

**PERMIT VIC/RL3
OFFSHORE GIPPSLAND BASIN
VICTORIA
AUSTRALIA**

**SOLE-2
WELL COMPLETION REPORT
BASIC DATA
VOLUME 1**

Prepared by:
Ross Tolliday/Cathy Ellis
October 2002

CONFIDENTIAL

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Exploration Manager

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**SOLE-2
BASIC DATA REPORT
Volume 1**

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WELL SUMMARY CARD
SOLE-2

WELL	SOLE-2	ON LOCATION	10:30hrs, 9 th July, 2002
WELL TYPE	Vertical Appraisal	SPUDED	00:30hrs, 11 th July, 2002
BLOCK/LICENCE	VIC/RL3	TD REACHED	21:15hrs, 16 th July, 2002
RIG	Ocean Bounty	RIG RELEASED	17:00hrs, 24 th July, 2002
WATER DEPTH	124.5m (LAT)	COMPLETION	Cased and suspended
RT	25.0m	STATUS	Suspended Gas Well
TD	1005mRT	TRAP TYPE	Structural Anticline
		OPERATOR	Basin Oil Pty. Ltd.

SURFACE LATITUDE	38° 06' 18.665" S	SURFACE Y coord	5 780 595.42mN
SURFACE LONGITUDE	149° 00' 28.997" E	SURFACE X coord	676 059.05mE
OBJECTIVE LATITUDE		OBJECTIVE Y coord	
OBJECTIVE LONGITUDE		OBJECTIVE X coord	
SEISMIC REFERENCE	Line GS91A-05, stn 2210 RRA Repro 2002	Spheroid/Datum	ANS / AGD 66
		ZONE	UTM Zone 51

REMARKS

The main objective of Sole-2 was to appraise the gas potential of the Latrobe Formation within the Sole Field northwest of Sole-1. The well was cased and a production test over the interval 771 to 785mRT flowed 20.6MMscf/d dry gas.

HOLE SIZE mm (inch)	CASING SIZE mm (inch)	SHOE DEPTH (mRT)	TYPE	LOT/FIT Sg (EMW)
914 (36)	762x508 (30x20)	183.6	X-52	N/A
444.5 (17 ½)	340 (13 3/8)	649.8	K-55	1.65 (FIT)
311 (12 ¼)	244.5 (9 5/8)	964.7	L-80	N/A

MUD DATA

SUITE	1
TYPE	KCI-PHPA-GLYCOL
DENSITY	1.12sg
VISCOSITY	50sec/qt
FLUID LOSS	4.5 ml/30min
PH	9
Rm	0.159 ohmm/18.6 °C
Rmf	0.144 ohmm/19.5 °C
Rmc	0.240 ohmm/16.2 °C
Chlorides	43000ppm
Barite	1.2% wt
KCI	5% wt
Glycol	3% vol

PERFORATIONS: 771 – 785mRT @ 5 shots per foot			
DRILL STEM TESTS			
DST	Flow rate	Choke	GOR
1	20.6MMscf/d dry gas with approx. 1000ppm H ₂ S	128/64"	N/A

FEWD LOGS

NO FEWD LOGS WERE RUN IN SOLE-2.

CORES

No.	INTERVAL (mRT)	CUT (m)	REC (m)
1	773 to 791	18	13.9
2	791 to 801	10	2.46
3	801 to 804.5	3.5	2.2
4	804.5 to 814.5	10	5.83

WIRELINE LOGS

LOG TYPE	RUN / SUITE	INTERVAL mRT	BHT °C /TIME SINCE CIRC.	COMMENTS
PEX-HALS-HNGS	1 / 1	1002.5 to 649.82	42.2 / 7hrs 5mins	Log initially hung up at 848m. Passed OK. Repeat section 870-750m.
MDT-GR	2 / 1	920.5 to 773.7	42.2 / 18hrs 40mins	32 Pretests, 19 good, 10 lost seals, 3 tight. Took 2 gas samples at 810m and 778m. Water sampling aborted due to probe plugging.
DSI-FMI-GR	3 / 1	1000 to 649	44 / 27hrs 06mins	Logged DSI from 1000-149m. Logged FMI to casing shoe.
CSAT-GR (VSP Survey)	4 / 1	997 to 197	46 / 34hrs 20mins	33 VSP levels at 10m spacing, 11 checkshot levels at 50m spacing from 660m. 3 repeat checkshots at 200m, 600m and 800m.
SWC-GR	5 / 1	1001 to 659		Shot 60, 7 Empty, 1 Misfire, 52 samples recovered. No thermometers run

1.0 WELL SUMMARY

1.1 OPERATIONAL SUMMARY

The semi-submersible Ocean Bounty was towed from the Patricia-2 location in VIC/L21 beginning at 00:45hrs, 9th July 2002. The rig arrived on the Sole-2 location in VIC/RL3, and dropped and set the first anchor (# 6) at 10:30hrs, 9th July 2002. After waiting on inclement weather, all anchors were run and tensioned and the well was spudded at 00:30hrs on the 11th July 2002.

The final Thales Geosolutions GPS surface rig position for Sole-2 ([Appendix-1](#)) is

Datum: AGD 66
Latitude: 38° 06 ' 18.665" S
Longitude: 148° 00' 28.997" E

Projection: AMG Zone 55, CM 147° E
Easting: 676 059.05 m
Northing: 5 780 595.42m

This position was 1.2 metres on a bearing of 118 Degrees (T) from the intended location. The final rig heading was 257.3 Degrees (T).

