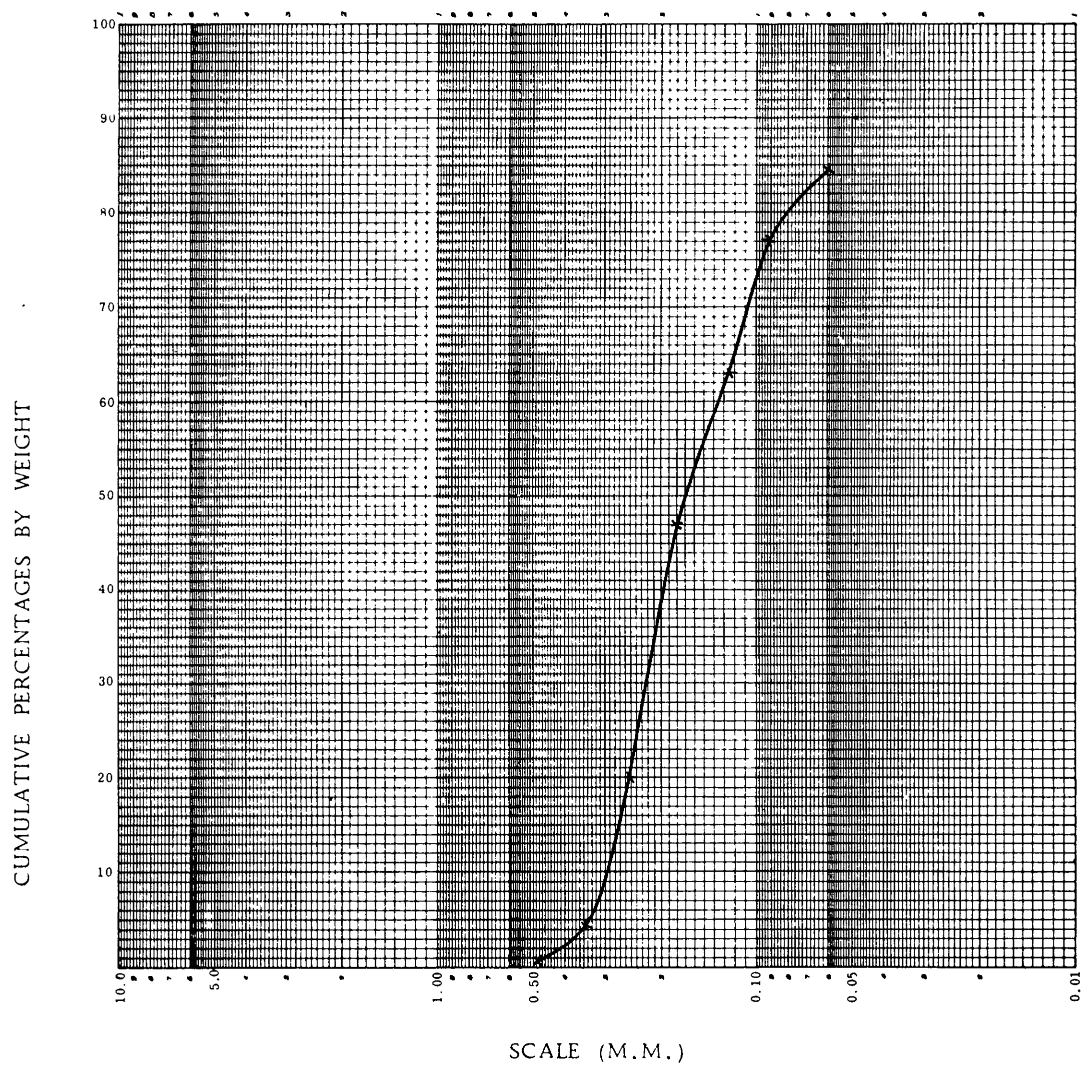


TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
2.000					0.00			
1.148					0.00			
1.000					0.00			
0.750					0.00			
0.490				0.000	0.00	0.00	100.00	
0.350				0.052	0.25	0.25	99.75	
0.250				0.104	0.50	0.75	99.25	
0.180				0.556	2.65	3.40	96.60	
0.125				1.354	6.45	9.85	90.15	
0.092				6.865	32.65	42.50	57.50	
0.063				6.210	29.55	72.05	27.95	
0.000	0.0000	PAN	PAN	5.685	27.15	99.10	00.90	
			TOTALS	20.826				

GEOSERVICES
SIEVE ANALYSIS

3-47

COMPANY B. O. C. OF AUSTRALIA LIMITED FILE NO.
WELL GOLDEN BEACH IA DATE 19 JUNE 1967 ENGRS.
SAMPLE TYPE SIDE WALL CORE SAMPLE DEPTH 3304 ft. SAMPLE NO. 4
REMARKS TIME (Min.)



TYLER STANDARD SCREEN SCALE SIEVES $\sqrt{2}$ or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
2. 000					0.00	0.00	0.00	
1. 148					0.00	0.00	0.00	
1. 000					0.00	0.00	0.00	
0. 750					0.00	0.00	0.00	
0. 490				0.099	0.90	0.90	99.10	
0. 350				0.401	3.65	4.55	95.45	
0. 250				1.699	15.45	20.00	80.00	
0. 180				2.948	26.80	46.80	53.20	
0. 125				1.798	16.35	63.15	36.85	
0. 092				1.501	13.65	76.80	23.20	
0. 063				.852	7.75	84.55	15.45	
0.000	0.0000	PAN	PAN	1.650	15.00	99.55	0.45	
			TOTALS	10.948	99.55			

3-48

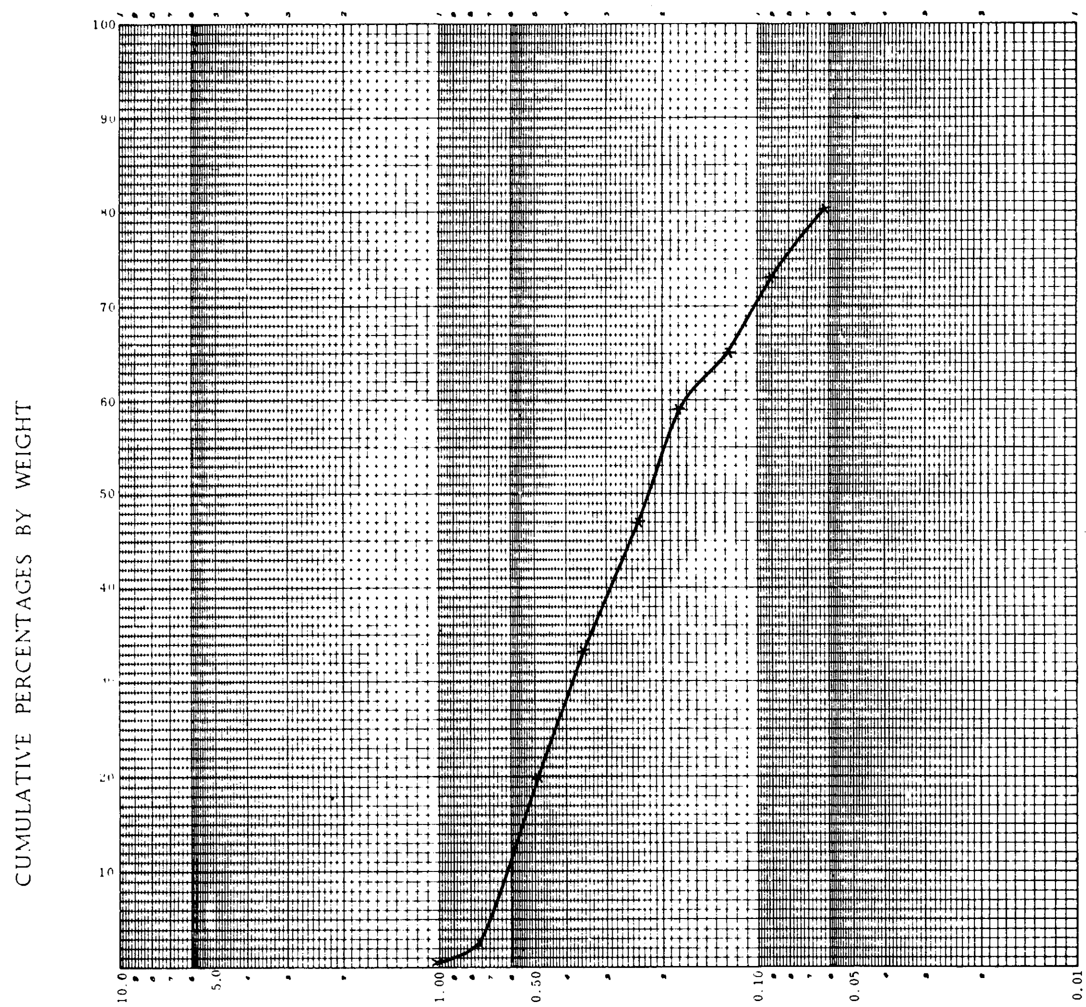
GEOSERVICES
SIEVE ANALYSIS

COMPANY **B. O. C. OF AUSTRALIA LIMITED** FILE NO.

WELL **GOLDEN BEACH IA** DATE **19 JUNE 1967** ENGRS.

SAMPLE TYPE **SIDE WALL CORE** SAMPLE DEPTH 3310 ft. SAMPLE NO. 3

REMARKS TIME (Min.)



SCALE (M.M.)

TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
2. 000				0.000	0.00	0.00	100.00	
1. 148				0.000	0.00	0.00	100.00	
1. 000				0.051	0.30	0.30	99.70	
0. 750				0.297	1.75	2.05	97.95	
0. 490				3.253	18.55	20.60	79.40	
0. 350				2.099	12.35	32.95	67.05	
0. 250				2.303	13.55	46.50	53.50	
0. 180				2.099	12.35	58.85	41.15	
0. 125				1.003	5.90	64.75	35.25	
0. 092				1.453	8.55	73.30	26.70	
0. 063				1.054	6.20	79.50	20.50	
0.000	0.0000	PAN	PAN	3.400	20.00	99.50	0.50	
			TOTALS	17.012	99.50			

CORE LAB

CORE LABORATORIES AUSTRALIA LTD.

Petroleum Reservoir Engineering

SIEVE ANALYSIS

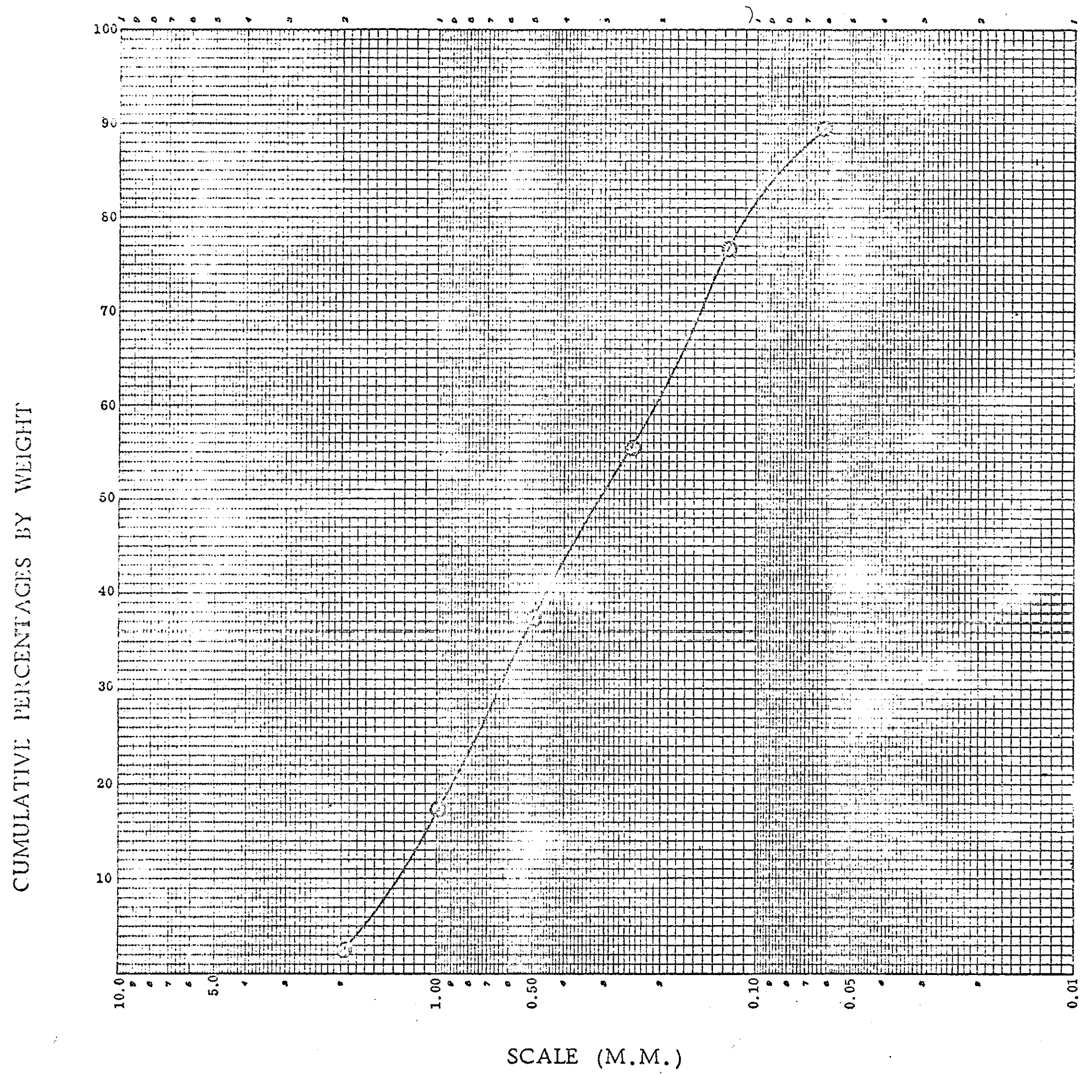
3-49

COMPANY BURMA OIL COMPANY — FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A — DATE 22 July 1967 — ENGRS. GAK

SAMPLE TYPE SIDE WALL CORES — SAMPLE DEPTH 5579 — SAMPLE NO. 1

REMARKS SIDE WALL CORE No. 28 — TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.395	2.34	2.34	97.66	
0.991	0.0390	16	18	2.529	15.00	17.34	82.66	
0.495	0.0195	32	35	3.362	19.94	37.28	62.72	
0.246	0.0097	60	60	3.086	18.30	55.58	44.42	
0.124	0.0049	115	120	3.610	21.41	76.99	23.01	
0.061	0.0024	250	230	2.114	12.53	89.52	10.48	
[illegible]	0.0000	PAN	PAN	1.767	48	100.0[illegible]	0.00	
				16 [illegible]				

CORE LAB

CORE LABORATORIES AUSTRALIA LTD.

Petroleum Reservoir Engineering

SIEVE ANALYSIS

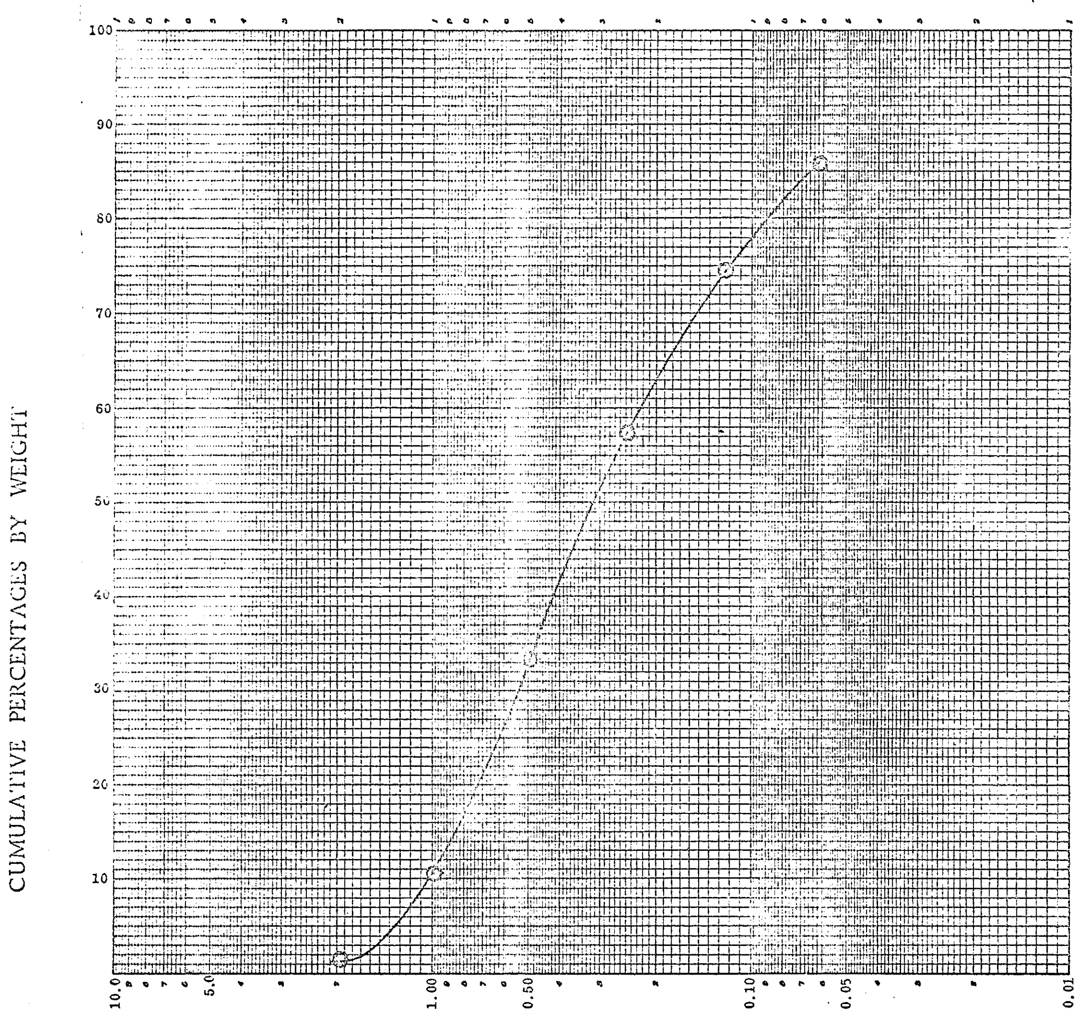
3-50

COMPANY BURMA OIL COMPANY — FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A — DATE 22 July 1967 — ENGRS. GAK

SAMPLE TYPE SIDE WALL CORES — SAMPLE DEPTH 5630 — SAMPLE NO. 2

REMARKS SIDE WALL CORE No. 24 — TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES $\sqrt{2}$ or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.226	1.61	1.61	98.39	
0.991	0.0390	16	18	1.241	8.83	10.44	89.56	
0.495	0.0195	32	35	3.186	22.66	33.10	66.90	
0.246	0.0097	60	60	3.397	24.17	57.27	42.73	
0.124	0.0049	115	120	2.419	17.21	74.48	25.52	
0.061	0.0024	250	230	1.611	11.46	85.94	14.06	
[illegible]	0.0000	PAN	PAN	1.[illegible]	14.06	100.[illegible]	0.00	
			[illegible]	[illegible]	[illegible]			

CORE LABORATORIES AUSTRALIA LTD.

Petroleum Reservoir Engineering

SIEVE ANALYSIS

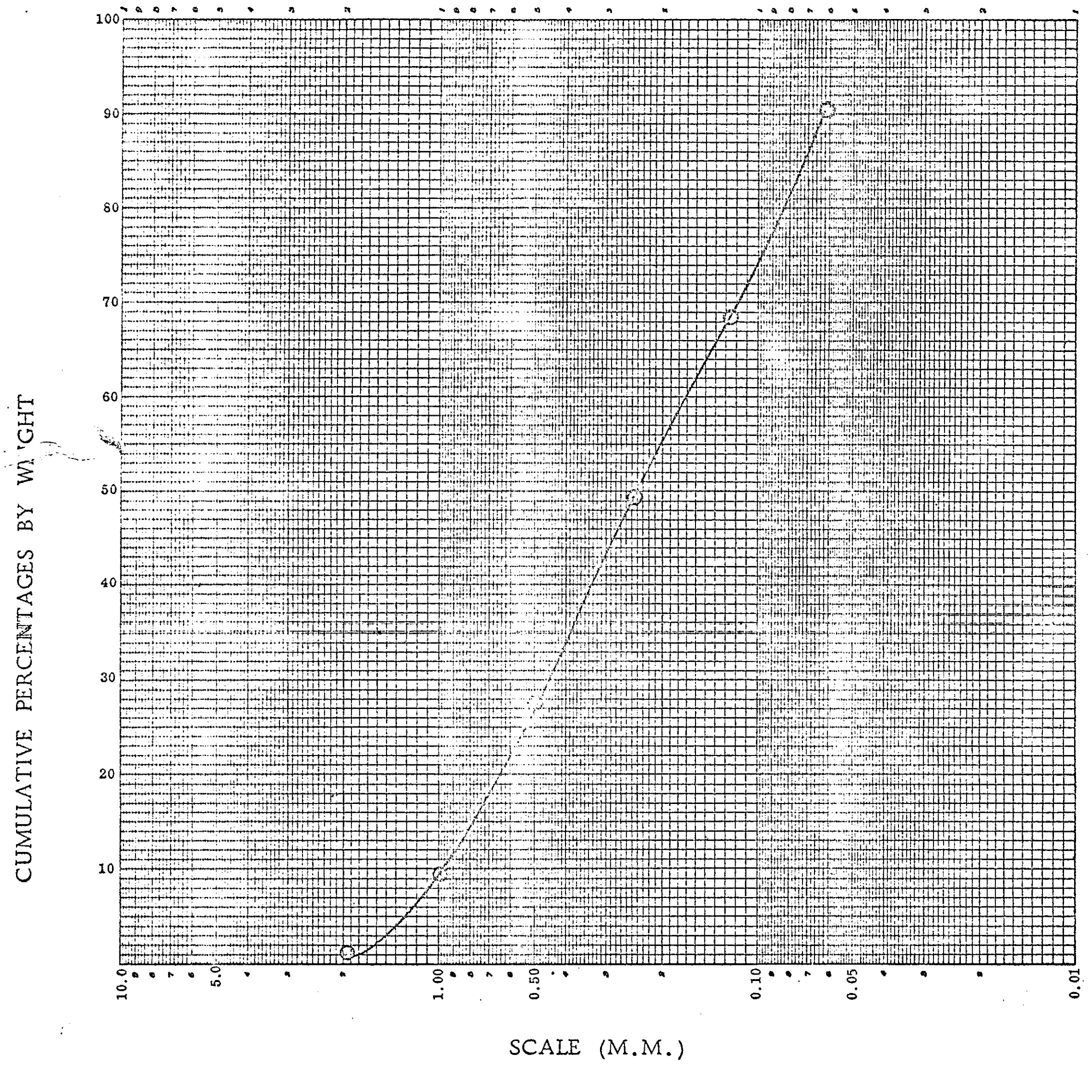
3-51

COMPANY: BURMA OIL COMPANY — FILE NO. AP3-SA-8

WELL: GOLDEN BEACH No. 1A — DATE: 24 July 1967 — ENGRS.: GAK

SAMPLE TYPE: SIDE WALL CORES — SAMPLE DEPTH: 5837 — SAMPLE NO.: 3

REMARKS: SIDE WALL CORE No. 21 — TIME (Min.): 15



TYLER STANDARD SCREEN SCALE SIEVES $\sqrt{2}$ or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.094	1.07	1.07	98.93	
0.991	0.0390	16	18	0.740	8.39	9.46	90.54	
0.495	0.0195	32	35	1.608	18.24	27.70	72.30	
0.246	0.0097	60	60	1.919	21.77	49.47	50.53	
0.124	0.0049	115	120	1.672	18.96	68.43	31.57	
0.061	0.0024	250	230	1.935	21.95	90.38	9.62	
0.000	0.0000	PAN	PAN	0.848	9.62	100.00	0.[illegible]	

CORE LAB

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Petroleum Reservoir Engineering

SIEVE ANALYSIS

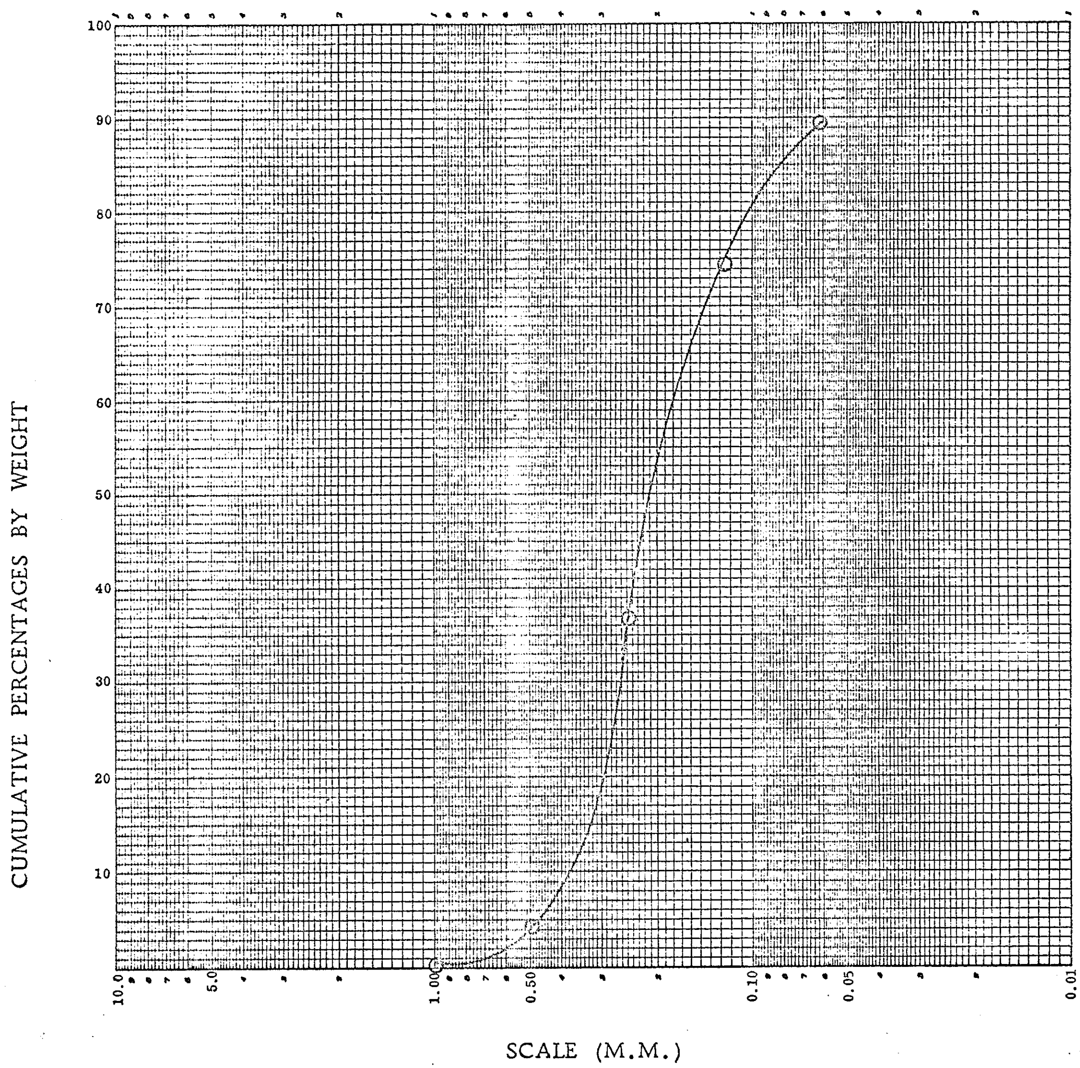
3-52

COMPANY BURMA OIL COMPANY FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A DATE 24 July 1967 ENGRS. GAK

SAMPLE TYPE SIDE WALL CORES SAMPLE DEPTH 5860 SAMPLE NO. 4

REMARKS SIDE WALL CORE No. 20 TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES $\sqrt{2}$ or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.023	0.21	0.21	99.79	
0.495	0.0195	32	35	0.466	4.26	4.47	95.53	
0.246	0.0097	60	60	3.553	32.45	36.92	63.08	
0.124	0.0049	115	120	4.128	37.70	74.62	25.38	
0.061	0.0024	250	230	1.647	15.04	89.66	10.34	
0.000	0.0000	PAN	PAN	1.132	10.34	100.00	0.00	
			TOT[illegible]	[illegible].949	100.[illegible]			

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Petroleum Reservoir Engineering

SIEVE ANALYSIS

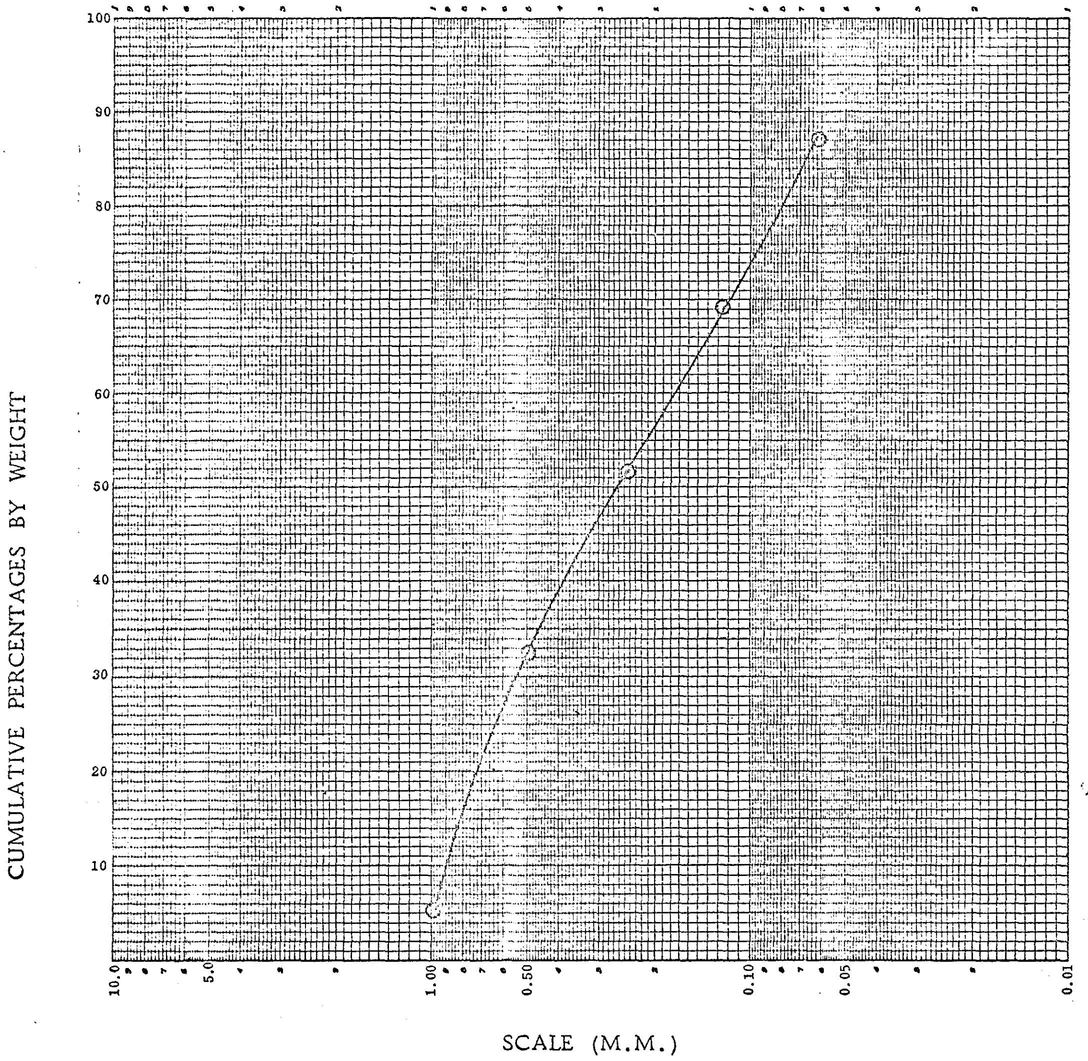
3-53

COMPANY: BURMA OIL COMPANY — FILE NO.: AP3-SA-8

WELL: GOLDEN BEACH No. 1A — DATE: 24 July 1967 — ENGRS.: GAK

SAMPLE TYPE: SIDE WALL CORES — SAMPLE DEPTH: 6409 — SAMPLE NO.: 5

REMARKS: SIDE WALL CORE No. 19 — TIME (Min.): 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.517	5.15	5.15	94.85	
0.495	0.0195	32	35	2.739	27.30	32.45	67.55	
0.246	0.0097	60	60	1.933	19.27	51.72	48.28	
0.124	0.0049	115	120	1.748	17.42	69.14	30.86	
0.061	0.0024	250	230	1.795	17.89	87.03	12.97	
0.000	0.0000	PAN	PAN	1.301	12.97	100.00	0.00	
			TOT[illegible]	[illegible].033	100.[illegible]			

