



**Northright-1**

**VIC/P-41**

# **Well Completion Report**

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## 1 OVERVIEW

### 1.1 WELL DATA SUMMARY

|                               |   |
|-------------------------------|---|
| <b>Well Name:</b>             | Northright-1  |
| <b>Operator:</b>              | Eagle Bay Resources   |
| <b>Permit:</b>                | VIC/P 41  |
| <b>Basin:</b>                 | Gippsland Basin   |
| <b>Type:</b>                  | Exploration   |
| <b>Status:</b>                | Plugged and Abandoned   |
| <b>Elevations:</b>            | Water Depth: 105.5m<br>Rotary Table: 25m  |
| <b>Surface Well Location:</b> | Easting: 688,922.4m E<br>Northing: 5,799,457.1m N<br>Latitude 37°55'57.754" S<br>Longitude 149°08'58.942" E |
| <b>Drilling Unit:</b>         | Ocean Bounty  |
| <b>Commence Contract:</b>     | 12:30 hrs, 24 <sup>th</sup> April, 2001   |
| <b>Spud Date:</b>             | 01:30 hrs, 26 <sup>th</sup> April, 2001   |
| <b>Date Reached TD:</b>       | 02:30 hrs, 29 <sup>th</sup> April, 2001   |
| <b>Rig Release Date:</b>      | 10:15 hrs, 1 <sup>st</sup> May, 2001  |
| <b>Total Depth:</b>           | 391mRT<br>366mSS<br>391mTVD   |
| <b>Estimated Well Cost:</b>   | AUD 3,150,000   |

## 1.2 HOLE AND CASING DATA SUMMARY

A summary of hole sizes and depths is provided in Table 1 and a summary of casing sizes and setting depths is presented in Table 2.

| Hole Size |      | Depth To |     | Length |
|-----------|------|----------|-----|--------|
| (in)      | (mm) | MRT      | MSS | (m)    |
| 36        | 914  | 154      | 129 | 23.5   |
| 12.25     | 311  | 250      | 225 | 96     |
| 8.5       | 216  | 391      | 366 | 141    |

**Table 1. Hole Size Summary.**

| Casing Size                      |         | Grade | Weight<br>(ppf) | LOT<br>(sg) | Cement      | Depth |       |
|----------------------------------|---------|-------|-----------------|-------------|-------------|-------|-------|
| (in)                             | (mm)    |       |                 |             |             | mRT   | mSS   |
| 30 *                             | 762/340 | X-52  | 310             | N/A         | 673 sxs "G" | 153.4 | 128.4 |
| 9 <sup>5</sup> / <sub>8</sub> ** | 244     | L-80  | 47              | 1.24        | 340 sxs "G" | 246.8 | 221.8 |

\* Swedged to a 13<sup>3</sup>/<sub>8</sub>" Casing Shoe

\*\* Swedged to 13<sup>3</sup>/<sub>8</sub>" then to 18<sup>3</sup>/<sub>4</sub>" Wellhead

**Table 2. Casing Summary.**

## 1.3 WELL LOCATION

Northright-1 is located in the Gippsland Basin off the South Eastern Coast of Australia (Victoria) in permit VIC/P 41 (Figure 1). The final surface well location was:

Easting 688,922.4m E  
 Northing 5,799,457.1m N  
 Latitude 37°55'57.754" S  
 Longitude 149°08'58.942" E

The final position was 8.0m at a bearing of 137.5° from the proposed location.

The seafloor at the Northright-1 location was relatively flat and firm.

A combination of Totco and MWD surveys are summarised in Table 3 and confirm the bottom hole location to be within 5m of surface location.

| Data Pt | Survey Type  | MD (mRT) | Inc (°) | Azi (°) |
|---------|--------------|----------|---------|---------|
| 0       | Datum        | 0        | 0       | 0       |
| 1       | Tie in point | 130.53   | 0       | 0       |
| 2       | MWD          | 237.27   | 0.06    | 161.38  |
| 3       | MWD          | 319.46   | 0.35    | 263.49  |

**Table 3. Survey Summary.**

## 1.4 WELL OVERVIEW

### 1.4.1 Drilling

The Ocean Bounty commenced work for Eagle Bay Resources NL at 12:30 hrs on 24<sup>th</sup> April, 2001 with the first anchor on bottom at the Northright-1 location. This concluded the tow from the Timor Sea via Australia's eastern seaboard.

Prior to dropping the first anchor, an anchor handling supply vessel (AHSV), the Pacific Sentinel, was disconnected from the tow line and was preparing to run anchors when a steering problem was noticed. During the time the fault was being investigated the first anchor was dropped and anchoring operations were suspended until the fault was temporarily corrected. At this point the Sentinel hooked up to the tow line and the Pacific Conqueror was released to run anchors. Whilst running anchors a pennant wire parted on Anchor # 3. The chain was recovered with a J hook and as the anchor was being pulled onto the vessel the shackle on the anchor gave way and the anchor was lost. Weather had deteriorated during this time and anchoring operations were suspended for eight hours. Once the weather improved the remaining anchors were run and the rig ballasted down to drilling draft.

Northright-1 was spudded at 01:30 hours on 26<sup>th</sup> April, 2001. A 914mm (36") hole was drilled riserless with seawater and gel sweeps from the sea floor to 154m. The 762mm (30") Wellhead Housing and extension swedged to 340mm (13<sup>3</sup>/<sub>8</sub>") casing was run and then cemented at 153.4m.