The final rig elevations were

RT – SL: 25.0 m
Water Depth (LAT): 124.5m (Note: MSL is approximately 0.6m above LAT).
RT - Sea bed: 149.5m

Sole-2 was drilled as a vertical gas appraisal well and was located 2.5km northwest of Sole-1. Sole-2 is in permit VIC/RL3, which is approximately 57km southeast of Orbost ([Figure 1](#)).

The main objective of the Sole-2 well was to appraise the gas potential of the Latrobe Formation within the Sole Field. The plan was to determine the productivity of the Sole gas field and its potential for commercial development. The well was also drilled to fulfil the Retention Lease (VIC/RL3) work commitment. Other objectives of the well were to establish if there was an oil leg associated with the gas column and appraise the deeper sub-Kate Shale target for hydrocarbons. The production test of the gas zone was delayed due to the presence of H₂S. The production test was finally conducted from 17th to 19th August and the well produced gas at a maximum stabilised rate of 20.6MMscf/d.

After spudding, the 36" hole was drilled from the seabed at 149.5mRT to 185.5mRT where a 30"x20" conductor was run to 183.6mRT and cemented with good returns. The 20" shoe track was drilled out and a 17 ½" hole was drilled riser less from 185.5mRT to 657mRT. This 17 ½" section was drilled with seawater and Hi Vis mud sweeps with returns to the sea floor. The 13 3/8" casing was then run and cemented, with the shoe set at 649.7mRT. The BOPs and marine riser were then run and tested.

The 12 ¼" BHA was made up and run in the hole. New formation was drilled from 657mRT to 660mRT and a Formation Integrity Test (FIT) was performed to an Equivalent Mud Weight of 1.65sg. The 12 ¼" hole was then drilled from 660mRT to 770mRT, where samples were circulated at 770mRT and then again at 773mRT. Four cores were then cut. Core # 1 from 773mRT to 791mRT (18m) with 13.9m recovered. Core # 2 was cut from 791mRT to 801mRT where the core barrel jammed after 10m, and only 2.46m was recovered. Core # 3 was cut from 801mRT and jammed after 3.5m at 804.5mRT with only 2.2m recovery. Core # 4 was cut from 804.5mRT to 814.5mRT and it also jammed, 5.83m were recovered. The well was then drilled to a total depth of 1005mRT, which was reached at 21:15hrs on 16th July 2002.

One suite of wireline logs were made at TD. There were indications of the presence of H₂S in the MDT samples.

After circulating the well, a 9 5/8" production casing string was run and cemented with the shoe at 964.7mRT. Before running the 3 1/2" production tubing a decision was made to suspend the well due to the possibility of H₂S during testing.

The well was suspended with EZSV's at 830mRT, 760mRT and 230mRT and cement plugs from 830mRT to 820mRT, 760mRT to 700mRT and 230mRT to 170mRT. Anchors were pulled and the rig was released at 17:00hrs, 24th July 2002.

The Ocean Bounty arrived back on location at 1400hrs on 10th August 2002. The well was re-entered at 2300hrs, 13th August 2002 and the cement plugs and EZSV's were drilled out. A production test was conducted over the interval 771 to 785mRT, which flowed 20.6MMscf/d of dry gas. EZSV's were set at 760m and 230m and cement plugs at 760mRT to 700mRT and 230mRT to 170mRT. Anchors were pulled and the rig was released at 2230hrs, 21st August 2002.

Further details can be found in the Drilling Operations End of Well Report ([Appendix 2](#)).

1.2 CASING

Three casing strings were run in the Sole-2 well. The 30"x20" casing was set at 183.6mRT on 11th July 2002 after the 36" hole was drilled to 185.5mRT. The 17 1/2" hole was then drilled to 657mRT. The 13 3/8" casing was set at 649.8mRT on 12th July 2002 and the BOPs run and landed at 1130hrs on 23rd July. The hole was drilled and cored in the next 12 1/4" section to a Total Depth of 1005mRT.

The well was completed at the total depth of 1005mRT with a 9 5/8" casing string. The casing shoe was set at 964.7mRT on 19th July 2002.

A summary of casing run in the well is shown below in Table 1 and in [Figure 2](#).

Hole Size mm (inch)	Casing Size mm (inch)	Shoe Depth (mRT)	Type	FIT Sg (EMW)
914 (36)	762x508 (30x20)	183.6	X-52	N/A
444.5 (17 1/2)	340 (13 3/8)	649.8	K-55	1.65
311 (12 1/4)	244.5 (9 5/8)	964.7	L80	N/A

2.0 SAMPLING

2.1 DITCH CUTTINGS

Five sets of cuttings were collected over the intervals 657m to 1005m in Sole-2 (Table 2). The sample intervals were varied from 2m to 5m according to the drilling rate of penetration and section depths.

The cuttings were described and the report is included in [Appendix 3](#).

Depth (mRT)	Interval (m)
657 - 660	3
660 – 750	5
750 – 771	3
771 - 773	2
773 – 814.5	Core only, no cuttings
814.5 – 1005	5

The cuttings were packed in boxes and distributed as per Table 3. For more details see the Final Mudlogging Report in [Appendix 4](#).

Sample type	No. Sets	Quantity per sample (g)	Distributed to: -
Washed & dried-samplex trays	1	5	OMV
Washed & dried-A	1	100	OMV
Washed & dried-B	1	100	AGSO
Washed & dried-C	1	100	VDNRE
Washed & dried-D	1	100	SANTOS
Washed & dried-E	1	100	SANTOS

2.2 SIDEWALL CORES

One Sidewall Coring run of 60 shots was conducted in Sole-2 over the interval from 1001mRT to 659mRT.

