



W630

Well

WELL REPORT CROSSROADS - 1 (W630)

Gippsland (onshore)

PEP/72

Halliday Enterprises Pty Ltd

ALL COMMUNICATIONS SHOULD BE ADDRESSED TO
SECRETARY FOR MINES
TELEPHONE: 654 4388



MINES DEPARTMENT
WEST TOWER, PRINCES GATE
171 FLINDERS STREET
MELBOURNE, VIC. 3000

CROSSROADS No. 1

See also application for
permit to alter a bore (GW2)
and well completion report on
this well submitted under the
Groundwater Act

W630

WELL REPORT

by

J. D. Watt

and

E. T. Kempin

COMPANY: HALLIDAY ENTERPRISES PTY. LIMITED.

WELL: CROSSROADS NO. 1

LOCATION: Latitude: 38°19'39"S
Longitude: 147°9'42"E
P.E.P. 72 Gippsland Basin (onshore)
VICTORIA, AUSTRALIA.

2/27

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S U M M A R Y

The Crossroads No. 1 well was located 120 feet south of the Arco-Woodside Seaspray No. 1 well approximately 4 miles northwest of the town of Seaspray along the Seaspray road.

The objective of the well was to test a highly resistivity zone in porous sandstones within the Latrobe Valley Coal Measures, which contained hydrocarbons in the Seaspray No. 1 well. For control reasons the Crossroads No. 1 well was located adjacent to the Seaspray No. 1 bore.

The well was spudded on May 19th 1971 and abandoned as a water well on June 14th 1971. Total depth was measured as 3410 feet by the driller and 3412 feet by Schlumberger. The well was drilled in 13 days and the sandstone of interest tested with a drill stem test. The test tool stuck in the hole and was abandoned. Casing was run over the remaining open part of the formation and the rig released on June 4th. The well was then suspended until June 11th, when the wellhead was rigged up for production testing. The casing was perforated and the well tested until June 14th when the hole was abandoned and left as a water well for the property owner.

The Crossroads No. 1 well, being located 120 feet from the Seaspray No. 1 well is considered a twin of the previous well and no significant lithologic or structural changes were observed between the wells. For a detailed description of the previous work and area structure and stratigraphy, the reader is referred to the Seaspray No. 1 Well Completion Report by Frank T. Ingram, 1964 for Arco Ltd/Woodside (Lakes Entrance) Oil Co. N.L. Such geology as pertinent to this report has been included herein.

The anomalous resistivity which prompted the drilling of the well proved to be exceedingly fresh water (resistivity 31 ohms @ 52°) with a scum of live oil.

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W E L L H I S T O R Y

GENERAL DATA

Well Name: CROSSROADS NO. 1

Location Latitude 38° 19' 39" S
Longitude 147° 9' 42" E
Warragul 4 Mile Sheet

Name and Address of Tenement Holder: Woodside Oil N.L.,
151 Flinders Street,
MELBOURNE. VIC. 3000

Petroleum Tenement: P.E.P. 72, (onshore) Victoria

District: Gippsland

Total Depth: Driller: 3410 feet
Schlumberger: 3412 feet

Date Drilling Commenced: May 19, 1971

Date Drilling Completed: June 1, 1971

Date Well Abandoned: June 14, 1971

Date Rig Released: June 4, 1971

Drill Time to Total Depth: 13 days

Elevations: Ground Level: 97 feet
Kelly Bushing: 106 feet

Status: Abandoned, left as a water well to property owner, Mr. R.S. McNeilly

DRILLING DATA

Name and Address of Drilling Contractor: W.L. Sides & Son Pty. Limited.
Wellington Road,
CLAYTON. VIC.

Drilling Plant: Failing 2500 mounted on Albion Reiver
Twin Steer Diesel Truck with double drum
air operated draw works driven by two
Model 4-71 G.M.C. diesel engines and
incorporating 75' "Failing" mast rated
to 90,000 pounds.

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Mud Pumps: 1 Denver-Gardner FXO 10 x 7 $\frac{1}{4}$ " driven
by G.M.C. 6-71 Diesel
1 Wheatley 10 x 5" driven by rig
engines

Blowout Preventers: Cameron SS 12" Series 900
Regan 10" Series 1500
Payne Accumulator

Hole Sizes: 12 $\frac{1}{4}$ " to 117'
8 $\frac{1}{2}$ " to 769'
6 $\frac{1}{2}$ " to 3410'

Casing: 9-5/8" J55, 36 lb. Range 2 set with 40
sacks 2% CaCl cement @ 114'
7" J55 LTC 23 lb. Range 2 Buttress set
with 80 sacks of 8% bentonite slurry
cement and 20 sacks 2% CaCl cement @
465' through perforations from 440-
445'
4 $\frac{1}{2}$ " 13.5 lb. 8 rd. STC set with 150 sacks
15 lb. construction cement slurry at
3370'

Drilling Mud: Fresh water gel to 1832'
Fresh water gel with ligno-sulfonate to
3410' (TD)
Ligno-sulfonate with diesel to condition
for 4 $\frac{1}{2}$ " casing
Average wt. 9.3 - 9.4 lbs/gallon

Drilling Fluid: Type - Fresh water gel with ligno-
sulfonate

Materials:

<u>Type:</u>	<u>Quantity Used:</u>
Supercol	124 Sacks
Ligcon	9 "
Unical	19 "
Cellucol	15 Kilogram
Caustic Soda	1 Drum
Barytes	54 Sacks
Dieselene	900 Gallons

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Average Analysis:

Weight: 9.3 - 9.4
 Funnel Viscosity: 38-43 secs/Qt.
 Water Loss: 12-20 ccs/30 mins
 F.C. 2/32
 Sand: 2% initially - 0.1%
 pH: 7.5 - 9.0

Water Supply:

Water well drilled by Arco for the Seaspray No. 1 well and maintained by the property owner was pumped by air lift to maintain fresh water level in farmers pond which supplied rig demands.
 (Resistivity 12.2 ohms.)

Perforations:

7" casing was perforated from 440-445', 4 shots per foot using Schlumberger shaped charges in order to regain circulation suitable for cementing casing stuck at 460'.
 4½" casing was perforated from 3231' - 3249', 2 shots per foot using Schlumberger shaped charges for production testing.