CORE LAB

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Petroleum Reservoir Engineering

SIEVE ANALYSIS

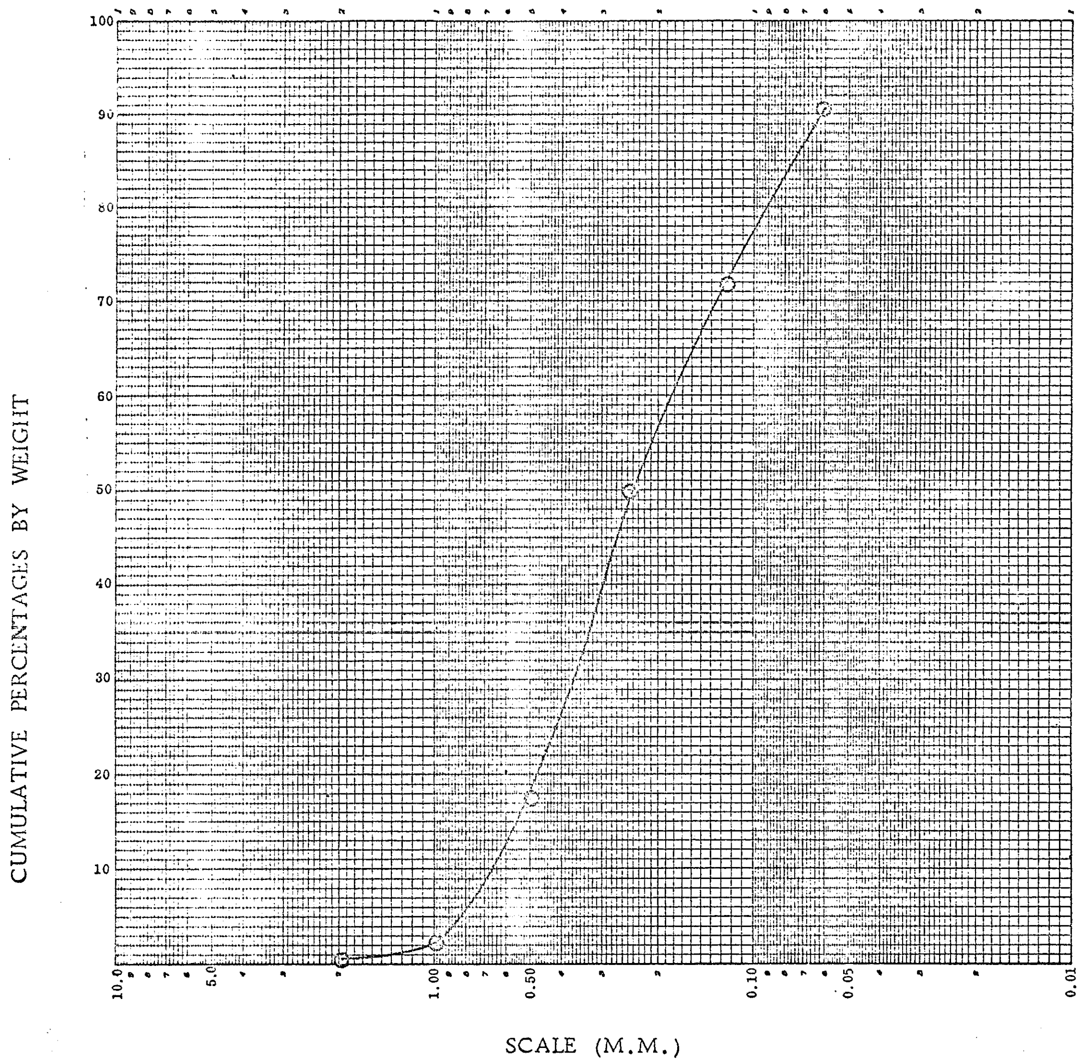
3-54

COMPANY: BURMA OIL COMPANY — FILE NO. AP3-SA-8

WELL: GOLDEN BEACH No. 1A — DATE: 24 July 1967 — ENGRS. GAK

SAMPLE TYPE: SIDE WALL CORES — SAMPLE DEPTH: 7526 — SAMPLE NO. 6

REMARKS: SIDE WALL CORE No. 15 — TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES $\sqrt{2}$ or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.051	0.54	0.54	99.46	
0.991	0.0390	16	18	0.146	1.55	2.09	97.91	
0.495	0.0195	32	35	1.465	15.54	17.63	82.37	
0.246	0.0097	60	60	3.043	32.28	49.91	50.09	
0.124	0.0049	115	120	2.081	22.07	71.98	28.02	
0.061	0.0024	250	230	1.738	18.44	90.42	9.58	
0.000	0.0000	PAN	PAN	0.903	9.58	100.00	0.00	
			TOTAL	9.427	100.[illegible]			

CORE LAB

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Petroleum Reservoir Engineering

SIEVE ANALYSIS

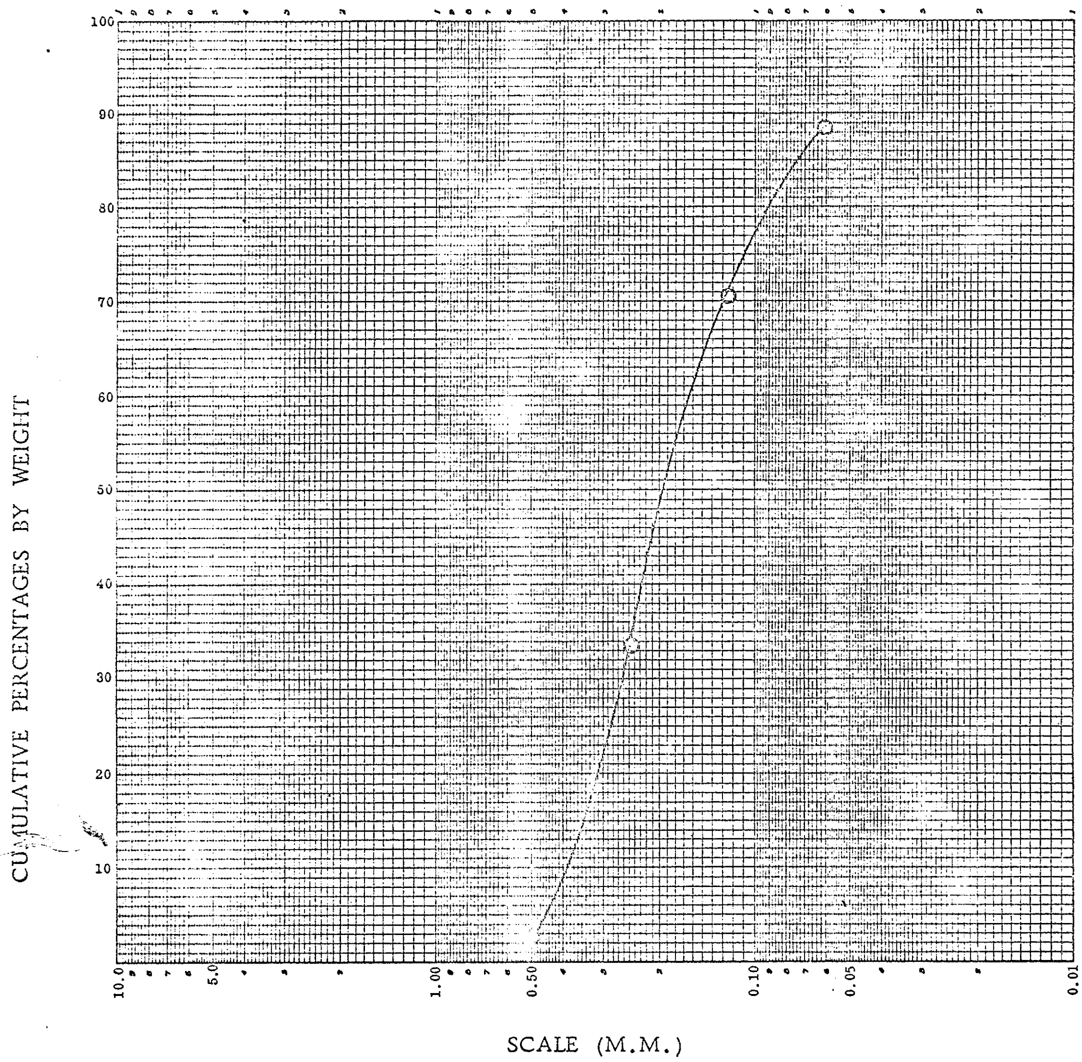
b-55

COMPANY: BURMA OIL COMPANY — FILE NO. AP3-SA-8

WELL: GOLDEN BEACH No. 1A — DATE: 24 July 1967 — ENGRS. GAK

SAMPLE TYPE: SIDE WALL CORES — SAMPLE DEPTH: 7607 — SAMPLE NO. 7

REMARKS: SIDE WALL CORE No. 10 — TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.000	0.00	0.00	100.00	
0.495	0.0195	32	35	0.139	2.86	2.86	97.14	
0.246	0.0097	60	60	1.492	30.73	33.59	66.41	
0.124	0.0049	115	120	1.810	37.28	70.87	29.13	
0.061	0.0024	250	230	0.851	17.53	88.40	11.60	
0.000	0.0000	PAN	PAN	0.563	11.60	100.00	0.00	
			T[illegible]	4.855	10[illegible]			

CORE LAB

CORE LABORATORIES AUSTRALIA LTD.

Petroleum Reservoir Engineering

SIEVE ANALYSIS

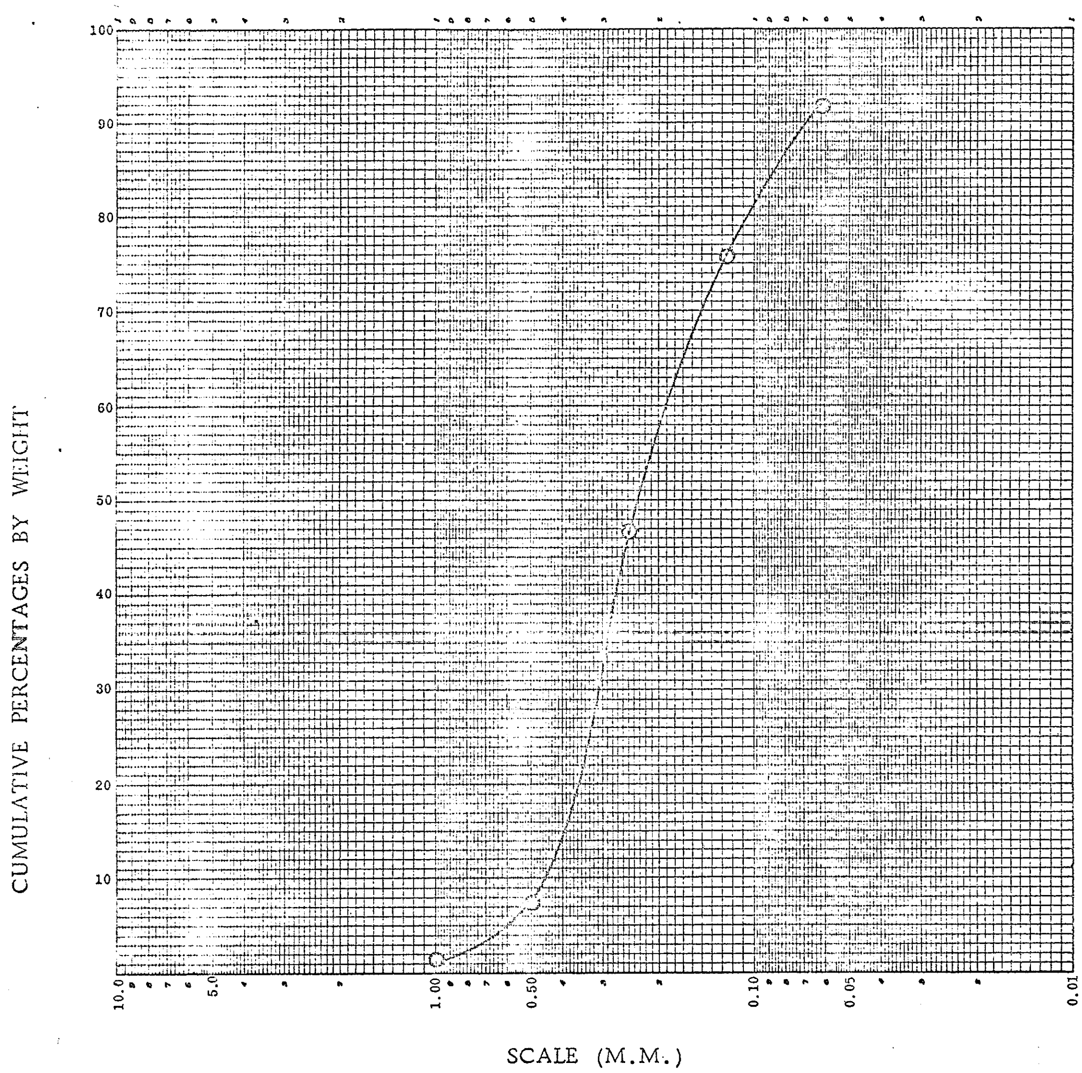
3-56

COMPANY BURMA OIL COMPANY FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A DATE 24 July 1967 ENGRS. GAK

SAMPLE TYPE SIDE WALL CORES SAMPLE DEPTH 7617 SAMPLE NO. 8

REMARKS SIDE WALL CORE No. 9 TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.082	1.30	1.30	98.70	
0.495	0.0195	32	35	0.394	6.25	7.55	92.45	
0.246	0.0097	60	60	2.478	39.31	46.86	53.14	
0.124	0.0049	115	120	1.831	29.05	75.91	24.09	
0.061	0.0024	250	230	1.002	15.90	91.81	8.19	
0.000	0.0000	PAN	PAN	0.516	8.19	100.00	0.00	
			TOT[illegible]	[illegible]303	100.[illegible]			

CORE LAB

CORE LABORATORIES AUSTRALIA LTD.

Petroleum Reservoir Engineering

SIEVE ANALYSIS

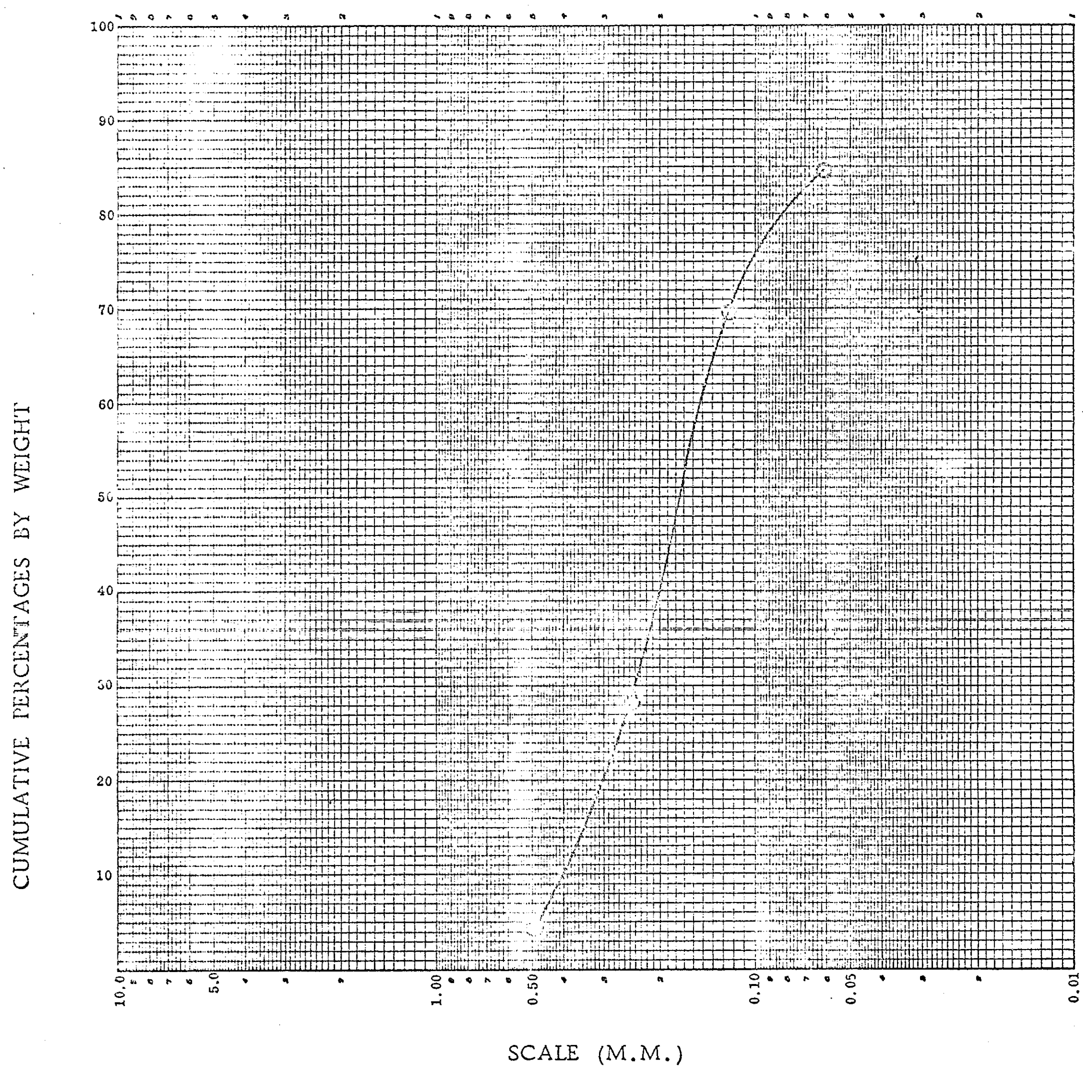
3-57

COMPANY BURMA OIL COMPANY — FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A — DATE 24 July 1967 — ENGRS. GAK

SAMPLE TYPE SIDE WALL CORES — SAMPLE DEPTH 7668 — SAMPLE NO. 9

REMARKS SIDE WALL CORE No. 6 — TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.000	0.00	0.00	100.00	
0.495	0.0195	32	35	0.145	4.32	4.32	95.68	
0.246	0.0097	60	60	0.803	23.94	28.26	71.74	
0.124	0.0049	115	120	1.380	41.13	69.39	30.61	
0.061	0.0024	250	230	0.508	15.14	84.53	15.47	
0.000	0.0000	PAN	PAN	0.519	15.47	100.00	0.00	
			T[illegible]	3.355	1[illegible]			

CORE LAB

CORE LABORATORIES AUSTRALIA LTD.

Petroleum Reservoir Engineering

SIEVE ANALYSIS

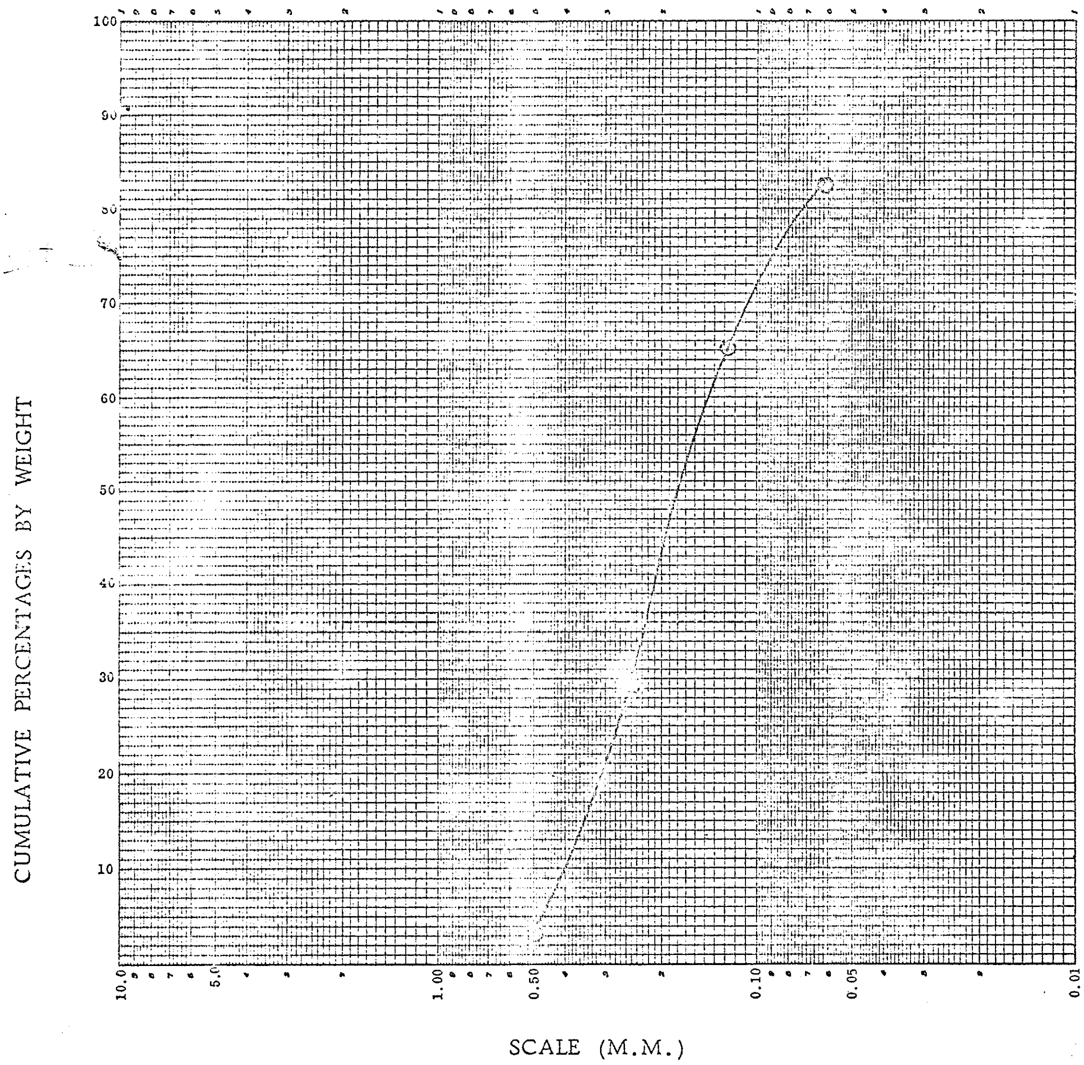
3-58

COMPANY: BURMA OIL COMPANY — FILE NO. AP3-SA-8

WELL: GOLDEN BEACH No. 1A — DATE: 24 July 1967 — ENGRS.: GAK

SAMPLE TYPE: SIDE WALL CORES — SAMPLE DEPTH: 7670 — SAMPLE NO.: 10

REMARKS: SIDE WALL CORE No. 5 — TIME (Min.): 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.[illegible]	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.000	0.00	0.00	100.00	
0.495	0.0195	32	35	0.154	3.05	3.05	96.[illegible]	
0.246	0.0097	60	60	1.341	26.57	29.62	70.38	
0.124	0.0049	115	120	1.818	36.01	65.63	34.37	
0.0[illegible]	0.0024	250	230	0.853	16.90	82.53	17.47	
0.000	0.0000	PAN	PAN	0.882	17.47	100.00	0.[illegible]	
			TOT[illegible]	[illegible]48	100[illegible]			

CORE LAB

CORE LABORATORIES AUSTRALIA LTD.

Petroleum Reservoir Engineering

SIEVE ANALYSIS

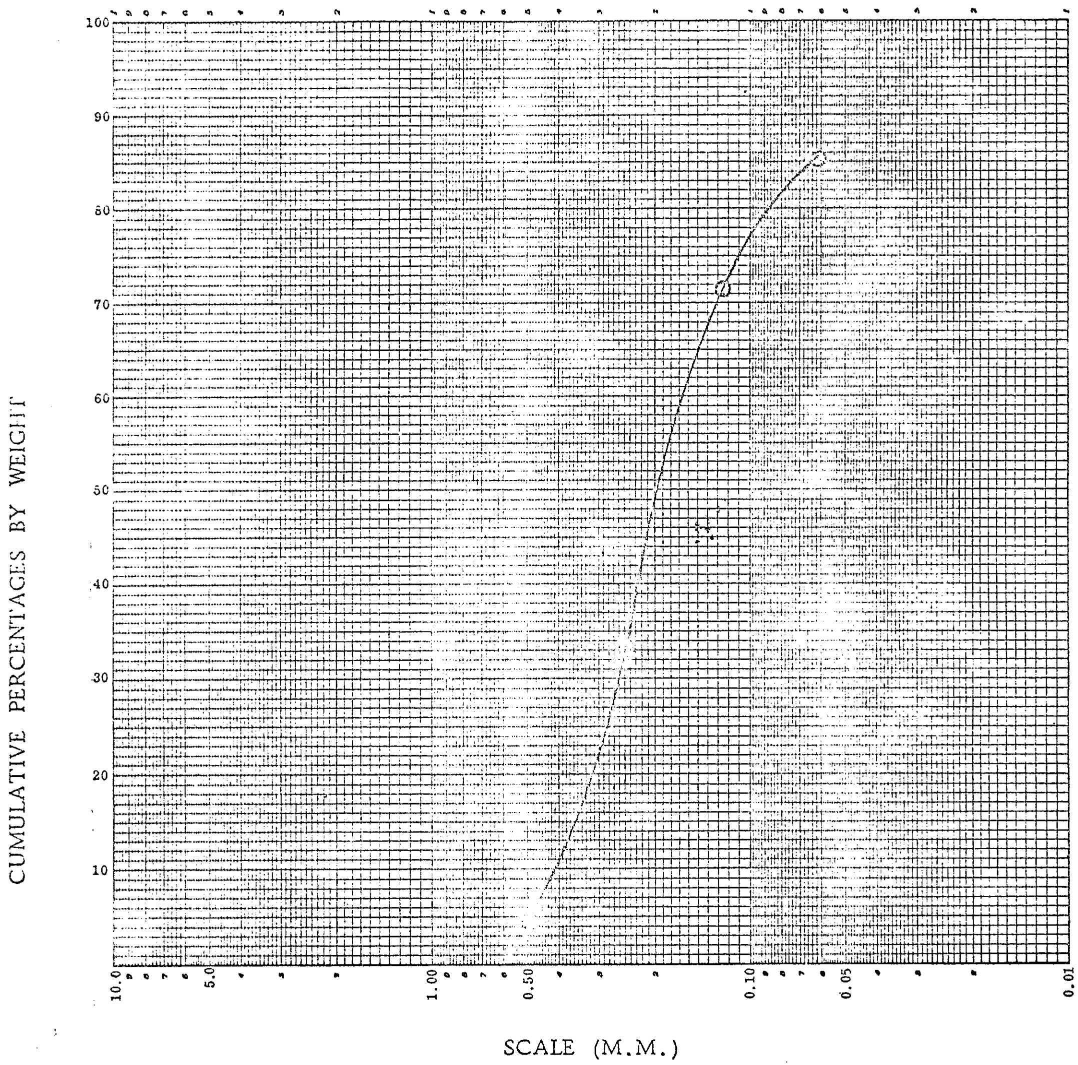
3-59

COMPANY BURMA OIL COMPANY FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A DATE 24 July 1967 ENGRS. GAK

SAMPLE TYPE SIDE WALL CORES SAMPLE DEPTH 7789 SAMPLE NO. 11

REMARKS SIDE WALL CORE No. 2 TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.000	0.00	0.00	100.00	
0.495	0.0195	32	35	0.271	4.43	4.43	95.57	
0.246	0.0097	60	60	1.747	28.58	33.01	66.99	
0.124	0.0049	115	120	2.358	38.58	71.59	28.41	
0.061	0.0024	250	230	0.823	13.46	85.05	14.95	
0.000	0.0000	PAN	PAN	0.914	14.95	100.00	0.00	
			TOTAL	[illegible]113	100.[illegible]			

CORE LAB

CORE LABORATORIES AUSTRALIA LTD.

Petroleum Reservoir Engineering

SIEVE ANALYSIS

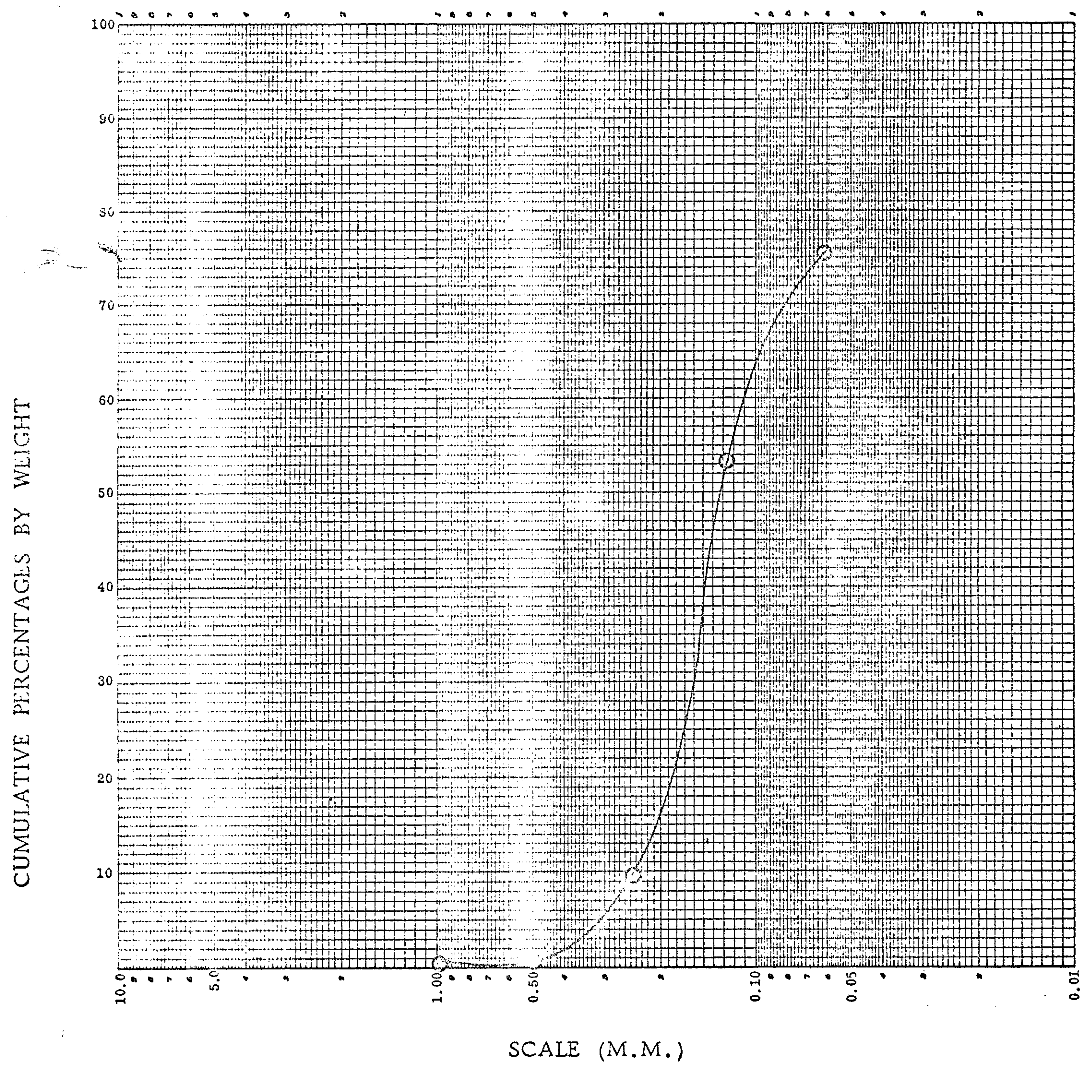
3-60

COMPANY BURMA OIL CO. OF AUSTRALIA FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A DATE 31 August 1967 ENGRS. GAK, PC

SAMPLE TYPE SIDE WALL CORES SAMPLE DEPTH 7997 SAMPLE NO. 12

REMARKS SIDE WALL CORE No. 29 TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.047	0.46	0.46	99.54	
0.495	0.0195	32	35	0.047	0.46	0.92	99.08	
0.246	0.0097	60	60	0.910	8.85	9.77	90.23	
0.124	0.0049	115	120	4.501	43.79	53.56	46.44	
0.061	0.0024	250	230	2.272	22.10	75.66	24.34	
0.000	0.0000	PAN	PAN	2.502	24.34	100.00	0.00	
			TOT[illegible]	[illegible]0.279	100.[illegible]			

CORE LAB

CORE LABORATORIES AUSTRALIA LTD.

