

WELL COMPLETION REPORT

KEYSTONE NO. 1

HALLIDAY ENTERPRISES PTY. LTD.

3 1 JUL 1986 April 6, 1972

WCR
KEYSTONE-1
(W641)

Page 1 of 11

WELL REPORT

COMPANY: Halliday Enterprises Pty. Ltd.

WELL: Keystone No. 1

LOCATION: Latitude: 38° 19' 39" S Longitude: 147° 9' 21" E

P.E.P. 72 Gippsland Basin

Victoria, Australia.

TABLE OF CONTENTS

	PAGE
SUMMARY	2
WELL HISTORY	
General Data	2
Drilling Data	3
FORMATION EVALUATION	4
GEOLOGY	5
HYDROCARBON SHOWS	6
APPENDIX : Sidewall Core Descriptions	8
ILLUSTRATIONS:	
Figure 1 Locality Map	10
Table l Stratigraphy	7
ATTACHMENTS:	
1. Core Lab Grapholog	Enc.
2. Composite Well Log	Enc.
3. COMPENSATED FORMATION DENSITY LOC	Enc.
4. LATEROLOG	Enc

SUMMARY

The Keystone No. 1 well was drilled 3/10ths mile west of Crossroads No. 1 drilled by Halliday and Seaspray No. 1 drilled by Arco. These wells are about three miles northwest of Seaspray, Victoria in P. E. P. 72. The Keystone well was drilled under a farm - in arrangement with Woodside Oil N. L. and its partners.

The well had two objectives, the first to test the Latrobe Group in an updip position from Crossroads No. 1 and the second to test the upper portion of the Strzelecki Group for gas. The top of the Latrobe was encountered lower than in Crossroads No. 1

Keystone No. 1 was spudded on February 8, 1972, using Richter Bawden's MI rig, a National 110 D.E. The hole was plugged and abandoned at 6430 feet on February 19, 1972, as a dry hole.

Trouble was experienced with severe caving of the Latrobe coals. The coals were eventually stabilized by increasing weight and viscosity and adding diesel to the mud system.

No tests were conducted. Minor oil was encountered in the Latrobe Group and small gas shows were penetrated in the Strzelecki. There were no commercial accumulations of hydrocarbons in the well.

WELL HISTORY

General Data

Well Name: Keystone No. 1

Location: Latitude: 38° 19' 39"S

Longitude: 147 9 21 E

Name and Address Woodside Oil N.L. of Tenement Holder: 151 Flinders Street

Melbourne, Victoria, 3000.

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

District: Gippsland Basin

Total Depth: Driller: 6430'

Schlumberger: 6427'

Date Drilling Commenced: February 8, 1972

Date Well Abandoned: February 19, 1972

Drilling Time to
Total Depth: 10 days

Elevations: Ground level: 97 feet Kelly bushing: 114 feet

Status: Plugged and abandoned.

Drilling Data

Name and Address of Drilling Contractor:

Richter Bawden Drilling Pty. Ltd.

Princess Gate Building

Flinders Street

Melbourne, Victoria, 3000.

Drilling Plant:

Rig Ml National 110 D.E.

Capacity 16,000 feet

Motors: 3, PTS-6 Superiors

Mast:

Lee C. Moore, Cantilever, 960,000 lb

capacity.

Pumps:

1 National N11000, Duplex, $7\frac{1}{4}$ " x 16" compound

1 Emsco D1000 Duplex, 73/4" x 18" compound

Blowout Preventors:

1 Cameron U 5000 lb. $13^{5}/_{8}$ "

1 G.K. 5000 lb. 13⁵/8" W.P. hydril

Hole Sizes:

 $17\frac{1}{2}$ " to 100"

 $12\frac{1}{4}$ " to 1033"

 $8^{3}/_{4}$ " to 6430' (T.D.)

Casing and Cement:

Setting Depth (KB)

Weight Grade

Thread

Shoe and Collars

Centralizers 1

Cement

Cement method

951 1006' 133/8" 95/811 54.5 lb 37 lb. J55 J55

Buttress 8 round, buttress

Guide shoe Float collar, guide shoe

None One

160 sxs 2%CaCl 375 sxs 2% CaCl Dowell, cmthead Dowell cmt head

Drilling Mud:

Fresh water gel, with diesel below 3700'

Water Supply:

Piped from Crossroads No. 1

Drilling Mud Additives:

425 sxs Caustic Soda 5 drums. Qbroxin ... 10 sxs Diesel 2510 gal.