Drilling with seawater and gel sweeps continued with a 311mm (12<sup>1</sup>/<sub>4</sub>") hole to 250m where the 244mm (9<sup>5</sup>/<sub>8</sub>") casing was run and cemented to 246.8m.

The marine riser and BOP equipment were then run and tested.

A 216mm (8<sup>1</sup>/<sub>2</sub>") BHA, complete with MWD (GR-RES-Dir) was run in the hole and 3m of new formation drilled prior to performing a leak-off test to 1.24 sg EMW. Drilling continued with KCl/PHPA mud to 391m. On completion of the 216mm (8<sup>1</sup>/<sub>2</sub>") hole the MWD, jars and stabiliser were laid out.

MWD logging and analysis of drill cuttings showed an absence of hydrocarbon indications and Northright-1 was declared a dry hole.

No wireline logging or production testing was conducted on Northright-1.

Abandonment of Northright-1 commenced with picking-up of 89mm (3<sup>1</sup>/<sub>2</sub>") drillpipe and run in the hole to 337m and pumping 6.17m<sup>3</sup> (38 bbls) of cement slurry for abandonment plug #1 from 337m to 212m. Whilst waiting on cement, the wear bushing was retrieved.

The top of plug#1 was tagged at 226m. Plug #2 was then pumped with 2.38m<sup>3</sup> (15 bbls) of cement slurry with the estimated top of the plug at 160m. The drillstring was then pulled out of the hole, the diverter rigged down, the BOP unlatched and the riser pulled.

The 508/762mm (20"/30") casing cutter was made-up and run in hole. The casings were cut at 133m and the wellhead, casing extensions and PGB were recovered. An ROV survey of the seabed was undertaken. An abandonment schematic forms figure 2 of this report.

Anchors were pulled and the new #3 anchor installed. The MODU was released when the last anchor was racked at 10:15hrs, 1<sup>st</sup> May 2001.

## 1.5 DETAILED DRILLING PERFORMANCE REVIEW

### 1.5.1 Mobilise Rig to Northright-1 Location

The MODU was mobilised from the Timor Sea via the eastern seaboard of Australia. The tow vessels were the Pacific Sentinel and Pacific Conqueror.

On approach to the Northright-1 location at 11:53 hrs the Pacific Sentinel reported experiencing steerage problems. At 12:30 hrs (EST), 24<sup>th</sup> April 2001 the first anchor (#6) was run on the Ocean Bounty and on bottom.

### 1.5.2 Run Anchors

Both Pacific Sentinel and Pacific Conqueror ran anchors as detailed in the anchoring diagram (see Appendix A Rig Positioning).

Chain length on all anchors after pretensioning was between 892m and 1,285m except for No.3, which was lost approximately 300m from the MODU.

The Pacific Sentinel took the static towline because of rudder problems and releaser the Pacific Conqueror to run the other primary anchors (#'s 2, 7 and 6). With #2 on bottom #7 turned upside down and had to be turned around. In passing the pennant of the last primary anchor, #3, the pennant line was tangled around the anchor. The Conqueror, was attempting to land the anchor on its deck when the pennant wire parted, no injuries resulted. While using a 'J' hook in an attempt to recover the #3 anchor the 'J' hook came off in heavy weather. This caused operations to be suspended for almost 8 hrs while 3m swells and 40 knot winds abated. When the chain was recovered #3 anchor was missing due to swivel failure.

Anchors #1, 8 and 5 were run, with #5 being re-run due to striking a rocky bottom at approximately 2,640'. Anchors were cross-tensioned and the MODU ballasted down to drilling draft.

The time breakdown to run and cross tension the anchors:

- Actual time: 35 hours, Trouble time: 19.25 hours,
- Productive Time: 45%, Technical Limit: 15.75 hours,
- Budgeted time: 14.4 hours, Over (Under) Budget: 143%.

The final rig position was 8m at 137.5° from the programmed location with a rig heading of 256°.

### 1.5.3 Pre-spud Activities / Drill 914mm (36") Hole Section

No TGB was run. The 914mm (36") hole was drilled without problems from 130.5m to 154m with a 660mm (26") bit / 914mm (36") hole opener at 15.7m/hr with seawater and 200+ sec/qt viscosity gel sweeps as follows:

- ⇒ Swept hole with 8m<sup>3</sup> (50 bbls) hi-vis mud every single
- ⇒ Swept hole with 16m<sup>3</sup> (100 bbls) hi-vis mud at section TD
- ⇒ Displaced hole to 24m<sup>3</sup> (150 bbls) hi-vis mud before POOH to run 762mm (30") conductor.

The survey recovered after the trip out at TD was a misrun.

Bit #1 – a 660mm (26”) Smith DSJC (3 x 24, 1 x 12) was run with a 914mm (36”) hole opener assembly, the BHA was:

Bit (26”), hole opener(36”), x/o, 3 x 203mm (8”) DC, 311mm (12¼”) stabiliser, 3 x 203mm (8”) DC, x/o, 127mm (5”) HWDP.

The time breakdown for drilling the 914mm (36”) hole was as follows:

- Actual time: 5.5 hours, Trouble time: 0.5 hours,
- Productive Time: 82%, Technical Limit: 5.0 hours,
- Budgeted time: 7.2 hours, Over (Under) Budget: (38%).