Plugs:

The 4½" casing is plugged with cement from 3249' (Schlumberger measurement) to the shoe at 3370'.
 No surface plug was set as the well was left as a water producer.

Fishing Operations:

DST No. 1 was run over the interval 3372-3412'. During the test the test tools became trapped in the hole, by loose running sand. The rig pulled on the tools for one hour to 90,000 lbs. The tools were then backed off at the Halliburton safety joint and abandoned. The fish left in the hole consisted of : 3-3/4" BT Pressure Recorder (3000 lb), Expanding Shoe Assembly, Shoe-Top Packer, Support Packer, Support Shoe, 30' of perforated Anchor Pipe, 3-7/8" VR Safety Joint case and seat, 24 hour Clock, 2x2-7/8" subs, Nurnberg Temperature Recorder and Ther-

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LOGGING AND TESTING

Ditch Cuttings:

Unwashed cuttings were caught at 30 foot intervals from surface to 117'. Washed cuttings were caught at 10 foot intervals from 117-3410' (TD). Complete sets of cuttings were sent to Victoria Mines Dept. in Melbourne. Washed cuttings were also sent to Woodside Oil N.L. in Melbourne.

Cores:

No conventional or sidewall cores were cut.

Mudlogging:

A portable hotwire and gas chromatograph was employed from 117' to Total Depth. The chromatograph was inoperative from 1832' to Total Depth. Density log (Gamma-Gamma)

Wireline Logging:

Induction Electric with Spontaneous Potential and Gamma Ray logs were run on the same sonde from 465-3412'.

Formation Testing:

DST No. 1 was run from 3372-3412'. The test recovered 3000' of fresh water with drilling mud and minor sand and silt. Water recovered had resistivities of 12.5 ohms @ 60°. The tool plugged and became stuck in the hole. The test was abandoned and the tools left downhole. See Appendix No. 1 for detailed information on DST No. 1.

Test Behind Casing:

The 4½" casing was perforated from 3231-3249', 2 shots per foot. The fresh water cushion was swabbed off and fresh formation water with live oil scum was recovered at a rate of approximately 1000 barrels of fluid per day by June 13th. Resistivities were 30-32 ohms @ 52°F. Final wellhead pressure observed was 25 psi. The well produced very fine to very coarse quartz sand with some coal for approx. 6 hours, gradually clearing up to clean water by June 14th.

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Deviation Surveys: No deviation surveys were taken.

Temperature Surveys: No temperature surveys were taken.

Other Surveys: No other well surveys were run.

WELL EVALUATION

To evaluate sand 3230-3410' casing was run to top of fish 3370'. This casing was perforated and then "rocked" with an air compressor. After eight hours work the well flowed with steadily increasing rate and built up to 22 bbls/hr. Surface pressure was measured at 25 psi after 10 minute shut-in. Fluid recovered was fresh water with a light oil slick. Oil was live and formed a waxy scum on flare pit. Insufficient oil was obtained for samples but from colouration - red, brown through green - and extremely volatile nature, it is concluded that the API gravity is in the range 45 to 60. Oil slick evaporated within minutes leaving a waxy scum.

COMPLETION

After determining that water was fresh, the well was released to property owner for stock and domestic use. A letter of acceptance is attached in Appendixes.

Before releasing well to property owner the high pressure control valves were recovered and replaced with a 2" tee and 2" low pressure gate valve. Well was shut-in for ten minutes and wellhead pressure was read as 25 psi. The well was left flowing to clean up as a small amount of sand was still being produced.

All formalities under the Ground Water Act 1969, have been completed and Form GW4 has been lodged with the Mines Department in Victoria.

G E O L O G Y

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The Crossroads No. 1 well was drilled as a twin of the Arco-Woodside Seaspray No. 1, 120 feet to the south.

There was no significant difference in the structure or stratigraphy observed between the two wells. For details of the previous work and geology the reader is referred to the Seaspray No. 1 Well Completion Report by Frank T. Ingram (1964) for Arco Limited. Minor differences in formation tops due to differences between kelly bushing levels and slight structural effects were noted. A stratigraphic table comparing depths of formation tops encountered in Crossroads No. 1 and Seaspray No. 1 follows. (See Table 1.)

Notes as to observed differences between Crossroads No. 1 and Seaspray No.1 are listed below:

1. The contact between the non-marine Lake Wellington/Haunted Hills Gravels Formation and the Jemmy's Point Formation may be up to about 30 feet higher than picked in the Seaspray No. 1 well. Yellow stained sand and limestone occurs below 345 feet in the Crossroads No. 1 well. Such staining is expected just below the top of an unconformity. Further the shales from the interval 350-375 feet were very glauconitic, indicating a marine environment. The Lake Wellington Formation grades in places into marine sediments, but the shales were associated with coquinas typical of the Jemmy's Point. Therefore, there either exists considerable relief over the 120 feet separating the two wells or the Jemmy's Point Formation top should have been picked at about 345 feet in the Seaspray No. 1 well.
2. There was 14 feet difference between the two wells at the top of the Gippsland Limestone. In a limestone environment it seems unlikely that there could be 14 feet of relief over 120 feet and the difference is attributed to errors in picks and measurement. The wireline logs indicates the top of the Gippsland Limestone to be at 598 feet in Crossroads No. 1 and 600 feet in Seaspray No. 1. Therefore, it is strongly suggested that the top of the Gippsland Limestone should be at about 600 feet in both wells.
3. All measurements indicate that the top of the Latrobe Valley Coal Measures is 10 feet higher in Seaspray No. 1 relative to Crossroads No. 1. This relief may explain the occurrence of a gas kick in the sand interval 3230-3410 feet in Seaspray No. 1 which did not occur in this zone in Crossroads No. 1.

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T A B L E 1

COMPARATIVE STRATIGRAPHY, CROSSROADS NO. 1 and SEASPRAY NO. 1

AGE	FORMATION	LITHOLOGY	DEPTHS		THICKNESSES	
			CROSSROADS	SEASPRAY	CROSSROADS	SEASPRAY
U. PLIOCENE	L. Wellington or Haunted Hills	Sand, Gravel and Clay	surface 345	surface 380	336 +	369 +
L. PLIOCENE	Jemmy's Point	Sand, Coquina some Marl	440	440	95	60
U. MIOCENE	Tambo River	Marl	598	610	158	170
MIOCENE	Gippsland Limestone	Limestone	2150	2150	1552	1540
OLIGOCENE	Lakes Entrance	Shale and Marl	2675	2665	525	515
L. OLIGOCENE- U. EOCENE	Latrobe Valley Coal Measures	Sand, Coal and Clay	-	4542	-	1877

9.