Dextrid

8 **s**xs

Perforating:

None

Plugs:

Plug No. 1 2600 - 2750 300 sxs cmt with

2% Ca C1

Plug No. 2 900 - 1100' 130 sxs cmt

Plug No. 3 surface 10 sxs cmt

Fishing:

None

Lost Circulation:

Circulation was lost for $1\frac{1}{2}$ hours at 2910 feet into Latrobe sands due to excessive coal cavings and cuttings in hole. Continued partial losses occurred through entire Latrobe until coals were stabilized by high viscosity

mud containing diesel fuel.

Bits:	No.	Size	Make Type	In	Out	Ftage	Hours	Condition
	Surface	$17\frac{1}{4}$	HTC OSC	0	100	100	2	1-1-I
	1	$12\frac{1}{4}$	HTC OSC3	100	1034	934	$7\frac{1}{4}$	1-1-I
	2	$8\frac{1}{2}$	HTC X3A	1034	3444	2410	$19\frac{1}{4}$	3-6-I
	3	8 1	HTC X1G	3444	4424	980	$10^{3}/_{4}$	7-3-0 ¹ / ₈ "
	4	8 <u>1</u>	HTC X1G	4424	4941	517	$11\frac{1}{4}^{\frac{1}{4}}$	7-5-I ^{'8}
	· 5	$8\frac{1}{2}$	HTC X1G	4941	5489	548	$11\frac{1}{2}$	7-4-I
	6	$8\frac{1}{2}$	HTC X1G	5489	5948	459	$11^{3}/_{4}$	7-8-I
	7	$8\frac{1}{2}$	HTC X1G	5948	6430	482	$16\frac{1}{4}$	3-4-I

FORMATION EVALUATION

Coring:	No conventional

30 sidewall cores, taken by Schlumberger

Testing: None

Mudlogging: Hotwire and Chromatograph with Drill Rate

by Core Laboratories Australia Ltd.

Logger: D. Sisely

Wireline Logging: Laterolog - Spontanious Potential and

Formation Density - Gamma Ray - Calipher,

by Schlumberger Seaco Engineer: W. Chaffee

Intervals: LL-SP 6423-1006

FDC-GR 6426-2500

Ditch Samples: 10 foot washed and dried, 100'-6430 (T.D.)

Distribution: 1 set each to Halliday Enterprises

(stored at Victorian Mines Dept.

Woodside-Burmah N. L. Victorian Mines Dept.)

Deviation Surveys:	Depth	Vertical Deviation
	1520	10
	2010 2468	3/ ₄ ° 1
	3500	1 °
•	4424	13/4
	4931	13/4 0
	5489	20 -
	6430	21/40

WELL EVALUATION

The well was evaluated by cutting samples, mudlog and wireline data. Minor oil slicks were noted on the shale shaker while conditioning mud during lost circulation and coal caving problems below 3400 feet. Small gas kicks were encountered from several thin zones in the Strzelecki Group. There were no commercial accumulations of hydrocarbon in the well.

GEOLOGY

Geology of the Keystone No. 1 well was obtained by wireline logs and ditch samples. Formation tops were taken from wireline data. Formation descriptions are of cuttings derived from ditch samples. All measurements are from the kelly bushing, 18 feet above ground level and 115 feet above sealevel.

From the surface to 450 feet occurred the Lower Pliocene sands of the Jemmy's Point Formation. They contained minor lignite, clay and coquina. The sands were loose to friable, fine to coarse grained, slightly lignitic in parts with minor to abundant biotite and some yellow or grey-green clay matrix.

From 450 feet to 545 feet occurred the Upper Miocene Tambo River formation. It was predominately a marly limestone with some coquina and marl interbeds. The limestone consisted of fossil debris in a grey-green matrix. Locally it contained abundant quartz grains.

The Miocene Gippsland Limestone occupied the interval 545 feet to 2118 feet. It was a white, cream, light grey to light grey-brown skeletal limestone, friable with thin hard streaks, generally porous, clean to dirty and often glauconitic. Below 1660 feet it contained interbedded thin grey-green marls which became thicker and more common below 2030 feet. The limestone was a porous fossil hash with minor micritic matrix except where hard. The pore space contained variable amounts of marly clay and glauconite with minor carbonaceous grains. The predominate fossils were forams, mollusks, echinoids, bryozoans and ostracods.