Of the 60 cores shot, 1 was a misfire, 7 were empty, none were lost and 52 samples were recovered. See [Appendix 5](#) for a SWC Shot Summary and [Appendix 6](#) for the SWC Descriptions Report.

Photos of the Sidewall Cores are in [Appendix 7](#).

21 SWCs were used in biostratigraphic evaluation. A list of these is in [Appendix 8](#) – Palynological Report-Basic Data.

2.3 CONVENTIONAL CORES

Four cores were cut in Sole-2 from 773mRT to 814mRT. Core # 1 cut 18m from 773m to 791mRT, and 14m was recovered. Core # 2 was cut from 791m to 801mRT when the core barrel jammed after 10m, and only 2.46m was recovered. Core # 3 was cut from 801m and jammed after 3.5m at 804.5mRT with only 2.01m recovery. Core # 4 was cut from 804.5 to 814.5mRT and it also jammed; 5.67m was recovered.

Core No.	Interval (mRT)	Metres Cut	Recovery (%)	Recovery (m)
1	773 to 791	18	78	14
2	791 to 801	10	24.6	2.46
3	801 to 804.5	3.5	57.4	2.01
4	804.5 to 814.5	10	56.7	5.67

The cores were cut into 1-metre lengths and the ends were filled with gypsum to prevent the core from being disturbed during transit. The core was then packed into custom designed crates for transport to Core Laboratories in Perth.

A coring operations report by CorPro is presented in [Appendix 9](#). A Preliminary Core Description Report is in [Appendix 10](#) and the Core Chips Descriptions Report is in [Appendix 11](#).

CORE SAMPLING

The core was slabbed and photographed by CoreLabs ([Appendix 12](#)) and then sampled for routine analyses by CoreLab. A suite of 1 1/2" diameter horizontal plug samples was cut at a rate of every 30 to 50 cm for Routine Core Analysis (RCA). There were also 27 Vertical plugs taken at approximately 1 metre intervals.

The Routine Core Analysis consisted of porosity, air permeability and grain density. Probe Permeametry was conducted on 173 points. Surface spectral Gamma Ray was run over the four cores. Additionally, 19 samples were analysed at multiple overburden pressures ([Appendix 13](#)).

Seven whole core sections were removed for later special analysis. The depths for the removed sections were Sample 1 - 775.25 to 775.55mRT, Sample 2 – 777.55 to 777.85mRT, Sample 3 – 781.62 to 781.92mRT, Sample 4 - 785.32 to 785.62mRT, Sample 5 - 805.55 to 805.85mRT, Sample 6 – 807.55 to 807.85mRT and Sample 7 – 808.85 to 809.15mRT.

Geochemical analysis on a core sample from 792.5mRT, was carried out by Geotechnical Services Ltd and consisted of GC-MS chromatography of saturated hydrocarbons and whole extracts ([Appendix 14](#)).

2.4 FORMATION FLUIDS

Gas samples were taken with the Schlumberger Wireline Formation Tester (MDT) in the Sole-2 well.

Two levels were sampled for gas. The first sample was taken at 810mRT. A one gallon chamber (S/N=36) was filled, then two single phase 250cc bottles (S/N=170 & 171), at the same level. The one-gallon was opened at surface and a Kitigawa Detector detected 400ppm H₂S.

The second sample was taken at 778m. A one-gallon chamber (S/N=20) was filled, and then two single-phase 250cc bottles (S/N=172 & 173) were filled at the same depth. The one-gallon chamber was opened at surface and a Kitigawa Detector measured 600ppm H₂S.

Samples from the single phase 250cc bottles were transferred by Oilphase at the rigsite to inert transport bottles. The details of volumes and pressures are in [Appendix 15](#).

A water sample was attempted at 866.5m. A good pretest was achieved but unfortunately after 30 minutes of pump out, the probe became plugged. The same depth was tried again however the seal failed after pumping out for approximately 10 minutes. The tool was moved to 868.2m after pumping for approximately 15 minutes the probe became plugged again. The water sampling was aborted.

MDT Pressure data and sample recovery summary are included as [Appendix 16](#). A Compositional Analysis Report of the gas samples is presented in [Appendix 17](#).

2.5 WELL TESTING

The presence of H₂S in the gas prevented the production test from being conducted immediately after evaluation and casing.

Additional equipment was mobilised and the Sole-2 well was tested on 17th August 2002 over the interval 771 to 785mRT for a period of 32 hours. Following an initial flow and shut-in to determine initial reservoir pressure, the well was flowed for 9.5 hours for clean up and to obtain a stabilised flow rate and pressure at maximum choke for deliverability analysis. A maximum rate of 20.6 MMscf/d was achieved. The well was then beamed back to achieve a second deliverability point and to obtain six separator gas samples. No condensate or sand production was measured during the test. A 6-hour shut-in was conducted to obtain pressure build-up data for analysis.

A DST overview is presented in [Appendix 18](#). The Expro DST Data Report and the Halliburton Electronic Memory Gauge Report can be found in [Appendices 19](#) and [20](#) respectively. Gas samples were analysed by Geotech and Petrotech and the resultant reports are presented as [Appendices 21](#) and [22](#) respectively.