#### 1.5.4 Run and Cement 762mm (30”) Conductor

The conductor was run without problems with a 1.5m stickup on the 30” wellhead above the seabed and shoe at 153.46m. Tension was held while cementing as per programme with 21.3m<sup>3</sup> (134 bbls) of 1.91sg Class G cement slurry with returns to the seabed. Volume based on 200% excess. The float held and the running tool was released after displacement.

PGB bullseye after landing was ¾° and after cementing and releasing the running tool was 1¼°.

The time breakdown for running and cementing casing was as follows:

- Actual time: 8 hours, Trouble time: 0 hours,
- Productive Time: 100%, Technical Limit: 8 hours,
- Budgeted time: 9.6 hours, Over (Under) Budget: (17%).

#### 1.5.5 Drill 311mm (12 ¼”) Hole Section

There were no problems in the 311mm (12¼”) hole, which was drilled, riserless at 38.8m/hr with seawater and 200+ sec/qt viscosity gel sweeps as follows:

- ⇒ Pumped 4.8m<sup>3</sup> (30 bbls) hi-vis gel/ sweeps as required,
- ⇒ Swept hole with 32m<sup>3</sup> (200 bbls) guar gum hi-vis mud at section TD,
- ⇒ Displaced hole to 32m<sup>3</sup> (200 bbls) hi-vis gel mud.

A wiper trip was made to the 762mm (30”) shoe and the hole condition was good. The BHA was pulled out of hole to run casing and the hole displaced to Drispac pill.

Bit #2 – a 311mm (12¼”) Varel ETD 115 (3x18) was run with a 90’ pendulum assembly, the BHA was:

Bit (12 ¼”), bit sub, x/o, 3 x 203mm (8”) DC, 311mm (12¼”) stabiliser, 2 x 203mm (8”) DC, 203mm (8”) Jars, 1 x 203mm (8”) DC, x/o, 12 x 127mm (5”) HWDP.

The time breakdown for drilling the 311mm (12¼”) hole was as follows:

- Actual time: 9 hours, Trouble time: 0 hours,
- Productive Time: 100%, Technical Limit: 9 hours,
- Budgeted time: 12 hours, Over (Under) Budget: (25%).

#### 1.5.6 Run and Cement 244mm (9<sup>5</sup>/<sub>8</sub>”) Casing

The 244mm (9<sup>5</sup>/<sub>8</sub>”) casing swedged to 476mm (18 ¾”) wellhead was run to 246.8m without problems. Landing of the wellhead was tested with a 22.7tonne (50kip) overpull. The casing was circulated prior to cementing with 11.1m<sup>3</sup> (70 bbls) of 1.9 sg Class G tail slurry (340 sxs Class G cement)

There were good returns to the seabed throughout. The float held and the running tool was released after displacement.



Time breakdown for running and cementing casing was as follows:

- Actual time: 10.5 hours, Trouble time: 0 hours,
- Productive Time: 100%, Technical Limit: 10.5 hours,
- Budgeted time: 14.4 hours, Over (Under) Budget: (27%).

### 1.5.7 Run BOP and Riser

The BOP stack was tested on the test stump prior to running. The MODU was moved off location by 15m and the drillfloor rigged to run the BOP's on marine riser. Two singles were made up to the LMRP and BOP's on the beams and both pods function tested. The BOP's were run testing the choke and kill lines to 1,400/34,500 kPa (200/5,000 psi) after the double and before slip joint.

With the slip joint, goosenecks and riser tensioners made up, the MODU was again moved over the well, the BOP's landed and latched onto the wellhead with a 50 kip overpull taken. The diverter was installed and BOP's tested according to Diamond Offshore Generals procedures; 1,400/17,200 kPa (200/2,500 psi) for annulars and 1,400/68,900 kPa (200/10,000 psi) for rams and choke and kill line valves on Yellow pod for 5/10 mins.

Time breakdown for running and testing BOPs and running the seal bore protector are as follows:

- Actual time: 24.5 hours, Trouble time: 0 hours,
- Productive Time: 100%, Technical Limit: 24.5 hours,
- Budgeted time: 21.6 hours, Over (Under) Budget: 13%.

### 1.5.8 Drill 216mm (8½") Hole Section

The BHA was made up, the MWD tested OK on surface and run in hole. The cement was tagged at 225m and the shoe track drilled out without problems. After cleaning to bottom and drilling 3m of new hole, the hole was displaced to a 1.1 sg mud and a leak off test conducted. Fracture gradient at the 340mm (9<sup>5</sup>/<sub>8</sub>") casing shoe was equivalent to 1.24 sg (10.34 ppg) mud density.

Bit #3 – Varel L127 (3x16) was run on a 90' pendulum assembly with a stabiliser above the MWD, the BHA was:

Bit (8 ½"), bit sub, x/o, MWD, 1 x 165mm (6½") DC, stabiliser, 3 x 165mm (6½") DC, 165mm (6½") jar, 2 x 165mm (6½") DC, 12 x 127mm (5") HWDP.

The bit drilled 216mm (8½") vertical hole from 250m – 391m with an average on bottom ROP of 14.8m/hr and was pulled when it reached hole section TD.

Mud losses in this interval were minimal at a total of 33bbbls over the interval at 1 – 1.5 bbbls/ hr. The hole was static during flow checks.