Petroleum Reservoir Engineering

SIEVE ANALYSIS

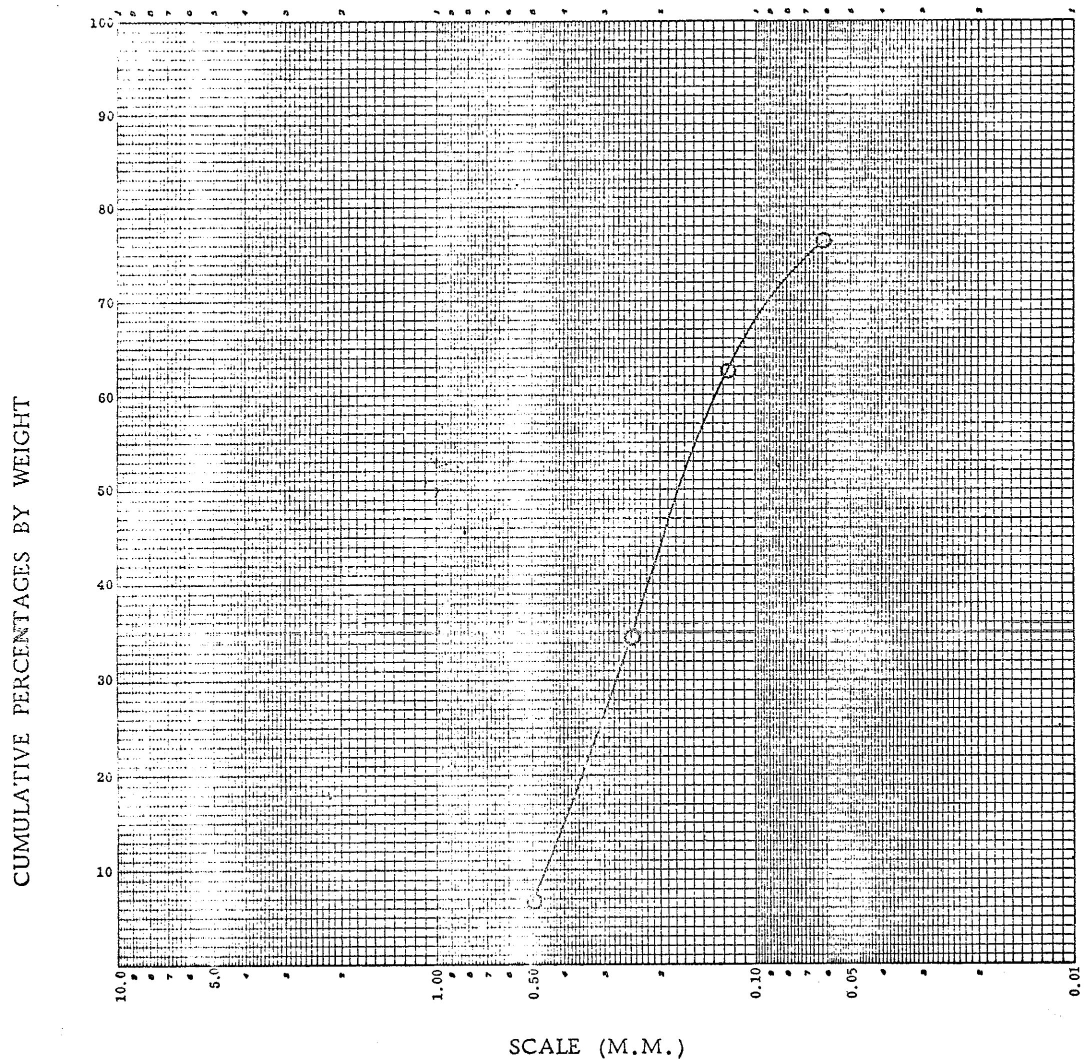
3-61

COMPANY BURMA OIL CO. OF AUSTRALIA FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A DATE 31 August 1967 ENGRS. GAK, PC

SAMPLE TYPE SIDE WALL CORES SAMPLE DEPTH 8049 SAMPLE NO. 13

REMARKS SIDE WALL CORE No. 28 TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.000	0.00	0.00	100.00	
0.495	0.0195	32	35	0.614	6.94	6.94	93.06	
0.246	0.0097	60	60	2.453	27.71	34.65	65.35	
0.124	0.0049	115	120	2.460	27.79	62.44	37.56	
0.061	0.0024	250	230	1.230	13.90	76.34	23.66	
0.000	0.0000	PAN	PAN	2.094	23.66	100.00	0.00	
			TO[illegible]	8.851	10[illegible]			

CORE LAB

CORE LABORATORIES AUSTRALIA LTD.

Petroleum Reservoir Engineering

SIEVE ANALYSIS

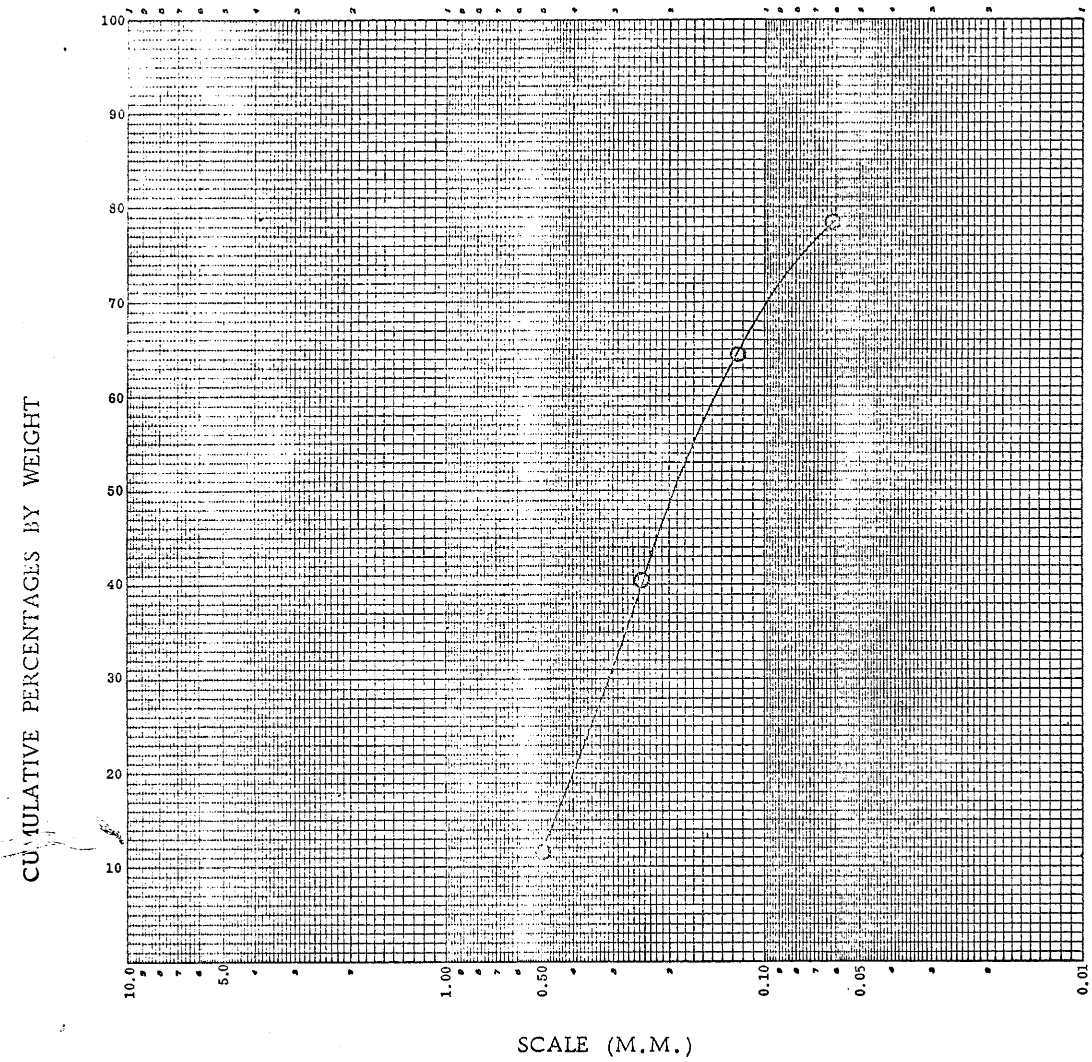
362

COMPANY BURMA OIL CO. OF AUSTRALIA FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A DATE 31 August 1967 ENGRS. GAK, PC

SAMPLE TYPE SIDE WALL CORES SAMPLE DEPTH 8130 SAMPLE NO. 14

REMARKS SIDE WALL CORE No. 26 TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES $\sqrt{2}$ or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.000	0.00	0.00	100.00	
0.495	0.0195	32	35	1.403	11.76	11.76	88.24	
0.246	0.0097	60	60	3.401	28.50	40.26	59.74	
0.124	0.0049	115	120	2.912	24.40	64.66	35.34	
0.061	0.0024	250	230	1.689	14.15	78.81	21.19	
0.000	0.0000	PAN	PAN	2.528	21.19	100.00	0.00	
			TOTAL	11.933	100.00			

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SIEVE ANALYSIS

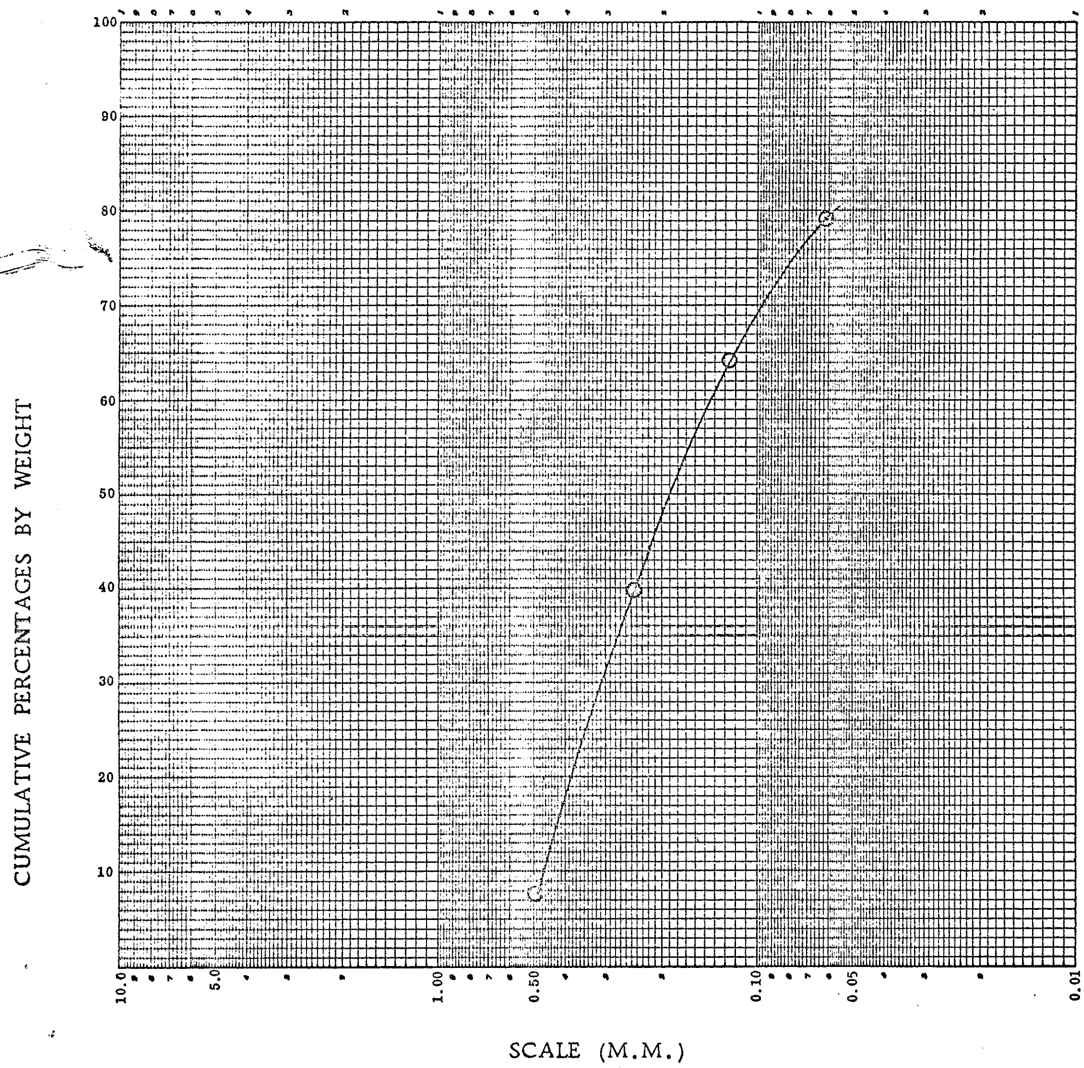
3-63

COMPANY BURMA OIL CO. OF AUSTRALIA FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A DATE 31 August 1967 ENGRS. GAK, PC

SAMPLE TYPE SIDE WALL CORES SAMPLE DEPTH 8321 SAMPLE NO. 15

REMARKS SIDE WALL CORE No. 23 TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.000	0.00	0.00	100.00	
0.495	0.0195	32	35	0.615	7.94	7.94	92.06	
0.246	0.0097	60	60	2.478	32.01	39.95	60.05	
0.124	0.0049	115	120	1.883	24.33	64.28	35.72	
0.061	0.0024	250	230	1.154	14.91	79.19	20.81	
0.000	0.0000	PAN	PAN	1.611	20.81	100.00	0.00	
			TOTALS	[illegible]	100.00			

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SIEVE ANALYSIS

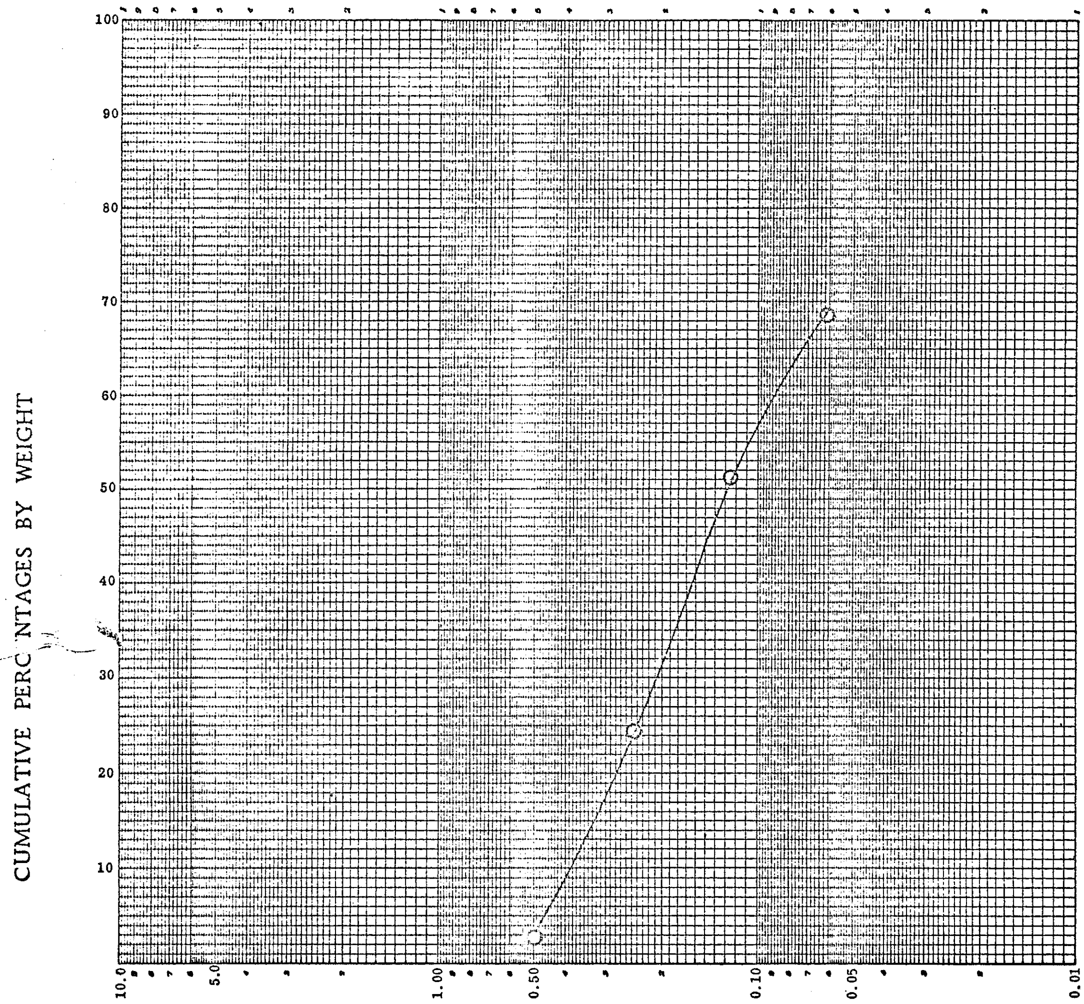
3-64

COMPANY BURMA OIL CO. OF AUSTRALIA FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A DATE 31 August 1967 ENGRS. GAK, PC

SAMPLE TYPE SIDE WALL CORES SAMPLE DEPTH 8357 SAMPLE NO. 16

REMARKS SIDE WALL CORE No. 22 TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.000	0.00	0.00	100.00	
0.495	0.0195	32	35	0.330	2.92	2.92	97.08	
0.246	0.0097	60	60	2.442	21.62	24.54	75.46	
0.124	0.0049	115	120	3.003	26.58	51.12	48.88	
0.061	0.0024	250	230	2.006	17.76	68.88	31.12	
0.000	0.0000	PAN	PAN	3.516	31.12	100.00	0.00	
			TOTALS	11.297	100.00			

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SIEVE ANALYSIS

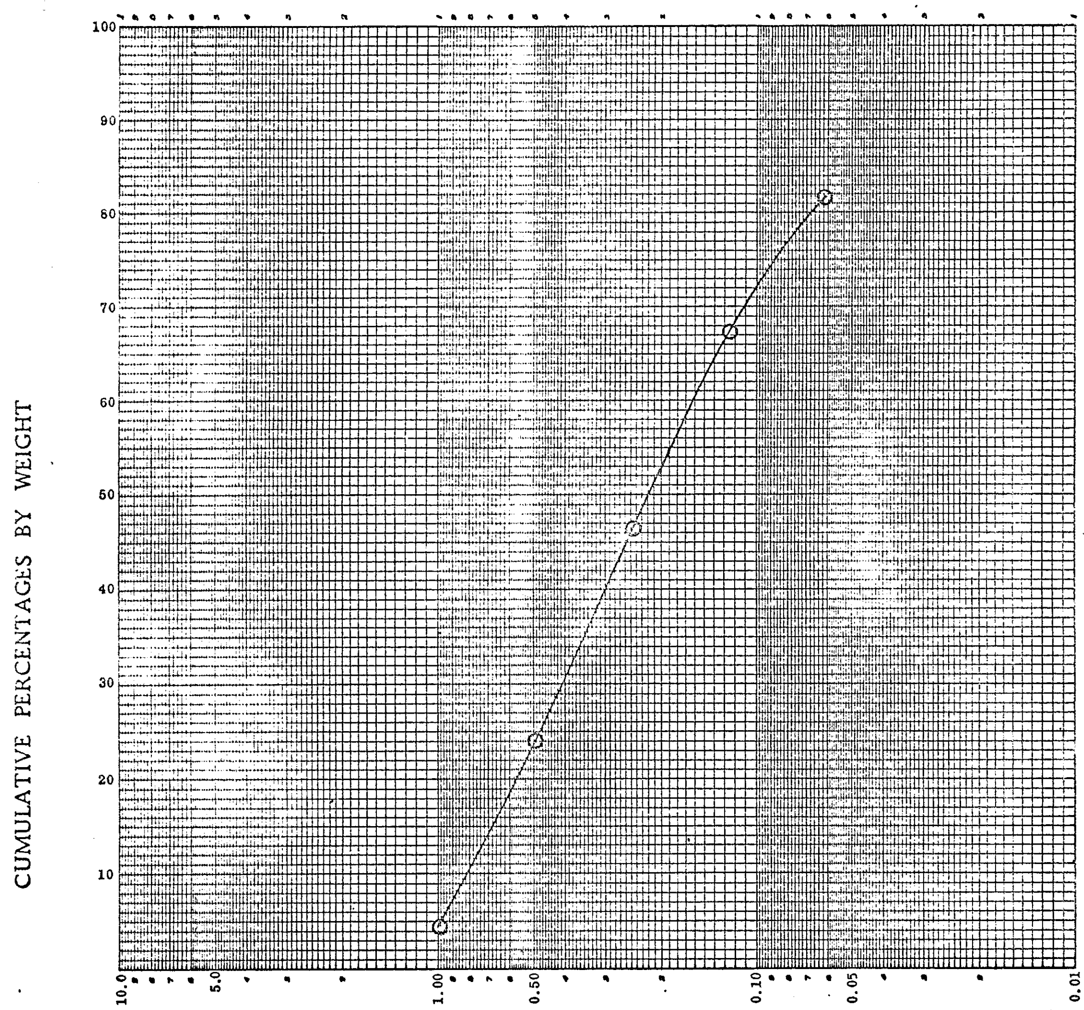
3-65

COMPANY: BURMA OIL CO. OF AUSTRALIA — FILE NO. AP3-SA-8

WELL: GOLDEN BEACH No. 1A — DATE 31 August 1967 — ENGRS. GAK, PC

SAMPLE TYPE: SIDE WALL CORES — SAMPLE DEPTH 8642 — SAMPLE NO. 17

REMARKS: SIDE WALL CORE No. 18 — TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.545	4.45	4.45	95.55	
0.495	0.0195	32	35	2.395	19.56	24.01	75.99	
0.246	0.0097	60	60	2.768	22.60	46.61	53.39	
0.124	0.0049	115	120	2.574	21.02	67.63	32.37	
0.061	0.0024	250	230	1.749	14.28	81.91	18.09	
0.000	0.0000	PAN	PAN	2.216	18.09	100.00	0.00	
			[illegible]	[illegible].247	[illegible]			

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SIEVE ANALYSIS

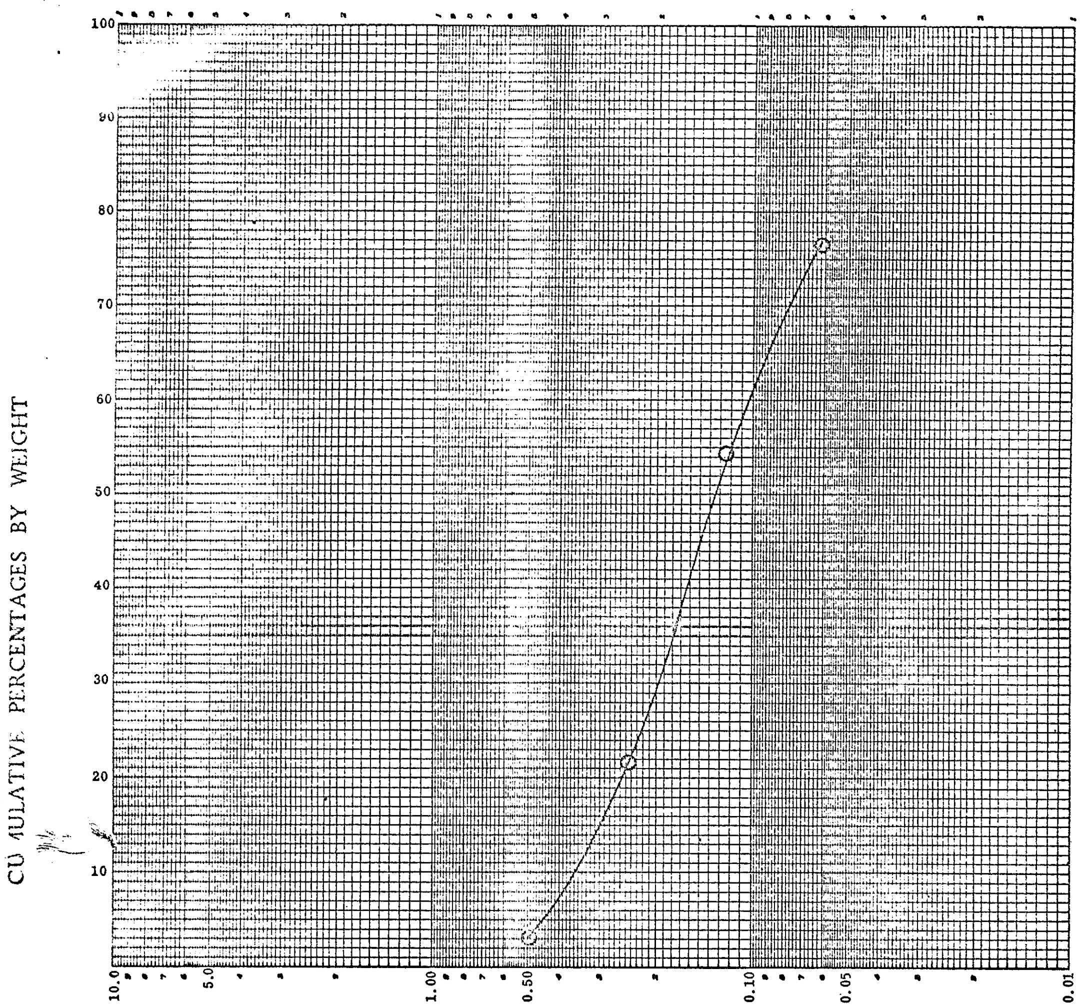
3-66

COMPANY BURMA OIL CO. OF AUSTRALIA FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A DATE 31 August 1967 ENGRS GAK, PC

SAMPLE TYPE SIDE WALL CORES SAMPLE DEPTH 8644 SAMPLE NO. 18

REMARKS SIDE WALL CORE No. 26 TIME (Min.) 15



SCALE (M.M.)

TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.000	0.00	0.00	100.00	
0.495	0.0195	32	35	0.301	3.12	3.12	96.88	
0.246	0.0097	60	60	1.812	18.79	21.91	78.09	
0.124	0.0049	115	120	3.115	32.30	54.21	45.79	
0.061	0.0024	250	230	2.192	22.73	76.94	23.06	
0.000	0.00[illegible]	PAN	PAN	2.224	23.06	100.00	0.[illegible]	
			[illegible]	[illegible]	[illegible]			

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SIEVE ANALYSIS

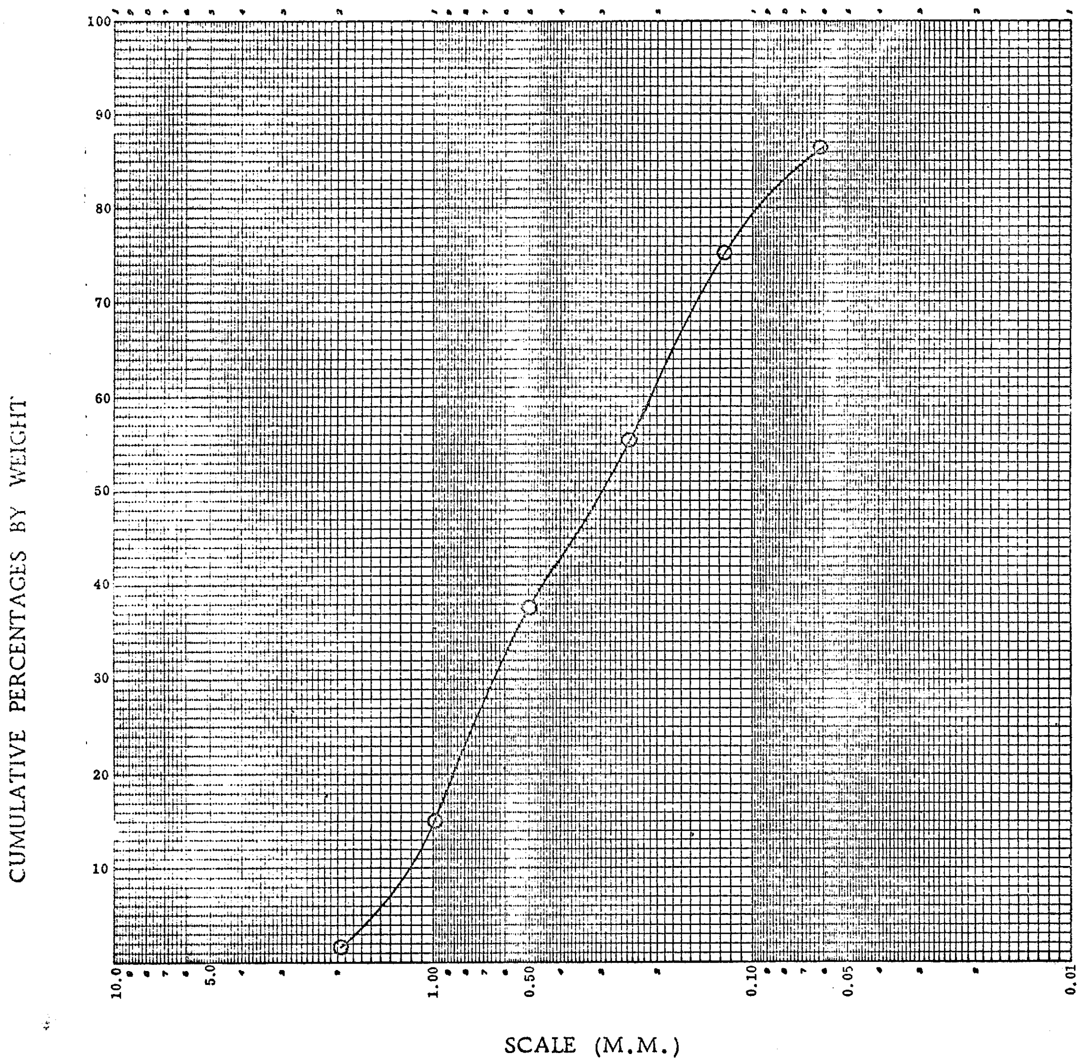
3-67

COMPANY BURMA OIL CO. OF AUSTRALIA FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A DATE 31 August 1967 ENGRS. GAK, PC

SAMPLE TYPE SIDE WALL CORES SAMPLE DEPTH 8645 SAMPLE NO. 19

REMARKS SIDE WALL CORE No. 17 TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES $\sqrt{2}$ or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.170	1.92	1.92	98.08	
0.991	0.0390	16	18	1.158	13.08	15.00	85.00	
0.495	0.0195	32	35	2.021	22.83	37.83	62.17	
0.246	0.0097	60	60	1.578	17.82	55.65	44.35	
0.124	0.0049	115	120	1.715	19.37	75.02	24.98	
0.061	0.0024	250	230	1.023	11.56	86.58	13.42	
0.000	0.0000	PAN	PAN	1.188	13.42	100.00	0.00	
				8.853	100.			