The Gippsland Limestone graded into the Oligoiœne Lakes Entrance formation which was predominately a grey-green, brown and grey-brown fossiliferous marl with hard grey limestone streaks and occasional siltstone. The marl graded to calcareous mudstone. Below 2450 feet, there were traces of pyrite and glauconite above 2550 feet. Below 2550 feet the formation was very glauconitic to the top of the Latrobe Group at 2711 feet.

The Lakes Entrance was separated from the Lower Oligocene - Upper Eocene Latrobe Group by an unconformity at 2711 feet. The Latrobe overlies the Strzelecki Group unconformably at 4589 feet. The Latrobe was composed of interbedded sand, coal, shale, silt and minor dolomite.

The sands were generally medium to very coarse grained, often pebbly, clean to moderately kaolinitic, loose, quartzose and porous. However, certain sands were clay choked with kaolin such as from 3265 to 3320 feet and from 3830 to 3870 feet. These coarse grained sands contained fine grained sand and clay as matrix and were much less porous. Major clastic intervals with dirty sands and common interbedded shale, silt and thin coals occurred from 3620 feet to 3780 feet and from 3870 feet to 4040 feet.

Coals were common in the Latrobe and thin coals occurred throughout the formation. The coals were dark brown to black, lignitic, soft to brittle and dirty to pyritic in part.

The principle thick coals occurred as listed below:-

2730	_	2780	3202	_	3228
2824	-	2856	3466	_	3486
3110	_	3126	3501	-	3519
3134	-	3166	3570	_	3608
3170	_	3182	3792	_	3818

Coals were less common below 4300 feet.

The shales were brown, carbonaceous, silty, sandy or lignitic in part. Shales occurred as dirty streaks in sands, as thin cyclic interbeds in the zones 3620 to 3780 feet and 3870 to 4040 feet and as thicker 5 to 20 foot beds either within or separating well developed sands and coals throughout the Latrobe. The thickest shales existed below 4040 feet. Shales were most common between 4180 and 4300 feet.

Siltstones were generally gradational between sand and shale and rarely well developed. Dolomites were rather rare, the best developed occurring at 3166 and 4300 feet.

The Cretaceous Strzelecki Group consisted of massive greywackes and sub greywackes with thin shales, dolomites and rare porous sandstones from 4589 feet to total depth at 6430 feet.

The greywackes and sub-greywackes were light grey to light grey-green, very fine to coarse grained, very clay choked, micaceous, very lithic, chloritic in part, tight, with local carbonaceous lamina, minor pyrite and occasional zones of calcareous cement. The shales were grey, grey-brown, brown and occasionally green, micaceous, carbonaceous, often silty to sandy, thinly laminated and rarely calcareous. The siltstones were gradational between the greywackes and shales. The best developed sands rarely developed much permeability and resembled the greywackes. The most permeable sands occurred at 5275, 5450, 5745, 6220-35, 6485 and 6360-6390 feet. Thin dolomites to 4 feet thick were fairly common. They were very dirty and sandy.

HYDROCARBON SHOWS

There were two petroleum targets in the Keystone well, the Latrobe Group and the Strzelecki Group. Neither proved to have commercial accumulations of hydrocarbons. Several minor show were encountered. Each show is listed below:

<u>Interval</u>	Gas	Remarks	<u>Formation</u>
1380-1550	5-50uCl	Minor gas, no stain.	Gippsland Limestone.
2780-2820	12uC1	Clean sand, no stain or flour.	Top Latrobe sand.
2960-2980	8uCl	Intbd. sand and shale, no stain.	Latrobe

Interval	Gas	Remarks	Formation
4635-4675	llu Cl	Greywacke, no stain	Top of Strzelecki
5620-5675	20u C1	Minor porosity, no stain	Strzelecki
5825	8u C1	Porosity streak, no stain	do
6220-6240	9u C1	Minor sand porosity	r, do
6285-6290	10u C1	Minor sand porosity no stain	r, do

A graphic presentation of the gas readings is presented on the included Core Laboratories report.

TABLE 1
STRATIGRAPHY, KEYSTONE NO. 1, Halliday Enterprises Pty. Ltd.