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CONTRIBUTIONS TO GEOLOGIC KNOWLEDGE RESULTING FROM DRILLING

The anomalously high resistivities which occur in the Latrobe Valley Coal Measure in the area, are due to extremely fresh waters with measured resistivities of 31-32 ohms @ 52°.

These waters are probably even more resistive within the formation before being contaminated by drilling mud, sampling, casing and testing.

REFERENCES

- INGRAM, Frank T. 1964 Seaspray No. 1 Well, final well report, unpublished report for Arco Limited and Woodside (Lakes Entrance) Oil Co. N.L.

Crossroads 1.

Halliday Enterprises Ltd.

GL = 97'

Spudded 19.5.71 reached T.D. 3.6.71

TD = 3140.

Location $38^{\circ} 19' 39''$ S $147^{\circ} 09' 42''$ E.

Note location 2 seconds West of Seagram 1.

Stratigraphy

Pre Permian Kalimantan, Kalimantan	0 - 440
Tambo River Formation	440 - 597
Ceylonian Limestone Fan	597 - 2150
Lakes Entrance Formation	2150 - 2665
Lalrobe Valley Coal Measures	2665 - 3140

. . .

A P P E N D I X 1

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FORMATION TESTING

D.S.T. 1:

Data sheets for D.S.T. 1 were taken from the Halliburton report. Copies of this report follow. The test tools below the safety joint were left in the well hence no bottom pressure or temperature data was obtained.

The tools became stuck in the hole during the test. They were partial plugged during the flow period. Loose running sand trapping the anchor pipe is believed responsible for the tools becoming stuck. The rig pulled up to 90,000 pounds on the string for one hour. The drill string was then backed off the test tools at the safety joint and retrieved.

Tools left in the hole were:

3-3/4" Pressure Recorder (3000 lbs.), Expanding Shoe Assembly, Shoe-Top Packer, Support Packer, Support Shoe, 30 feet of perforated Anchor Pipe, 3-7/8" VR Safety Joint case and seat, 24 hour Clock, 2 x 2-7/8" Subs, Nurnberg Temperature Recorder and Thermometer.

TEST BEHIND 4 1/2" CASING

The 4 1/2" casing was perforated from 3231-3249 feet, on 11th June at 2 shots per foot with Schlumberger shaped charges. The fresh water cushion was swabbed off and fresh water with live oil scum recovered at a rate of approximately 1000 barrels of fluid per day by June 13th. Resistivities were 30-32 ohms @ 52°F. Final wellhead pressure observed was 25 psi. The well produced very fine to very coarse quartz sand with some coal for approximately 6 hours, gradually clearing up to clean water by June 14th.

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FLUID SAMPLE DATA				Date	Ticket Number	
Sampler Pressure _____ P.S.I.G. at Surface Recovery: Cu. Ft. Gas _____ cc. Oil _____ cc. Water _____ cc. Mud _____ Tot. Liquid cc. _____ Gravity _____ ° API @ _____ ° F. Gas/Oil Ratio _____ cu. ft./bbl.				6-2-71	HI 1752	
RESISTIVITY _____ CHLORIDE CONTENT _____ Recovery Water .25 @ 60 ° F. _____ ppm Recovery Mud _____ @ _____ ° F. _____ Recovery Mud Filtrate _____ @ _____ ° F. _____ ppm Mud Pit Sample _____ @ _____ ° F. _____ Mud Pit Sample Filtrate _____ @ _____ ° F. _____ ppm Mud Weight 9.4 vis 38 Sec. sp				Kind of Job	OPEN HOLE	Holliburton District
				Tester	MR. HEARNE	Witness MR. NIXON
				Drilling Contractor	W. L. SIDE AND SON	BC
EQUIPMENT & HOLE DATA						
				Formation Tested	-	
				Elevation	- Ft.	
				Net Productive Interval	- Ft.	
				All Depths Measured From	Kelly Bushing	
				Total Depth	3412' Ft.	
				Main Hole/Casing Size	6 1/2"	
				Drill Collar Length	299.3' I.D. 2"	
				Drill Pipe Length	3049' I.D. 3.476"	
				Packer Depth(s)	3372' Ft.	
				Depth Tester Valve	3351' Ft.	
TYPE		AMOUNT	Depth Back	Surface	Bottom	
Cushion Diesel Water		3148	Ft. Pres. Valve	Choke	3/8" Bottom Choke 5/8"	
Water		200				
Recovered		2500	Feet of		Muddy Water	
Recovered		448	Feet of		Discolored Water	
Recovered		200	Feet of		Rat hole	
Recovered			Feet of			
Recovered			Feet of			
Remarks Tool opened at 9:00 with a strong blow at surface. Closed in one minute due to leak in hose. Reopened at 9:05. Surface PSI 220, decreasing throughout flow to zero until closed in at 11:52. On second flow, (Customer request) tool stuck in hole. Backed off at safety joint.						
TEMPERATURE	Gauge No. 2270	Gauge No. 2269	Gauge No.	TIME		
	Depth: 3355 Ft.	Depth: 3412 Ft.	Depth: Ft.			
Est. °F.	12 Hour Clock	- Hour Clock	Hour Clock	Tool A.M.		
	Blanked Off No	Blanked Off Yes	Blanked Off	Opened 9:00 P.M.		
Actual °F.	Pressures		Pressures		Pressures	
	Field	Office	Field	Office	Field	Office
Initial Hydrostatic	1,952	1648				
First Period Flow	Initial	1,700	CHART LEFT IN			
	Final	1,790	HOLE.....		172	
	Closed in					
Second Period Flow	Initial					
	Final					
	Closed in					
Third Period Flow	Initial					
	Final					
	Closed in					
Final Hydrostatic	-	-				