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SIEVE ANALYSIS

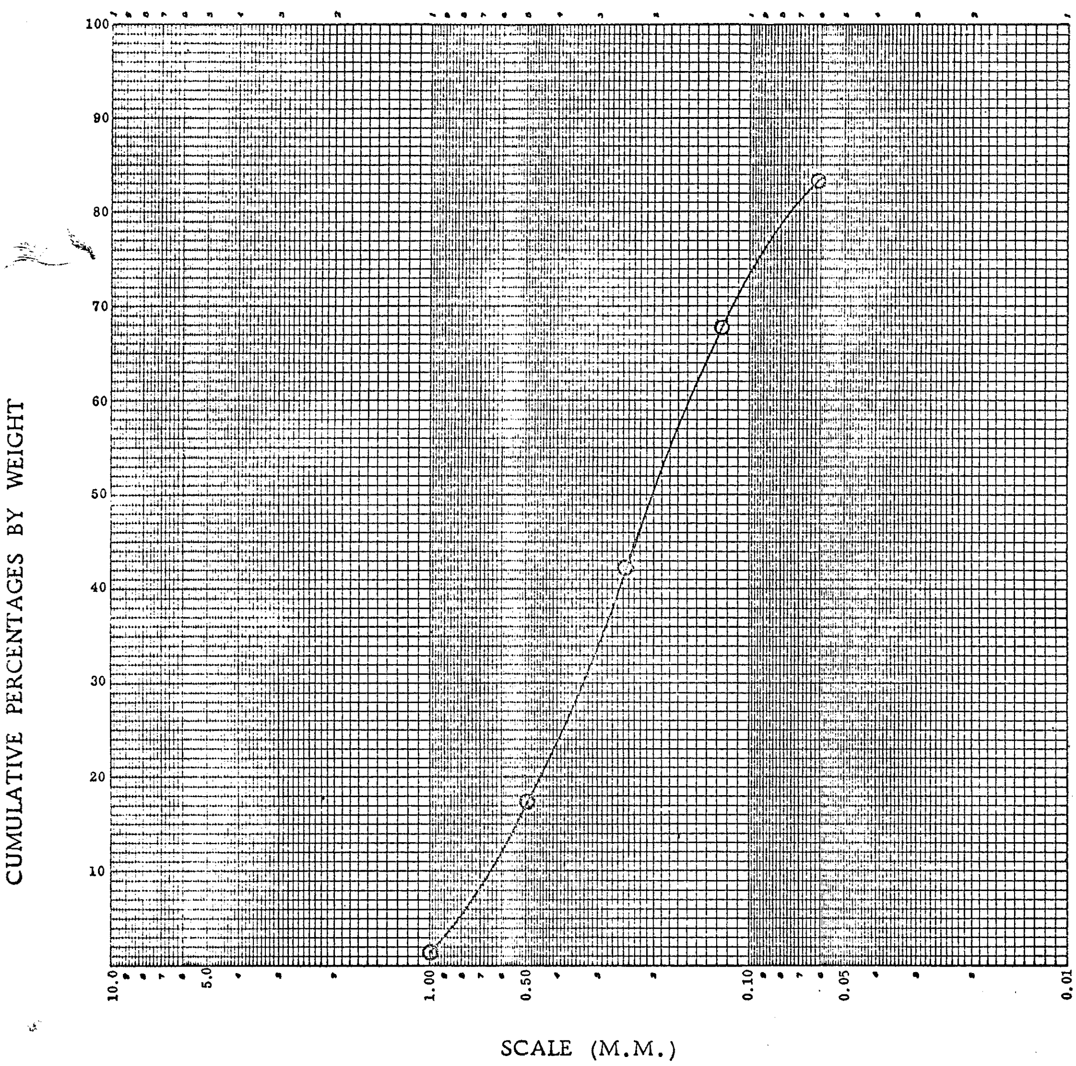
3-68

COMPANY: BURMA OIL CO. OF AUSTRALIA — FILE NO. AP3-SA-8

WELL: GOLDEN BEACH No. 1A — DATE: 31 August 1967 — ENGRS.: GAK, PC

SAMPLE TYPE: SIDE WALL CORES — SAMPLE DEPTH: 8660 — SAMPLE NO.: 20

REMARKS: SIDE WALL CORE No. 16 — TIME (Min.): 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.160	1.37	1.37	98.63	
0.495	0.0195	32	35	1.892	16.15	17.52	82.48	
0.246	0.0097	60	60	2.894	24.70	42.22	57.78	
0.124	0.0049	115	120	3.006	25.65	67.87	32.13	
0.061	0.0024	250	230	1.830	15.62	83.49	16.51	
0.000	0.0000	PAN	PAN	1.935	16.51	100.00	0.00	
			[illegible]	11.717	100.00			

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SIEVE ANALYSIS

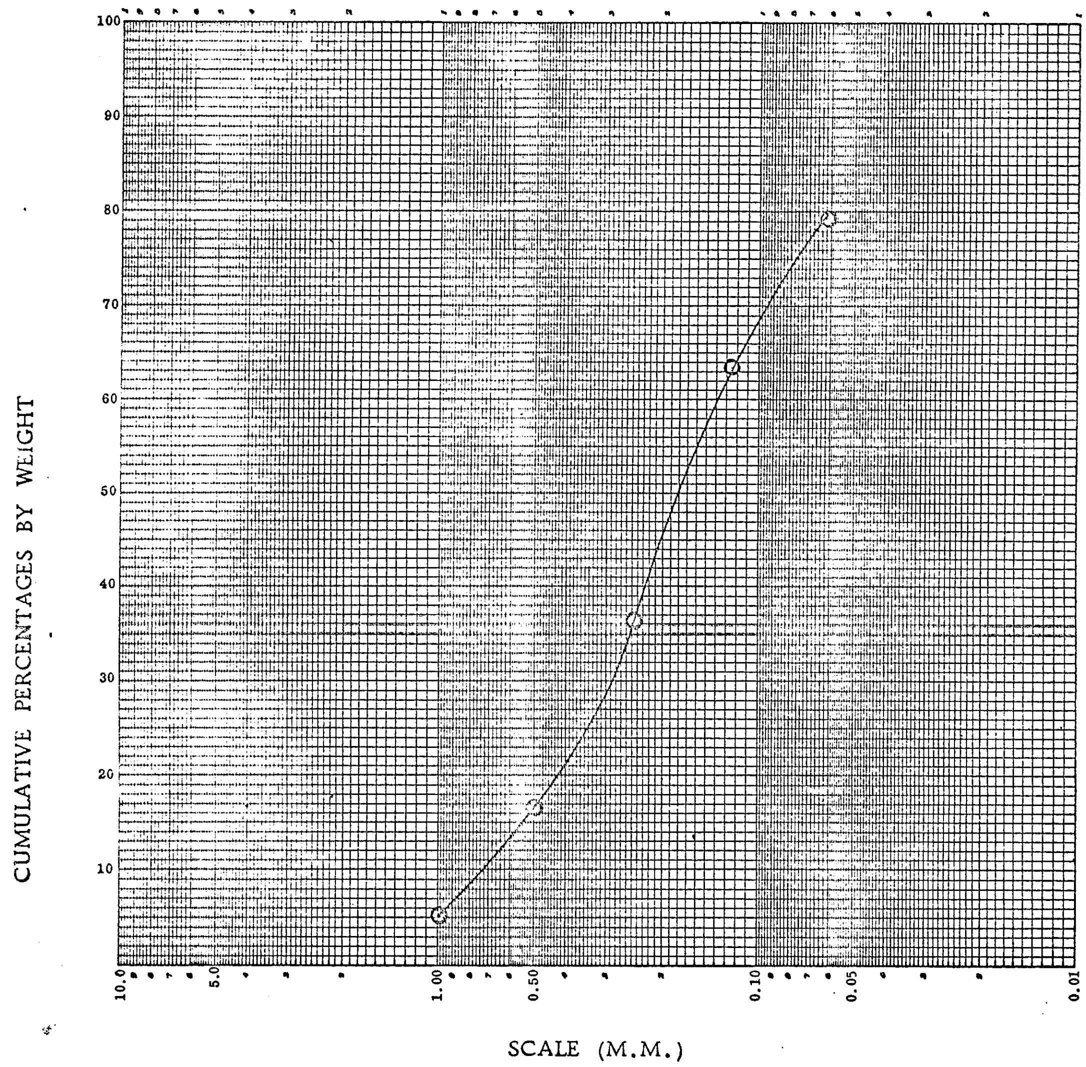
3-69

COMPANY BURMA OIL CO. OF AUSTRALIA FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A DATE 1 September 1967 ENGRS. GAK, PC

SAMPLE TYPE SIDE WALL CORES SAMPLE DEPTH 8661 SAMPLE NO. 21

REMARKS SIDE WALL CORE No. 15 TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.799	5.20	5.20	94.80	
0.495	0.0195	32	35	1.798	11.71	16.91	83.09	
0.246	0.0097	60	60	2.954	19.24	36.15	63.85	
0.124	0.0049	115	120	4.188	27.27	63.42	36.58	
0.061	0.0024	250	230	2.435	15.86	79.28	20.72	
0.000	0.0000	PAN	PAN	3.181	20.72	100.00	0.00	
			TOTALS	[illegible]	[illegible]			

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Petroleum Reservoir Engineering

SIEVE ANALYSIS

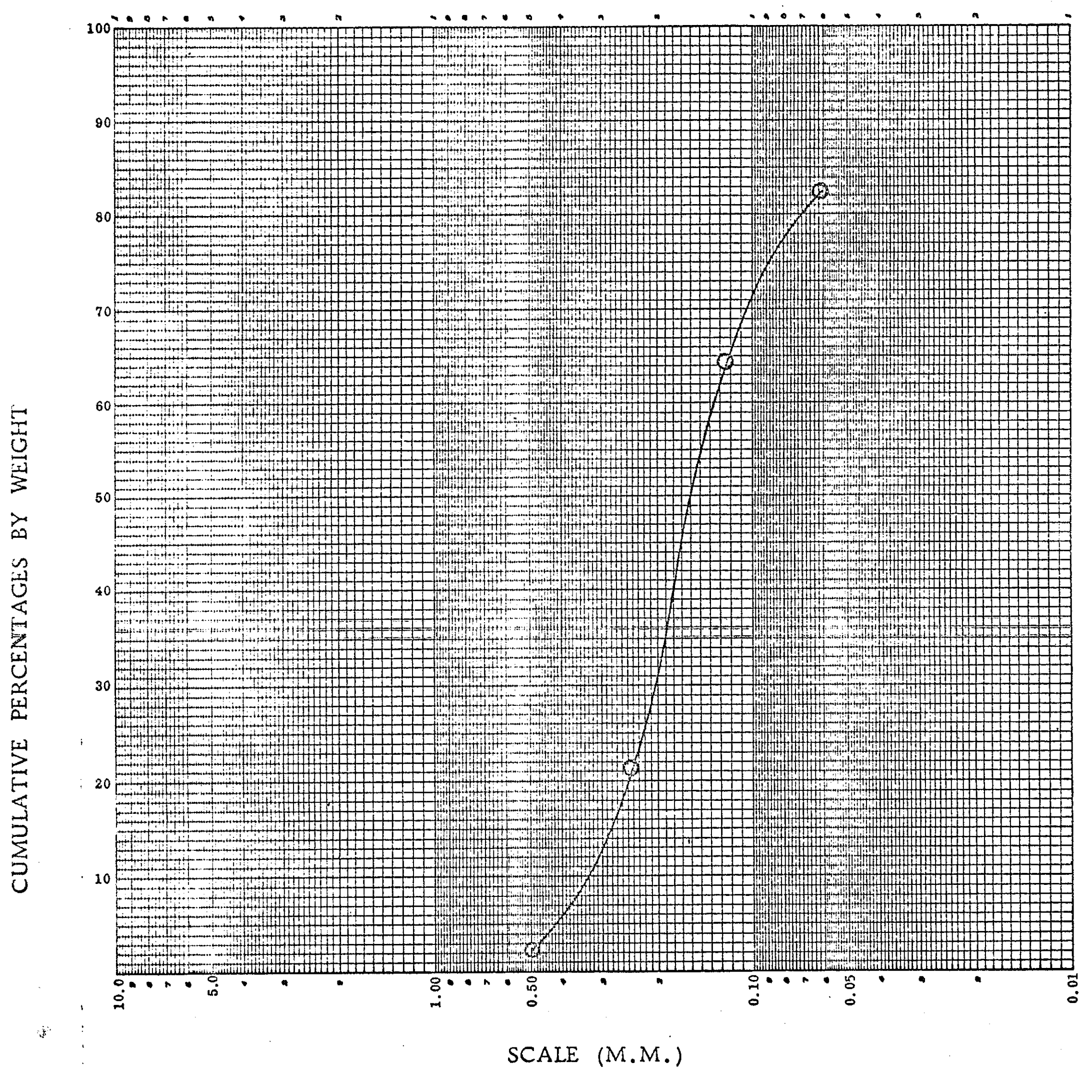
3-70

COMPANY BURMA OIL CO. OF AUSTRALIA FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A DATE 1 Sept. 1967 ENGRS. GAK, PC

SAMPLE TYPE SIDE WALL CORES SAMPLE DEPTH 8724 SAMPLE NO. 22

REMARKS SIDE WALL CORE No. 28A TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES $\sqrt{2}$ or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.000	0.00	0.00	100.00	
0.495	0.0195	32	35	0.272	2.16	2.16	97.84	
0.246	0.0097	60	60	2.388	19.00	21.16	78.84	
0.124	0.0049	115	120	5.421	43.14	64.30	35.70	
0.061	0.0024	250	230	2.303	18.33	82.63	17.37	
0.000	0.0000	PAN	PAN	2.183	17.37	100.00	0.00	
			TOTALS	12.567	100.00			

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SIEVE ANALYSIS

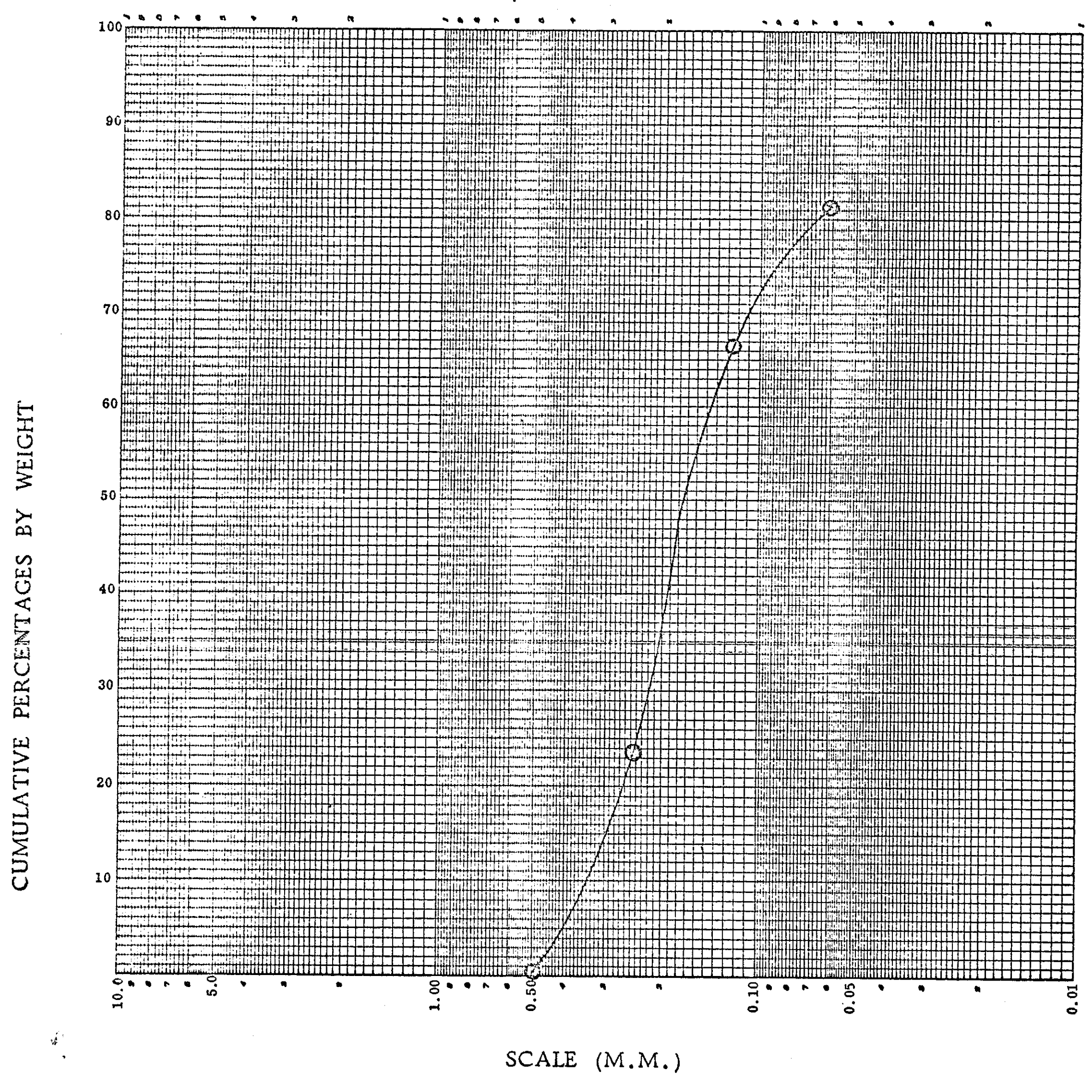
3-71

COMPANY: BURMA OIL CO. OF AUSTRALIA — FILE NO. AP3-SA-8

WELL: GOLDEN BEACH No. 1A — DATE: 1 Sept. 1967 — ENGRS. GAK, PC

SAMPLE TYPE: SIDE WALL CORES — SAMPLE DEPTH: 8813 — SAMPLE NO. 23

REMARKS: SIDE WALL CORE No. 22A — TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.000	0.00	0.00	100.00	
0.495	0.0195	32	35	0.112	0.61	0.61	99.39	
0.246	0.0097	60	60	4.263	23.05	23.66	76.34	
0.124	0.0049	115	120	7.907	42.76	66.42	33.58	
0.061	0.0024	250	230	2.758	14.91	81.33	18.67	
0.000	0.0000	PAN	PAN	3.452	18.67	100.00	0.00	
			TO[illegible]	[illegible]	100.00			

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SIEVE ANALYSIS

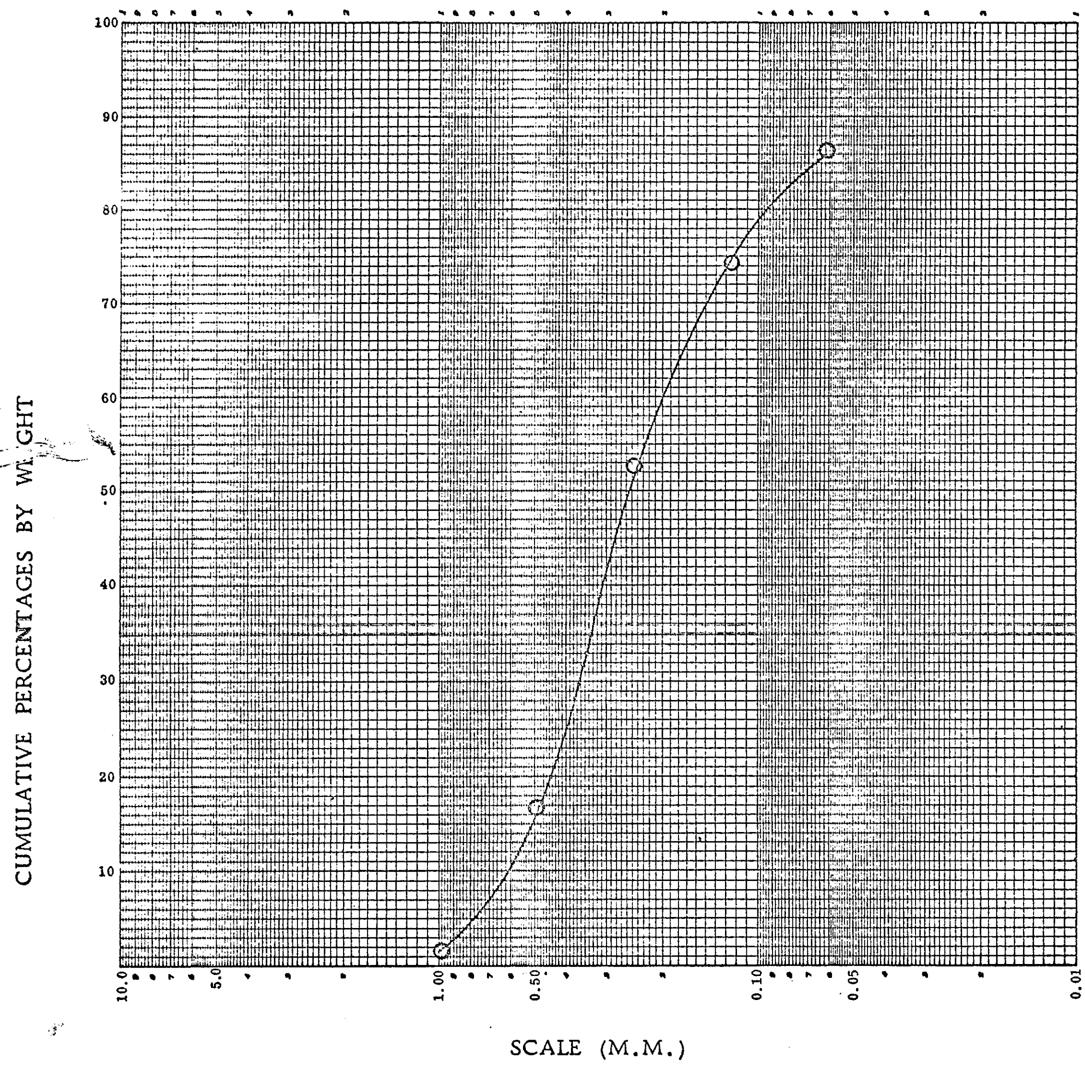
3-72

COMPANY BURMA OIL CO. OF AUSTRALIA — FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A — DATE 1 Sept. 1967 — ENGRS. GAK, PC

SAMPLE TYPE SIDE WALL CORES — SAMPLE DEPTH 8835 — SAMPLE NO. 24

REMARKS SIDE WALL CORE No. 11 — TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.271	1.99	1.99	98.01	
0.495	0.0195	32	35	2.035	14.92	16.91	83.09	
0.246	0.0097	60	60	4.893	35.88	52.79	47.21	
0.124	0.0049	115	120	2.913	21.36	74.15	25.85	
0.061	0.0024	250	230	1.659	12.17	86.32	13.68	
0.000	0.0000	PAN	PAN	1.865	13.68	100.00	0.00	
				13.636	100.[illegible]			

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SIEVE ANALYSIS

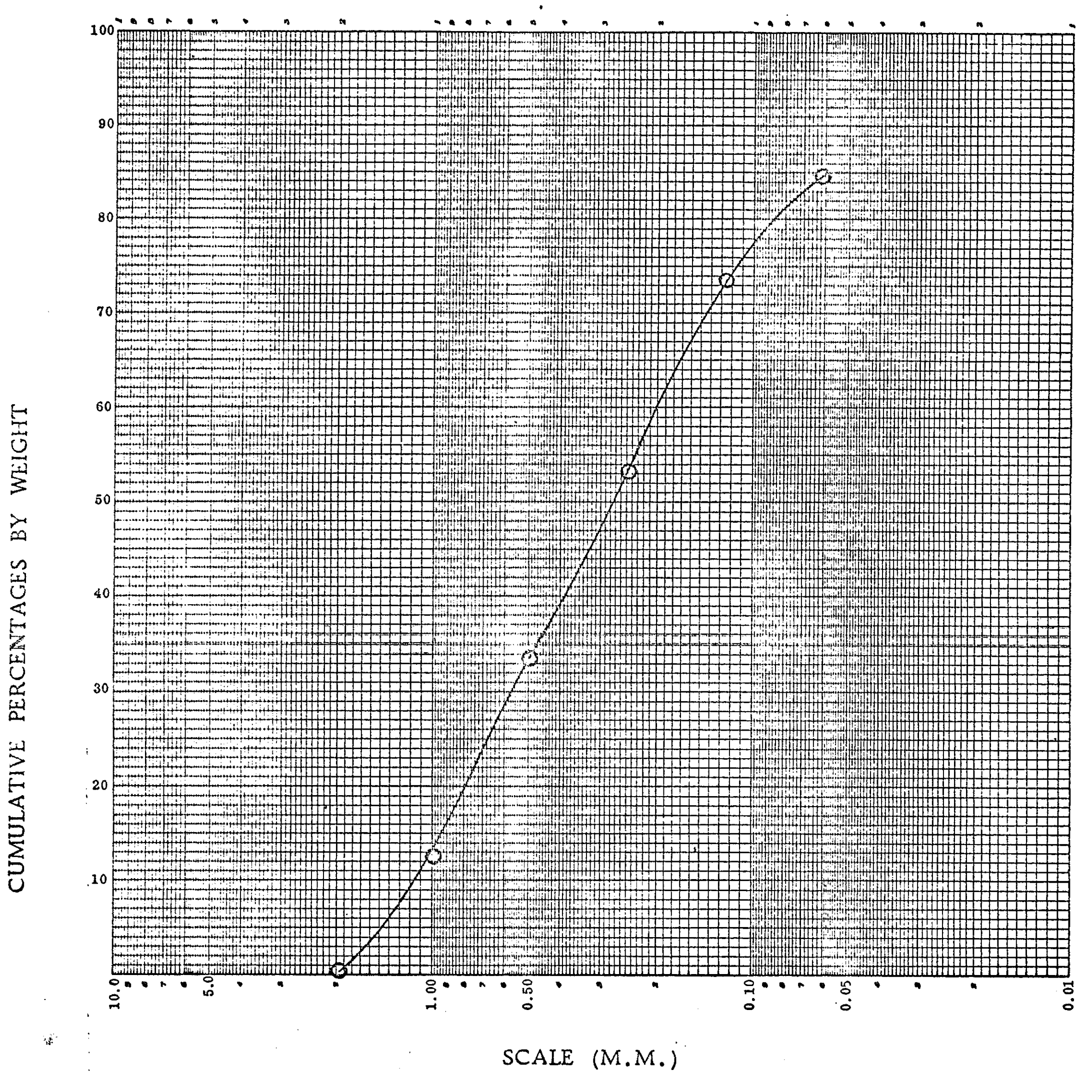
3-73

COMPANY BURMA OIL CO. OF AUSTRALIA FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A DATE 1 Sept. 1967 ENGRS. GAK, PC

SAMPLE TYPE SIDE WALL CORES SAMPLE DEPTH 8840 SAMPLE NO. 25

REMARKS SIDE WALL CORE No. 10 TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.057	0.52	0.52	99.48	
0.991	0.0390	16	18	1.321	11.98	12.50	87.50	
0.495	0.0195	32	35	2.335	21.18	33.68	66.32	
0.246	0.0097	60	60	2.145	19.46	53.14	46.86	
0.124	0.0049	115	120	2.291	20.78	73.92	26.08	
0.061	0.0024	250	230	1.205	10.93	84.85	15.15	
0.000	0.0000	PAN	PAN	1.670	15.15	100.00	0.00	
			TOT	[illegible]	100.00			

CORE LAB

CORE LABORATORIES AUSTRALIA LTD.

Petroleum Reservoir Engineering

SIEVE ANALYSIS

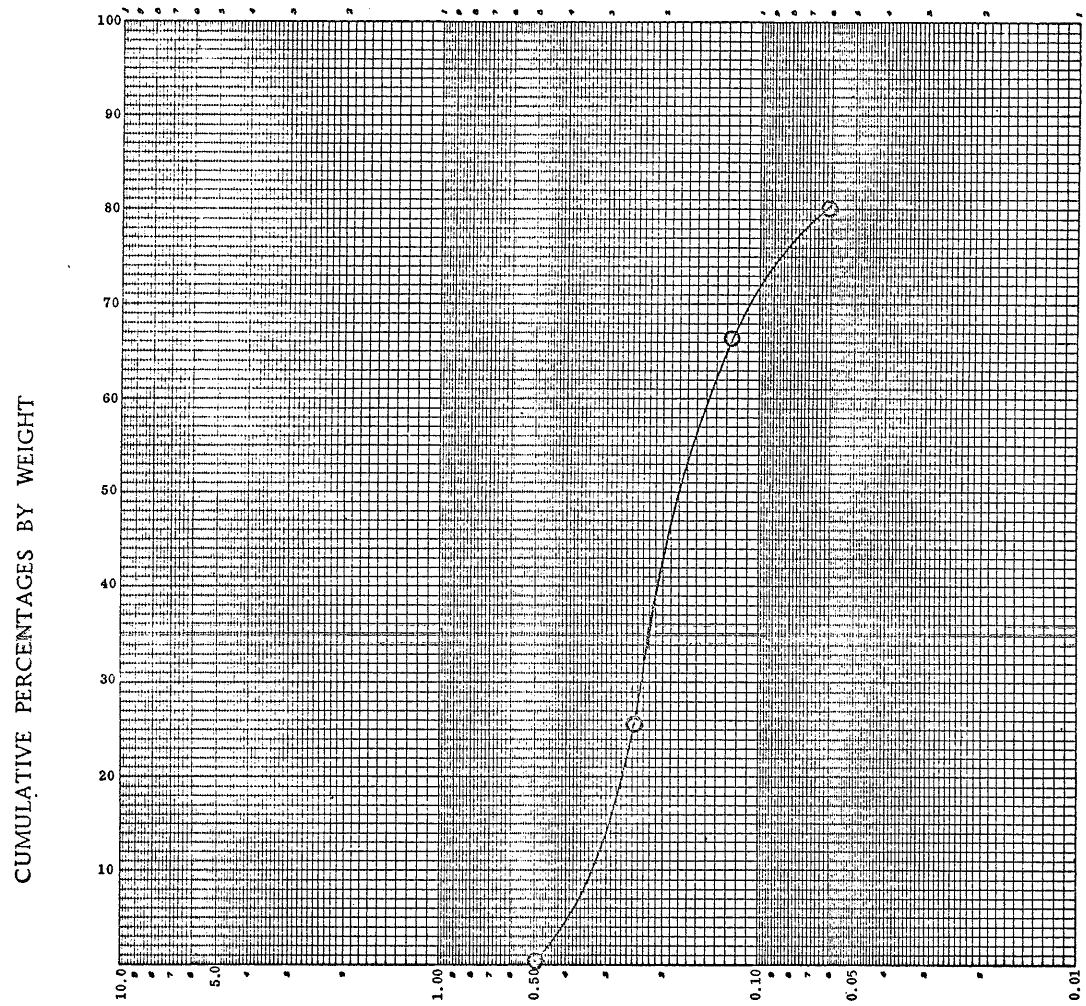
3-74

COMPANY BURMA OIL CO. OF AUSTRALIA — FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A — DATE 1 Sept. 1967 — ENGRS. GAK, PC

SAMPLE TYPE SIDE WALL CORES — SAMPLE DEPTH 8972 — SAMPLE NO. 26

REMARKS SIDE WALL CORE No. 8 — TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.000	0.00	0.00	100.00	
0.495	0.0195	32	35	0.117	0.66	0.66	99.34	
0.246	0.0097	60	60	4.448	25.09	25.75	74.25	
0.124	0.0049	115	120	7.208	40.65	66.40	33.60	
0.061	0.0024	250	230	2.412	13.60	80.00	20.00	
0.000	0.0000	PAN	PAN	3.545	20.00	100.00	0.00	
			TOTALS	17.730	100.00			

CORE LAB

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Petroleum Reservoir Engineering

SIEVE ANALYSIS

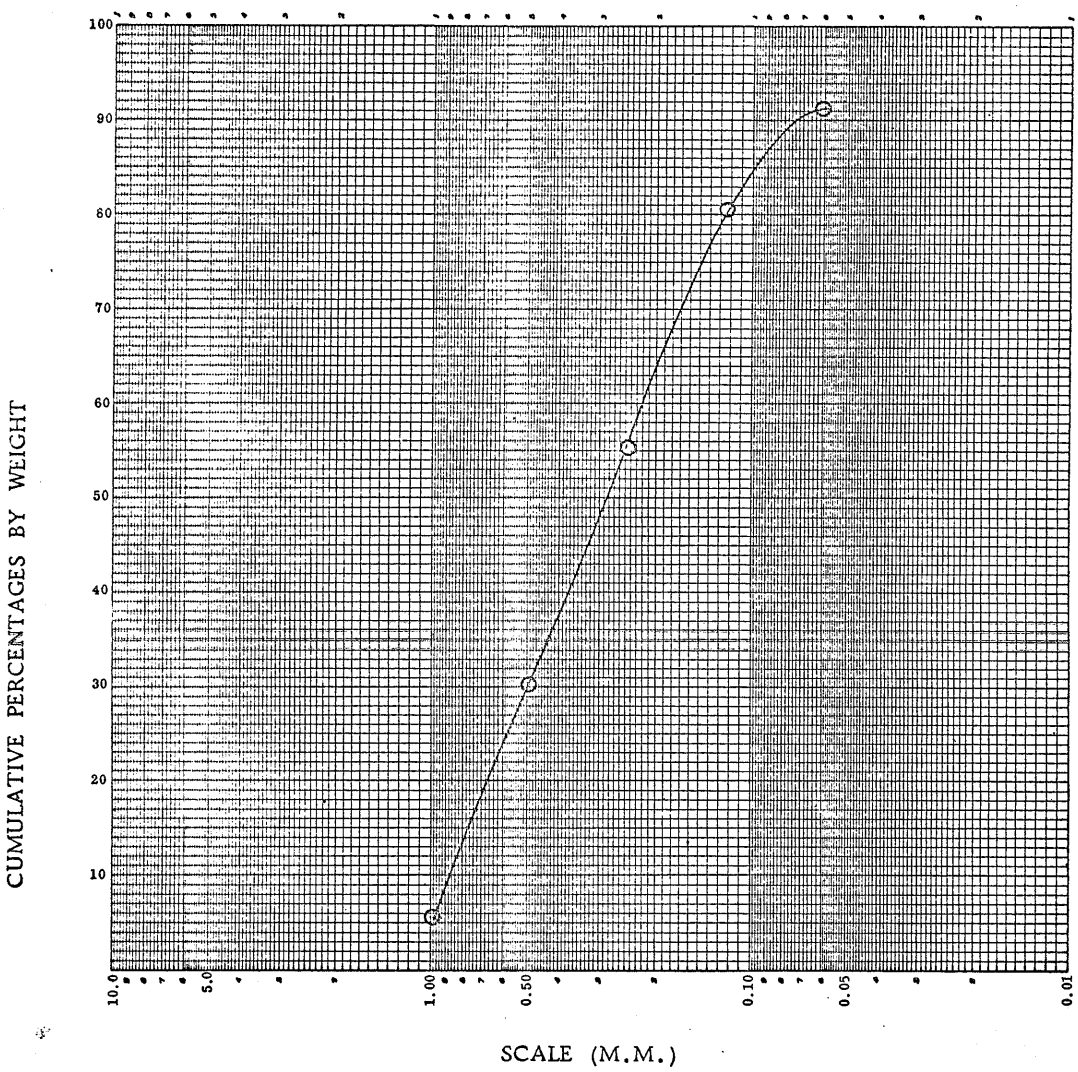
3-75

COMPANY BURMA OIL CO. OF AUSTRALIA FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A DATE 1 Sept. 1967 ENGRS. GAK, PC

SAMPLE TYPE SIDE WALL CORES SAMPLE DEPTH 8975 SAMPLE NO. 27

REMARKS SIDE WALL CORE No. 7 TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.430	5.74	5.74	94.26	
0.495	0.0195	32	35	1.824	24.34	30.08	69.92	
0.246	0.0097	60	60	1.898	25.33	55.41	44.59	
0.124	0.0049	115	120	1.894	25.27	80.68	19.32	
0.061	0.0024	250	230	0.787	10.50	91.18	8.82	
0.000	0.0000	PAN	PAN	0.661	8.82	100.00	0.00	
			TOTALS	7.494	100.00			

CORE LAB

CORE LABORATORIES AUSTRALIA LTD.