3.0 GEOLOGY

3.1 GEOLOGICAL SUMMARY

Interval summaries of the lithology's penetrated in Sole-2 are in the Daily Geological Reports ([Appendix 23](#)) and appears below. Detailed cuttings sample descriptions (657 to 1005mRT) can be found in [Appendix 3](#), Side Wall Core descriptions are in [Appendix 6](#) and basic Core and Core Chip descriptions are in [Appendices 10](#) and [11](#) respectively.

Returns above 657mRT were to the Sea Floor.

Marine Lime muds, Clays and very fine Muddy Limestones:	657 – 771mRT
Fine to very Coarse Sandstones, minor Argillaceous Sandstones and Muds	771 – 902mRT
Sandstones and Argillaceous Sandstones	902 – 942mRT
Argillaceous Silts and Sands and Silty Muds	942 – 991mRT
Silty and Argillaceous Sandstones and Argillaceous Silts	991 – 1005mRT

Moderate to high gas readings were recorded while drilling through the reservoir, with a maximum of 18.3% while drilling at 772mRT. No hydrocarbon fluorescence was observed in the well during drilling, however fluorescence was noted in Core Chips, Side Wall Cores and slabbed Core.

Seafloor - 657mRT No samples taken – returns to seabed

657 to 771mRT

MARL with minor interbedded CALCISILTITE

MARL (60-95%): light greenish grey to light grey, occasionally greenish grey to light olive grey, soft to slightly firm, sub-blocky to amorphous, minor to common calcareous silt, trace to rare fossil fragments (forams, echinoid spines, bryozoans), trace glauconite (increasing with depth), trace pyrite. Grades to **Calcareous Claystone** in part.

CALCISILTITE (5-40%): very light grey, soft, amorphous to sub-blocky, common calcareous clay matrix, rare argillaceous matrix, trace glauconite and pyrite.

771 to 849mRT

MASSIVE SANDSTONE with minor SILTSTONE

SANDSTONE (90-100%): translucent to very light grey, milky, minor clear, trace pink, loose, fine to very coarse, trace pebbly, predominantly medium to coarse, angular to mainly sub-angular to sub-rounded, sub-elongate to mainly sub-spherical, poorly to moderately sorted, trace to 5% very light grey argillaceous content, trace pyrite, trace lithic fragments, very good to excellent inferred porosity.

SILTSTONE (0-10%): medium to dark brown, soft, predominantly quartz silt, trace very fine quartz, 10 to 20% argillaceous content, sub blocky to sub fissile, trace micro mica, grades to Argillaceous Siltstone.

This interval includes 4 un-sampled intervals from 773 to 814.5mRT, which were cored and the cuttings were not circulated out.

849-884mRT

ARGILLACEOUS SANDSTONE and interbedded SANDSTONE with minor SILTSTONE

ARGILLACEOUS SANDSTONE (90-100%): translucent to very light grey, milky, minor clear, trace pink, loose, fine to very coarse, predominantly medium to coarse, angular to mainly sub-angular to sub-rounded, sub-elongate to mainly sub-spherical, poorly sorted, 20 to 25% very light grey argillaceous content, trace to 5% calcareous/dolomitic content, trace pyrite, trace glauconite, trace red lithic fragments, poor to fair inferred porosity. From 855m the sandstone has a moderate petroliferous odour. Bright mineral fluorescence.

SANDSTONE (30-60%): as above, 10 to 15% very light grey argillaceous content, trace to 5% calcareous/dolomitic content, trace pyrite, trace glauconite, trace red lithic fragments, fair to very good inferred porosity.

SILTSTONE (0-10%): medium to dark brown, soft, predominantly quartz silt, trace very fine quartz, 10-20% argillaceous content, sub blocky to sub fissile, trace micro mica, grades to Argillaceous Siltstone.

884 to 902mRT

SANDSTONE with minor interbedded SILTSTONE

SANDSTONE (10-100%): translucent to very light grey, milky, minor clear, trace pink, loose, medium to very coarse, predominantly very coarse, angular to sub-angular, sub-elongate to sub-spherical, poorly to moderately sorted, 10 to 15% very light grey argillaceous content, trace to 5% light brown weak dolomite cement, nil to trace calcareous content, trace pyrite, trace glauconite, trace red lithic fragments, good inferred porosity.

SILTSTONE (0-90%): dark greyish brown, soft, predominantly quartz silt, trace very fine quartz, 10-20% argillaceous content, sub blocky to sub fissile, 5-10% micro mica, grades to Argillaceous Siltstone

902-942mRT

SANDSTONE grading to ARGILLACEOUS SANDSTONE.

SANDSTONE (100%): translucent to very light grey, milky, minor clear, trace pink, loose, fine to very coarse, predominantly medium to coarse, angular to sub-angular, sub-elongate to sub-spherical, poorly to moderately sorted, 10-15% very light grey argillaceous content, nil to trace calcareous content, trace pyrite, trace red, dark grey lithic fragments, trace black coaly fragments, good inferred porosity, grades to

ARGILLACEOUS SANDSTONE (at base of interval): as above, 20-25% very light grey argillaceous content, nil calcareous content, trace pyrite, trace red, dark grey lithic fragments, trace black coaly fragments, fair to good inferred porosity.