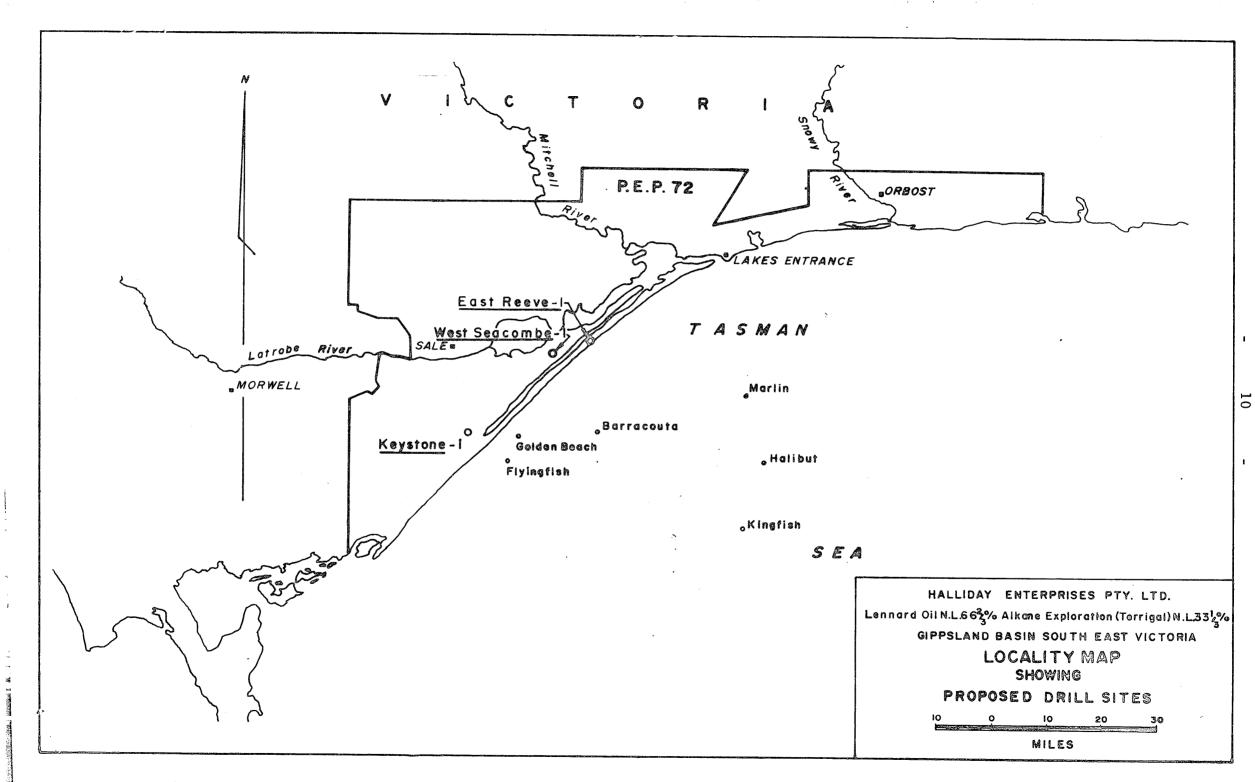
AGE	FORMATION		DEPTH Kelly Bushing	(of tops) Ground Level	THICKNESS
L. Pliocene	Jemmy's Point	Sand with lignite, clay & coquina.	18	+97	+432
U. Miocene	Tambo River	Limestone wit		-335	95
Miocene	Gippsland Ls.	Limestone wit		-430	1573
Oligocene	Lakes Entrance	Marly shale	2118	-2003	593
L. Oligocen Eocene	eLatrobe Group	Sand, coal, shale, silt	2711	-2596	1878
Cretaceous	Strzelecki Gp.	Greywacke, shale, minor sand.	4589	-4474	n.a.

APPENDIX

SIDEWALL CORE DESCRIPTION, KEYSTONE NO. 1
Depths were selected from FDC log; solvent cuts were with chlorothane.