Legal Location Sec. - Twp. - Rng. -----
 Lease Name -----
 Well No. 1 -----
 Test No. 1 -----
 Field Area PEP 72 -----
 Mea. From Tester Valve -----
 County AUSTRALIA -----
 State VICTORIA -----
 Tested Interval 3372' - 3412' -----
 Lease Owner/Company Name HALLIDAY ENTERPRISES -----

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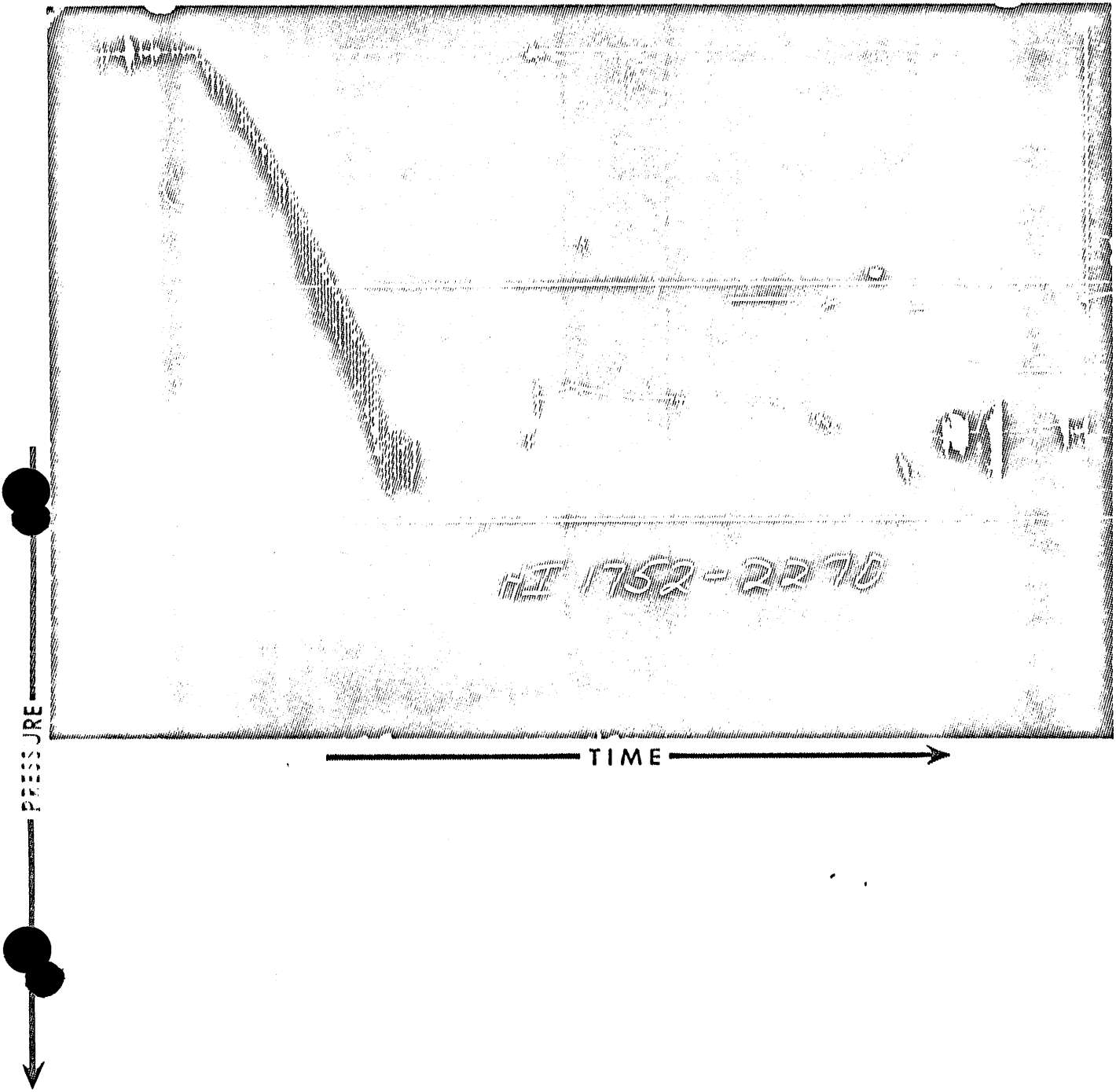
14/27

HI 1752

	O. D.	I. D.	LENGTH	DEPTH
Reversing Sub	5"	2.12"	12"	345049'
Water Cushion Valve				
Drill Pipe	4"	3.476"	3049'	
Drill Collars	-	2"	299.3'	
Handling Sub & Choke Assembly				
Dual CIP Valve	3.88"	.87"	58"	
Dual CIP Sampler				
Hydro-Spring Tester	3.90"	.62"	68"	3351'
Multiple CIP Sampler				
Extension Joint				
AP Running Case	3.75"		55"	3355'
Hydraulic Jar	3.88"	1"	32"	
VR Safety Joint	3.88"	.75"	30"	
Pressure Equalizing Crossover				
Packer Assembly	5.25"	.75"	58"	3372'
Distributor				
Packer Assembly				
Flush Joint Anchor	3.25"	1.75"		
Pressure Equalizing Tube				
Blanked-Off B.T. Running Case				
Drill Collars				
Anchor Pipe Safety Joint				
Packer Assembly				
Packer Assembly				
Anchor Pipe Safety Joint				
Side Wall Anchor				
Drill Collars				
Flush Joint Anchor				
Blanked-Off B.T. Running Case	3.75"	2.50"	50"	3412'

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

16.

16/27

A P P E N D I X 2

WATER ANALYSIS

Seven water samples recovered from the interval 3231-3249 feet in the Crossroads No. 1 well were tested for resistivity. The water samples were taken on June 13 and June 14 during production testing after most of the sediment flow had diminished. The resistivity measurements were conducted by Schlumberger at thier Sale, Victoria office.

The measurements were taken and averaged. Results were:

31.7 ohms at 52° F. (average)

These measurements indicate very fresh water with a dissolved solids content on the order of 200 ppm or less.

Halliday Enterprises Pty. Ltd.