942-991mRT

Interbedded ARGILLACEOUS SILTSTONE, SILTSTONE, ARGILLACEOUS SANDSTONE and SILTY CLAYSTONE

ARGILLACEOUS SILTSTONE (30-60%): light to medium brownish grey to olive grey, greenish grey, soft, predominantly quartz silt, trace very fine to fine quartz, 15 to 25% argillaceous content, sub blocky, trace to 5% micro mica, trace fine black coal fragments

SILTSTONE (0-70%): light to medium greyish brown to olive grey, greenish grey in parts, very soft to soft, predominantly quartz silt, trace very fine to fine quartz, 10 to 20% argillaceous content, sub blocky to sub fissile, 5 to 10% micro mica, trace fine black coal fragments, nil to trace calcareous content, grades to Argillaceous Siltstone.

ARGILLACEOUS SANDSTONE (0-80%): translucent to very light grey, milky, minor clear, trace pink, loose, fine to medium, trace coarse, mainly medium, angular to sub-angular, sub-elongate to sub-spherical, moderately sorted, 15 to 25% very light grey argillaceous content (clay washing out of sample), nil to trace calcareous content, trace pyrite, trace red, dark grey lithic fragments, trace black coaly fragments, fair to good inferred porosity.

SILTY CLAYSTONE (0-40%): light to medium brownish grey to olive grey, greenish grey in parts, soft plastic, amorphous, 20 to 25% quartz silt, trace very fine quartz, trace micro mica, trace fine black coal fragments, nil to trace calcareous content

991 to 1005mRT

SILTY and ARGILLACEOUS SANDSTONE with interbedded ARGILLACEOUS SILTSTONE

SILTY SANDSTONE (30-70%): translucent to very light grey, light brown, loose, fine to medium, trace coarse, mainly upper fine to lower medium, angular to sub-angular, sub-elongate to sub-spherical, moderately sorted, 15 to 25% light greyish brown quartz silt, 5 to 10% argillaceous content, trace pyrite, trace mica, trace to 5% red, green, dark grey lithic fragments, trace black coaly fragments and laminae, fair inferred porosity.

ARGILLACEOUS SANDSTONE (30-70%): translucent to very light grey, light brown, loose, fine to medium, trace coarse, mainly upper fine to lower medium, angular to sub-angular, sub-elongate to sub-spherical, moderately sorted, 10 to 15% light greyish brown quartz silt, 15 to 25% argillaceous content, trace pyrite, trace mica, trace to 5% red, green, dark grey lithic fragments, trace black coaly fragments and laminae, fair inferred porosity. Grades to Argillaceous Silty Sandstone.

ARGILLACEOUS SILTSTONE (10-30%): light to medium brownish grey to olive grey, greenish grey, soft, predominantly quartz silt, trace very fine to fine quartz, 15 to 25% argillaceous content, sub blocky, trace to 5% micro mica, trace fine black coal fragments

3.2 BIOSTRATIGRAPHY

Twenty One Side Wall Core and two Core samples were sent to LAOLA Pty.Ltd. for processing. These were then evaluated by Alan Partridge of BIOSTRATA Pty. Ltd.

The basic data and Species Distribution Charts are included as [Appendix 8](#).

4.0 HYDROCARBON SHOWS

4.1 OIL FLUORESCENCE SHOWS

A summary of fluorescence observed in Sidewall Cores and Cores 1 to 4 can be found in Table 5. No fluorescence was observed in the cuttings while drilling.

Details of fluorescence observed in Sidewall Cores can be found in the Descriptions and photos in [Appendices 6 and 7](#).

Details of fluorescence observed in Cores 1 to 4 can be found in the Basic Core and Core Chip Descriptions and Photos in [Appendices 10, 11 and 12](#).

TABLE 5 - Summary of SWC and CORE Fluorescence		
Swc No.	Depth mRT	Description of Fluorescence
15 - 22	880.2 – 848.5	20 – 100% dull to mod bright greenish yellow to bright cream, even, direct fluor, slow to fast bluish white cut, thin cream res ring fluor
23 - 25	847 - 840	Dull to mod bright cream, mod fast bluish white, blooming cut, mod cream res ring
26	837	Dull greenish yellow direct fluor, slow greenish cut, thin yellowish res ring
28 - 33	831 – 811	5 to 30% dull greenish yellow direct fluor, slow bluish white cut, thin, weak cream res ring
34 - 36	810 - 807	Dull cream direct fluor, mod fast bluish white cut, mod cream res ring
40 - 44	801 - 790	Patchy to spotty dull cream to greenish yellow direct fluor, mod fast bluish white cut fluor, mod thick cream res ring
45 - 47	789 - 787	50 to 100% uniform, dull cream direct, mod bluish white cut, mod cream res ring
48 - 51	784 - 776	10% uniform, dull cream direct, mod bluish white cut, mod cream res ring
52 - 53	774 - 773	Nil direct fluor, weak cream cut, mod to thin cream res ring
CORE#1	773	Nil at the top of the core #1 where the sandstones are heavily pyrite cemented
	776.7 - 779.0	Dull to moderately bright solid greenish yellow direct fluorescence
	779.0 - 789.35 (base core #1)	Moderately bright solid lemon yellow direct fluorescence
CORE#2	Core #2 top to 792.2	Moderately bright lemon yellow, patchy to predominantly solid fluorescence in sandstones between claystone intervals
	792.2-792.6	Bright solid lemon yellow to greenish yellow direct fluorescence. (The dark grey sandstones have moderately bright solid to patchy greenish yellow direct fluorescence throughout.)
CORE#3	801 – 803.01	Bright lemon yellow to greenish yellow solid direct fluorescence throughout. There is a moderately strong petroliferous odour throughout the core. No rotten egg (H ₂ S) odour
CORE#4	804.5 – 810.17	Moderately bright, becoming dull to moderately bright even (to patchy in pyrite cemented zones) lemon yellow to greenish yellow direct fluorescence. Weak petroliferous odour throughout

4.2 GAS SHOWS

Mud Gas was first recorded from 657mRT and continued until the Total Depth of 1005mRT. The maximum gas recorded was 18.3% at 772mRT. The well was cored from 773 to 814.5mRT and due to low circulation rates the gas was not circulated out of the hole. The mud gas is plotted on the Formation Evaluation Log ([Enclosure 2](#)).