The decision to TD the well above the prognosis was based on MWD logs and samples.

The time breakdown of the drilling of the 216mm (8½") hole is as follows:

- Actual time: 20.5 hours, Trouble time: 0 hours,
- Productive Time: 100%, Technical Limit: 20.5 hours,
- Budgeted time: 19.2 hours, Over (Under) Budget: 4%.

### 1.5.9 TD Wireline Logging of 216mm (8½”) Hole Section

No logs were run due to adequate information being gained from successful MWD run.

The time breakdown of the logging of the 216mm (8½”) hole is as follows:

- Actual time: 0 hours, Trouble time: 0 hours,
- Productive Time: 0%, Technical Limit: 24 hours,
- Budgeted time: 24 hours, Over (Under) Budget: N/A%.

### 1.5.10 Well Abandonment

The plug and abandonment plugs were set using 89mm (3½”) DP stinger and summarised in Table 4.

| Plug No. | Amount Pumped | From (m) | To (m) | Tagged |
|----------|---------------|----------|--------|--------|
| 1        | 187 sx        | 337      | 212    | Yes    |
| 2        | 72 sx         | 223      | 160    | No     |

**Table 4. Plug and Abandonment Cement Plug Summary.**

The 89 mm (3½”) drillpipe cementing stinger was picked-up with a mule shoe and ran in the hole to set cement plug #1 (337 – 212 m). The string was then pulled to 156 m and circulated clean. BOP’s were then flushed, excess drill pipe laid down and the wear bushing retrieved. The string was ran in hole and cement plug #1 was tagged at 226m and plug #2 was then set (223m - 160m). Excess drillpipe was then laid down and the diverter rigged down, BOP’s unlatched, riser pulled and BOP’s secured. The 508/762 mm (20”/30”) casing cutter assembly was ran in the hole and casing cut at 133.5m. The cut casing and PGB were recovered.

A time breakdown for the abandonment operations is as follows:

- Actual time: 31 hours, Trouble time: 0 hours,
- Productive Time: 100%, Technical Limit: 31 hours,
- Budgeted time: 28.8 hours, Over (Under) Budget: 7%.

### 1.5.11 Pull Anchors.

All of the anchors were pulled by both the Pacific Conqueror and Pacific Sentinel and the rig de-ballasted and under tow after reinstalling the lost #3 anchor.

- Actual time: 22.25 hours, Trouble time: 2 hours,
- Productive Time: 91%, Technical Limit: 20.25 hours,
- Budgeted time: 21.6 hours, Over (Under) Budget: 3%.

The rig was released at 10:15 hours on 1<sup>st</sup> May, 2001.

## 2 WELL PERFORMANCE DATA - TIME VS DEPTH CURVE

The Time versus Depth curve for Northright-1 forms Figure 3 of this report.

## 3 DRILLING RECORDS

### 3.1 OPERATIONAL REPORTS.

Daily operational reports are summarised in Appendix B.

### 3.2 BIT AND BHA RECORDS

Bit and BHA reports for Northright-1 are summarised in Appendix C.

### 3.3 CASING AND CEMENTING SUMMARY

A casing and cementing summaries are included with casing tallies in Appendix D.

### 3.4 DRILLING FLUID SUMMARY

A drilling fluids summary prepared by Baker Hughes Inteq is presented in Appendix E.

### 3.5 WELL TRAJECTORY SUMMARY

Northright-1 was planned as a vertical well with regular surveys conducted in accordance with PSLA regulations. The well was surveyed using a Totco survey tool prior to spud and at completion of the 36" hole. Directional surveys were then recorded by Anadrill Schlumberger and these are shown in the Table 5. The well had a maximum angle of 0.35° at 319m. Due to a combination of Totco and MWD surveys an area of uncertainty was used to describe the bottom hole location, +/-5m based on a centre at 5.28mN, 6.12mW of the proposed location.

| Data Pt | Survey Type | MD (m) | Inc (°) | Azi (°) | Crs Lnght (m) | TVD (m) | VS (m) | Displ +N/-S (m) | Displ +E/-W (m) | Total Displ +N/-S (m) | At Azi (°) | DLS (°/10m) |
|---------|-------------|--------|---------|---------|---------------|---------|--------|-----------------|-----------------|-----------------------|------------|-------------|
| 0       | Datum       | 0      | 0       | 0       | 0             | 0       | 0      | 0               | 0               | 0                     | 0          | 0           |
| 1       | Totco       | 130.53 | 0       | 0       | 0             | 130.53  | 5.4    | 5.4             | -5.9            | 8.00                  | 312.47     | 0           |
| 2       | MWD         | 237.27 | .06     | 161.38  | 106.74        | 237.27  | 5.35   | 5.35            | -5.88           | 7.95                  | 312.27     | .01         |
| 3       | MWD         | 319.46 | .35     | 263.49  | 82.19         | 319.46  | 5.28   | 5.28            | -6.12           | 8.08                  | 310.78     | .04         |

**Table 5. Well Trajectory Summary.**

### 3.6 LOT/FIT REPORTS

Leak off test details for the well (244mm (9<sup>5</sup>/<sub>8</sub>”) casing only) are summarised in Table 6.

| Casing                        |     | Depth | Leak Off Pressure |        | EMW  |      | LOT EMW |
|-------------------------------|-----|-------|-------------------|--------|------|------|---------|
| in                            | mm  | mRT   | psi               | Kpa    | ppg  | sg   | sg      |
| 9 <sup>5</sup> / <sub>8</sub> | 244 | 246.8 | 50                | 344.73 | 9.13 | 1.10 | 1.24    |

**Table 6. Leak-off Test Summary.**

### 3.7 PORE PRESSURE REPORTS

Pore pressure analysis prior to drilling Northright-1 indicated that a normal pressure gradient existed in the area. During drilling operations no indications of pore pressure higher than normal were found.