TELEPHONE:
94 5147

58 CUTLER ROAD
CLONTARF, N.S.W. 2093

June 21, 1971



Secretary for Mines
Mines Dept.
171 Flinders St.
MELBOURNE, Vic 3000

ATTN: Mr. Peter Kenly, Geological Survey

Dear Sir:

This letter confirms that 6*30 oz. bottles of fresh water recovered from the Crossroads No. 1 well have been delivered to your office by Mr. E.T. Kempin. This water was obtained from the sand aquifer at 3230-3410 feet, well depths, through perforations from 3231-3249 feet.

Mr. B.R. Thompson of your sedimentary basin section has expressed a desire for information on groundwater obtained from the Crossroads No. 1 well. Information he may find of interest follows:

Measured wellhead pressure: 25 psi

Flow rate (estimated): 1,000 barrels per day (U.S.)

Measured resistivity: 30.7 ohms @ 52° F. (averaged from 7 samples)

Formation: Latrobe Valley Coal Measures

Yours faithfully,

A handwritten signature in dark ink, appearing to read "J.D. Watt".

J.D. Watt

for Halliday Enterprises

A P P E N D I X 3

17/27

The following is a copy of letter of agreement received from Mr. R.S. McNeilly the property owner re disposal of water bore:

June 16, 1971

Mr. R.S. McNeilly,
Seaspray Road,
via SALE. 3850

The Managing Director,
Halliday Enterprises Pty. Ltd.,
58 Cutler Road,
CLONTARF.

Dear Sir:

CROSSROADS NO. 1

With reference to the above bore and your offer to release this bore for our use. We have discussed this with the pertinent departments of the Victorian Government and am now agreeable to accepting responsibility for this bore.

We wish to thank your company for making this bore available as it will be of considerable value to the farm.