Petroleum Reservoir Engineering

SIEVE ANALYSIS

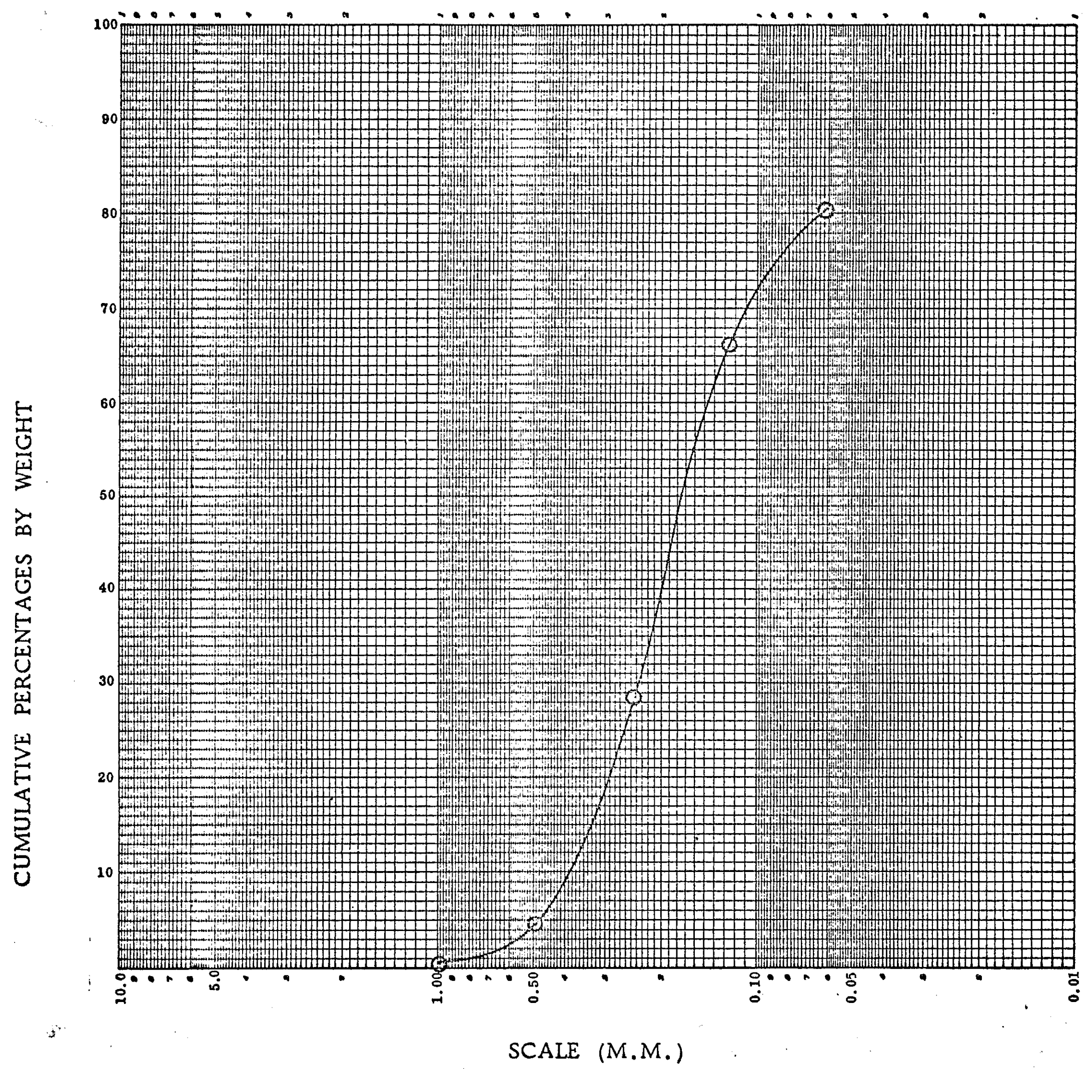
3-76

COMPANY BURMA OIL CO. OF AUSTRALIA FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A DATE 1 Sept 1967 ENGRS. GAK, PC

SAMPLE TYPE SIDE WALL CORES SAMPLE DEPTH 9105 SAMPLE NO. 28

REMARKS SIDE WALL CORE No. 2 TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.064	0.60	0.60	99.40	
0.495	0.0195	32	35	0.448	4.20	4.80	95.20	
0.246	0.0097	60	60	2.539	23.79	28.59	71.41	
0.124	0.0049	115	120	4.012	37.59	66.18	33.82	
0.061	0.0024	250	230	1.531	14.34	80.52	19.48	
0.000	0.0000	PAN	PAN	2.079	19.48	100.00	0.00	
			TOTALS	10.673	[illegible]			

CORE LAB

CORE LABORATORIES AUSTRALIA LTD.

Petroleum Reservoir Engineering

SIEVE ANALYSIS

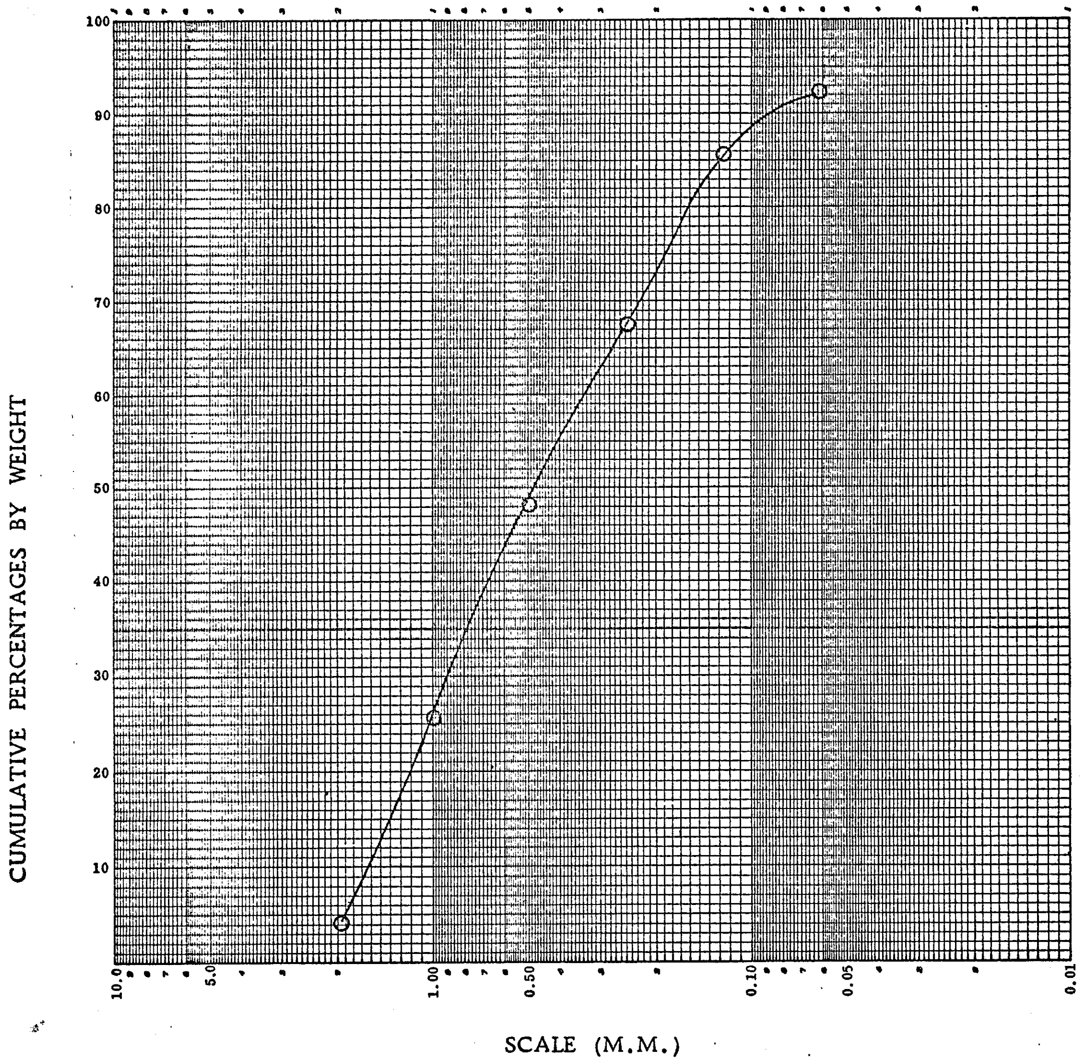
3-77

COMPANY BURMA OIL CO. OF AUSTRALIA FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A DATE 1 Sept. 1967 ENGRS. GAK, PC

SAMPLE TYPE SIDE WALL CORES SAMPLE DEPTH 9106 SAMPLE NO. 29

REMARKS SIDE WALL CORE No. 18A TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.736	4.14	4.14	95.86	
0.991	0.0390	16	18	3.841	21.59	25.73	74.27	
0.495	0.0195	32	35	3.977	22.36	48.09	51.91	
0.246	0.0097	60	60	3.504	19.70	67.79	32.21	
0.124	0.0049	115	120	3.186	17.91	85.70	14.30	
0.061	0.0024	250	230	1.189	6.69	92.39	7.61	
0.000	0.0000	PAN	PAN	1.354	7.61	100.00	0.00	
			TOTALS	17.787	100.00			

CORE LABORATORIES AUSTRALIA LTD.

Petroleum Reservoir Engineering

SIEVE ANALYSIS

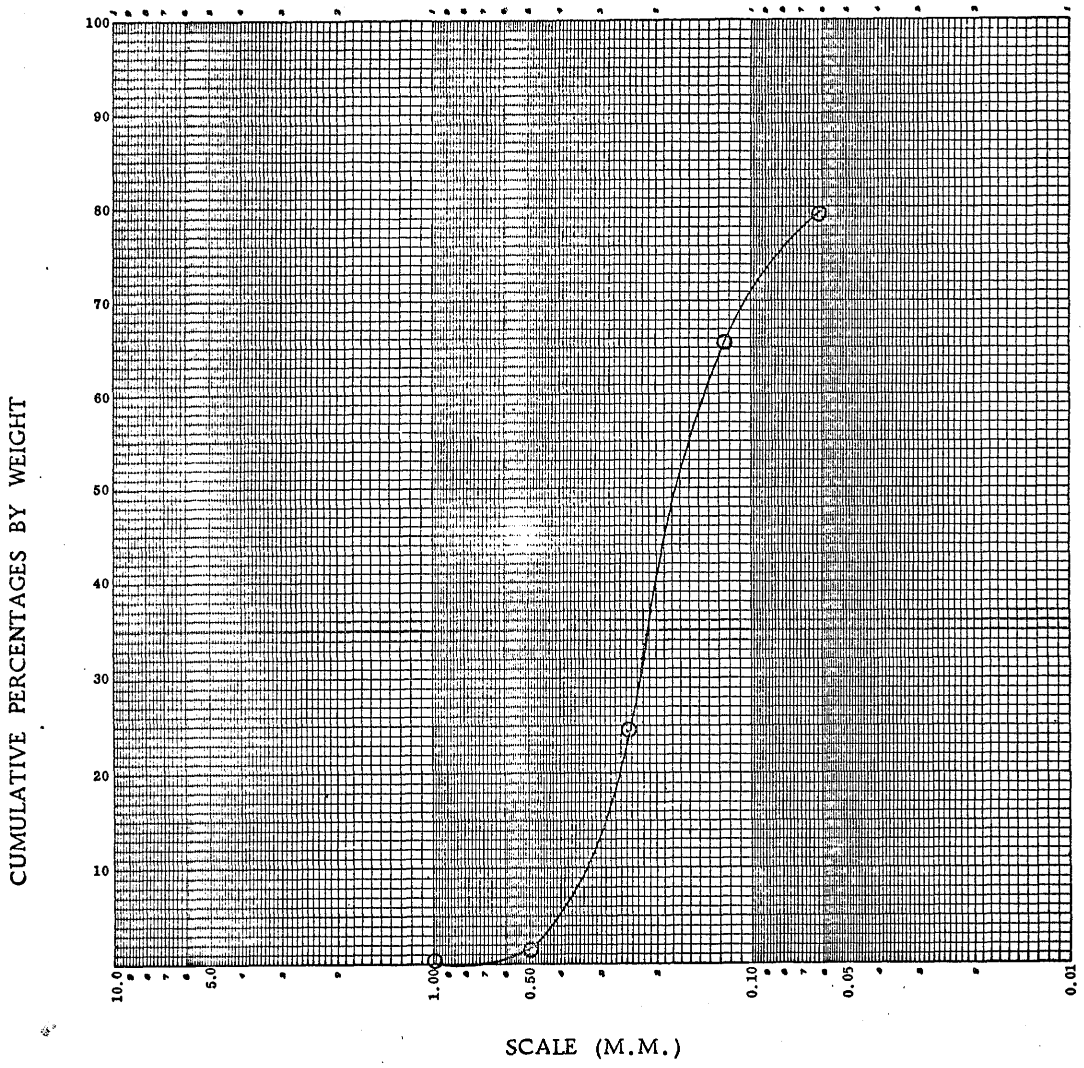
3-78

COMPANY BURMA OIL CO. OF AUSTRALIA FILE NO. AP3-SA-8

WELL GOLDEN BEACH No. 1A DATE 1 Sept. 1967 ENGRS. GAK, PC

SAMPLE TYPE SIDE WALL CORES SAMPLE DEPTH 9108 SAMPLE NO. 30

REMARKS SIDE WALL CORE No. 17A TIME (Min.) 15



TYLER STANDARD SCREEN SCALE SIEVES √2 or 1.414				WEIGHT ON SIEVES		TOTAL PERCENTAGE CUMULATIVE		
OPENING (M.M.)	OPENING (INS.)	TYLER MESH	U.S. No.	GMS.	%	ON	PASS	
7.925	0.3120	2.5		0.000	0.00	0.00	100.00	
3.962	0.1560	5	5	0.000	0.00	0.00	100.00	
1.981	0.0780	9	10	0.000	0.00	0.00	100.00	
0.991	0.0390	16	18	0.075	0.33	0.33	99.67	
0.495	0.0195	32	35	0.225	1.00	1.33	98.67	
0.246	0.0097	60	60	5.229	23.16	24.49	75.51	
0.124	0.0049	115	120	9.348	41.40	65.89	34.11	
0.061	0.0024	250	230	3.053	13.52	79.41	20.59	
0.000	0.0000	PAN	PAN	4.648	20.59	100.00	0.00	
			TOTALS	22.578	100.00			

BOC :

GAS AND FUEL CORPORATION OF VICTORIA
RESEARCH AND TESTING DEPARTMENT
Chief Chemist's Division

3-79

SPECIAL TEST REPORT No. AC67/302

Requested by Mr. Hartmann

Date received 8. 8. 67. Date required

Material 6 gas samples in steel bombs and tinplate cans, all at atmospheric pressure. Complete gas analysed is

Query

Origin of Sample B. O. C. Australia Ltd. (Mr. T. C. Tyner)

REPORT

Component \ Sample No.	2	2a	3	3a	4	4a
CO_2	N.D.	0.3	0.4	≤ 0.1	0.4	≤ 0.1
O_2	N.D.	17.9	1.4	≤ 0.1	0.2	0.2
N_2	14.4 (incl. O_2)	71.7	4.6	2.0	0.7	1.9
He	0.009	≤ 0.001	0.006	0.004	0.005	0.005
H_2	38.2	0.6	≤ 0.001	0.2	0.2	1.0
CH_4	43.4	8.4	85.9	90.9	91.7	91.1
C_2H_6	2.6	0.7	5.2	4.6	4.9	4.1
C_3H_8	0.9	0.3	1.6	1.5	1.3	1.2
$i\text{-}C_4H_{10}$	0.1	0.04	0.2	0.2	0.2	0.2
$n\text{-}C_4H_{10}$	0.1	0.04	0.3	0.3	0.2	0.2
$i\text{-}C_5H_{12}$	0.03	0.001	0.1	0.1	0.1	0.04
$n\text{-}C_5H_{12}$	0.02	0.001	0.1	0.1	0.1	0.04
C_6H_{14}'s	≤0.0005 (with C_7+)	0.003 (with C_7+)	0.1	0.1	≤0.0005 (with C_7+)	≤0.0005 (with C_7+)
C_7+			0.1	≤ 0.0005		
Total	99.7 % (assumed)	100.0 %	100.0	100.0	100.0	100.0
S.G.	0.457	-	0.643	0.613	0.608	0.598
C.V.	631	-	1016	1053	1054	1026

Samples

2. Bomb, Golden Beach 1A, D.S.T. No.1) 9102-9107'
2a. Can, Golden Beach 1A, D.S.T. No.1)
3. Can, " " " D.S.T. No.2) 8968-8973'
3a. Bomb, " " " " ")
4. Bomb, " " " D.S.T. No.3) 8808-8815.5' and 8828-8838'
4a. Bomb, " " " D.S.T. No.3)

Notes Sample No.2 was displaced from the bomb by Mercury. All the others were displaced with water.

...../over

Chemist E. R. Colson Date 17.8.67

Checked ERC Laboratory Port Melbourne

23/25/4561

GAS AND FUEL CORPORATION OF VICTORIA
RESEARCH AND TESTING DEPARTMENT
Chief Chemist's Division

3-80

SPECIAL TEST REPORT

No. AC67/340

Requested by	Mr. H. F. Hartmann	Chart Index No. 210
Date received	25/8/67	Date required
Material	2 gas samples in steel bombs @ approx. 300 psig.	
Query	Complete gas analysis	
Origin of Sample	B. O. C. Australia Ltd. (Mr. T. C. Tyner)	

REPORT

ANALYSIS by three (3) combined gas chromatograph techniques.

Component \ Sample (1)	1	2
CO_2	$\leq$ 0.1	$\leq$ 0.1
O_2 + Ar (2)	$\leq$ 0.2	$\leq$ 0.2
N_2	6.3	6.3
He	0.01	0.01
H_2	0.001	0.001
CH_4	93.4	93.4
C_2H_6	0.06	0.08
C_3+	$\leq$ 0.01	$\leq$ 0.01
Total (3)	100.08	100.10
S.G.	0.582	0.582
C.V.	932	932

NOTES

1. Samples both labelled "Golden Beach 1A, Sample No. 5, D. S. T. No. 8, 2040 - 2045', 22/8/67".
2. The split between O_2 and Ar is unknown. If 100% O_2, concentration would be 0.2%. If 100% Ar concentration would be 0.06%.
3. Another peak was observed in the Molecular Sieve column analysis which remains unidentified. It could be perhaps a rare gas except He, Ar, and Kn_{84} and could have a concentration up to about 0.5%.
4. Analysis for Sulphur compounds has not been carried out.

Chemist	E. R. Colson	Date	30/8/67
Checked		Laboratory	Port Melbourne

23/25/4561

CHEMICAL BRANCH
MINES DEPARTMENT

CHEMICAL LABORATORIES—
Departments of Agriculture, Health, and Mines, Victoria

GMG:MS
Phone: 63 0321

An. FF, GG, 31/7

STATE LABORATORIES
MACARTHUR STREET
MELBOURNE, C.1

3-81

14th September, 1967

Report on Sample No. 1039/67

Sample	:	Gas
Locality	:	Offshore from Golden Beach (Well 1A)
Sender	:	B.O.C. of Australia Ltd., 8-12 Bridge Street, SYDNEY. N.S.W.

Details of Sample:

One sample of gas was received for analysis. This sample was obtained during the drilling of Golden Beach No.1A. The description of the sample, taken from Schlumberger Formation tests, is as follows:

Sample No.	1
Test No.	1
Date	17/7/67
Depth (feet)	8973
Volume recovered (cu ft)	1-2

It was requested that this sample be analysed for $C-C_6$ fractions, carbon dioxide, nitrogen, hydrogen sulphide, molecular weight of the C_7+ fraction, specific gravity, heating value, and helium.

3-82

Results	Lab. No.1039/67 As received Mol %	Sample No.1 Air-free basis Mol %
Hydrogen	Nil	Nil
Helium	Nil	Nil
Methane	37.8	85.9
Ethane	3.4	7.8
Propane	1.0	2.3
i - Butane	0.1	0.2
n - Butane	0.2	0.5
i - Pentane	0.04	0.09
n - Pentane	0.04	0.09
C_6& higher	Nil	Nil
Oxygen	11.8	Nil
Nitrogen	45.0	2.5
Carbon Dioxide	0.2	0.2
Total	99.58	99.58

Calculated Calorific Value (air-free) 1081 Btu's per cubic foot at 60°F, 30" Hg.

Calculated Specific Gravity (air-free) 0.6404

The sample as received contained 43.3% of air (calculated from O_2).

Hydrogen sulphide was not detected. The effectiveness of this test was limited by the smallness of the sample available.

John G. Kennedy

Senior Chemist,
Mines Department.

CHEMICAL BRANCH
MINES DEPARTMENT
CHEMICAL LABORATORIES—
Departments of Agriculture, Health, and Mines, Victoria
GMG:MS
Phone: 63 0321

STATE LABORATORIES
MACARTHUR STREET
MELBOURNE, C.1

3-83

An. FF,GG, 15/8

14th September 1967

Report on Samples Nos.1104-1106/67

Sample	:	Natural Gas
Locality	:	Offshore from Golden Beach (Well 1A)
Sender	:	B.O.C. of Australia Ltd., 8-12 Bridge Street, SYDNEY. N.S.W.

Details of Samples:

Three samples of gas were received for analysis. These samples were obtained from Drill Stem Tests following the drilling of Golden Beach Well No.1A.

	Sample No.2	Sample No.3	Sample No.4
Perforation (feet)	9102-9107	8968-8973	8808-8815.5,8828-8838
Pressure of Sample	Atmospheric	Atmospheric	Atmospheric
Date	31/7/67.	3/8/67.	5/8/67.

It was requested that the sample be analysed for C-C_6 fractions, carbon dioxide, nitrogen, hydrogen sulphide, moleoular weight of the C_7 + fraction, specific gravity, heating value and helium.

3-84

Results

	Lab. No.1104/67 As received Mol %	Sample No.2 Air-free basis Mol %
Hydrogen	0.6	0.6
Helium	Nil	Nil
Methane	90.2	90.60
Ethane	5.2	5.1
Propane	1.5	1.5
i - Butane	0.2	0.2
n - Butane	0.2	0.2
i - Pentane	0.05	0.05
n - Pentane	0.04	0.04
C_6 & higher	0.01	0.01
Oxygen	0.05	Nil
Nitrogen	1.8	1.6
Carbon Dioxide	Nil	Nil
Total	99.85	99.90

Calculated Calorific Value 1049 Btu's per cubic foot at 60°F 30" Hg

Calculated Specific Gravity 0.6060

The sample as received contained 0.25% of air (calculated)

Hydrogen sulphide was not detected - the test being limited by the smallness of the sample.

3-85

Results:

	Lab. No. 1105/67 As received Mol %	Sample No.3 Air-free basis Mol %
Hydrogen	0.1	0.1
Helium	Nil	Nil
Methane	91.1	91.6
Ethane	5.1	5.1
Propane	1.4	1.4
i - Butane	0.2	0.2
n - Butane	0.3	0.3
i - Pentane	0.1	0.1
n - Pentane	0.1	0.1
C_6 & higher	0.05	0.05
Oxygen	0.1	Nil
Nitrogen	1.3	0.9
Carbon Dioxide9	Nil	Nil
Total	99.85	99.85

Calculated Calorific Value (Air-free) 1063 Btu's per cubic foot at 60°F, 30" Hg.

Calculated Specific Gravity (Air-free) 0.6087

The sample as received was calculated to contain 0.5% of air.

Hydrogen sulphide was not detected, however the test was limited by the smallness of the sample.

3-86

Results

	Lab. No.1106/67	Sample No.3
	As received Mol %	Air free-basis Mol %
Hydrogen	0.4	0.4
Helium	Nil	Nil
Methane	90.6	90.7
Ethane	5.0	5.0
Propane	1.1	1.1
i - Butane	0.2	0.2
n - Butane	0.2	0.2
i - Pentane	0.04	0.04
n - Pentane	0.04	0.04
C_6 & higher	0.01	0.01
Oxygen	0.03	Nil
Nitrogen	1.1	1.0
Carbon Dioxide	1.1	1.1
Total	99.82	99.79

Calculated Calorific Value (Air-free) 1037 Btu's per cubic foot at 60°F 30" Hg.

Calculated Specific Gravity (Air-free) .6098

The sample as received contained by calculation, 0.13% of air.

Hydrogen sulphide was not detected, however the smallness of the sample available limited the test.

John G. Kennedy

Senior Chemist,
Mines Department.

CHEMICAL BRANCH
MINES DEPARTMENT
CHEMICAL LABORATORIES—
Departments of Agriculture, Health, and Mines, Victoria
GMG:MS
Phone: 63 0321
An. FF, GG, 31/8

STATE LABORATORIES
MACARTHUR STREET
MELBOURNE, C.1

3-87

14th September, 1967

Report on Sample No.1188/67

Sample	:	Natural Gas
Locality	:	Golden Beach No.1A
Sender	:	B.O.C. of Australia Ltd., 8-12 Bridge Street, SYDNEY. N.S.W.

Details of Sample:

One sample of gas was received for analysis. This samplewas obtained during the testing of Golden Beach Well No.1A.

Description of Sample:

Sample No.	5
Date collected	22/8/67
D.S.T.	8
Interval (feet)	2040-2045

It was requested that this sample be analysed for $C-C_6$ fractions, carbon dioxide, nitrogen, hydrogen sulphide, molecular weight of the C_7 + fraction, specific gravity, heating value, and helium.

3-88

Results	Lab. No.1188/67	Sample No.5
	As received	Air-free basis
	Mol %	Mol %
Hydrogen	Trace	Trace
Helium	Nil	Nil
Methane	93.3	94.3
Ethane	Nil	Nil
Propane	Nil	Nil
i - Butane	Nil	Nil
n - Butane	Nil	Nil
i - Pentane	Nil	Nil
n - Pentane	Nil	Nil
C_6& higher	Nil	Nil
Oxygen	0.2	Nil
Nitrogen	6.3	5.5
Carbon Dioxide	0.01	0.01
Total	99.81	99.81

Calculated Calorific Value (Air-free) 939 Btu's per cubic foot at 60°F, 30" Hg.

Calculated Specific Gravity (Air-free) 0.5765.

The sample as received contained 1% of air (calculated).

Hydrogen sulphide was not detected - the test being limited by the smallness of the sample available.

John G. Kennedy

Senior Chemist,
Mines Department.

CHEMICAL BRANCH
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CHEMICAL LABORATORIES—
Departments of Agriculture, Health, and Mines, Victoria
GMG:MS
Phone: 63 0321

STATE LABORATORIES
MACARTHUR STREET
MELBOURNE, C.1

3-99

2nd October, 1967

An. RM, 2/8

Report on Samples Nos.1034-1038/67

Sample : Water

Locality : Off-shore from Golden Beach (Well 1A)

Sender : The Manager,
B.O.C. of Australia
8-12 Bridge Street,
SYDNEY.

Details of Samples:

One sample of mud filtrate and four of water were received for analysis. They resulted from the testing of Oil Well - Golden Beach No.1A).

The description of samples taken from Schlumberger Formation Tests are as follows:-

Mud Filtrate Sample

Taken from flow-line 17 July 1967.

Water Samples.

Sample No.	1	2	3	4
Test No.	1	2	3	4
Date	17.7.67.	18.7.67.	19.7.67.	19.7.67.
Depth (I.E.S.)	8973	9105	8837	8645
Volume recovered (ccs)	3000	60	8100	19000
Remarks	with 1.2cuft of gas	muddy	muddy	with slight skin of oil.

It was requested that the following determination be made Na, Ca, Mg, Fe, Cl, CO_3, HCO_3, SO_4, specific gravity and resistivity. The samples should also be tested for traces of oil.

3-90

Report on Sample Nos.1034-1038/67

Results:

Lab. No.		1034	1035	1036	1037	1038
Sample Mark		Mud Filtrate	1	2	3	4
		p.p.m	p.p.m	p.p.m	p.p.m	p.p.m
Total solids in solution		8600	6700	2350	4450	5500
Chloride	(Cl)	2085	[illegible]910	300	745	800
Carbonate	(CO_3)	Nil	Nil	Nil	Nil	Nil
Bicarbonate	(HCO_3)	1790	1790	895	1193	1252
Sulphate	(SO_4)	2995	2272	771	1248	1581
Calcium	(Ca)	56	35	56	57	18
Magnesium	(Mg)	23	3	9	6	5
Sodium	(Na)	3500	2525	931	1512	2013
Potassium	(K)	446	325	102	167	233
Iron-Soluble	(Fe)	Nil	Nil	31	24	4
Total hardness (as $CaCO_3$)		235	97	177	167	66
pH		7.9	8.3	8.2	8.2	8.0
Specific Resistance at 17°C		86	109	285	159	130
Specific Gravity		n.d	1.012	n.d	1.020	1.008

Traces of petroleum were detected in these waters, after centrifuging. This fraction was just sufficient in quantity to be isolated by extraction. The nature of the fluorescence seemed to indicate that the "oil" was a condensate rather than a crude oil.