CORE NO.	DEPTH	RECOVERY	DESCRIPTION
1	63881	1/2"	Greywacke: light grey, very fine grained, clay choked, micaceous, very lithic, carboraceous lamina, no flourescence, no odour, tight.
2	63351	3/8"	Greywacke: light grey, tight, no show, as above.
3	63051	3/8"	Greywacke: light grey-green, fine - medium grained, very clay choked, tight, no show.
4	62921	5/8"	Greywacke: light grey, tight, no show, as above.
5	57951	3/4"	Greywacke: light grey-green, fine - medium grained, very clay choked, chloritic and lithic grains, tight, no show.
6	5781'	7/8"	Greywacke: Light grey-green, fine - coarse grained, predominately medium grained, clay choked, tight, no show.
7	57751	. 3/8"	Greywacke: light grey-green, fine - coarse grained, predominately medium - coarse grained, very calcareous, mineral flowescence, tight, no show.
8	5761'	7/8"	Greywacke: light grey-green, silt - very fine grained, 10% porosity, faintly laminated, no show.
9	54931	3/4"	Greywacke: light grey-green, fine - medium grained, clay choked, micaceous, lithic, low porosity, no show.
10	5491'	111	Greywacke: as above, no show.
11	5413'	Empty	•
12	5406'	1-1/8"	Greywacke: as above, no show.
13	5371'	211	Mudstone: light grey-green, soft, waxy
			non calcareous, no show.
14	5359'	1-3/4"	Mudstone: as above, slightly silty and pyritic, no show.
15	46471	Misfire	
16	46231	1-7/8"	Greywacke: light grey, light grey-green silt - very fine grained, very clay choked, no visible porosity, mud impregnated along fracture, no show.
17	45951	1-3/4"	Sandstone: silt - pebbly, very poorly sorted, abundant clay matrix, browngrey argillaceous matrix, some mineral flourescence, questionable diesel odour, no show.

CORE NO.	DEPTH	RECOVERY	DESCRIPTION
18	4393'	1-5/8"	Sandstone: light grey-brown, very fine grained - pebbly, soft, friable, quartzose, minor kaolinitic matrix, no
19	43851	2-1/8"	flourescence, very faint odour. Sandstone: white - light grey, fine - very coarse grained, very poorly sorted, augular - sub-rounded, white kaolin
20	38891	1-3/4"	matrix, no show. Sandstone: grey-brown, very fine grained - pebbly, mud permeated, kaolin matrix, abundant carbonaceous flecks,
21	3871'	Misfire	soft, friable, no show.
22	3839'	2"	Sandstone: grey-brown, very fine grained - granular, abundant kaolin matrix, low
23	38291	2"	porosity, no cut, no flourescence. Sandstone: cream-light brown, fine grained - granular, rounded - angular, kaolin matrix, moderately low porosity, no
24	37261	2-1/8"	flourescence or cut, faint gassy odour. Sandstone: cream to grey-brown, very fine grained to granular, angular - rounded kaolinitic, no show.
25	3622'	.1-3/4"	Sandstone: grey-brown, fine grained - granular, angular-rounded, poorly sorted, carbonaceous, brown kaolinitic matrix, low porosity, no show.
26	33,951	1-3/4"	Sandstone: light brown, silt-pebbly, angular-rounded, no matrix, very porous and friable, no show.
27	3125'	211	Silty shale, grey-brown, waxy, soft, very carbonaceous to coaly, micaeous, no show.
28	2920'	2"	Sandstone: light grey, fine-coarse grained poorly sorted, angular-rounded, friable, soft, minor clay matrix, rare pyrite, no show.
29	2810'	1-3/4"	Sandstone: cream, fine grained - granular, sub angular - rounded, minor kaolin, soft, friable, minor carbonaceous grains, no show.
30	2804'	2"	Sandstone: light grey-brown, fine - granular, friable, soft, minor kaolin matrix, slightly carbonaceous, no show.



This is an enclosure indicator page.

The enclosure PE603373 is enclosed within the container PE906021 at this location in this document.

The enclosure PE603373 has the following characteristics:

ITEM_BARCODE = PE603373
CONTAINER_BARCODE = PE906021

NAME = Well Completion Log

BASIN = GIPPSLAND PERMIT = PEP 72 TYPE = WELL

SUBTYPE = COMPLETION_LOG

DESCRIPTION = Second copy of Well Completion Log

containing geology spontaneous potential and resistivity. Copy of

PE603372 for Keystone-1

REMARKS =

 $DATE_CREATED = 19/02/1972$

DATE_RECEIVED =

 $W_NO = W641$

WELL_NAME = KEYSTONE-1

CONTRACTOR =

CLIENT_OP_CO = HALLIDAY ENTERPRISES PTY

This is an enclosure indicator page. The enclosure PE603376 is enclosed within the container PE906021 at this location in this document.

The enclosure PE603376 has the following characteristics:

ITEM_BARCODE = PE603376
CONTAINER_BARCODE = PE906021

NAME = Formation Density Log

BASIN = GIPPSLAND
PERMIT = PEP 72
TYPE = WELL
SUBTYPE = WELL_LOG

DESCRIPTION = Compensated Formation Density Log in

second copy of WCR for Keystone-1 $\,$

(W641). Copy of PE601450.