Yours sincerely,

ROBERT S. McNEILLY

GENERALIZED STRATIGRAPHIC COLUMN

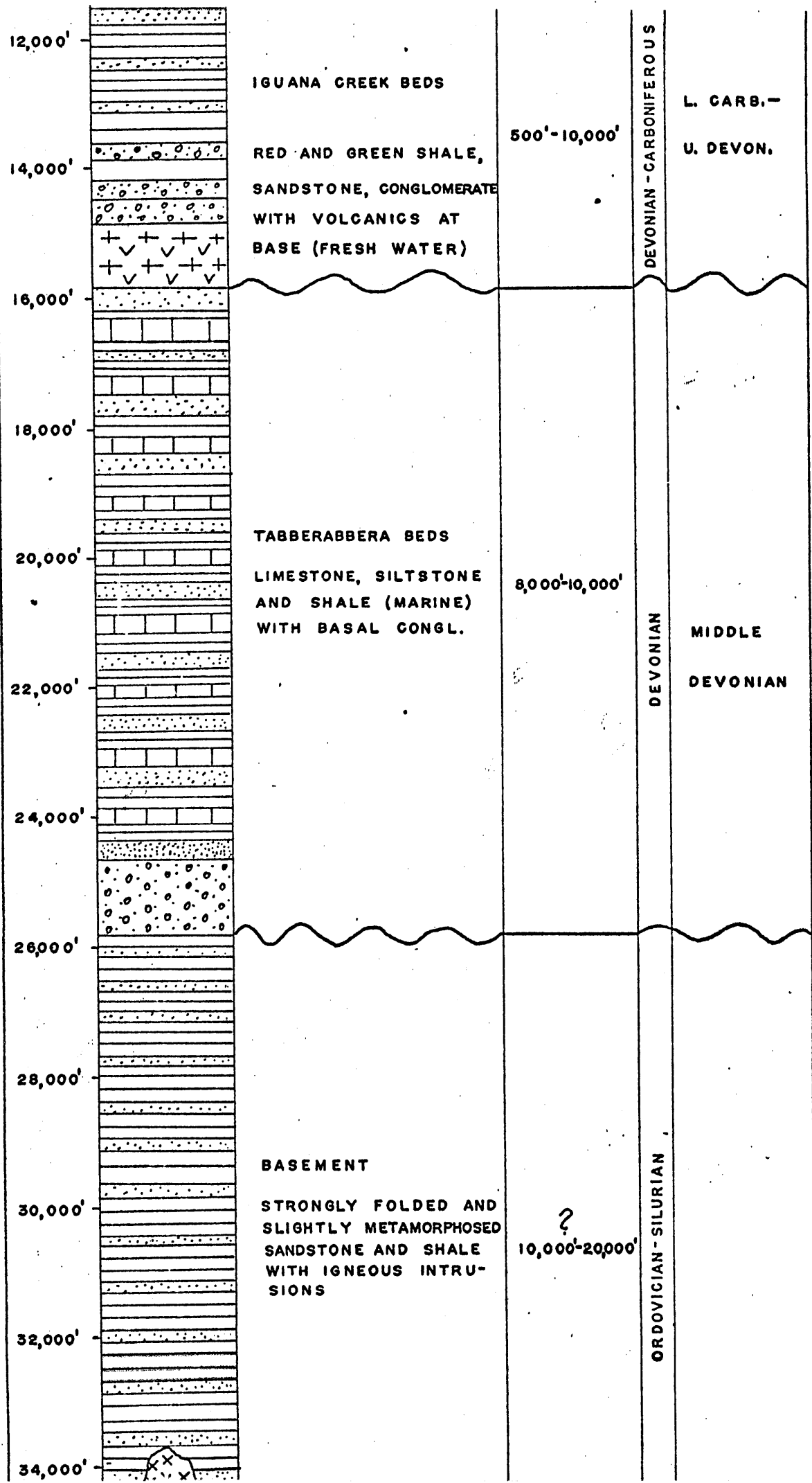
GIPPSLAND BASIN

18/27

VERTICAL SCALE 1" = 2000 FEET

AGGREGATE THICKNESS	LITHOLOGY	NAME AND DESCRIPTION	UNIT THICKNESS	AGE	
		HAUNTED HILL GRAVELS AND JEMMY'S POINT FM. SAND, GRAVEL AND CLAY	0 - 600'	TERTIARY	QUATERNARY - L. PLIOCENE
		TAMBO RIVER FM. SANDY MARL	0 - 300'		U. MIOCENE
2000'		GIPPSLAND LIMESTONE MARL AND LIMESTONE	900'-1650'	TERTIARY	MIOCENE
		LAKES ENTRANCE FM. CALCAREOUS SHALE & MARL	200'-760'		OLIGOCENE
4000'		LATROBE VALLEY COAL MEASURES BROWN COAL, SAND & CLAY	50'-2000'		L. OLIGOCENE - U. EOCENE
6000'		MARINE CRETACEOUS SHALE, SILTSTONE & SAND (PROBABLY NOT PRESENT ON MAINLAND, OR VERY THIN)	UNKNOWN - REPORTED IN HOLLANDS LANDING BORE ONLY	CRET.	UPPER - MIDDLE
8000'		STREZLECKI GROUP FRESH WATER GRAY-WACKE, FELDSPATHIC SANDSTONE, ARKOSE, SHALE AND MUDSTONE	5200'-20,000' UNKNOWN	JURASSIC? - CRETACEOUS	L. CRETACEOUS - U. JURASSIC?
10,000'					
12,000'		IGUANA CREEK BEDS		DEVONIAN - CARBONIFEROUS	L. CARB. -
14,000'		RED AND GREEN SHALE, SANDSTONE, CONGLOMERATE WITH VOLCANICS AT BASE (FRESH WATER)	500'-10,000'		U. DEVON.
16,000'					
18,000'					

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GEO COUNSEL PTY. LTD.

23 RIVERVIEW STREET
SOUTH PERTH 6151

TELEPHONE 67 6928

WELL REPORT

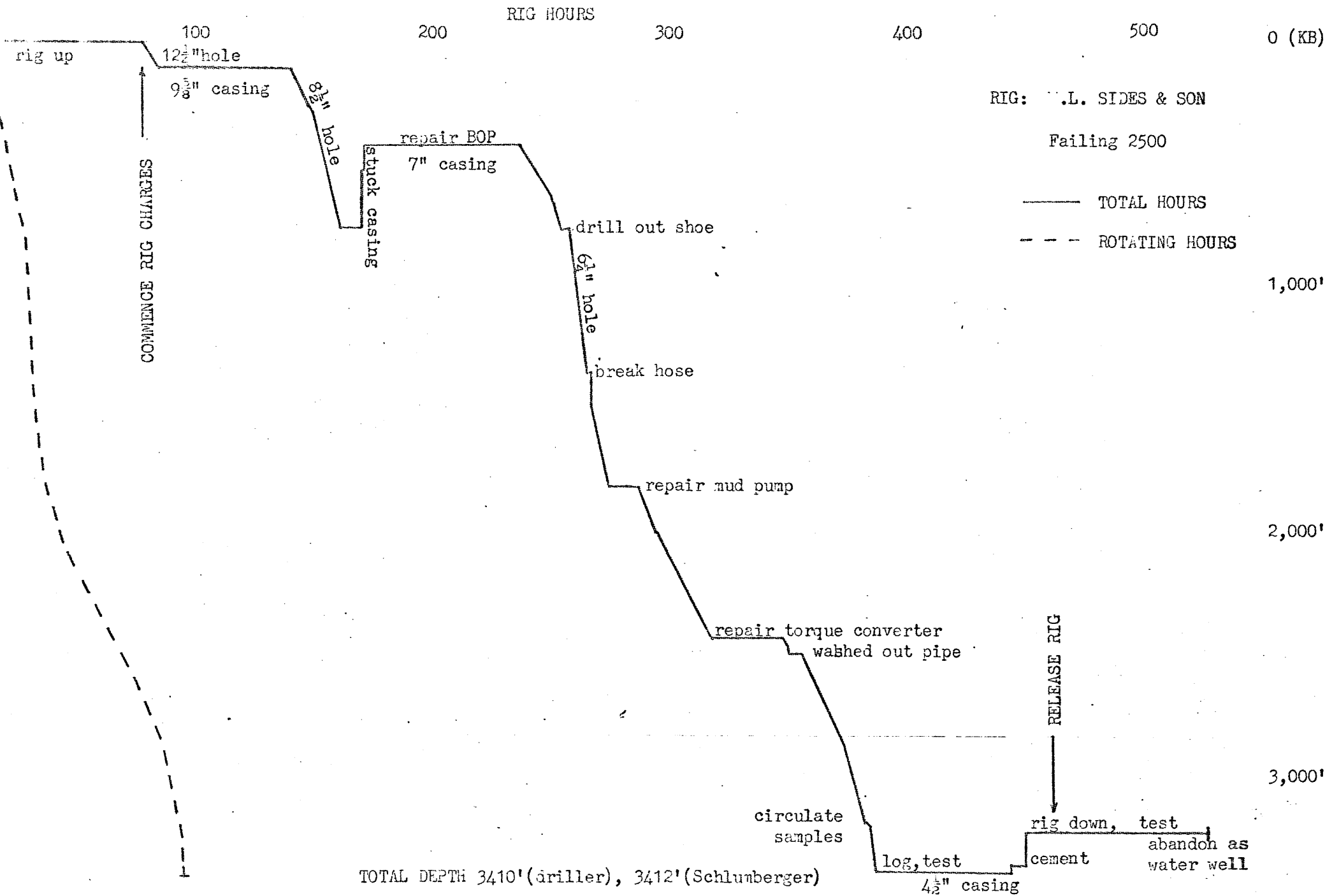
COMPANY: HALLIDAY ENTERPRISES, PTY. LTD.
WELL: CROSSROADS NO. 1
LOCATION: Latitude 38°19'39"S
Longitude 147° 9'42"E
P.E.P. 72 Gippsland Basin (onshore)
Victoria, Australia

CONTENTS

1. MUD LOG (hotwire with chromatograph)
2. RIG HOURS
3. TIME BREAKDOWN
4. MUD SUMMARY AND BITS
5. INITIAL DRILLING PROGRAMME
6. LOG DISTRIBUTION

CROSSROADS NO. 1

2/27



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TIME BREAKDOWN, hours/day

CROSSROADS NO.1 Halliday Enterprises Pty. Ltd.