TABLE 6 - Summary of Drilling Gas

INTERVAL (mRT)	Total Gas (%)	C ₁ (ppm)	C ₂ (ppm)	C ₃ (ppm)	iC ₄ (ppm)	nC ₄ (ppm)	C ₅ (ppm)
657 - 771	0 – 0.24	0 - 4040	-	-	-	-	-
771 - 773	3.6 – 18.3	2112 - 134136	-	0 – 191	-	-	-
773 – 814.5	Cored Interval	Gas not circ. out					
814.5 – 886	0.22 – 6.21	1364 - 59674	0 - 760	0 - 264	-	-	-
886 - 942	0.05 – 0.08	242 - 2302	0 -133	0 - 51	-	-	-
942 - 1005	0.03 – 0.05	68 - 241	-	-	-	-	-

5.0 LOGGING AND SURVEYS

5.1 MUD LOGS

Baker Hughes Inteq (BHI) provided conventional mud logging services integrated with a computerised data logging and processing system.

The BHI unit was operated continuously throughout the well. The following logs were provided and are included as Enclosures; a Formation Evaluation Log ([Enclosure 2](#)), a Drilling Data Log ([Enclosure 3](#)), a Pressure Evaluation Log ([Enclosure 4](#)) and a Pressure Summary Plot ([Enclosure 5](#)). No Gas Ratio Log is enclosed as primarily C_1 was recorded.

The BHI End of Well Mud Logging report is included in [Appendix 4](#). Petrotech monitored sodium thiocyanate tracer in the drilling mud during drilling through the zone of interest; this report is presented in [Appendix 24](#).

5.2 WIRELINE LOGS

Wireline logs were run at Total Depth by Schlumberger. There were five runs made in one suite. There were no reruns or significant tool problems.

A list of logs run is in Table 7 and mud data relevant to the runs is in Table 8.

TABLE 7 - WIRELINE LOG SUMMARY					
LOG TYPE	DATE	RUN / SUITE	INTERVAL mRT	BHT °C /TIME	COMMENTS
PEX-HALS-HNGS	17/7/02	1 / 1	1002.5 to 649	42.2 / 7hrs 5mins	Log hung up at 848m. Past OK. Repeat section 870-750m at high Res.
MDT-GR	17/7/02	2 / 1	920.5 to 773.7	42.2 / 18hrs 40mins	32 Pretests, 19 good, 10 lost seals, 3 tight. Took gas samples at 810m and 778m. Water sampling aborted due to probe plugging.
DSI-FMI-GR	18/7/02	3 / 1	1000 to 149	44 / 27hrs 06mins	Logged DSI from 1000-149m. Logged FMI to casing shoe.
CSAT-GR (VSP Survey)	18/7/02	4 / 1	997 to 197	46 / 34hrs 20mins	33 VSP levels at 10m spacing, 11 checkshot levels at 50m spacing from 660m. 3 repeat checkshots at 200m, 600m and 800m.
SWC-GR	18/7/02	5 / 1	1001 to 659		Shot 60, 7 Empty, 1 Misfire, 52 samples Recovered. No thermometers run

TABLE 8 - MUD DATA	
SUITE	1
TYPE	FLO-PRO (KCI-PHPA-GLYCOL)
DENSITY	1.12sg
VISCOSITY	50sec/qt
FLUID LOSS	4.5 cc/30min
pH	9
Rm	0.159 ohmm/18.6 °C
Rmf	0.144 ohmm/19.5 °C
Rmc	0.240 ohmm/16.2 °C
Chlorides	43000ppm
Barite	1.2% wt
KCI	5% wt
Glycol	3% vol
K+	27000ppm

A Wireline Logging Report and Operations Summary are contained in [Appendix 25](#).

[Enclosure 1](#) is a Merged Composite Playback of the basic log channels.

5.3 WIRELINE FORMATION TESTER

The Schlumberger Wireline Formation Tester (MDT) was run in the Sole-2 well. The MDT was Run #2 of the wireline logging Suite and was used to take formation pressure pretests and formation fluid samples.

A total of 32 pretests (including pretests done prior to sampling) were attempted over the interval 920.5 to 773.7mRT. Of these 19 were successful, 10 had a lost seal and 3 were tight or unstable.

Two levels were sampled for gas. The first sample was taken at 810mRT. A one gallon chamber (S/N=36) was filled, then two single phase 250cc bottles (S/N=170 & 171), at the same level. The one-gallon was opened at surface and a Kitigawa Detector detected 400ppm H2S.

The second sample was taken at 778m. A one-gallon chamber (S/N=20) was filled, and then two single-phase 250cc bottles (S/N=172 & 173) were filled at the same depth. The one-gallon chamber was opened at surface and a Kitigawa Detector measured 600ppm H2S.

Samples from the single phase 250cc bottles were transferred by Oilphase at the rigsite to inert transport bottles. The details of volumes and pressures are in [Appendix 15](#).