Comment:

The prescence of bentonite and drilling additives made the analyses very difficult. An ionic balance could not be obtained, there being an excess of cations over anions in each case. The explanation is believed to lie in the special anions contributed by the additives, but not determined in the analyses. It is hoped, however, that the analytical figures given will prove to be of value in the appraisal of these waters.

John G. Kennedy

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An. RM, 8/8

STATE LABORATORIES
MACARTHUR STREET
MELBOURNE, C.1

391

4th October, 1967

Report on Samples Nos.1107-1108/67

Sample	:	Water
Locality	:	Offshore from Golden Beach (Well1A)
Sender	:	The Manager, B.O.C. of Australia Ltd., 8-12 Bridge Street, SYDNEY. N.S.W.

Details of Samples:

Two samples of water were received for analysis. They resulted from the testing of Oil Well - Golden Beach No.1A.

	Sample No.5	Sample No.6
Drill Stem Test (feet)	8968-8973	8808-8815.5, 8828-8838
Date	3/8/67	5/8/67
Origin	Probably mud filtrate	Probably mud filtrate

Lab. No.		1107	1108
Sample No.		5	6
Results:		Parts per million	
Total solids in solution		6500	7000
Chloride	(Cl)	925	1445
Carbonate	(CO_3)	Nil	82
Bicarbonate	(HCO_3)	2576	4163
Sulphate	(SO_4)	2203	2021
Calcium	(Ca)	16	17
Magnesium	(Mg)	3	7
Sodium	(Na)	2598	2982
Potassium	(K)	428	353
Iron-Soluble	(Fe)	24	56
Total hardness (as $CaCO_3$)		53	72
pH		8.2	8.4
Specific Resistance at 17°C		116 ohmcm.	106 ohmcm.
Specific Gravity		1.013	1.018

Extraction of the surface layer obtained after the centrifuging of Lab. No.1107, Sample No.5 gave a waxy residue with a creamy blue fluorescence not characteristic of crude oil while Lab. No.1108, Sample No.6 yielded only a trace of residue with a yellow fluorescence more typical of crude oil.

3-92

Comment:

The presence of bentonite and drilling additives made the analyses very difficult. An ionic balance could not be obtained, there being an excess of cations over anions. The explanation is believed to lie in special anions contributed by the additives, but not determined in the analyses. It is hoped, however, that the analytical figures given will prove to be of value in the appraisal of these waters.

John C. Kennedy

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GMG:MS

STATE LABORATORIES
MACARTHUR STREET
MELBOURNE, C.1

3-93

4th October, 1967

An. RM, 29/8

Report on Sample No.1189/67

Sample	:	Water
Locality	:	Offshore from Golden Beach (Well 1A)
Sender	:	The Manager, B.O.C. of Australia, 8-12 Bridge Street, SYDNEY. N.S.W.

Details of Sample:

One sample of water was received for analysis. This sample resulted from the testing of oil well Golden Beach No.1A.

Description of Sample

No. of sample	7
Date collected	13/8/67
D.S.T.	7
Interval	8632-8647; 8660-8680

It was requested that this sample be analysed and tested for traces of oil.

Lab. No.		1189
Sample No.		7
Results:		Parts per million
Total solids in solution		8600
Chloride	(Cl)	3564
Carbonate	(CO_3)	41
Bicarbonate	(HCO_3)	1294
Sulphate	(SO_4)	379
Calcium	(Ca)	46
Magnesium	(Mg)	11
Sodium	(Na)	3330
Potassium	(K)	107
Iron-Soluble	(Fe)	1.3
Total hardness (as $CaCO_3$)		161
pH		8.1
Specific Resistance 21°C		81 ohmcm.
Specific Gravity		1.008

3-94

Extraction of the ligher surface layer obtained on centrifuging this sample yielded a small amount of residue which displayed a yellow fluorescence, apparently of a crude oil.

Comment:

The presence of bentonite and drilling additives made the analyses very difficult. An ionic balance could not be obtained, there being an excess of cations over anions. The explanation is believed to lie in special anions contributed by the additives, but not determined in the analyses. It is hoped, however, that the analytical figures given will prove to be of value in the appraisal of these waters.

John G. Kennedy

Senior Chemist,
Mines Department.

3-95

Extraction of the ligher surface layer obtained on centrifuging this sample yielded a small amount of residue which displayed a yellow fluorescence, apparently of a crude oil.

Comment:

The presence of bentonite and drilling additives made the analyses very difficult. An ionic balance could not be obtained, there being an excess of cations over anions. The explanation is believed to lie in special anions contributed by the additives, but not determined in the analyses. It is hoped, however, that the analytical figures given will prove to be of value in the appraisal of these waters.

John G. Kennedy
for BHS
Senior Chemist,
Mines Department.

3-96

PETROLOGY REPORTS

3-97

GEOLOGICAL SURVEY OF VICTORIA

Report to B.O.C. of Australia Ltd.

PETROGRAPHIC DESCRIPTION OF SELECTED SIDEWALL CORES FROM BETWEEN 7997 AND 9220 FEET, GOLDEN BEACH 1A WELL

5th October, 1967

J. Barry Hocking

3-98

CONTENTS

3-99

INTRODUCTION

Preliminary

Nine thin-sections of Golden Beach 1A sidewall cores - from 7997, 8049, 8321, 8644, 8724, 8813, 9105, 9106 and 9108 feet respectively - were submitted by B.O.C. of Australia Ltd. An additional two thin-sections were prepared by the Victorian Mines Department from sidewall cores at 9210 ft. (V.M.D. Slide No.9331) and 9220 ft. (V.M.D. Slide No.9322).

During the examination of the sandstone thin-sections three other thin-sections were selected for a brief comparative study. These were from 7110-12 ft., Golden Beach West 1 (B.H.P. Slide No. M.1616); 6774 ft., Barracouta A-1 (V.M.D. Slide No. 9127); and 354 ft., V.M.D. Boolarra 4 (V.M.D. Slide Collection, uncatalogued).

Acknowledgements

Dr. D. Spencer-Jones, Mr. G. Bell and Mr. K.Bowen (Victorian Geological Survey) made helpful suggestions regarding the thin-section of the sample from 9220 ft. A rapid x-ray diffraction analysis of this same sample was carried out by Mr. Peter Darragh of C.S.I.R.O. Applied Mineralogy, Fishermens Bend, and a chemical analysis was made by Spectrometer Services Pty. Ltd., North Melbourne.

Permission was granted by the General Manager of Hematite Petroleum Pty. Ltd. for the writer to examine selected thin-sections from their collection, including B.H.P. Slide No. M.1616.

3-100

1. SILICEOUS MUDSTONE

S.W.C. at 9220 ft.

In a preliminary note the writer advised that this rock was a strongly weathered fine-grained acid volcanic, very tentatively named a rhyolite. Its unusual texture and unique e-log characteristics tended to distinguish it from the associated fine-grained sedimentary rocks. A subsequent more detailed investigation, plus comparative studies, now indicate it to be a siliceous mudstone.

1.1 Hand Specimen

The sidewall core consists of a light grey clay which encloses angular fragments of a harder material, also light grey in color, of seemingly identical composition. The largest fragment is ¾ in. long and, together with some of the others, has a partly polygonal outline which probably results from weathering and shrinkage. In fact the texture of the rock is reminiscent of the 'C' horizon of a soil profile.

1.2 Thin Section

A thin-section cut from one of the harder fragments shows it to be composed of fine to very fine sand and silt sized grains loosely scattered through a matrix of cryptocrystalline silica which encloses thin elongate clay mineral laths possessing rather unusual shapes.

The sand and silt grains include quartz (only 1%) of up to 0.2 mm; the grains are angular but rarely euhedral. Rare aggregate quartz grains are suggestive of a granitic (or gneissic) origin. One quartz grain contained a needle-like rutile inclusion, but most are inclusion-free.

Angular grains of potash and plagioclase feldspar occur in sparing amounts. The former is orthoclase, which may be partially altered to kaolinite, whereas the latter consists of fresh oligoclase or andesine.

The remainder of the coarser particles are composed of trace amounts of metamorphic rock fragments (metaquartzite and quartz-mica schist); fine-grained sedimentary rock fragments; brown devitrified volcanic glass; deformed and partially altered muscovite; irregular patches of pale-green ?chlorite; angular-euhedral to slightly rounded apatite, zircon and tourmaline; and calcite and leucoxene (refer below).

3-101

Leucoxene is relatively common as shapeless brown stains of up to 0.5 mm size scattered throughout the matrix; these stains give the rock a speckled appearance in hand specimen. It occasionally forms a coating on sand-sized grains.

Sand-sized calcite aggregates are not uncommon. They appear to form a secondary cement and are sometimes seen to partially enclose the matrix laths.

The matrix constitutes the bulk of the rock and is dominated by cryptocrystalline silica with the texture of chert. In addition there are numerous laths of doubtful composition. Though rarely more than 1/80 mm. across, the laths are frequently elongate (e.g. 0.15 mm). Apart from being straight or slightly curved, they possess a variety of shapes including those which are prong-like and cellular. One example of the latter is a bicellular structure which, by coincidence, very closely resembles an under-sized planktonic foram. The laths generally have a vermicular habit along their length, and are frequently also bilamellar or trilamellar. They show no preferred orientation across the thin-section, although they may be very locally sub-parallel.

The lath material appears to be a clay mineral with most of the properties of kaolinite; however, in places it possesses birefringence ranging up to low second order, which is not so with kaolinite. The x-ray results indicate the presence of kaolinite in the rock, although the writer would prefer to be non-committal about classifying the mineral at this stage. Some of the laths have been partially replaced by the cherty silica of the matrix. They therefore tend to be partially ghost-like and completely vanish upon extinction.

The origin of the laths is somewhat of a mystery. Their unusual shapes and random orientation tend to discount the possibility that they were originally feldspar laths of a volcanic rock or that they are the <u>in situ</u> authigenic products of soil formation. Their texture does suggest an authigenic origin, however, and the only explanation the writer can offer is that they are detrital remnants of the authigenic chlorite commonly found in the typical Strzelecki Group arkoses (Edwards & Baker, 1943). They have obviously not been transported far, however. Texturally they closely resemble much of the chloritic pore-fill of the arkoses, although compositionally they differ. If the clay mineral of the laths is indeed kaolinite, then the above explanation remains feasible, since kaolinite is one of the most common alteration products of chlorite.

The cherty matrix silica was probably formed during diagenesis. Apart from partially replacing the laths, it has apparently cemented them before subsequent compaction had the opportunity to produce a preferred orientation. There are also occasional relict grains (e.g. ?feldspar) now replaced by chalcedony and/or microcrystalline quartz. In one instance the latter displays a crude radial extinction pattern. Other shapeless aggregates of microcrystalline quartz, which is slightly coarser-grained than the cherty matrix, are randomly distributed throughout the thin-section.

The matrix also contains a small but significant amount of sericite and probably some clay-sized kaolinite. It is very difficult to determine whether any detrital quartz mud is present.

Perhaps the strongest evidence for this rather atypical rock being classified as sedimentary is the presence in it of limited amounts of brown-black carbonaceous material, both as shapeless grains of up to 0.4 mm. diameter and as elongate stringers of up to 0.8 mm. length.

1.3 X-Ray Analysis

X-ray diffraction of both the clay and the partially weathered fragments which it encloses showed that they have identical composition. There is an apparent high proportion of quartz; however, one should not overlook the possibility that the high quartz response results from perfection of crystallinity rather than abundance, although the microscopic examination tends to discount this possibility.

Also detected, but in apparently much lesser quantities, are kaolinite and 'mica', the latter probably being a true mica rather than a hydrous mica. Again the microscopic examination suggests or confirms these findings.

No montmorillonite or chlorite were detected.

1.4 Chemical Analysis

The chemical analysis (Table 1) proves to be of no particular practical value. However, it is interesting to note how closely it resembles not only that of a Strzelecki Group shale, but also a randomly chosen analysis of a 'typical' rhyolite (although the K_2O value is noticeably higher in the latter).

3-103

TABLE 1. Chemical analysis of a hard fragment from a sidewall core at 9220ft, Golden Beach 1A well. Two other analyses are provided for comparison. All three are calculated on a dry basis.

....	1.	2.	3.
SiO_2	66.90	66.21	67.65
Al_2O_3	12.90	19.62	15.36
Fe_2O_3	6.80	4.60	4.68
FeO	n.m.*	....	0.54
MgO	1.35	1.36	0.88
CaO	0.88	1.81	1.66
Na_2O	0.71	2.09	1.35
K_2O	2.35	3.58	6.96
P_2O_5	n.m.	....	0.18
rest	n.m.	...	0.74
TOTAL	92.02	99.27	100.10

1: Golden Beach 1A, 9220 ft. Analysis by Spectrometer Services Pty. Ltd., North Melbourne.

The following were not analysed for: sulphate (incl. S), carbonate (incl. C), chloride, and phosphate (incl. P); hence the total is noticeably deficient.

Less than 0.01% MnO was detected.

The following were detected in trace amounts: Zr, Va, Sn, Cr, Cu, and Zn; there was no Pb.

2: Strzelecki Group shale, Outtrim Colliery, South Gippsland. Adapted from Table 6, Edwards & Baker (1943)

3: 'Typical' rhyolite, Cerro Mercado, Durango, Mexico. Adapted from Table 134, A Descriptive Petrography of the Igneous Rocks, Vol.II, by A. Johannsen (1941).

* not measured

1.5 Lithostratigraphy and Genesis

As mentioned, the 9220 ft. sample is rather unique. Compared with thin-sections of Strzelecki Group mudstones and shales (namely those described by Edwards & Baker, 1943, and now stored by the Victorian Mines Dept.), it is perhaps superficially similar but differs in four significant ways:

(i) it contains a high proportion of secondary silica;
(ii) it possesses the unusually shaped clay mineral laths;
(iii) the matrix is largely lacking in fine-grained argillaceous material; and
(iv) it lacks the disseminated carbonaceous matter which is prevalent in many of the Strzelecki Group lutites.

It is unfortunate that samples of the sandstones below 9220 ft. were not available for thin-sectioning. The tentative conclusion drawn from those above this depth (refer Part 2 of this report) is that they are post-Strzelecki Group. Consequently the siliceous mudstone may also be post-Strzelecki, or alternatively it may form the uppermost bed of the group.

As far as genesis is concerned, the limited number of sand and silt sized particles are derived from igneous (intrusive and extrusive), metamorphic and reworked sedimentary sources. The clay mineral laths are inferred to be of reworked sedimentary origin. The source of the secondary silica and its mode of mobilisation is not known however.

The weathering exhibited in the hand specimen would seem to be largely one of partial physical disaggregation which succeeded the silica cementation.

2. SANDSTONES

S.W.C.'s at 7997, 8049, 8321, 8644, 8724, 8813, 9105, 9106, 9108 and 9210 ft.

Each of these sidewall cores consists of muddy, and often partially calcareous, sandstone. The qualitative and quantitative aspects are discussed below and the latter outlined in Tables 2 & 3 and Fig. 1.

2.1 Mineral Composition

Quartz: Quartz is the most common mineral. It occurs (i) as single grains, (ii) as two- or three-grain aggregates, (iii) in metamorphic rock fragments, (iv) as a secondary matrix constituent and (v) as fine detrital grains associated with the argillaceous matrix. The most abundant type of quartz are the single detrital grains. There are some indications in the deepest samples of rare anhedral overgrowths. Extinction of the quartz grains ranges from straight to semi-composite, but is generally moderately undulose. Vacuoles, either scattered or as chains, are infrequent; so too are inclusions (e.g. zircon, rutile). In the second type of quartz each grain of the aggregate, which is of medium sand size or sometimes coarser, is welded along virtually straight boundaries. These aggregates are probably from a nearby granitic (or perhaps gneissic) source. The remaining quartz types are discussed under 'Metamorphic Rock Fragments' and 'Argillaceous and Siliceous Matrix'.

Feldspar: Of the feldspars, the potash group is with one exception the dominant variety. An independent, more detailed count than that of Table 2 indicates that the potash-plagioclase ratio lies between 1:1 (9108 ft.) and 9:1 (7997 ft.) though each of these values is atypical - the average is actually closer to 3:1. The potash group is represented largely by orthoclase together with uncommon perthite and occasional microcline. In the basal sandstone at 9210 ft. some of the angular-euhedral orthoclase grains possess a partially altered core surrounded by a narrow rim of fresh orthoclase which is quite possibly authigenic. Micrographic quartz intergrowths also occur in some orthoclase grains, a feature which is typical of pegmatites.

The plagioclase feldspars are invariably in the calcic oligoclase to sodic andesine range. Albite twinning is typical.

The feldspars range from fresh to strongly altered. Alteration products are kaolinite (particularly in the potash group) and sericite (particularly in the plagioclase group). Strongly kaolinised feldspar often has a dusky brown coloration and tends to be granulated and disaggregated so that it gradually becomes indistinguishable from the matrix. It is quite obvious, therefore, that some at least of the argillaceous matrix of these sandstones is the product of feldspar alteration. Where the feldspar comes into contact with calcite cement, the latter has often attacked and partially or completely replaced it.

Metamorphic Rock Fragments (MRF's): These are dominated by metaquartzite with subordinate quartz-mica schist and quartz schist. Each is a chemically and physically stable variety.

Sedimentary Rock Fragments (SRF's): One of the most difficult aspects of the present study was the differentiation of the fine-grained SRF's from the muddy matrix - this was unfortunately made largely so by the poor quality of most of the thin-sections. For this reason it should be realised that the figures given for 'SRF's' and 'Mud' in Table 2 are not necessarily accurate. The SRF's are found to consist primarily of shale (which is sometimes carbonaceous), argillaceous mudstone, and siliceous mudstone and siltstone; any of these may be partially sandy.

Volcanic Rock Fragments (VRF's): The two identifiable types of VRF were (a) basic and/or intermediate lavas, including andesite, and (b) pale brown or pale green grains of what is assumed to be devitrified glass.

Chert: True chert is present in trace amounts only (Table 2). In addition, however, there is a small but significant amount of chert-like material, particularly in the deepest samples, which appears to be identical to the matrix of the siliceous mudstone at 9220 ft. This material has been classified either as SRF's or mud matrix, depending largely on its shape. In addition to chert, rare grains of chalcedony are encountered.

'Granitic' Rock Fragments (GRF's): In addition to the quartz aggregates of probable granitic origin (which have been grouped under 'Quartz' in Table 2) there are also occasional aggregates of quartz-potash feldspar, quartz-plagioclase feldspar, quartz-mica and potash-plagioclase. These are of apparent granitic, and perhaps aplitic (where finer-grained) origin, though they are too few in number to list in Table 2.

3-107

<u>Amphibole</u>: Ine one thin-section only, namely that of the deepest sample at 9210 ft., there is a single grain of amphibole. It is shapeless, with very pale green color, negligible pleochroism and characteristic intersecting cleavage (i.e. a basal section). The mineral could not be classified precisely.

<u>Micas</u>: Muscovite and biotite are present in roughly equal proportions. Frequently they are altered. Muscovite is occasionally completely replaced by kaolinite, whereas biotite is either bleached or partially altered to chlorite. Physical deformation is very common in the larger mica grains and may proceed to the extent of fragmentation into shreds.

<u>Chlorite</u>: Only the basal sample at 9210 ft. possesses more than trace amounts of chlorite which occurs as pale green, sub-rounded grains and rare patches in the matrix, as well as an alteration product of biotite. The chlorite is sometimes oxidised to a material with a pale brown coloration.

<u>Heavy Minerals</u>: Though not indicated in Table 2, granular heavy minerals occur in trace amounts. They consist of green brown tourmaline (rarely pale blue), colorless zircon and, in the sample at 8813 ft., honey-colored or very pale green epidote. Somewhat tattered ilmenite is rare although its alteration product, namely leucoxene, is common as a stain (refer 'Iron Staining').

<u>Argillaceous & Siliceous Matrix</u>: These are grouped as 'Mud' in Table 2.
(a) <u>Mud</u>:- The muddy matrix is composed of varying and unmeasured proportions of kaolinite, sericite and quartz, with supplementary traces of chlorite. The kaolinite is usually granular, but occasionally possesses vermicular habit. As mentioned above, a small proportion of the quartz is the cherty variety which is also encountered at 9220 ft.
(b) <u>Secondary Quartz</u>:- In many of the sandstones, but particularly the basal one at 9210 ft., there is a noticeable amount (9% at 9210 ft.) of interlocking silt-sized quartz. This material resembles fine-grained metaquartzite, except that it lacks the external shape of detrital grains and instead irregularly occupies former pore spaces between the framework particles. The fact that it often blends imperceptibly into adjacent quartz grains supports the fact that it is secondary in origin and that some re-solution has occurred. The mechanism is unknown,

however, though it is apparent that it was an early-stage phenomena which took place while the sand was only partially compacted. It has been noted, too, that this secondary quartz sometimes surrounds fresh euhedral feldspars, and has obviously protected them from alteration.

Calcite: Calcite is not common except in the lowest sandstone sample at 9210 ft. (Table 2). It usually appears as disconnected sand-sized aggregates, though at 9210 ft. it forms an interlocking network in portions of the thin-section. The fact that it is a secondary cement is witnessed in the 9210 ft. sample where it forms a narrow ($\frac{1}{2}$ mm. across) vein transecting the thin-section; wispy offshoots of this vein tend to heal fractured quartz grains. In addition, the calcite is occasionally found to partially enclose patches of the secondary quartz described above. The attack of feldspar grains by the calcite, which is also documented above, further supports the assumption.

In two samples, at 8724 and 7997 ft., rare, shapeless aggregates of very fine-grained, dusky brown carbonate were observed. The writer believes this to be siderite.

Iron Staining: Leucoxene is relatively common as a secondary stain in the Golden Beach 1A sandstones, as it is in the siliceous mudstone at 9220 ft. It occasionally coats framework grains, but is more common as a patchy stain of fine-grained SRF's and portions of the mud matrix. It may also penetrate and stain muscovite. Traces of leucoxene that are located in hairline fractures in the 9210 ft. sample suggest its mobilisation by means of connate waters during or shortly after diagenesis. Mineral relationships make it further apparent that the leucoxene staining preceded the crystallisation of both the secondary quartz and calcite cements.

Carbonaceous Material: Brown-black carbonaceous material occurs either as individual 'grains' or as elongate, sub-parallel shreds in most samples. It tends to be more common in the more muddy samples (Table 2).

Miscellaneous: Amongst the oddments recognised in the sandstone thin-sections are:

1. A single grain of grass-green ?glauconite at 9210 ft.
2. A possible globigerinid-type foram. at 9105 ft. The 'test' material is very obscure; the 'chambers' are filled with a non-calcareous mud which is stained by leucoxene.

3. Two calcareous fossils at 8724 ft., the larger one being 0.45 mm. across. Their outline is either circular or sub-ellipsoidal. One of them possesses gentle external crenulations as well as a limited number of radial septae. It also has a core of pyrite, which is the only detected occurrence of the mineral in all of the Golden Beach 1A samples examined. It is not possible to classify the fossils.

2.2 Texture and Porosity

Grain Size: In the samples examined, the maximum grain size of quartz, which is the most common mineral, ranges from 0.6 to 1.4 mm. and the mode ranges from 0.15 to 0.5 mm. Most other framework grains are of roughly equivalent sizes. All the sandstones are moderately to poorly sorted.

Grain Shape: The shape of the sandstone particles tends to be somewhat variable. Quartz ranges from angular to rounded, but is most frequently sub-angular (though rounding is slightly more prevalent in the samples at 8321 and 8049 ft.); it is sub-equant to sub-elongate. A small proportion of the angular grains are euhedral, though fragmented. Feldspars tend to be angular and euhedral when fresh, but are subangular to sub-rounded when weathered. MRF's have similar shapes to quartz whereas SRF's, which are generally softer, are frequently sub-rounded. VRF's and chert are often sub-rounded to sub-angular. With the heavy minerals, euhedral, broken euhedral and partially rounded (water-worn) shapes are all encountered; the former two are the most frequent, however, suggesting that they are derived directly from igneous rocks.

Maturity: According to the classification of Folk (1951), the sandstones are texturally immature.

Packing & Porosity: In the deeper samples, where the proportion of matrix is least, the framework particles tend to exhibit moderately close packing, and planar grain contacts are not uncommon. In the shallower samples there is more of a tendency for the framework grains to be suspended in the matrix. Several factors are responsible for the low porosity of the sandstones:
(i) the matrix tends to fill the integranular pore space;
(ii) as a result of compaction, micas and the softer sedimentary rock fragments yield and more closely fit the pore outlines; and
(iii) secondary calcite and silica fill most of the remaining voids.

The writer doubts that the percentage of pores shown in Table 2 gives a true representation of porosity. The actual values are probably somewhat more.

Fabric: In some samples there is a weak indication of fabric, presumed to be due to stratification, that is produced by the sub-parallel alignment of shreds of carbonaceous material and of elongate coarser-grained quartz and mica grains.

2.3 Compositional Trends

(a) General: Table 2 reveals two pronounced upward trends in the proportion of two of the major sandstone constituents. With the exception of the 9210 ft. sample, these trends are:
(i) a steady decrease in quartz content; and
(ii) a corresponding increase in the argillaceous and siliceous matrix (i.e. 'mud').

The 9210 ft. sample appears to differ because of its close association with the siliceous mudstone bed (that yielding the 9220 ft. sample) which immediately underlies it.

The other minor variations in composition are embraced by the limits of error involved in the point counting process used to construct Table 2 and must therefore be taken as meaningless.

(b) Selective: Table 3 and Fig. 1 have been prepared by re-calculating the values of Table 2 to exclude all but the dominant framework components. The latter are grouped according to Folk (1954). These values are thus more indicative of provenance trends, whereas bulk percentages tend to be influenced by localised depositional and diagenetic environments.

The observed upward trends are:
(i) a very gentle increase in quartz and chert;
(ii) a negligible variation in feldspar and igneous rock fragments; and
(iii) an increase in MRF's and mica.

The last is the most pronounced trend and may eventually prove to be of some lithostratigraphic significance.

2.4 Classification

Fig.1 is a QFM diagram - the components are explained in Table 3 - based on Folk (1954). The main disadvantage of this classification scheme is that SRF's are excluded, though this does not prove to be a serious disadvantage in this case.

It is found that all of the Golden Beach 1A samples are subgreywackes. Two of them are actually feldspathic subgreywackes, and one lies on the boundary between the two.

2.5 Provenance

Representatives of all major provenance groups, namely igneous (both intrusive and extrusive), metamorphic, and reworked sedimentary, are evident in the Golden Beach 1A sandstones. It would appear that a major contribution is derived from granites and from texturally immature sediments with a lesser influence due to metamorphic rocks and a negligible influence due to volcanic rocks.

2.6 Depositional Environment

The textural immaturity of the sandstones suggests deposition under relatively low energy conditions such as might be expected on a floodplain.

The occurrence of shreds of carbonaceous material also supports this possibility. However the traces of ?glauconite and rare fossils raise the possibility of marine influence, though it may have only been faint and/or temporal.

2.7 Lithostratigraphic Conclusions

The Golden Beach 1A sandstones differ considerably from the typical Strzelecki Group arkose of the South Gippsland Highlands described by Edwards & Baker (1943). An example of the composition of the latter, namely a sample from V.M.D. Boolarra 4, is presented in Tables 2 & 3 and Fig. 1.

A preliminary qualitative examination of so-called Strzelecki Group sandstones in wells in the Seaspray area indicates that they would fall between the arkose and feldspathic subgreywacke plots of Fig. 1; indeed, some appear to closely resemble the latter.

Two representative 'Upper Cretaceous' sandstones are plotted in Fig. 1 (see also Tables 2 & 3), and it is apparent that they differ from the Golden Beach 1A samples, but to a lesser extent than does the Strzelecki Group arkose. They have a lower feldspar percentage, and their M value is roughly identical to that of the uppermost Golden Beach 1A sandstones.

The 'Upper Cretaceous' sandstones are thus considered to be slightly more mature, chemically, and also slightly younger than the Golden Beach 1A sandstones. However, for convenience, the latter could be tentatively placed in the rock unit informally known as the Golden Beach Formation - that is until such time as a more reliable lithostratigraphic scheme is devised.

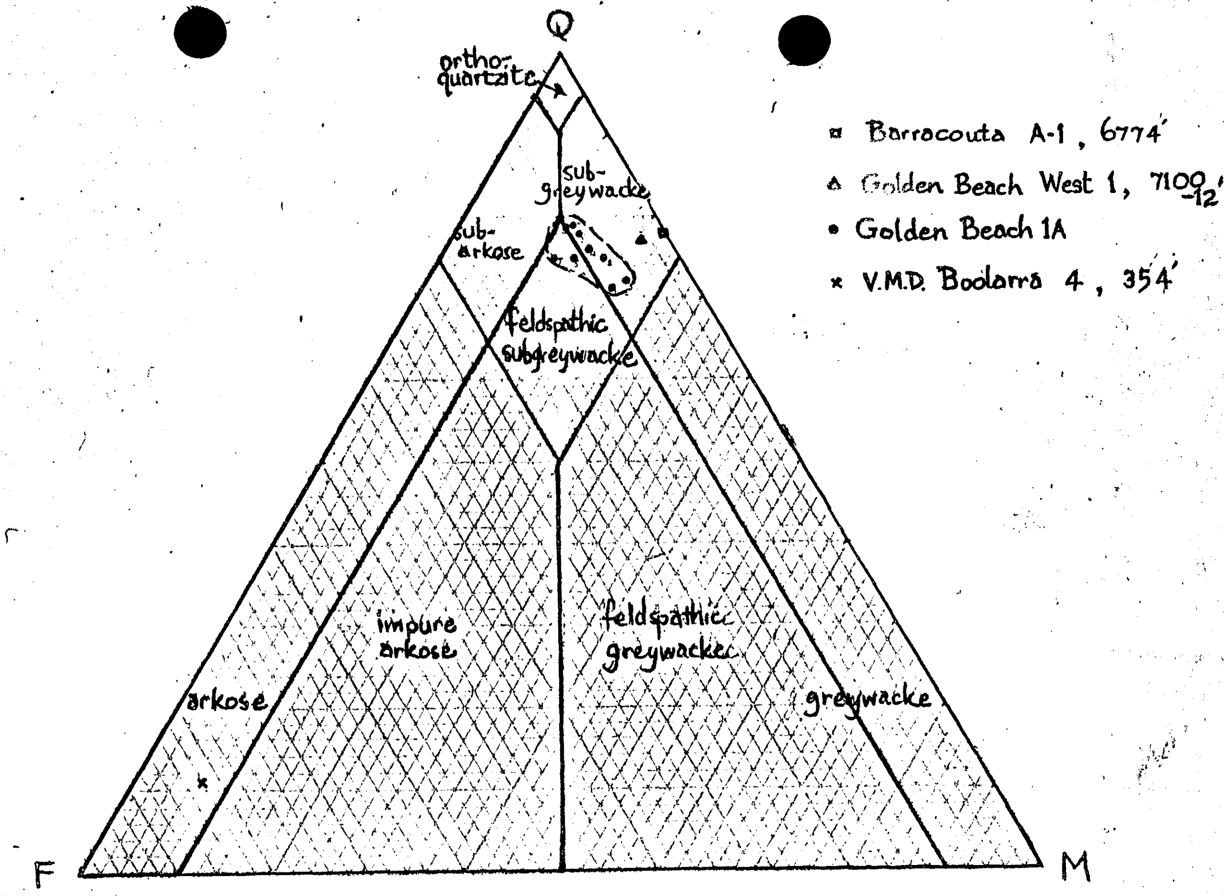

FIG. 1. A QFM diagram (Folk,1954) showing the close grouping of the Golden Beach 1A sandstone samples. A typical Strzelecki Group arkose and two 'Upper Cretaceous' sandstones are plotted for comparison.