	MAY															JUNE															TOTALS						
	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	11	12	13	14	15	31	%				
RIG UP & DOWN	11	11½	11	11	11	11	16½																10	16	10				3	7	129	24					
DRILL AHEAD							1	7½							11½	12	22¼	13	10½													92	17				
DRILL CEMENT										4½	9¾			5½	1¼																	11¼	2				
REAM															3¾			½	3		2	7										16¼	3				
CONDITION MUD									¾		¾				2¼	4			1	2¼	17											28½	5				
CIRC. SAMPLE																			½	2												2½	.5				
CIRC. E LOGS																				1¼												1¼	.25				
TRIP								¾		½	1¾		1		¾	5¼	1	5½	5	¾	6½										30½	6					
SERVICE RIG																					1										1¼	.3					
INSTALL/TEST BOP									23½	15		12	16¾		1¾			¼														69¼	13				
CUT-SLIP LINE																																	¾	.15			
REPAIR RIG											1¼				3½	2	¾	13½	1½													22¼	4				
CORE																																					
WIRE LINE LOG																					¾																
RUN/CMT CASING								¾			¾	½												11½													
WAIT ON CEMENT								11½	½			12																									
DST																						12															
PROD. TEST																												5	5	7	2						
FISH																																					
STUCK PIPE																																					
OTHER																																					
TOTALS	11	11½	11	11	11	11	17½	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	10	16	10	5	5	7	5	7	533					
PERCENTAGES																																					
OF FOOTAGE	0	0	0	0	0	0	.88	2.6	0	5.2	13.62	0	0	0	274	9.8	122	0	130	152	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100		
FOOTAGE	0	0	0	0	0	0	30	87	0	178	465	0	0	0	925	337	426	0	445	517	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3410		

WELL SUSPENDED

23/27

GEO COUNSEL PTY. LTD.

23 RIVERVIEW STREET
SOUTH PERTH 6151

TELEPHONE 67 6928

OPERATOR: Halliday Enterprises Pty. Ltd.

WELL: CROSSROADS NO. 1

MUD SUMMARY

Surface to 1832 feet: Fresh water gel

1832 to 3410 feet(TD): Fresh water gel with ligno-sulfonate

3410, condition for 4½" casing: Ligno-sulfonate with diesel

BITS

NO.	SIZE	IN	OUT	MAKE	TYPE	SERIAL	NOZZLE	FOOTAGE	HOURS	WEIGHT	RPM	PUMP	CONDITION
1	12¼	0	117	LeGrange	MD	n.a.	Reg	117	8	2000	70	55	1-1-in
2	8½	117	760	Smith	DTJ	60825	Reg	643	19½	2-5000	60-80	50	1-1-in
	6¼	760	1832	Smith	DTJ	DS855	2x9 1x10	58' cement 295' old hole 1072' new hole		5-6000	60-100	54	1-2-in
4	6¼	1832	2447	Smith	DTJ	DS901	2x9 1x10	615	29¾	5-10000	60-120	53	2-2-in
5	6¼	2447	3410	Smith	DTJ	DS902	open	963	23½	6-10000	70-120	56	3-2-1/16" under

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SUITE 101, 1ST FLOOR, CENTRAL BUSINESS CENTRE, CREMONA, VIC 3060

DRILLING
SERVICING PTY. LTD.
APPLIED GEOSCIENCES
CONSULTANTS & ASSOCIATES

April 21, 1971

HALLIDAY ENTERPRISES PTY. LTD.

DRILLING OPERATIONS

WELL NAME: Crossroads # 1.
ESTIMATED TOTAL DEPTH: 3900 Feet.
LOCATION: Vicinity of Sale, Victoria.
DRILLING CONTRACTOR: W. L. Sides & Son Pty. Ltd. - Melbourne.
DRILLING EQUIPMENT: Failing 2500.
SUPERVISION: Drilling - Drilling Servicing Consultant Pty. Ltd.
Geology - W. Nixon, J. Watt and R.J. Berven.

PROGRAM:

1. Prepare site and move in Failing 2500 drilling rig, rig up.
2. Spud in 12-1/4 hole and drill to \pm 90 feet.
3. Run 3 joints 9-5/8 casing with guide shoe and two centralizers. Cement with sufficient construction cement (50 sacks) with 2% calcium chloride, to get cement returns to surface. Use rig pump for cement job.
4. WOC until samples set. Land 10 inch 2000 MSP casing bowl and install BOP equipment, consisting of Shaffer 10 inch 3000 MSP mechanical double gate and 10 inch 3000 MSP Hydril accumulator.

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Pressure test to 1000 psi. Pressure test kill manifold to 2000 psi and kelly cock to 2000 psi. Test mud manifold kelly hose to 750 psi.

5. Drill out shoe and drill to \pm 810 feet with 8-3/4 or 8-1/2 bits.
6. Run \pm 810 feet, 7", 20 or 23 lb/ft J55 casing with guide shoe and centralizer on lower three joints.
7. Cement with sufficient construction cement to give rise of ⁷⁰⁰350 feet (~~55~~ sacks). Use top plug only. Bump plug to maximum 500 psi. Land casing at free running weight and cut off casing.
8. Pressure test casing, blind rams and pipe rams to 2000 psi. Check Hydril for operation, but do not pressure test.
9. Drill out using 6-1/4 jet bits. Drilling mud - lightweight bentonite with water loss controlled to below 15 CCS to 2800 feet and below 6-8 CCS from 2800 to TD. Sample, core and wire logs to be taken as directed by well site geologist.
10. DST to be run in the top of the sands at approximately 3200 feet. If hydrocarbons are recovered, the well to be deepened to test all sands to basement predicted at 3900 feet.
11. DST tools to test open hole of 6-1/4 are required on site from time of drilling out of 7" casing. BT recorders suitable for hole depths of 4000 feet with pressure gradient of 43.5 psi per 100 feet.
12. At TD, the hole to be evaluated and a completion or abandonment program drawn up.