A water sample was attempted at 866.5m. A good pretest was achieved but unfortunately after 30 minutes of pump out, the probe became plugged. The same depth was tried again however the seal failed after pump out for approximately 10 minutes. The tool was moved to 868.2m after pumping for approximately 15 minutes the probe became plugged again. The water sampling was aborted.

MDT Pressure data and sample recovery summaries are included as [Appendix 16](#).

5.4 VELOCITY SURVEY

A Velocity Survey (VSP) was run at Total Depth in Sole-2. There were 33 VSP levels at 10m spacings and 11 checkshot levels at 50m spacing from 660m. There were 3 repeat checkshots at 200m, 600m and 800m.

Gun and Hydrophone Co-ordinates:

Gun Azimuth	12.0 Deg
Gun Offset	56.0m
Gun Depth (From RT)	30.0m
Hydrophone Depth	28.0m
SRD Depth	25.0m

The Data was processed by CGG and their report is included as [Appendix 26](#). The basic products from the report are a TWT Log, Calibrated Velocity Log, Synthetic Seismograms and Composite Displays with Maximum Bandwidth Filters and Seismic Match Filters. These logs and displays are included as [Enclosures 6 to 15](#).

5.5 FEWD

No FEWD tools were run in Sole-2.

5.6 WELLHEAD LOCATION

The final well head location for Sole-2 as determined by Thales is in [Appendix 1](#). The well was re-entered for testing and the re-entry rig positioning report by Thales is presented in [Appendix 27](#).

5.7 SITE SURVEY

A site survey was undertaken by Thales Geosolutions (Australasia) Limited between 15 to 23 March, 2002 to investigate the suitability of the Sole-2 location for the positioning of a semi-submersible drill rig prior to drilling. The resultant report is presented in [Appendix 28](#) and [Enclosures 16 to 20](#).

6.0 SAMPLE ANALYSES

6.1 OIL ANALYSES

A fluid sample was geochemically extracted from Core#2 at 792.5m. This was subjected to Whole Extract GC-MS, and then Liquid Chromatography and GC-MS Saturates Analysis by GEOTECH.

The results are presented in [Appendix 14](#).

6.2 GAS ANALYSES

Two levels were sampled for gas. The first sample was taken at 810mRT. The one-gallon chamber was opened at surface and a Kitigawa Detector detected 400ppm H₂S.

The second sample was taken at 778m. The one-gallon chamber was opened at surface and a Kitigawa Detector measured 600ppm H₂S.

MDT Pressure data and a sample recovery summary are included as [Appendix 16](#). Compositional analysis of these samples was performed by Corelab ([Appendix 17](#)).

During the production test of Sole-2, Petrotech performed a sampling and analysis for trace components in gas. The samples were taken from the choke manifold and test separator outlet lines. Wellsite testing indicated the gas to be dry with approximately 1000ppm H₂S (measured by Draeger). Compositional analysis was performed by Geotech.

The results of these analyses are presented in [Appendices 22](#) and [21](#) respectively.

6.3 WATER ANALYSES

There were no water samples recovered from Sole-2.

FIGURES

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LOCATION & TECTONIC ELEMENTS MAP