WELL NAME	DEPTH	Qz.& Cht. (Q)	Feld. & IRF's (F)	MRF's & Mica (M)	TOTAL
Golden Beach 1A	7997 ft	71	9	20	100
" " "	8049 ft	75	8	17	100
" " "	8321 ft	72	7	20	99
" " "	8644 ft	76	9	15	100
" " "	8724 ft	75	11	14	100
" " "	8813 ft	79	9	12	100
" " "	9106 ft	75	13	12	100
" " "	9108 ft	78	9	13	100
" " "	9210 ft	79	10	11	100
Golden Beach West 1	7100-7112 ft	77	3	20	100
Barracouta A-1	6774 ft	78	negl.	21	99
V.M.D. Boolarra 4	354 ft	12	82	7	101

TABLE 3. Relative proportions of framework constituents, calculated on a matrix-free basis and grouped according to Folk (1954). These values are used in Fig. 1 above.

B.H.
Sept. 1967

WELL NAME	DEPTH (ft)	Qz.	Pot. feld.	Plag.	MRF	VRF	SRF	Cht.	Chlor.	Mica	Calc.	'Mud'	Carbs. mater -ial	Pores	TOTAL
Golden Beach 1A	7997	26	3	n.	8	n.	4	n.	n.	1	n.	57	1	n.	99
" " "	8049	30	3	n.	7	n.	2	n.	n.	n.	n.	52	6	n.	100
" " "	8321	37	3	n.	11	1	2	n.	n.	n.	n.	45	2	n.	101
" " "	8644	47	4	1	8	n.	4	n.	n.	2	3	30	1	n.	100
" " "	8724	45	6	1	7	n.	2	n.	n.	1	n.	37	n.	n.	99
" " "	8813	58	5	n.	8	1	4	n.	n.	1	n.	23	n.	n.	100
" " "	9106	57	8	2	8	n.	2	n.	n.	1	4	18	n.	n.	100
" " "	9108	57	2	4	8	1	2	n.	n.	1	3	20	n.	1	99
" " "	9210	38	3	1	4	1	3	n.	2	1	16	28	2	1	100
Golden Beach West 1	7100-12	19	n.	n.	5	n.	3	n.	n.	n.	35	33	3	n.	98
Barracouta A-1	6774	52	1	n.	10	n.	1	n.	n.	4	1	28	n.	4	101
V.M.D. Boolarra 4	354	6	13	7	4	28	2	1	25	n.	3	8	n.	3	100

TABLE 2. Approximate percentage values of constituents in the Golden Beach 1A sandstone samples and in three others chosen for comparison. Where a constituent is present, but in negligible amounts, the symbol 'n' is used.

REFERENCES

Edwards, A.B. & Baker, G., 1943. Jurassic arkose in southern Victoria. *Proc. Roy.Soc.Vic.*, 55(2): 195-228

Folk, R.L., 1951. Stages of textural maturity in sedimentary rocks. *Jour.Sed.Pet.*, 21: 127-130

Folk, R.L., 1954. The distinction between grain size and mineral composition in sedimentary rock nomenclature. *Jour.Geol.*, 62: 344-359

Barry Hocking

J.B. HOCKING,
Geologist

Copy handed to Alen Hamilton of Woodside on 4/8/67

PRELIMINARY PETROLOGICAL NOTE ON S.W.C. 13, ~~9220 FT.~~, GOLDEN BEACH 1A WELL

Macroscopic

The sidewall core consists of a light grey clay which encloses angular fragments of a harder material, also light grey in color, of seemingly identical composition. The largest fragment is ¾ ins. long and , together with some of the others, has a partly polygonal outline which probably results from weathering and shrinkage. In fact the texture of the rock is reminiscent of the 'C' horizon of a soil profile.

Microscopic (Sli. No. 9322)

Examination of one of the harder fragments reveals a very fine-grained volcanic rock with sand- and silt-sized phenocrysts randomly scattered throughout. The latter include 1.2% quartz (determined by point-counting); iron oxide replacements of ferro-magnesians, particularly ?ilmenite and leucoxene, which are themselves partially corroded; uncommon potash and plagioclase (oligoclase to andesine) feldspar, the former dominating; patches of granular calcite; muscovite; and heavy minerals such as apatite, zircon, tourmaline and magnetite.

The groundmass is dominated by microcrystalline silica. Also present are laths of clay mineral, commonly vermicular, which appears to be kaolinite. It is assumed that the clay has replaced original feldspar grains; in doing so it has sometimes taken on arcuate or even circular shapes. It is significant that in individual patches of the thin-section the laths are aligned, indicating the partial mobility of the rock before final crystallisation. Other than the clay laths, minor amounts of sericite are present. There is no volcanic glass.

X-Ray

X-ray diffraction of both the clay and the partially weathered fragments which it encloses showed that they have identical groundmass composition. There is an apparent high proportion of quartz; however, one should not overlook the possibility that that the high quartz response results from perfection of crystallinity rather than abundance, although the microscopic examination tends to discount this possibility. (CSIRO Applied Mineralogy, Fishermens Bend)

Also detected, but in apparently much lesser quantities, are kaolinite and 'mica', the latter probably being a true mica rather than a hydrous mica. Again the microscopic examination suggests confirms these findings.

No montmorillonite ~~(that is, bentonitic clay) was present.~~ or chlorite were detected.

Conclusions

The rock is a predominantly fine-grained, weathered acid volcanic (and not a tuff). On the basis of the approximate proportions of quartz and the inferred overall potash-plagioclase feldspar ratio, it is given the tentative name of rhyolite.

The rock differs considerably from the basic Older Basalts of lower Tertiary age which are found in South Gippsland. It also differs from the basic (or ?intermediate) volcanic of Jurassic or Permian age which was encountered in Duck Bay No.1 well. In fact the youngest known acid volcanics in Gippsland are the Upper Devonian lavas of the Eastern Highlands. Since a preliminary examination of the Golden Beach 1A wireline logs indicates that the volcanics are approximately 40 feet thick, and since they interrupt a seemingly conformable sedimentary sequence, it is highly unlikely that they are erosional remnants, either transported or in situ, of Upper Devonian lavas. A preliminary age determination by Dr. J.G. Douglas

../2

places them in the Lower Cretaceous.

J.B. HOCKING,
Geologist.

3.8.67

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3-118

PALAEONTOLOGIAL REPORTS

PALAEO

ALL COMMUNICATIONS SHOULD BE ADDRESSED
SECRETARY FOR MINES

TELEPHONE: 63 0321
JD/KR

3-119

DEPARTMENT OF MINES
TREASURY BUILDINGS
MELBOURNE, C.2
19th July, 1967.

RECEIVED
21 JUL 1967

Preliminary Palynological Examination of B.O.C. Golden Beach 1A Bore Cores

Side wall cores from the B.O.C. Golden Beach No. 1 1A Bore were treated by the hydrofluoric acid - Schulze's solution method, and the residues examined for acid insoluble microfossils.

Cores from 5793, 6462, 7249, 7543, 7603 and 7690 feet yielded few microfossils.

Cores from 5517, 7642, 7644 and 7692 feet contained microfloral assemblages, including Araucariacites, Podocarpidites, Microcachyridites, Cyathidites, Osmundacidites, Gleicheniidites, Ceratosporites, Proteacidites, Myrtaceidites and Triorites species. The youngest (5517 ft.) beds contained a greater percentage of Proteacidites pollens than the older beds.

This assemblage is younger than that found in Lower Cretaceous (Strzelecki Group) beds, and older than that of the Lower Tertiary coal measures. Although characteristic guide fossils are absent it appears to be Palaeocene - Upper Cretaceous in age.

Because the amount of core supplied was very small (none were over ¾" long), and all had to be thoroughly washed to remove mud contamination, the samples macerated were very small.

Acid insoluble B.O.C. Golden Beach 1A sidewall core (1st August 1967) residues were examined from the following samples :-

8088, 8874, 9016, 9096, 9282, 9399, 9462 and 9472 ft.

No diagnostic microfossils were obtained from the 8088 ft. sample. Very rare angiosperm pollen grains may be regarded as either contamination, or indication that the sample is of the lower-most Tertiary - upper-most Cretaceous age suggested for the beds examined in Report 1 (19/7/67).

Small possibly dinoflagellate organisms isolated from the 8874 and 9016 ft. samples may represent brackish or marine sedimentation, but their age is unknown. A few Cyathidites, Neoraistrickia, and Lycopodiumsporites sporomorphs however, suggest Cretaceous sedimentation.

The most useful assemblage isolated was from 9282 ft. where rare microplanktonic organisms including small Baltisphaeridium sp. were associated with large number of the colonial green alga Palambages Wetzel, with a lower Upper Cretaceous - Albian (Lower Cretaceous) range.

No diagnostic microfossils were obtained from the deepest (9472 ft.) samples examined, but isolated microfossils suggest that these also are of lower-most Upper Cretaceous - upper-most Lower Cretaceous (i.e. Middle Cretaceous) in age.

I consider that all these beds are probably younger than any outcrop Strzelecki Group Beds.

John Douglas
Senior Geologist

Preliminary Palynological Examination of B.O.C. Golden Beach 1A Bore

Samples (2)

Acid insoluble B.O.C. Golden Beach 1A sidewall core residues were examined from the following samples :-

8088, 8874, 9016, 9096, 9282, 9399, 9462 and 9472 ft.

No diagnostic microfossils were obtained from the 8088 ft. sample. Very rare angiosperm pollen grains may be regarded as either contamination, or indication that the sample is of the lower-most Tertiary - upper-most Cretaceous age suggested for the beds examined in Report 1 (19/7/67).

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// I consider that all these beds are probably younger than any outcrop Strzelecki Group Beds. //

John Douglas
John Douglas
Senior Geologist

Mr. Whiting

DEPARTMENT OF NATIONAL DEVELOPMENT

Bureau of Mineral Resources, Geology and Geophysics 3-120

MINUTE

64/869G

Subject:— B.O.C. GOLDEN BEACH NO. 1a WELL.

Assistant Director (Geology)

At the request from Burmah Oil Australia Ltd., Sydney, some sidewall cores from B.O.C. Golden Beach No.1a Well were sent to the Bureau of Mineral Resources by the Geological Survey of Victoria for palynological examination.

The samples yielded moderately to poorly preserved microfloras.

Sample No. 4480 (depth 9472 feet) contains *Cyclosporites hughesi* and *Lycopodiumsporites circolumenus* and is therefore of Neocomian to lowermost Albian age.

Sample No. 4479 (depth 9154 feet) yielded a poor microflora of uncertain age.

Sample No. 4478 (depth 9065 feet) and No. 4477 (depth 7932 feet) contain *Cicatricosisporites australiensis*, a confirmation that they are Cretaceous.

Sample No. 4477 (7932 ft) also contains *Crybelosporites striatus*, *Dictyotosporites speciosus* and *Contignisporites cooksonii*, so that it is most probably of Lower Albian age.

Discussion

1. Some marine acritarchs (*Micrhystridium sp.*) were encountered in samples No. 4489,4479 and 4478, not sufficient however to indicate that an open marine environment existed at the time of deposition.
2. Sample No. 4477 showed no traces of Upper Cretaceous microfloras but contains some angiospermous pollen types which we regard as Tertiary contamination.

1 SEP 1967

(D. BURGER)
(Palynologist)

3-121

Micropalaeontological Report on Golden Beach No.1A Well

The samples listed below were submitted for micropalaeontological examination by B.O.C. of Australia Limited. They were examined during the period between 11th July and 26th July, 1967. NFF means that no foraminifera were found. The rare foraminifera and bryozoal and echinoid fragments occasionally present in the sidewall cores are obviously contaminants (apart, of course, in cores at 1986', 1992' and 1995'); besides other considerations, their generally yellowish orange colour and size (one to several mm) do not enable them to be regarded as being in situ in the predominantly dark coloured and fine-grained sediments sampled.

Sidewell cores

Depth 1986'	rich foraminiferal fauna, including Globigerina linaperta, G. angiporoides and Chiloguembelina cubensis. This fauna represents A.N. Carter's faunal unit 3, which is equivalent to D.J. Taylor's Zonule K; the age is uppermost Eocene.
1992'	As above, but less rich fauna
1995'	As above, but less rich fauna
2008'	fish teeth
2224'	NFF (except a few contaminant Miocene foraminifera)
3362'	NFF
3365'	NFF
5517'	NFF
5518'	NFF
5593'	NFF
5604'	NFF (except a few contaminant Miocene Elphidium sp.)
5609'	NFF (except a few contaminant echinoid fragments)
5791'	NFF
5793'	NFF
6462'	NFF
7249'	NFF
7543'	NFF
7545'	NFF
7603'	NFF
7605'	NFF
7642'	NFF
7644'	NFF
7690'	NFF
7692'	NFF
7932'	NFF
7933'	NFF
8025'	NFF
8088'	NFF
8246'	NFF (except a contaminant Robulus sp.)
8248'	NFF
8495'	NFF
8607'	NFF
8609'	NFF
8708'	NFF
8784'	NFF
8785'	NFF
8874'	NFF
8966½'	NFF
9016'	NFF
9019'	NFF
9065'	NFF
9072'	NFF
9096'	NFF
9152'	NFF
9154'	NFF
9280'	NFF
9282'	NFF (except a contaminant globigerinid fragment)

Depth 9356' NFF
9358' NFF (except a contaminant bryozoal fragment)
9391' NFF
9399' NFF
9462' NFF
9472' NFF

Cuttings

Samples of cuttings, collected very 10' between 7450' and 7710', were also examined (fossils had been reported from a part of this interval). No fossils belonging to the sampled strata were found; in several samples (e.g. 7570'-7580' and 7630'-7640') a few typical Miocene foraminifera (Amphistegina cf. lessonii and Cibicides) as well as bryozoal and echinoid fragments were present. These are obviously contaminants.

Signed (Dr. C. Abele)
Geologist
6th September, 1967

BASIN GIPPSLAND DATE

WELL NAME GOLDEN BEACH -1 ELEVATION

AGE	PALYNOLOGIC ZONES	HIGHEST DATA Preferred Depth	Rtg.	Alternate Depth	Rtg.	2 way time	LOWEST DATA Preferred Depth	Rtg	Alternate Depth	Rtg.	2 way time
IG- IO.	P. tuberculatus										
	U. N. asperus										
EOCENE	M. N. asperus	2500	3								
	L. N. asperus						2900	3			
	P. asperopolus										
	U. M. diversus										
	M. M. diversus										
	L. M. diversus	3290	3				3490	3			
PALEOCENE	U. L. balmei	4060	3				4060	3			
	L. L. balmei										
	T. longus	5160	3				5160	3			
CRET[illegible]EOUS	T. lilliei	5520	3				5700	3			
	N. senectus	5750	4				6100	4			
	C. trip./T.pach.	6460	4								
	C. distocarin.						6770	4			
	T. pannosus										
EARLY CRETACEOUS											
PRE-CRETACEOUS											

COMMENTS: All ages based on cuttings.
Probable non-marine dinoflagellates at 4060 feet; otherwise entirely non-marine.

RATINGS:
0; SWC or CORE, EXCELLENT CONFIDENCE, assemblage with zone species of spores, pollen and microplankton.
1; SWC or CORE, GOOD CONFIDENCE, assemblage with zone species of spores and pollen or microplankton.
2; SWC or CORE, POOR CONFIDENCE, assemblage with non-diagnostic spores, pollen and/or microplankton.
3; CUTTINGS, FAIR CONFIDENCE, assemblage with zone species of either spore and pollen or microplankton, or both.
4; CUTTINGS, NO CONFIDENCE, assemblage with non-diagnostic spores, pollen and/or microplankton.

NOTE: If a sample cannot be assigned to one particular zone, then no entry should be made. Also, if an entry is given a 3 or 4 confidence rating, an alternate depth with a better confidence rating should be entered, if possible.

DATA RECORDED BY: A.D.P. DATE Feb. 1973

DATA REVISED BY: A.D.P. DATE Jan. 1975

FORM No R315 12/72

3-123

LOG ANALYSES

LOGS

3725

GOLDEN BEACH NO.1A

SCHLUMBERGER LOG INTERPRETATION COMMENTS (RUN NO. 1)

By: T.C. Earls

1. Mr. Strecker's interpretation is attached herewith.

2. The apparent log anomalies at the top of the pay sand are explained by increased shaliness. Higher formation water salinity could also be a contributing factor.

3. Application of shaly sand techniques gives a marked gradation in porosity values from about 14% at the top of the pay sand to over 35% towards the base. The porosities derived by this method are appreciably lower than these previously calculated for the upper part of the sand (ref. memo dated 26th May).

4. Water saturations are consistent with previous calculations.

5. I agree with Strecker's conclusion that there is an increase in shaliness towards the top, however I feel his porosity values are probably pessimistic. (He admits that the derived P values are high).

   The vertical segregation mechanism used to explain the apparent conflicting SW versus derived SGN and RHS gradients is not consistent with his findings. The increase of shaliness (and decrease of permeability) at the top of the interval would tend to offset the gravitational effect. Such an effect would only be expected to occur in homogeneous and highly permeable formations.

6. With regard to Strecker's recommendations, in this particular instance a fresher mud may have helped at the top of the pay interval only. Subsequent sections to be logged may have higher formation water salinities and we must try to avoid situations where Rmf approaches Rw. The possibility of keeping our mud less conductive will be investigated.

   The problem of borehole diameter will of course solve itself in subsequent drilling.

(Signed) T.C. Earls
6th June 1967.

14 DEC 1982

HORIZON IDENTIFICATION

Well Depth (below M.S.L.) / Two – Way Seismic Time Comparison (seconds)

FROM FINAL INTERPRETATION REPORT GH-82A VOL 1.

WELL NAME LINE & SHOT POINT	WATER BOTTOM **	TOP LATROBE	I INTRA LATROBE	II INTRA LATROBE	III INTRA LATROBE	TOP STRZELECKI	TOTAL DEPTH
Albatross-1 GB79-117 S.P. 117	-43m/.057	-697m/.640	N/A	N/A	N/A	-732m/0.690	-1247m/
Baleen-1 GB81-31 S.P. 300	-55m/.073	No Latrobe Top Iron Nodule Band @ -644m/.645	Not Present	Not Present	Not Present	*Geological Pick -697.5m/0.696 Seismic Pick /0.730	* -1020.5m/0.922
Emperor-1 GB79-117 S.P. 750	-51m/.068	-1515m/1.180	N/A	N/A	/1.285	-1827m/1.380	-1985m/
Flathead-1 GB81-41 S.P. 228	-53m/.070	No Latrobe as described by H.O.A.L.	Not Present	Not Present	Not Present	*Geological Pick -465m/0.492 Seismic Pick /0.530	* -1056m/.910
Gannet-1 GB79-120 S.P. 100	-38m/.050	-665m/0.610	N/A	N/A	N/A	Geological Pick -696m/0.640 Seismic Pick /0.675	-1449m/
Golden Beach-1A GB81-1 S.P. 585	-19m/.025	-633m/0.592	-908m/0.847	-1086m/.960	N/A	N/A	-2928m/
Sperm Whale-1 GB81-26 S.P. 130	-55m/.072	* -795m/0.741	Not Present	Not Present	Not Present	*Geological Pick -937m/0.849 Seismic Pick /0.860	* -1407m/1.170
Sweep-1 GB79-165 S.P. 770	-69m/.092	-750m/0.738	N/A	N/A	N/A	Geological Pick -827m/0.790 Seismic Pick /0.800	-900m/0.825
West Seahorse-1 GB81-1A S.P. 152.5	-40m/.052	Top of first Coal * -1386m/1.126 Seismic Pick /1.110	* -1543m/1.246	N/A	N/A	N/A	* -2480m/1.750
West Seahorse-2 GB81-1A S.P. 111.1	-39m/.051	Top of first Coal * -1407m/1.148 Seismic Pick /1.120	* -1556m/1.260	N/A	N/A	N/A	* -2040.5m/1.562
Whale-1 GB81-41 S.P. 134.9	-52m/.068	No Latrobe Top Ferriginous unit @ -429m/0.483	Not Present	Not Present	Not Present	* -463.6m/0.520	* -800.6m/.781

* Verified by Checkshot Survey

** Computed Time (Water Reflection Muted)

Table 5

L[illegible] AND INTERPRETATION OF ELECTRICAL LOG[illegible] 3-124

Log	Run No	Interval.
Induction Electrical Log:		
	1	473 - 1718 ft.
	2	1664 - 4056 ft.
	3	4011 - 6460 ft.
	4	6275 - 7914 ft.
	5	7700 - 9545 ft.
Laterolog:		
	1	1554 - 4053 ft.
Microlog/Caliper:		
	1	473 - 1719 ft.
	2	7700 - 9545 ft[illegible]
Micrololog/Microlaterolog/Caliper:		
	1	1665 - 4054 ft.
	2	4011 - 6459 ft.
	3	6250 - 7903 ft.
Formation Density Log		
	1	1664 - 4057 ft.
	2	4011 - 7900 ft (uncompensated)
	3	7700 - 9545 ft.
Gamma Ray - Neutron Log:		
	1	1664 - 4056 ft.
	2	8000 - 9148 ft (inside casing and with CC1 log)
	3	1790 - 2297 ft.
Borehole Compensated Sonic/Gammar Ray Log:		
	1	4011 - 7888 ft.
	2	7700 - 9528 ft.
Borehole Compensated Sonic Log:		
	1	473 - 1709 ft.
	2	1664 - 4046 ft.
Continuous Dipmeter:		
	1	1664 - 4050 ft.
	2	4011 - 7890 ft.
	3	7700 - 9530 ft.
	4	7700 - 9140 ft.
Cement Bond Log:		
	1	1000 - 3915 ft.
	2	1640 - 2740 ft.
	3	6800 - 9318 ft.
	4	1650 - 2287 ft.

Interpretation of Golden Beach 1A

3-126

At 2200'

$R_{mf} = 0.80$ @ $68^{o}F$

$= 0.50$ @ $112^{o}F$

$SSP = +35mv$

$\therefore \frac{R_{mfe}}{R_{we}} = .35$

But $R_{mfe} = .85 \; R_{mf}$

$= .43$ @ $112^{o}F$

$\therefore R_{we} = 1.23$ @ $112^{o}F$

$\therefore R_{w} = 5.0$ @ $112^{o}F$.

Other values from the logs are:-

$R_{mll} = 3.5 \; \Omega$

$R_{ll} = 35 \; \Omega$

$R_{il} = 41 \; \Omega$

$\rho_{B} = 2.13$ gm/cc

.N = 600API

Entering the restivity values into Chart 17. we find that:

$R_{t} = 41 \; \Omega$

& $D_{i} = 20''$

From the porosity tools, we find that:

$\phi_{fd} = 31\%$

& $\phi_{n} = 34\%$

This shows that:

$\phi = 31\%$ and the zone is slightly shaly.

Hence $F = 7.5$

Using Archies formula we find:

$S_{w} = 96\%$

3-127

Using the Ratio Method, namely:

$$\frac{R_{xo}}{R_t} = \frac{R_{mf}}{R_w} \frac{S_w^2}{S_{xo}^2}$$

We have $S_w = 92\%$

Hence the two methods are in good agreement and we have established a good value for R_w at this point. The salinity seems to remain constant with decreasing depth up to the gas-oil contact. For example at 2100.

$$\phi_{fd} = 36\%$$

$$R_{il} = 30\ \Omega$$

This again gives

$$S_w = 96\%$$

Above this level, the SP exhibits a base line shift and it is difficult to see whether this is caused by the extremely high restivity of the formation or if there is a change in water salinity. As there are no shale streaks within the sand, no R_w determination can be made. However if we consider the SP deflection from the shale at 2010' to the sand below, it is just a few millivolts positive. This would give us:

$$SP = +3mv$$

$$\frac{R_{we}}{R_{MFe}} \approx 1.$$

$$\therefore R_{we} = .43 \text{ @ } 112^{o}\text{ F}$$

$$\therefore R_w = .75 \text{ @ } 112^{o}\text{F}$$

This would seem to be the minimum salinity possible.

Before we make any calculations of porosity and water saturation, we must identify the type of problem with which we are dealing. In the lower half of the hydrocarbon bearing zone the logs behave as would be expected. However as we approach the top of the zone, we see

(a) The Laterolog restivity decreases progressively.
(b) The Microlaterolog restivity increases progressively.
(c) The FDC tends to high bulk density value.
(d) The Sonic tends to slightly lower travel times.
(e) The Neutron fluctuates about a mean.
(f) The Gamma-Ray rises progressively.

3-128

It is obvious that the zone is gas bearing but further assupmtions must be made to account for the above phenomena. These may be:

1. The water salinity increases towards the top of the zone.
2. There is an increasing amount of dolomitization towards the top of the interval.
3. The interval becomes increasingly shaly towards the top.

Of course it may be a combination of these possibilities but we will examine them in turn to see how they fit the facts.

1. From our initial calculations from the SP, we have seen that the water salinity is about 700 ppm at 2100' and could be as much as 5000 ppm at 2015'. This would explain the resistivity trend qualitatively only. For example at 2022.

$$R_{il} = R_{l} = 30\ \Omega$$

$$R_{mll} = 12.\ \Omega$$

From chart 53

$$S_w = 70\%$$

which is a little low for the top of a gas sand. Even if we use a salinity of 27000 ppm, such as is found in the top of the Barracouda field, we still only have

$$S_w = 35\%$$

Also a salinity change will not explain the movement of the porosity tools. Hence, while not completely discarding this possibility, we must look elsewhere for the main effect.

2. Considerable Dolomite was found in Barracouda A-1 and this could explain the increasing density of the zone in question. However the sonic should show a stronger reaction and this decrease in porosity should cause an increase, not a decrease, in restivity.

3. This possibility looks the most likely it is indicated by the increasing gamma ray activity. We have seen from the Side Wall Cores that any shaliness is in the form of dispersed clays.

Let us assume that the shale at 2012' has zero porosity i.e. it is composed entirely of sand grain and shale material.

For the neutron

$$\phi_n = \phi + .5p$$

$$\therefore p = 86\%$$

For the density

$$\phi_{fd} = \phi + \frac{\rho_g - \rho_{sh}}{\rho_g - \rho_f} p.$$

$$\therefore \rho_{sh} = 2.25 \text{ gm/cc}$$

3-129

This seems a reasonable value although a little higher than the 2.20 gm/cc for the shales at 2180' & 1950'.

For the restivity, we may use the De Witte formula:

$$R_t = \frac{a R_c R_w}{(p+\phi S_w)(p R_w + \phi R_c S_w)}$$

It can be seen from the restivities at about 2080', shown to be clean on the gamma ray, that the S_w is very low indeed. We can therefore neglect the ϕS_w term and assume that any electrical conductivity is due to the shales. The above formula then reduces the to (given a=1)

$$P = \sqrt{\frac{R_c}{R_t}}$$

If we take the above shale as being similar to the interstitial clay.

Then C_c = 700 mmho

R_c = 1.4 ohns

As a rough check:

At 2012 R_{il} = 2.5 Ω (probably a little high due to bed thickness).

$$\therefore P = \sqrt{\frac{1.4}{2.5}}$$

$$= 75\%$$

This is not too different from the 86% calculated previously from the FDC-N.

Column 8 of Table 1 show the shale percentages calculated through out the gas zone and they are plotted on Fig.1. Below the Gas/Water contact at 2075, the p values in column 9 are calculated from the FDC-N using:

$$\phi_n - \phi_{fd} = .23p$$

Now a p value has been obtained, we can correct the FDC & N porosities for shaliness using

$$\phi_{fd} \text{ corrected} = \phi_{fd} - .27p$$

$$\phi_n \text{ corrected} = \phi_n - .5p$$

These values are shown in Columns 11 and 12, on table 2. We may now enter those values into the sandstone chart on page 40 and obtain . ϕ the true porosity and S_{gn} the gas saturation in the the zone investigated by the neutron-density combination. These values are shown in columns 13 and 14 and they are plotted on figure #1.

3-130

This plot is particularly interesting because it shows the gas saturation increasing towards the top of the zone. This compares very well with the microlaterolog which is not so affected by the shaliness because S_{xo} is lower than S_w and R_{mf} a lot lower than R_w. If we calculate the Residual Hydrocarbon Saturation in the Invaded zone from the Microlaterolog using the De Witte formula or better still using the formula proposed by P. Simandoux of the FIP, namely.

$$R_{xo} = \frac{aR_cR_{mf}}{(p+\emptyset)\,(pR_w+\emptyset R_c)\,S_w^2}$$

we obtain the values shown in column 16, and plotted on Figure 1. These values follow the S_{gn} values but they are considerably lower.

The reason for this is easy to see if we consider the invasion in the gas zone to be similar to that calculated at 2200', namely D_i = 20". Since the borehole diameter is 12" we have a depth of invasion from the borehole wall of about 4". This is sufficiently deep for the MLL to measure only R_{xo} and yet the FDC and N will be affected by R_t. Hence we can say that S^o_{gn} represents a lower limit of the gas saturation of the virgin zone.

As we have used our restivity devices to give us the shale content, it is not permissable to feed their values back into the usual equations to obtain a saturation value. If we could obtain the percentage shale in a different manner, then we could use these equations. Other approaches tried were:

1. Calculating shale percentages from an FDC-N plot in the water zone and calibrating the γ-ray for the gas zone. This method failed because the statistical variations of the neutron in a $12\frac{1}{4}$" hole gave an unacceptable spread of values.

2. Using the empirical formula $p = \dfrac{\gamma_{max} - \gamma}{\gamma_{max} - \gamma_{min}}$

This failed for two reasons,
- it gives too high values of p eg. at 2032 we calculate p = 36% whereas even assuming S_w = 0 we only have p = 12% from the restivity.
- the gamma ray does not always seem to reflect the percentage of shale. eg. at 2300'

3. The SP can be used to determine p but it is obviously of no use in this case.

The only approach we can make to S_w is to use the Ratio Method. We will assume the formations to be clean and this will give us an upper limit of S_w. The values are shown in column 17 and plotted on Fig. 1. They are calculated assuming a value of R_w = 5.0 Ω at 112°F. A value of R_w = .75 Ω at 112° would give the values as shown in column 18.

3-130

As expected the water saturation is high at the top of the zone and decreases progressively as the gas/water contact is approached.

CAUTION ! One cannot say for example that at 2072 the S_w = 19% and p = 5%. The same values and equation have been used in deducing the two results and they are dependent on each other. The true situation lies somewhere between these figures say,

$$S_w \sim 13\%$$
$$p \sim 2\%$$

However under the circumstances given, it is not possible to determine each quantity exactly, only to place an upper limit on its value.

Conclusions.

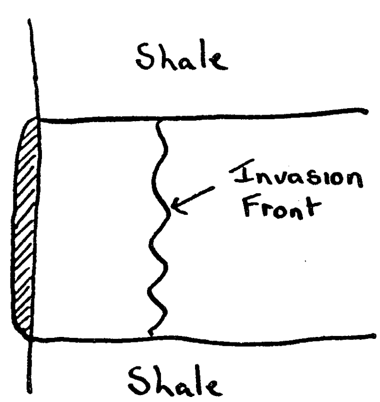
The porosity remains fairly constant over the entire zone except at the top where it is reduced by the advent of shaliness. The values shown in Column 13 are probably fairly accurate.

The percentage shale is probably well represented by the values shown in columns 8 and 9 although they may be a shade high.

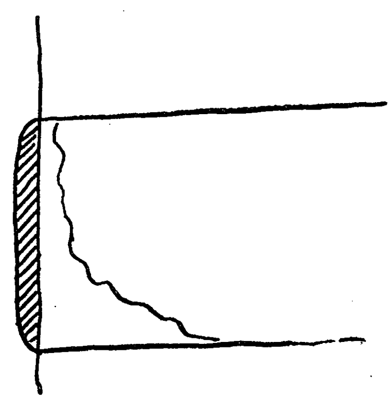
The connate water salinity is probably fairly constant (700ppm) but it may increase slightly toward the top of the zone. It is unlikely to reach the maximum of 5000ppm predicted.