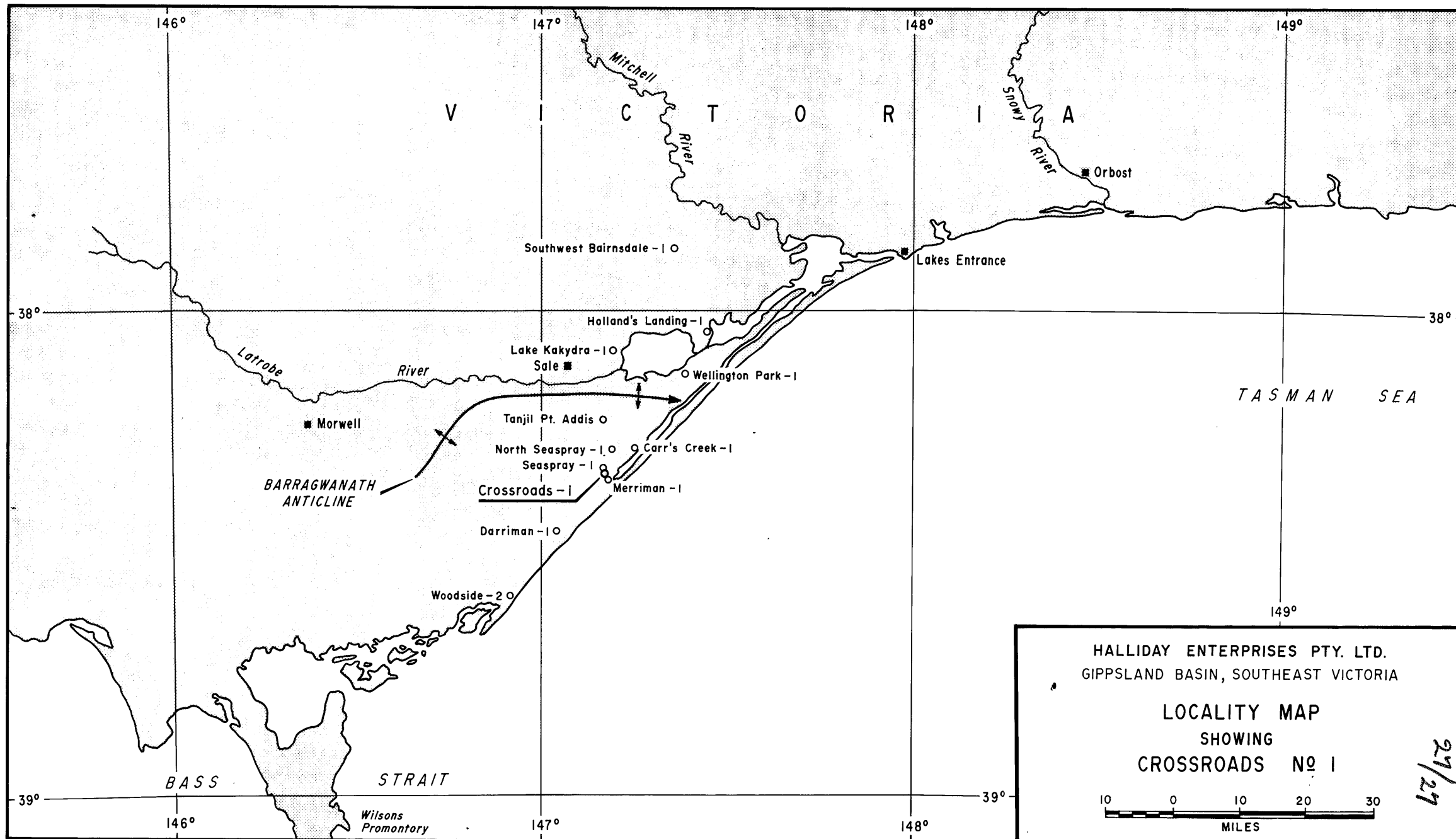
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GEO COUNSEL PTY. LTD.

23 RIVERVIEW STREET
SOUTH PERTH 6151
TELEPHONE 67 6928

LOG DISTRIBUTION

1. VICTORIAN MINES DEPT.
West Tower, Princes Gate
MELBOURNE, Vic. 3000
2. WOODSIDE OIL N.L.
151 Flinders St.
MELBOURNE, Vic. 3000
3. BURMAH OIL CO.
10 Stirling Highway
MIDLANDS, W.A. 6009
4. AUSTRALIAN OIL & GAS CORP.LTD.
261 George St.
SYDNEY, N.S.W. 2000
5. CONTINENTAL OIL CO.
168 Kent St.
SYDNEY, N.S.W. 2000
6. ENDEAVOUR OIL CO. N.L.
232 Victoria Pde.
EAST MELBOURNE, Vic.
7. HARBOURSIDE OIL
Tower Bldg., Australia Square
SYDNEY, N.S.W. 2000
8. MURUMBA OIL N.L.
6 O'Connell St.
SYDNEY, N.S.W. 2000
9. PEXA OIL N.L.
291 George St.
SYDNEY, N.S.W. 2000
10. PLANET OIL N.L.
United Insurance Bldg.
Corner Hunter & George Sts.
SYDNEY, N.S.W. 2000
11. HALLIDAY ENTERPRISES, PTY.LTD.
53 Cutler Road
CLONTARF, N.S.W. 2093



Drafting by : EXPLORATION DRAFTING SERVICES

PE601456

This is an enclosure indicator page.
The enclosure PE601456 is enclosed within the
container PE902796 at this location in this
document.

The enclosure PE601456 has the following characteristics:

ITEM_BARCODE = PE601456
CONTAINER_BARCODE = PE902796
NAME = Well Completion Log
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = COMPLETION_LOG
DESCRIPTION = Well Completion Log (enclosure from
Well Report) for Crossroads-1
REMARKS =
DATE_CREATED = 14/06/1971
DATE_RECEIVED =
W_NO = W630
WELL_NAME = East Reeve-1
CONTRACTOR = Halliday Enterprises
CLIENT_OP_CO = Halliday Enterprises

(Inserted by DNRE - Vic Govt Mines Dept)

PE603165

This is an enclosure indicator page.
The enclosure PE603165 is enclosed within the
container PE902796 at this location in this
document.

The enclosure PE603165 has the following characteristics:

ITEM_BARCODE = PE603165
CONTAINER_BARCODE = PE902796
NAME = Crossroads 1 Mud Log
BASIN = GIPPSLAND
PERMIT = PEP 72
TYPE = WELL
SUBTYPE = MUD_LOG
DESCRIPTION = Crossroads 1 Mudlog. Attachment 3 of
WCR.
REMARKS =
DATE_CREATED =
DATE_RECEIVED =
W_NO = W630
WELL_NAME = Crossroads-1
CONTRACTOR = Geo Counsel Pty. Ltd.
CLIENT_OP_CO = Woodside Oil N.L.

(Inserted by DNRE - Vic Govt Mines Dept)