GIPPSLAND BASIN

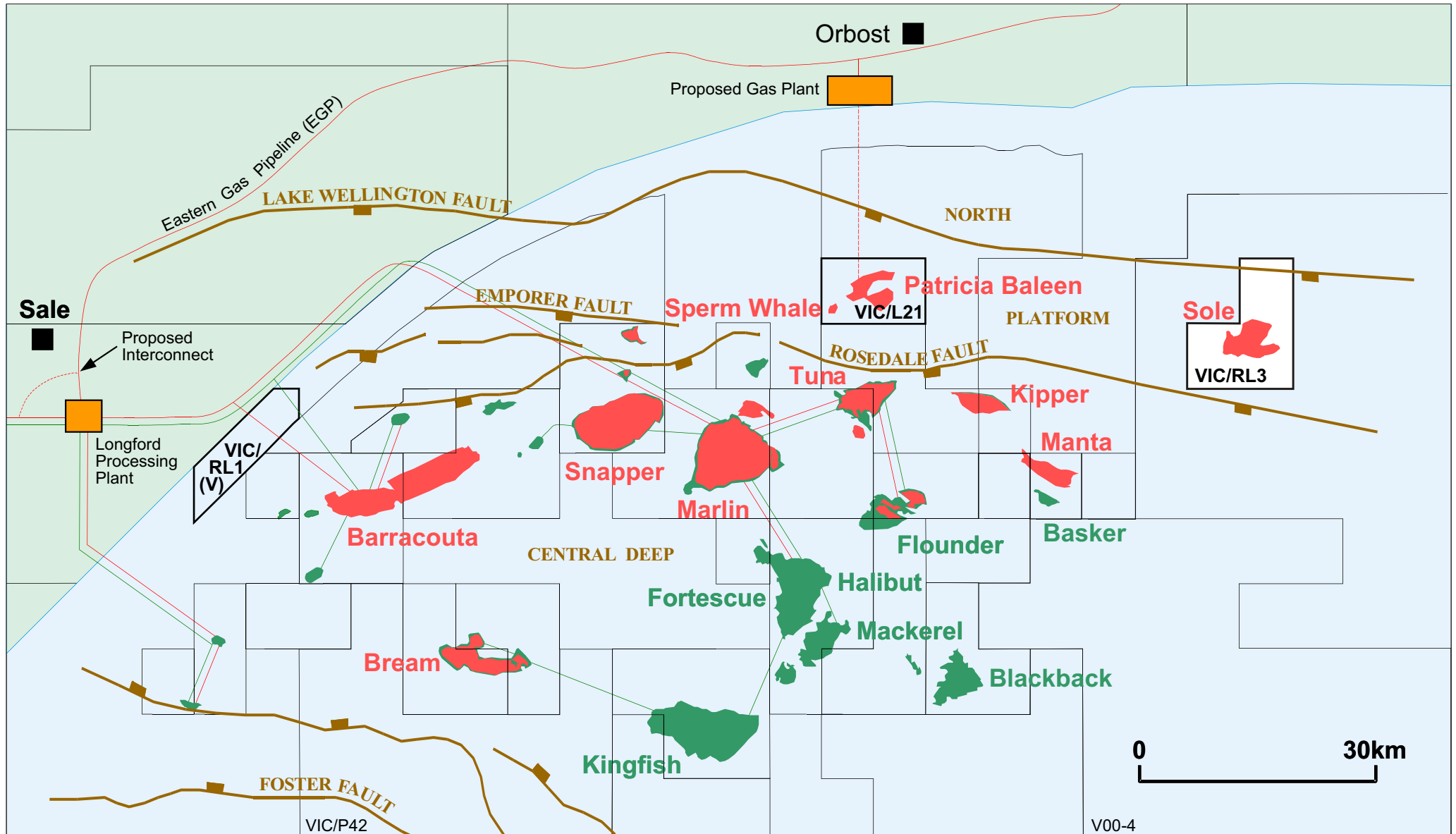
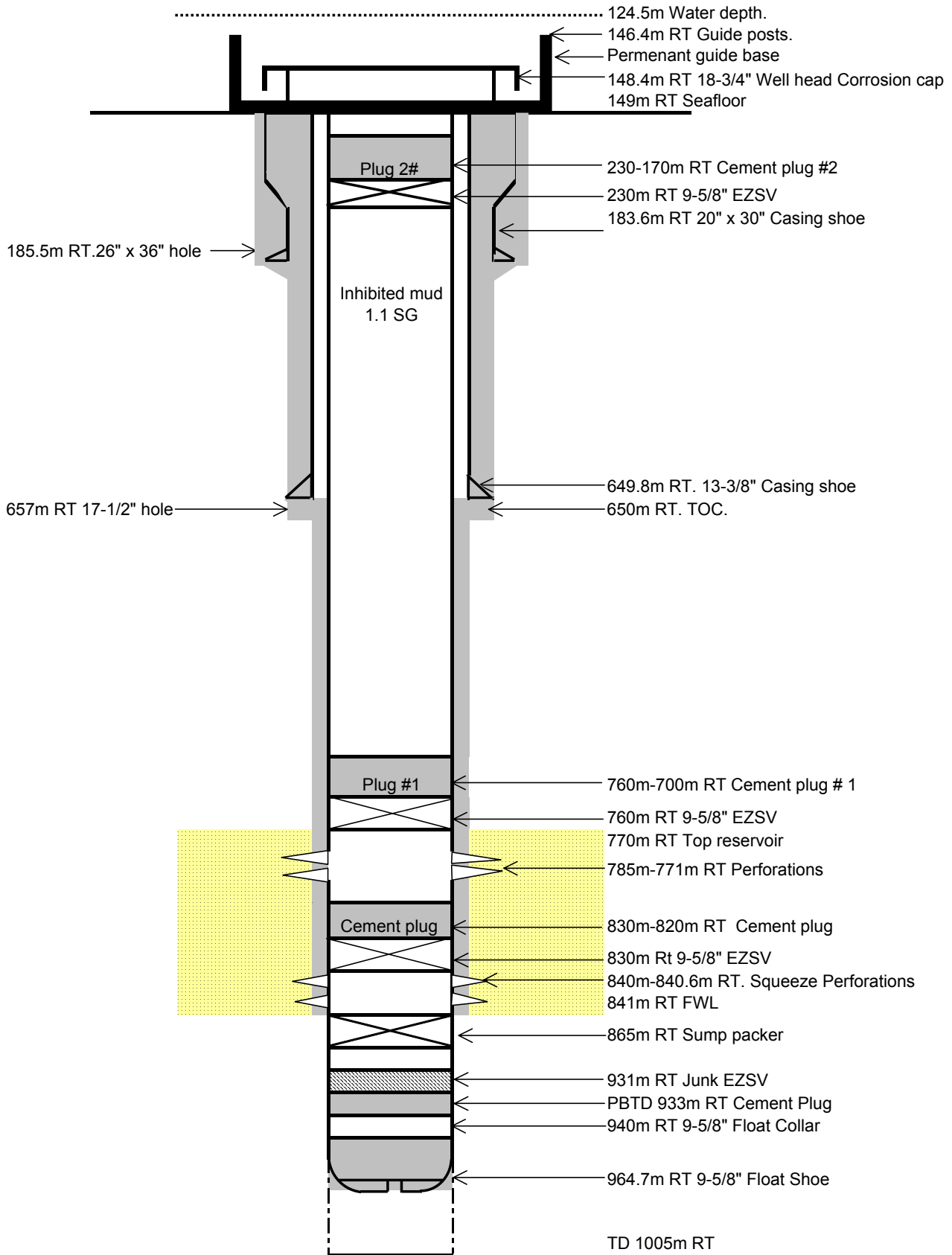


FIGURE 1

Sole 2 Suspension Schematic



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