REMARKS =

DATE_CREATED = 18/02/1972

DATE_RECEIVED =

 $W_NO = W641$

WELL_NAME = KEYSTONE-1 CONTRACTOR = SCHLUMBERGER

CLIENT_OP_CO = HALLIDAY ENTERPRISES PTY

This is an enclosure indicator page. The enclosure PE603377 is enclosed within the container PE906021 at this location in this document.

The enclosure PE603377 has the following characteristics:

ITEM_BARCODE = PE603377
CONTAINER_BARCODE = PE906021

NAME = Laterolog

BASIN = GIPPSLAND

PERMIT = PEP 72 TYPE = WELL

SUBTYPE = WELL_LOG

DESCRIPTION = Laterolog in second copy of WCR for Keystone-1 (W641). Copy of PE601451.

REMARKS =

DATE_CREATED = 18/02/1972 DATE_RECEIVED = 02/01/1986

 $W_NO = W641$

WELL_NAME = KEYSTONE-1 CONTRACTOR = SCHLUMBERGER

CLIENT_OP_CO = HALLIDAY ENTERPRISES PTY

This is an enclosure indicator page. The enclosure PE905923 is enclosed within the container PE906021 at this location in this document.

The enclosure PE905923 has the following characteristics:

ITEM_BARCODE = PE905923
CONTAINER_BARCODE = PE906021

NAME = Structural Cross-Section

BASIN = GIPPSLAND BASIN

PERMIT = PEP/72 TYPE = WELL

SUBTYPE = CROSS_SECTION

DESCRIPTION = Structural Cross-Section (enclosure

from WCR) for Keystone-1

REMARKS = added by DNRE 16/07/99

 $DATE_CREATED = 31/07/71$

DATE_RECEIVED =

 $W_NO = W641$

WELL_NAME = KEYSTONE-1

CONTRACTOR = HALLIDAY ENTERPRISES PTY LTD CLIENT_OP_CO = HALLIDAY ENTERPRISES PTY LTD

FOR
HATIIDAY ENTERPRISES PTY LTD:

KEYSTÖNE NO 1 WELL

WILDCAT
VICTORIA
BY
CORE LABORATORIES AUSTRALIA
(OLD) LTD:

3



Core Laboratories Australia (Qld.) Ltd.

BRISBANE, AUSTRALIA

28th February, 1972

HALLIDAY ENTERPRISES PTY. LTD., 58 CUTLER ROAD, CLONTARF, NEW SOUTH WALES. 2093

ATTENTION: MR. W. H. NIXON

SUBJECT: MUD AND CUTTINGS ANALYSIS

KEYSTONE NO. 1 WELL

VICTORIA

GENTLEMEN:

A CORE LABORATORIES AUSTRALIA combination drill cuttings and hydrocarbon detection unit was present at the site of the subject well during drilling operations from 100 feet to the total depth of 6430 feet.

Utilising standard equipment, the drilling fluid was monitored continuously from 100 feet to total depth of 6430, and the drill cuttings were checked at regular intervals for oil and gas content and lithology. The results of these operations are shown on the accompanying Grapholog.

HYDROCARBON SHOWS: There were no significant shows of oil or gas. At 2740 feet to 2980 feet a slight increase of Methane was recorded due to the coal measures. From 6200 feet to 6300 feet an increase of Methane was recorded, but no visible fluorescence or cut.

We sincerely appreciate this opportunity to have been of service, and trust the information furnished in this report and during drilling operations has assisted in the evaluation of the subject well.

Yours very truly, CORE LABORATORIES AUSTRALIA (QLD) LTD.

GENE A. JACKMAN, RESIDENT MANAGER.

Dist.
Addressee 11 copies.
ENCS.

This is an enclosure indicator page.

The enclosure PE603375 is enclosed within the container PE906021 at this location in this document.

The enclosure PE603375 has the following characteristics:

ITEM_BARCODE = PE603375
CONTAINER_BARCODE = PE906021

NAME = Grapholog

BASIN = GIPPSLAND PERMIT = PEP 72

TYPE = WELL SUBTYPE = MUD LOG

DESCRIPTION = Second copy of Grapholog containing

drilling rate hydrocarbon analysis and

geology. Enclosure to WCR of Keystone-1. Copy of PE603374.

REMARKS =

DATE_CREATED = 17/02/1972 DATE_RECEIVED = 31/07/1986

 $W_NO = W641$

WELL_NAME = KEYSTONE-1

CONTRACTOR = CORE LABORATORIES AUSTRALIA LTD

CLIENT_OP_CO = HALLIDAY ENTERPRISES PTY