### 3.8 FORMATION TEMPERATURE REPORTS

No wireline logs were run in Northright-1 and therefore no static bottom hole temperature was recorded. Annulus temperature was recorded continuously by MWD and at TD the temperature was approximately 28°C.

### 3.9 PROJECT LOGISTICS

Logistics and support infrastructure are summarised in Figure 4.

#### 3.9.1 Mobilisation

Spud equipment was loaded out from Darwin on March 15<sup>th</sup> prior to rig mobilisation to Northright-1. Therefore, most equipment was onboard when the Ocean Bounty arrived at the Northright-1 location.

Eagle Bay personnel (Drilling Supervisor, Drilling Engineer, Fugro Surveyor) were mobilised to the Ocean Bounty from Sydney on Sunday, 22<sup>nd</sup> April. The Drill-Quip engineer travelled offshore on Monday, 23<sup>rd</sup> April.

#### 3.9.2 Shorebase

Eden was chosen as the shorebase for Northright-1 and is approximately 500 kms from Sydney and 550kms from Melbourne. It is located on the South East coast of New South Wales.

Eden is primarily a fishing port (population 4,000) but has an excellent wharf and is accessible 24 hours a day. Sailing time from Eden to Northright-1 location was 7 hours at economical speed and 6 hours at full speed.

Toll Energy were contracted to supply labour, trucking and crane services in Eden. Toll does not have a base in Eden and were mobilised from Melbourne. Labour was supplied locally (with the exception of an experienced dogman from Melbourne). A 70 tonne mobile crane was also mobilised from Melbourne because the largest crane available in the Eden area was rated to 20 tonnes.

All the equipment for Eagle Bay's first load out was consolidated at Toll Energy's yard in Melbourne and shipped to arrive in Eden on Wednesday, 25<sup>th</sup> April. The first vessel

(Pacific Conqueror) arrived in Eden at 1100 hours on 26<sup>th</sup> April and backload cargo was discharged on arrival. Cargo was then loaded and Pacific Conqueror sailed at 1600 hours the same day.

The Pacific Sentinel arrived in Eden at 1840 hours on 27<sup>th</sup> April and arrived with clear decks. Repairs were carried out on the rudder and completed by 1030 hours on 29<sup>th</sup> April after which cargo was loaded and the vessel sailed at 1600 hours.

The Pacific Conqueror arrived in Eden at 0700 hours on 30<sup>th</sup> April and backload cargo was discharged and the vessel sailed at 1100 hours on the same day.

The Eden shorebase was closed on Tuesday, 1<sup>st</sup> May.

All operations at Eden ran very smoothly and is recommended that any future programmes within the vicinity utilise Eden as the shorebase.

### **3.9.3 Helicopters / Crew Changes**

CHC Helicopters were contracted to supply an exclusive use Bell 412 helicopter, which was based at West Sale Airport, Victoria. The helicopter was mobilised from Essendon on 22<sup>nd</sup> April.

Chubb Security were contracted by CHC Helicopters to provide security and check-in facilities at West Sale Airport.

For all flights, passengers were collected from their hotel at Melbourne airport at 0600 hours for transport to West Sale. The designated hotel was the Airport Hilton. The journey from Melbourne airport to West Sale is approximately 2-3/4 hours. A bus or car was used depending on numbers and this service was provided through Toll Energy.

There were a total of 14 flights between West Sale and the Ocean Bounty. This includes one special flight to the Ocean Bounty with MWD parts on 28<sup>th</sup> April but does not include the mobilisation and demobilisation flight between Essendon and Sale.

The one-way flight time between Sale and the Northright-1 location was originally estimated to be 52 minutes by CHC Helicopters. This proved to be inaccurate and one way flight time was closer to 1 hour because of RAAF base at East Sale having flying exercises and a no fly zone in place.

All helicopter operations ran smoothly and no problems were encountered during the programme.

## **3.10 COMMUNICATIONS**

Communications services were provided by Telstra's Iterra Satellite system. Both voice and data services were provided. All aircraft and vessels involved in the drilling of Northright-1 utilised their appropriate communications infrastructure.

## **3.11 WEATHER FORECASTING**

Regular daily site specific and long range forecasts were provided by Weather News International (WNI).

## 4 GEOLOGICAL REPORT

### 4.1 WELL SUMMARY

Northright-1 exploration well was located in the north-eastern part of permit VIC/P41, approximately 17km south of the Victorian coastline. The retention license VIC/RL3 which included the suspended gas discovery well Sole-1 and dry hole Dart-1 was encompassed by the exploration license (VIC/P41). Geologically, the most important offset well was the producing oil discovery Leatherjacket-1 36km to the west south west of Northright-1.