The water saturation is still uncertain. We have established a maximum value of 19% close to the Gas/Water contact but the actual minimum saturation is likely to be 10 - 15%. This probably remains fairly constant throughout the zone except at the top where the lower porosities and increasing shaliness should cause it to rise.

The apparent opposite effect of decreasing S_w towards the top, as seen in the S_{gn} and RHS curves, is probably due to a vertical segregation in the highly permeable formations. Thus once a filter cake has been established, (see inset) the invasion will tend to disappear at the top of the zone and increase towards the bottom giving the observed effect.



DURING INVASION



AFTER VERTICAL SEGREGATION

3-132

Recommendations

In order to improve the reliability of the data obtained from the logs, the following changes should be beneficial:

1. Use a fresher mud.
This would make the SP less positive; if the formation water is more saline at the top of the sand, a negative SP would result.

2. Use a smaller borehole diameter. This would increase the accuracy of the neutron particularly in the highly porous formations. It might then be possible to calibrate the gamma ray in terms of shale percentage and hence arrive at an independent value of p in the gas bearing formation.

I. Strecker.

APPENDIX. Explanation of tables 1 and 2.

Column	Symbol	How Derived.
1	ρ_B	Bulk Density from FDC log.
2	N	Reading in API units from Neutron.
3	$\varnothing_{nl}$	Apparant Limestone Porosity calculated from N using chart 32.
4	$\varnothing_{ns}$	$\varnothing_{nl}$ corrected for sandstone using chart 36.
5	R_l	Laterolog Restivity.
6	R_{mll}	Microlaterolog Restivity.
7	R_{il}	Induction Restivity.
8	P	Percentage Shale derived from R_l.
9	P	Percentage Shale derived from FDC-N.
10	$\varnothing_{fd}$	Porosity derived from ρ_b using chart 38.
11	$\varnothing_{fdc}$	$\varnothing_{fd}$ corrected for shaliness.
12	$\varnothing_{nc}$	$\varnothing_{ns}$ corrected for shaliness.
13	$\varnothing$	True porosity and gas saturation derived
14	S_{gn}	from $\varnothing_{fdc}$ and $\varnothing_{nc}$ using Chart 40.
15	R_{mllc}	R_{mll} corrected for mud cake using chart 24.
16	RHS	Residual Hydrocarbon Saturation.
17	S_w	Water saturation assuming clean formation using Ratio Method (R_w = 5Ω @ 112°F.)
18	S_w	As above but R_w = .75 @ 112°F .

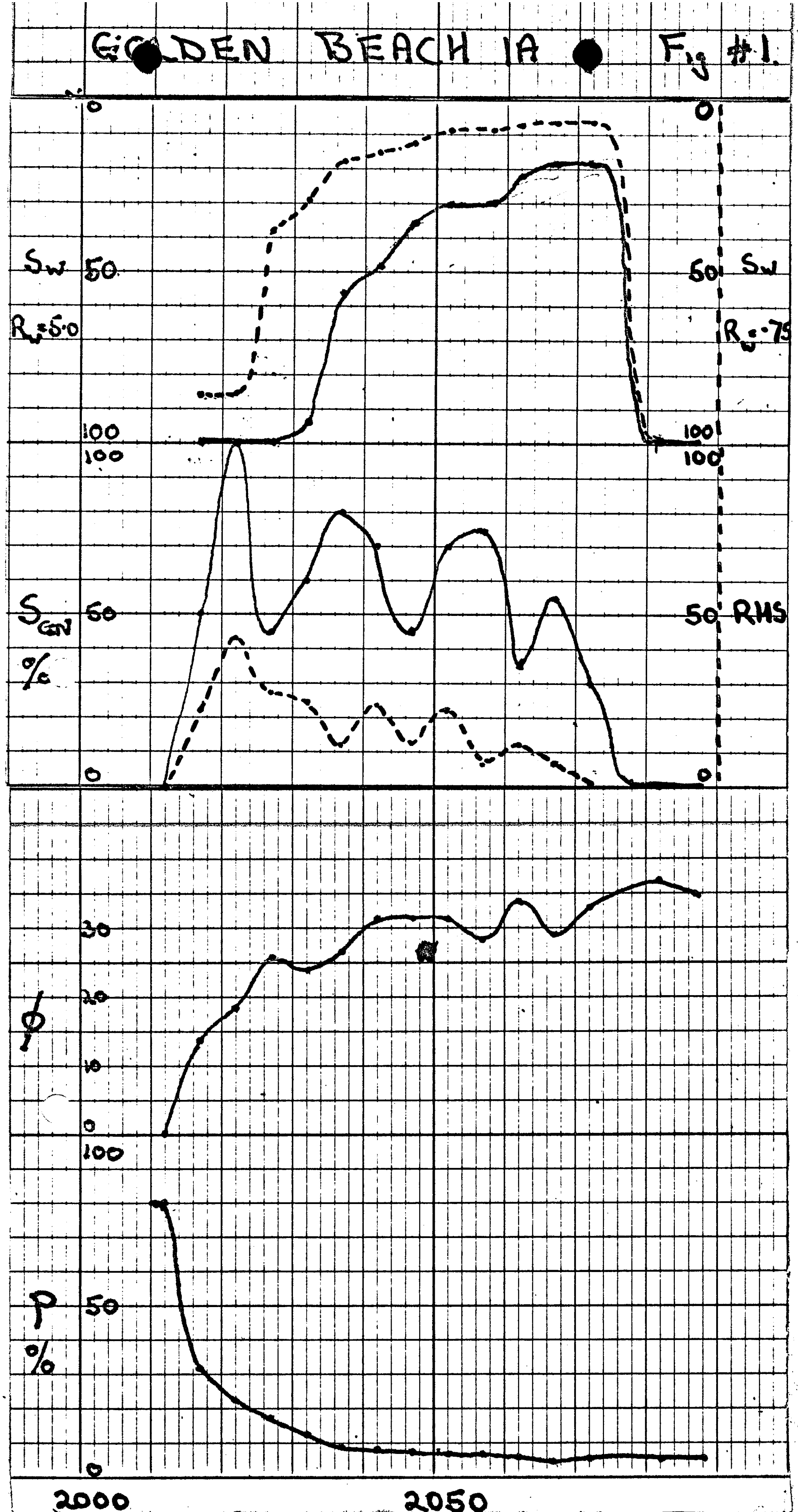
INTERPRETATION OF: Golden Beach #1. Table #1. 3-134

	1	2	3	4	5	6	7	8	9
	ρ_B	N	$\emptyset_{nl}$	$\emptyset_{ns}$	R_1	R_{mll}	R_{il}	P	P
	gm/cc	API	%	%	ohms	ohms	ohms	%	%
2012	2.34	550	43	43	4	3	2.5	80	
2017	2.20	680	24	28	14	6.3	14	31	
2022	2.07	800	15	21	30	12	30	32	
2027	2.02	660	26	30	50	6.4	50	17	
2032	2.05	730	20	25	90	7.5	100	12	
2037	1.95	780	16	22	160	6.0	160	9	
2041	1.86	720	20	25	200	5.8	200	8	
2047	1.90	690	23	27	260	4.6		7	
2052	1.83	740	19	25	400	5.7		6	
2057	1.92	790	15	21	370	5.3		6	
2062	1.92	640	28	32	450	4.5		5.5	
2067	1.95	740	19	25	820	5.6		4	
2072	1.94	630	29	33	550	4.0		5	
2077	1.91	680	24	28		4.0			
2082	2.03	560	36	37		2.5	35		4
2087	2.07	580	34	36		2.6	30		4

INTERPRETATION OF: Golden Beach #1 Table #2 3-135

ρ

% Shale	10	11	12	13	14	15	16	17	18	Depth
	Ø$_{fd}$	Ø$_{fdc}$	Ø$_{nc}$	Ø	S_{gn}	R_{mllc}	RHS	S_w	S_w	
	%	%	%	%	%	ohms	%	%	%	
12	19	0	0	0						2012
17	27	19	9	14	50	7	21	100	85	2017
22	35	29	4	18	100	15	43	100	85	2022
27	38	33	17	26	45	7	28	100	38	2027
32	36	33	14	24	60	8.5	25	94	29	2032
37	42	40	11	27	80	6.5	11	57	18	2037
41	47	45	16	32	70	6.2	24	49	15	2041
47	45	43	21	32	45	4.7	12	35	12	2047
52	48	46	16	32	70	6.1	22	30	9	2052
57	44	42	12	28	75	5.6	6	30	9	2057
62	44	43	25	34	35	4.6	12	21	7	2062
67	42	41	17	29	55	6.0	7	19	6	2067
72	42	41	26	33	30	4.0	0	19	6	2072
77	44			29?						2077
82	37			29?				100		2082
87	35							100		2087


GOLDEN BEACH 1A
Fig #1.
Sw
Rw=5.0
Rw=.75
50
100
0
S GN %
RHS
ϕ
30
20
10
P %
2000
2050

3-137

B.O.C. OF AUSTRALIA

LOG INTERPRETATION. (By T.C. TYNER)

Well GOLDEN BEACH NO.1A   Page 1

4050 - 7900

RM = 1.30 @ 67 Rmf = 1.04 @ 62 Rmc 2.20 @ 60

Hole size $8\frac{5}{8}$ BHT 182 F @ 6500

Plot	1	2	3	4	5	6	7	8	9	10	11	Chart
Depth	4420 4430	4735 4750	5085 5100	5496 5510	5650 5670	5740 5760	5830 5850	5940 5945	5980 5600	6020 6035	6105 6128	
Temp	152		160	168						176		
Rm	0.59		0.56	0.53						0.50		
Rmf	0.42		0.40	0.38						0.36		
Rmc	0.90		0.85	0.81						0.77		
SP	+20	+15	+8	0	-6	-10	0	-13	-22	-24	-27	
$(Rmf)_e / (Rw)_e$	0.58	0.66	0.78	1.00	1.17	1.35	1.00	1.45	1.90	2.00	2.10	4
$(Rw)_e$	0.63	0.52	0.44	0.32	0.27	0.23	0.32	0.21	0.16	0.15	0.15	
Rw	1.90	1.20	0.90	0.60	0.37	0.31	0.60	0.28	0.21	0.20	0.20	5
R_{16}	38	20	15.7	15.5	9.5	10.5	13.2	10.0	7.5	7.2	7.2	
R_{16} corr	44	21	15.6	14.8	8.8	9.9	12.8	9.4	6.9	6.5	6.5	7
R_{IL}	20-60	20	20	18	8.8	9.5	12.8	10.0	5.2	5.0	5.0	
Rxo (R_{MLL})	20	9	12	13	10	11	11	10.1	10	10	10.5	
F ($=\frac{Rxo}{Rmf}$)	47	22	30	34	21	29	30	28	28	28	29	
ϕ_{MLL}	13	19	16	14	19	16.5	16	17	17	17	16.5	20
$\frac{Rxo}{Rt}$	1.0-0.3	0.45	0.6	0.7	1.1	1.2	0.9	1.0	1.9	2.0	2.1	
$\frac{Rmf}{Rw}$	0.22	0.34	0.44	0.63	1.0	1.2	0.62	1.3	1.7	1.8	1.8	
Sw	100+	100+	100+	100+	100	100	100+	90	100	100	100	53
Sw(Archie)	100+	100+	100+	100	94	97	100+	79	100	100	100	
SONIC	77	85	83	80	83	83	82	83	83	83	80	
ϕ_{Sonic}	16	22	20	18	20	20	20	20	20	20	18	
F_{Sonic}	31	16	20	24	20	20	20	20	20	20	24	20
Sw(Archie)	100	96	95	88	92	80	100	75	90	90.	98	

Di: R_{IL} and R_{16}(corr) are approximately the same, indicating shallow invasion.

REMARKS:

3-138

LOG INTERPRETATION.

Well GOLDEN BEACH NO.1A　　　　Page 2

4050 - 7900

	RM	@	Rmf	@	Rmc	@
To 6500:	1.30	67	1.04	62	2.20	60
Below 6500:	1.15	85	1.10	62	1.94	65

Hole size $8\frac{5}{8}$　BHT 182 / 194 F @ 6500 / 7900

Plot	12	13	14	15	16	17	18	19	20	21	22	Chart
Depth	6183 6200	6204 6220	6220 6228	6250 6260	6290 6304	6308 6318	6340 6350	6400 6413	6528 6538	6610 6614	6898 6908	
Temp	178							182	175		180	
Rm	0.49							0.47	0.55		0.54	
Rmf	0.36							0.35	0.39		0.37	
Rmc	0.76							0.74	[illegible]			
SP	-32	-32	-37	-30	-38	-40	-42	-47	-33	-43	-32	
$\frac{(Rmf)e}{(Rw)e}$	2.40	2.40	2.80	2.30	2.80	3.05	3.20	3.70	2.5	3.3	2.45	4
(Rw)e	0.13	0.13	0.11	0.13	0.11	0.10	0.09	0.08	0.13	0.10	0.13	
Rw	0.15	0.15	0.12	0.15	0.12	0.10	0.10	0.09	0.15	0.10	0.15	5
R_{16}	6,0	6.0	5.2	6.0	7.2	5.2	6.1	3.5	8.0	5.5[illegible]	7.5	
R_{16} corr	6.0	6.0	5.2	6.0	6.5	5.2	6.1	3.5	7.2	5.53	6.7	7
R_{IL}	4.0	4.0	3.1	4.0	4.8	3.2	4.0	2.0	4.0	2.0	4.0	
Rxo (R_{MLL})	10.5	10.0	10.5	10.0	14.0	10.0	12.0	7.0	10	8.0	11	
F ($=\frac{Rxo}{Rmf}$)	29	28	29	28	39	27	34	20	25	20	30	
ϕ_{MLL}	16.5	17	16.5	17	14.5	17	15.5	20	18	20	16	20
$\frac{Rxo}{Rt}$	2.6	2.5	3.4	2.5	2.9	3.1	3.0	3.5	2,5	4.0	2.7	
$\frac{Rmf}{Rw}$	2.4	2.4	3.0	2.4	3.0	3.5	3.9	3.9	2.6	3.9	2.5	
Sw	100	100	100	100	100	100	100	100	100	100	100	53
Sw(Archie)	100	100	100	100	100	92	92	95	97	100	100	
SONIC	83	82	83	82	78	82	80	85	80	86	78	
ϕ_{Sonic}	20	20	20	20	17	20	20	22	18	23	17	
F_{Sonic}	20	20	20	20	27	20	20	16	24	14	27	20
Sw(Archie)	87	87	83	87	82	79	71	82	95	84	100	

Di: The differences between R_{IL} and corrected R_{16} indicate that Di is about 16 inches.

Sw from F_{Sonic} will be optimistic if the sands are shaly.

REMARKS:

3-139

LOG INTERPRETATION.

4050 - 7900

Well GOLDEN BEACH NO.1A

Page 3

RM = 1.15 @ 85 Rmf = 1.10 @ 62 Rmc 1.94 @ 65

Hole size $8\frac{5}{8}$ BHT 194 F @ 7900

Plot	23	24	25	26	27	28	29	Chart	
Depth	7043 7045	7175 7186	7217 7237	7470 7478	7495 7500	7667 7673	7786 7794		
Temp	181					192			
Rm	0.54					0.50			
Rmf	0.37					0.35			
Rmc									
SP	-40	-42	-45	-40	-40	-20	-20		
$\frac{(Rmf)e}{(Rw)e}$	3.0	3.2	3.5	3.0	3.0	1.75	1.75	4	
(Rw)e	0.11	0.10	0.09[illegible]	0.10	0.10	0.17	0.17		
Rw	0.12	0.10	0.095	0.10	0.10	0.20	0.20	5	
R_{16}	7.3	6.5	7.0	7.0	9.8	10.3	10.8		
R_{16} corr	6.8	6.0	6.5	6.5	9.1	9.7	10.0	7	
R_{IL}	4.2	2.7	2.5	3.7	5.0	8.3	9.0		
Di	40	60	24	20	40			15	
Rxo (=R_{MLL})	8.5	8.0	11	11	15	9.0	8.5		
F (=$\frac{Rxo}{Rmf}$)	23	21.5	30	30	40	25.7	24.3		
ϕ_{MLL}	18.5	19	16.5	16.5	14	17.5	18	20	
$\frac{Rxo}{Rt}$	2.0	3.0	4.4	3.0	3.0	1.1	0.94		
$\frac{Rmf}{Rw}$	3.0	3.7	3.7	3.5	3.5	1.7	1.7		
Sw	80	90	100	90	90	80	70	53	
Sw (Archie)	82	90	100	90	90	77	73		
SONIC	87	83	80	78	76	74	72		
FDC						2.50	2.48		
ϕ_{Sonic}	23	20	18	17	15	14	12	37	
ϕ_{FDC}						9	10	38	
$\phi_{FDC/Sonic}$						11	11	43	
q(% shale)						0.36	0.17		$= \frac{\phi_S - \phi_F}{\phi_S}$
F_{Sonic}	15	20	24	27	35	40	60	20	
Sw	66[x]	86	100	85	84	100	100		

$$Sw = \frac{\frac{F_S . Rw}{Rt} - \frac{q}{2}}{1-q}$$

REMARKS: [x]Probably optimistic as true Rt may be lower than R_{IL}, the porous sand being only 3 ft thick.

B.O.C. OF AUSTRALIA

LOG INTERPRETATION. (By T.C. TYNER)

Well GOLDEN BEACH NO.1A

7900 - 9545

RM = 1.01 @ 86 Rmf = 0.95 @ 63 Rmc 2.00 @ 68

Hole size $8\frac{1}{2}$ BHT 220 F @ 9545

Plot	1	2	3	4		5	6	7	8	9	10	11	Chart
Depth	7991 7994	8046 8051	8096 8100	8128 8138		8164 8170	8325 8348	8354 8366	8391 8399	8640 8646	8658 8687	8808 8819	
Temp(°F)	200											210	
Rm	0.44											0.42	
Rmf	0.30											0.28	
Rmc	0.7 0											0.68	
SP	[illegible]	-20		-40		-30	-32	-32	-32	-22	-23	-23	
(Rmf)e / (Rw)e		1.7		2.9		2.2	2.4	2.4	2.4	1.8	1.8	1.8	4
(Rw)e		0.15		0.09		0.12	0.1	0.1	0.1	0.13	0.13	0.13	
Rw		0.17		0.09		0.13	0.1	0.1	0.1	0.15	0.15	0.15	5
R_{16}	11	10.8	10.5	12		13.3	10.3	14	12.1	19	17	14.2	
R_{16} corr	10	10	9.7	11		12.3	9.5	13.5	11.2	19	17	13.5	7
R_{IL}	10	9.1	9.1	7		10.5	9.3	11.2	10.8	16	16	15.8	
R_{1x1}	1.5	2.1	2.0	1.8	1.3	1.3	1.2	1.1	1.3	1.2	1.3	1.1	
R_{2x2}	2.2	3.4	3.0	2.4	2.1	2.1	2.0	1.9	2.2	2.0	2.0	1.8	
R_{1x1}/Rmc	2.1	3.0	2.9	2.6	1.9	1.9	1.7	1.6	1.9	1.7	1.9	1.6	
R_{2x2}/Rmc	3.1	4.9	4.3	3.4	3.0	3.0	2.9	2.7	3.1	2.9	2.9	2.6	
Rxo	7	35	12	5.6	8.4	8.4	11	10.5	10.5	11.2	7	8.4	22
F(=Rxo/Rmf)	23	127	40	19	28	28	38	36	36	40	25	30	
ø (ML)	18.5	8.5	14	20	17	17	14.5	15	15	14	18	16.5	20
Rxo/Rt	0.7	3.8	1.3	0.8	1.2	0.8	1.24	0.94	1.0	0.7	0.44	0.53	
Rmf/Rw	1.8	1.8	1.8	3.0	3.0	2.3	2.9	2.9	2.9	1.9	1.9	1.9	
Sw	57	100+	85	45	66	53	58	50	52	55	39	46	53
Sw(Archie)	62	100+	86	49	60	59	64	57	58	61	47	54	45

REMARKS:

3-141

LOG INTERPRETATION.

Well GOLDEN BEACH NO.1A   Page 2

7900 - 9545

RM = 1.01 @ 86   Rmf = 0.95 @ 63   Rmc 2.00 @ 68

Hole size $8\frac{1}{2}$ BHT 220 F @ 9545

Plot	12	13	14	12A
Depth	8836 8842	8970 8981	9100 9110	8832 8836
Temp			213	
Rm			0.42	
Rmf			0.28	
Rmc			0.68	
SP	-23	-25	-22	-23
$\frac{(Rmf)e}{(Rw)e}$	1.8	1.95	1.8	1.8
(Rw)e	0.13	0.12	0.13	0.13
Rw	0.15	0.13	0.15	0.15
R_{16}	28	16.2	13	20
R_{16} corr	31	15.8	12	22
R_{IL}	30	15	13	20
R_{1x1}	1.1	1.2	1.1	1.1
R_{2x2}	1.9	1.9	2.0	2.0
$R_{1x1/Rmc}$	1.6	1.8	1.7	1.7
$R2x2/_{Rmc}$	2. 7	2.7	2.9	2.9
Rxo	10.5	7.3	11.5	11.5
F $(=\frac{Rxo}{Rmf})$	37	26	41	41
ø (ML)	15	17.5	14	14
$\frac{Rxo}{Rt}$	0.35	0.5	0.88	0.57
$\frac{Rmf}{Rw}$	1.87	2.15	1.87	1.87
Sw	37	40	63	48
Sw (Archie)	43	47	68	56

REMARKS:

LOG INTERPRETATION.

Well GOLDEN BEACH NO. 1A

7900 - 9545

RM = 1.01 @ 86 Rmf = 0.95 @ 63 Rmc 2.00 @ 68

Hole size $8\frac{1}{2}$ BHT 220 F @ 9545

Plot	1	2	3	4	5	6	7	8	9	Chart
Depth	7991 7994	8046 8051	8096 8100	8128 8138	8164 8170	8325 8348	8354 8366	8391 8399	8640 8646	
SP		-20		-40	-30	-32	-32	-32	-23	
Rw		0.17		0.095	0.12	0.10	0.10	0.10	1.8	4 & 5
Rt	10	9.1	9.1	7.0	10.5	9.3	11.2	10.8	16.0	
Rxo (ML)	7.0	35.0	12.0	5.6-8.4	8.4	11.0	10.5	10.5	11.2	22
FDC	2.48	2.44	2.40	2.42	2.48	2.47	2.47	2.5	2.43	
SONIC	76	75	74	77	71	77	73	77	76	
ϕ ($\frac{Rxo}{Rmf}$=F)	18.5	8.5	14	20-17	17	14.5	15	15	14	20
ϕ_{FDC}	10	13	15	14	10	11	11	9	13	38
ϕ_{Sonic}	15	14.5	14	16	11.5	16	13	16	15	37
$\phi_{FDC/Sonic}$	12.5	13.5	14.5	15	11	13	12	12	14	43
q (% shale)	0.33	0.10	0	0.12	0.13	0.30	0.15	0.45	0.13	$= \frac{\phi_S - \phi_F}{\phi_S}$
F_{Sonic}	35	39	42	32	64	32	50	32	35	
Sw: %										
Using Rxo (ML):										
Rw from SP	62	100	86	49-60	59	64	57	58	68	Archie
Rw= 0.17	62	100	86	68-82	67	84	70	75	65	"
Rw= 0.10	48	100	66	52-63	52	64	57	58	50	"
Using $\phi_{FDC/Sonic}$: (including correction for q)*										
Rw from SP	90	90	90	7 0	87	63	70	60	59	"
Rw =0.17	90	90	90	93	100	87	100	89	64	"
Rw =0.10	64	68	68	70	83	63	70	60	48	"
$\phi_{Effective}$	12.5	13.5	14.5	15	11	13	12	12	14	43

REMARKS: $^{*}Sw_{corrected} = \frac{(\text{Sw from Archie's formula using } F_{Sonic}) - \frac{q}{2}}{1 - q}$

3-143

LOG INTERPRETATION.

Well GOLDEN BEACH NO.1A

7900 - 9545

RM = 1.01 @ 86 Rmf = 0.95 @ 63 Rmc 2.00 @ 68

Hole size $8\frac{1}{2}$ BHT 220 F @ 9545

Plot	10	11	12	13	14	12A			
Depth	8658 8687	8808 8819	8836 8842	8970 8981	9100 9110	8832 8836		8000	9000
SP	-23	-23	-23	-25	-22	-23	Temp	200	212
Rw	0.15	0.15	0.15	0.13	0.15	0.15	Rm	0.44	0.42
Rt	16	15.8	30	15	13	20	Rmf	0.30	0.28
Rxo (ML)	7.0	8.4	10.5	7.3	11.5	10.5	Rmc	0.7 0	0.68
FDC	2.47	2.44	2.47	2.43	2.37	2.45			
SONIC	73	75	67	80	83	78			
ϕ ($\frac{Rxo}{Rmf}$-F)	18	16.5	15	17.5	14	15			
ϕ_{FDC}	11	13	12	13	17	12.			
ϕ_{Sonic}	13	14.5	9	18	20	16.5			
$\phi_{FDC/Sonic}$	12	14	9	15	18	14			
q (%shale)	0.15	0.10	0	0.3	0.15	0.27			
F_{Sonic}	48	39	110	24	20	30			
Sw: %									
Using Rxo (ML):									
Rw from SP	49	54	43	48	72	53			
Rw = 0.17	52	57	46	54	73	57			
Rw = 0.10	40	44	35	42	56	43			
Using $\phi_{FDC/Sonic}$: (including correction for q)									
Rw from SP	7 0	62	74	44	48	48			
Rw = 0.17	76	67	79	53	52	52			
Rw = 0.10	57	45	61	36	38	36			
$\phi_{Effective}$	12	14	9	15	18	14			

$$q = \frac{\phi_S - \phi_{FDC}}{\phi_S}$$

$$Sw = \frac{F_{Sonic} \times Rw}{Rt}$$

REMARKS:

PE601515

This is an enclosure indicator page.
The enclosure PE601515 is enclosed within the container PE902907 at this location in this document.

The enclosure PE601515 has the following characteristics:

ITEM_BARCODE = PE601515
CONTAINER_BARCODE = PE902907
NAME = Masterlog Geoservices
BASIN =
PERMIT = PEP 42
TYPE = WELL
SUBTYPE = well log
DESCRIPTION = Masterlog Geoservices
REMARKS =
DATE_CREATED = 15/07/1967
DATE_RECEIVED =
W_NO = W503/506
WELL_NAME = Golden Beach 1, 1a
CONTRACTOR = BOC of Australia
CLIENT_OP_CO = BOC of Australia

(Inserted by DNRE - Vic Govt Mines Dept)

PE902908

This is an enclosure indicator page.
The enclosure PE902908 is enclosed within the container PE902907 at this location in this document.

The enclosure PE902908 has the following characteristics:

ITEM_BARCODE =	PE902908
CONTAINER_BARCODE =	PE902907
NAME =	Well Velocity Survey
BASIN =	
PERMIT =	PEP 42
TYPE =	WELL
SUBTYPE =	survey
DESCRIPTION =	Well Velocity Survey
REMARKS =	
DATE_CREATED =	
DATE_RECEIVED =	
W_NO =	W503/506
WELL_NAME =	Golden Beach 1, 1a
CONTRACTOR =	BOC of Australia
CLIENT_OP_CO =	BOC of Australia

(Inserted by DNRE - Vic Govt Mines Dept)

PE902909

This is an enclosure indicator page.
The enclosure PE902909 is enclosed within the container PE902907 at this location in this document.

The enclosure PE902909 has the following characteristics:

ITEM_BARCODE = PE902909
CONTAINER_BARCODE = PE902907
NAME = Generalized Stratographic Column
BASIN =
PERMIT = PEP 42
TYPE = WELL
SUBTYPE = column
DESCRIPTION = Generalized Stratographic Column
REMARKS =
DATE_CREATED =
DATE_RECEIVED =
W_NO = W503/506
WELL_NAME = Golden Beach 1, 1a
CONTRACTOR = BOC of Australia
CLIENT_OP_CO = BOC of Australia

(Inserted by DNRE - Vic Govt Mines Dept)

PE902910

This is an enclosure indicator page.
The enclosure PE902910 is enclosed within the container PE902907 at this location in this document.

The enclosure PE902910 has the following characteristics:

ITEM_BARCODE = PE902910
CONTAINER_BARCODE = PE902907
NAME = Well Velocity Survey
BASIN =
PERMIT = PEP 42
TYPE = WELL
SUBTYPE = survey
DESCRIPTION = Well Velocity Survey Golden Beach No 1a
REMARKS =
DATE_CREATED = 18/07/1967
DATE_RECEIVED =
W_NO = W503/506
WELL_NAME = Golden Beach 1, 1a
CONTRACTOR = BOC of Australia
CLIENT_OP_CO = BOC of Australia

(Inserted by DNRE - Vic Govt Mines Dept)

PE906090

This is an enclosure indicator page.
The enclosure PE906090 is enclosed within the container PE902907 at this location in this document.

The enclosure PE906090 has the following characteristics:

ITEM_BARCODE = PE906090
CONTAINER_BARCODE = PE902907
NAME = Section Through Golden Beach-1
BASIN = GIPPSLAND
ON_OFF = OFFSHORE
PERMIT = PEP 42
TYPE = WELL
SUBTYPE = XSECTION
DESCRIPTION = Section through Golden Beach-1 showing electrical logs.
REMARKS =
DATE_CREATED =
DATE_RECEIVED =
W_NO = W506
WELL_NAME = GOLDEN BEACH-1A
CONTRACTOR =
CLIENT_OP_CO = B.O.C. OF AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE906091

This is an enclosure indicator page.
The enclosure PE906091 is enclosed within the container PE902907 at this location in this document.

The enclosure PE906091 has the following characteristics:

ITEM_BARCODE = PE906091
CONTAINER_BARCODE = PE902907
NAME = Structure Map of Intra-Latrobe Horizon
BASIN = GIPPSLAND
ON_OFF = OFFSHORE
PERMIT = PEP 42
TYPE = SEISMIC
SUBTYPE = HRZN-CONTR
DESCRIPTION = Structure Map of Intra-Latrobe (first coal horizon in Golden Beach-1) Horizon
REMARKS =
DATE_CREATED = 18/07/1986
DATE_RECEIVED = 31/07/1986
W_NO = W506
WELL_NAME = GOLDEN BEACH-1A
CONTRACTOR =
CLIENT_OP_CO = WOODSIDE OIL COMPANY

(Inserted by DNRE - Vic Govt Mines Dept)

PE604466

This is an enclosure indicator page.
The enclosure PE604466 is enclosed within the container PE902907 at this location in this document.

The enclosure PE604466 has the following characteristics:

ITEM_BARCODE =	PE604466
CONTAINER_BARCODE =	PE902907
NAME =	Stratigraphic Log
BASIN =	GIPPSLAND
PERMIT =	PEP 42
TYPE =	WELL
SUBTYPE =	WELL_LOG
DESCRIPTION =	Golden Beach-1A Stratigraphic Log. Enclosure from WCR.
REMARKS =	
DATE_CREATED =	02/09/1967
DATE_RECEIVED =	
W_NO =	W506
WELL_NAME =	Golden Beach-1A
CONTRACTOR =	
CLIENT_OP_CO =	B.O.C. of Australia Limited

(Inserted by DNRE - Vic Govt Mines Dept)

PE905146

This is an enclosure indicator page.
The enclosure PE905146 is enclosed within the container PE902907 at this location in this document.

The enclosure PE905146 has the following characteristics:

ITEM_BARCODE = PE905146
CONTAINER_BARCODE = PE902907
NAME = Golden Beach-1A Progress Chart
BASIN = GIPPSLAND
PERMIT = PEP 42
TYPE = WELL
SUBTYPE = DIAGRAM
DESCRIPTION = Golden Beach-1A Progress Chart. Enclosure from WCR.
REMARKS =
DATE_CREATED = 31/08/1967
DATE_RECEIVED =
W_NO = W506
WELL_NAME = Golden Beach-1A
CONTRACTOR =
CLIENT_OP_CO = B.O.C. of Australia Limited

(Inserted by DNRE - Vic Govt Mines Dept)