The objective of Northright-1 was to test a integrity and hydrocarbon potential of a reverse fault structural trap set up at the top of the Latrobe Group reservoir. The fault trap was against a major east-west trending basin margin fault and updip from the known oil and gas accumulations of Sole and Leatherjacket. The Latrobe Group sandstone was prognosed to be sealed by marls of Tertiary Lakes Entrance Formation and underlain by secondary objective sandstones of Late Cretaceous Golden Beach Group. Early Cretaceous sandstone, litharenite and volcanics of the Strezlecki Group form the basement and underlie the Golden Beach Group fluvial channel/flood and coastal plan sequence.

Northright-1 did not encounter any hydrocarbon shows or significant gas concentration in either the primary or secondary reservoir objectives. Pore pressures were normal and there was little evidence of significant washout in mud logging lag times and FEWD tool response. Northright-1 was plugged and abandoned upon reaching the Strezlecki Group.

### 4.2 FORMATION TOP SUMMARY

| RT above LAT: 25.0m<br>WD: 105.5m<br>RT – ML: 130.5 m |                      |              |       |                   |              |         |       |      |
|---|----------------------|--------------|-------|-------------------|--------------|---------|-------|------|
| FORMATION   | PROGNOSED DEPTHS (m) |              |       | ACTUAL DEPTHS (m) |              |         |       |      |
|   | MDRT                 | MDSS         | THICK | MDRT              | TVD SS       | HI/LO   | THICK | DIFF |
| Sea Floor/ Sea Spray                                  | 130.0                | 105.0        | 132.0 | 130.5             | 105.5        | 0.5 low | 119.5 | 12.5 |
| Latrobe Group   | 262.0                | 237.0        | 56.0  | 250.0             | 225.0        | 12 high | 37.0  | 19.0 |
| Golden Beach Sands                                    | 318.0                | 293.0        | 60.0  | 287.0             | 262.0        | 31 high | 25.0  | 35.0 |
| Strzelecki Formation                                  | 378.0                | 353.0        | +42.0 | 312.0             | 287.0        | 66 high | +79.0 | -    |
| <b>TD</b>   | <b>420.0</b>         | <b>395.0</b> |       | <b>391.0</b>      | <b>366.0</b> |         |       |      |

**Table 7. Formation Top Summary.**

### 4.3 FORMATION DESCRIPTION SUMMARY

#### Latrobe Group

#### Tertiary

250-287mRT (37m)

| INTERVAL<br>(mRT) | ROP<br>(Ave)<br>(m/hr) | ROP<br>(Range)<br>(m/hr) | LITHOLOGY  |
|-------------------|------------------------|--------------------------|--|
| 250-287           | 36                     | 20-70                    | <b>SANDSTONE</b><br><b>SANDSTONE (100%)</b> opaque to smoky grey, medium to granular, predominantly very coarse grained, subangular to well rounded, poorly to moderately sorted, moderate sphericity, loose, commonly frosted grains, 10% pyrite cement, 5%-10% pyrite crystals, 5% off white clay matrix in part, , rare to minor quartz overgrowths in part, minor pyrite cement, fair to very good inferred porosity, mineral? Fluorescence. |

#### Golden Beach Group

#### Late Cretaceous

287-312mRT (25m)

| INTERVAL<br>(mRT) | ROP<br>(Ave)<br>(m/hr) | ROP<br>(Range)<br>(m/hr) | LITHOLOGY  |
|-------------------|------------------------|--------------------------|--|
| 287-303           | 37                     | 14-93                    | <b>SANDSTONE</b><br><b>SANDSTONE (100%)</b> opaque to smoky grey, translucent, medium to granular, angular to rounded, rare light grey to light olive grey angular quartz? Shards, poorly to moderately sorted, moderate sphericity, loose, grains, 10% pyrite cement, 5%-10% pyrite crystals, good to very good inferred porosity, mineral fluorescence.  |
| 303-312           | 19                     | 11-35                    | <b>CLAYSTONE and minor SANDSTONE</b><br><b>CLAYSTONE (75%):</b> off white to very light grey, dispersive to amorphous, slightly calcareous, 1-3% light green glauconitic matrix.<br><b>SANDSTONE (25%):</b> translucent to opaque, minor light grey smoky quartz, fine to very coarse grained, subangular to subrounded, poorly sorted, moderate to high sphericity, generally loose, 40% off white clay matrix, slightly calcareous, poor to fair inferred porosity, no fluorescence. |

#### Strezlecki Group

#### Early Cretaceous

312-391mRT (79m)

| INTERVAL<br>(mRT) | ROP<br>(Ave)<br>(m/hr) | ROP<br>(Range)<br>(m/hr) | LITHOLOGY  |
|-------------------|------------------------|--------------------------|--|
| 312-331           | 22                     | 14-32                    | <b>CLAYSTONE with lenses of SANDSTONE and SILTSTONE with trace COAL</b><br><b>CLAYSTONE (20-60%, Ave 45%)</b> off white to light greenish grey, predominantly dispersive to firm in part, non to slightly calcareous, 2-5% light green glauconitic matrix.<br><b>SILTSTONE (30-40%, Ave 35%)</b> very pale green to pale yellowish green, very hard, blocky, chloritised and silicified, rare angular quartzite, rare orange, grey and black lithic fragments.<br><b>SANDSTONE (10-40%, Ave 20%)</b> : translucent to opaque, minor light grey smoky quartz, fine to coarse grained, subangular to subrounded, poorly sorted, moderate to high sphericity, generally |



|         |    |       |  |
|---------|----|-------|--|
|         |    |       | <p>loose, 40% off white clay matrix, slightly calcareous, poor to fair inferred porosity, no fluorescence.</p> <p><b>COAL (Tr)</b> black, dull, soft to firm, brittle, platy, showing very fine laminations and fissility.</p>   |
| 331-391 | 23 | 13-61 | <p><b>CLAYSTONE with lenses of SANDSTONE and SILTSTONE with trace COAL</b></p> <p><b>CLAYSTONE (20-60%, Ave 45%)</b> off white to light greenish grey, predominantly dispersive to firm in part, non to slightly calcareous, 2-5% light green glauconitic matrix.</p> <p><b>SILTSTONE (30-40%, Ave 35%)</b> very pale green to pale yellowish green, very hard, blocky, chloritised and silicified, rare angular quartzite, rare orange, grey and black lithic fragments.</p> <p><b>SANDSTONE (10-40%, Ave 20%)</b> : translucent to opaque, minor light grey smoky quartz, fine to coarse grained, subangular to subrounded, poorly sorted, moderate to high sphericity, generally loose, 40% off white clay matrix, slightly calcareous, poor to fair inferred porosity, no fluorescence.</p> <p><b>COAL (Tr)</b> black, dull, soft to firm, platy to fissile.</p> |

#### 4.4 FORMATION EVALUATION WHILE DRILLING

Schlumberger's Anadrill FEWD tools were run throughout the 8 ½" hole section. The tool string was configured to acquire resistivity and gamma ray data near the bit for geological evaluation. FEWD data were interpreted to indicate a water wet reservoir section. A summary of the details of the FEWD portion of the project is summarised in Appendix F.

#### 4.5 WIRELINE LOGGING

No wireline logging services were used whilst drilling this well.

#### 4.6 FORMATION SAMPLING

A summary of mudlogging activities is presented in Appendix G.

Cuttings samples were acquired at 3m intervals as per programme and despatched as detailed in Baker Hughes Mudlogging Report in Appendix G.



## 5 UNSCHEDULED EVENTS

### 5.1 PRE-SPUD

#### 5.1.1 Pacific Sentinel Loss of Steerage

During the approach to the Northright-1 location the Pacific Sentinel was released from the starboard tow wire to prepare for anchor handling operations. After handing the tow line back to the rig the boat reported a steering problem and was going to investigate. When the rig was 600' from the drop zone the Pacific Sentinel reported major problems with the steering. The OIM decided it would be safer to drop the first anchor as it would take up to 3 hours to turn the rig around for another run. After 1.75 hours the Pacific Sentinel was able to take the rig on static tow only but unable to run anchors.

#### 5.1.2 Anchor #7 turned

Anchor #7 had turned and had to be re-run.

#### 5.1.3 Loss of #3 Anchor

Pennant wire tangled around anchor #3, repaired same.

Anchor # 3 pennant wire was passed to the Pacific Conqueror and the conqueror was to change out the pennant wire. Whilst attempting to deck the anchor the pennant wire parted. A "J" hook was passed to the boat and the anchor chain was chased. Whilst attempting to deck the anchor the "J" hook came off the anchor and flew across the deck of the boat (No injuries) and the anchor was lost again. Due to deteriorating weather conditions the boat stood down till day light (see section 6.1.4). At first light the Pacific Conqueror reported finding a large nut on deck that they suspected was from the anchor. A "J" hook was used to chase the chain and confirm that the nut was from the anchor swivel and the anchor had been lost. During this incident 3 hours were lost firstly due to the pennant wire parting and secondly chasing the chain and thirdly reinstalling the new anchor. This time does not include waiting on weather time, as it is possible that had this incident not occurred that anchor handling operations *may* have continued.

#### 5.1.4 Wait On Weather

During anchor recovery operations described in section 6.2, the weather may have partially contributed to the "J" hook incident. The boat captain then announced that he could not allow anchor handling operations to continue. A total of ?? hours was spent waiting on weather. A root cause of having to wait on weather was the initial delay in anchor handling operations caused by the steering failure on the Pacific Sentinel.

#### 5.1.5 Running Anchor #5

Due to encountering a rocky bottom at 2,640', #5 anchor was recovered and re-run.

#### 5.1.6 ROV Sonar Failure

Primary sonar on the ROV failed and replacement equipment was dispatched. Upon installation, the replacement equipment failed as well. This delayed the final seabed survey and also meant that recovery of the lost anchor was impossible.

## 5.2 DRILLING

During the drilling of the well there was no downtime.

## 5.3 POST DRILLING

There was no downtime during formation evaluation, abandonment and pulling anchors.

## 5.4 DOWNTIME ANALYSIS

Downtime experienced on Northright-1 and time associated with each downtime event is summarised in Table 8.

| Task   | Time Lost (H:MM) | % of Total Time |
|--|------------------|-----------------|
| Pacific Sentinel - Loss of Steerage                      | 3:25             | 2.37            |
| Anchor #7 turned   | 1:45             | 1.20            |
| #3 Anchor – Pennant Wire Tangled and Parted. Anchor lost | 6:20             | 4.35            |
| Wait On Weather  | 7:40             | 5.26            |
| Running Anchor #5  | 2:05             | 1.43            |
| ROV Sonar Failure  | 1:00             | 0.69            |
| <b>Total</b>   | <b>22:15</b>     | <b>15.27</b>    |

**Table 8. Downtime Analysis Summary.**

## 6 DETAILED TIME ANALYSIS

Figures in Appendix B summarise the time break down for Northright-1 and illustrate that 15.27% of the time on the spent on location was because of unscheduled events.

## 7 PROJECT ORGANIZATION

The Operations team working on Northright -1 consisted of:

### Perth Office

|                          |  |
|--------------------------|--|
| Managing Director        | Tony Rechner (Eagle Bay Resources)         |
| Exploration Manager      | Milton Schmedge (Eagle Bay Resources)      |
| Drilling Superintendent  | Stev Crocker (Labrador Petro-Management)   |
| Senior Drilling Engineer | Steve Hodgetts (Labrador Petro-Management) |
| Materials and Logistics  | John Smith (Labrador Petro-Management)     |
| Operations Geologist     | Dave Thorpe (Labrador Petro-Management)    |
| Technical Advisor        | Tom Brand (Labrador Petro-Management)      |
| HSE Coordinator          | Richard Keys (Quest)                       |

### Ocean Bounty

|                            |  |
|----------------------------|--|
| Senior Drilling Supervisor | Murry Jackson (Labrador Petro-Management)    |
| Drilling Engineer          | Chris Wilson (Labrador Petro-Management)     |
| Wellsite Geologists        | Tim Bray (International Geological Services) |

### Eden

|  |  |
|--|--|
| Shorebase Materials<br>and Logistics Coordinator | John Smith (Labrador Petro-Management) |
|--|--|

## 8 CONTRACTOR PERFORMANCE

- **Diamond Offshore General Company (MODU Ocean Bounty)**  
DOGC and the Ocean Bounty MODU performed well. Personnel onboard were excellent and the rig had very little downtime. The attitude and commitment to HSE is excellent and support infrastructure in Perth was good.
- **Swire Pacific (AHSVs Pacific Conqueror and Pacific Sentinel)**  
Pacific Conqueror did an excellent job to support the drilling operation. The Pacific Sentinel had steerage problems; the starboard rudder lock nut almost backed off. Prompt and appropriate action by Swire Pacific minimised operational delays.
- **CHC (Rotary Wing)**  
CHC (Lloyds) provided a Bell 214 for crew change personnel movement, which performed very well.
- **BHI (Drilling Fluids and Mud Logging)**  
BHI provided good support and onboard personnel were very good. The fluid systems were well designed and run efficiently. Support was adequate except in the area of reporting where some mud reports were not received until the drilling activities were finished.
- **Varel (Bits)**  
No problems.
- **Anadrill (MWD)**  
Initial poor organisation in mobilisation of equipment raised initial concerns that data collection could be compromised. Tools wrongly configured and surface malfunctions almost resulted in cancellation of running the tools below the rotary table. Prompt and appropriate action by the contractor resulted in the tools being run and they operated flawlessly.
- **Stolt Offshore (ROV)**  
ROV service was good and their work performed successfully. Loss of sonar was a problem and a replacement was sent to the rig on short notice however, it also did not work. Sonar failure precluded the use of the ROV to recover the lost #3 anchor.
- **Halliburton (Cementing)**  
Cementing operations were very good. Halliburton had upgraded their Recirculating Mixer during the tow from Kuda Tasi to Northright-1. The unit onboard performed well. Engineering service support and offshore personnel were very good.
- **DrilQuip (Wellhead System)**  
The Drilquip SS-10 subsea wellhead wellhead system worked well and was fit for purpose. Engineering and supply support from DrilQuip was very good as were offshore service representatives. No system problems occurred during operations.
- **Schlumberger (Wireline)**  
Schlumberger did an adequate job during the planning phase. All equipment arrived on time however no wireline logging was performed.

- **Weatherford (Casing Running)**  
All operations went smoothly and Weatherford performed well.
- **Tasman Oil Tools (Drilling Tools)**  
No problems.
- **Baker Oil Tools (Fishing)**  
No problems.
- **Smith (Jars and Wellhead Severence)**  
Support and equipment were very good. Abandonment services performed were excellent.
- **Fugro (MODU Positioning)**  
The service was very good with no problems experienced.
- **EDR Hydrosearch (QA-QC for MODU positioning)**  
EDR did a very good job, supplied good advice and prepared good reports as well as documented advice.
- **Arrowsmith and Muir (Site Survey)**  
Site survey work was accomplished satisfactorily and adverse weather conditions were managed correctly.
- **IDS (Drilling Reporting System)**  
No problems, worked well.
- **Telstra (Communications)**  
No problems.
- **OGT (Transport)**  
No problems.
- **WNI (weather forecasting)**  
Summary forecasts from WNI were brief and the time lapse in the data supplied (sometimes up to 6 hours) often missed significant changes in the weather in Bass Strait. It is recommended that a shorter time lapse in forecasting data be requested in any future operations in Bass Strait.

## 9 RECOMMENDATIONS

Overall the operation went well. Below are some comments for improvement:

- MODU (rig): The Ocean Bounty was a rig of opportunity and operated well, but this may not always be the best choice for future wells.
- Casing Setting Depths: setting of the 9-5/8" casing this was difficult to pick on ROP alone although it is difficult to do anything else in such a shallow well.
- Logistics supply vessel support: The two AHSVs did a good job but often availability was limited due to turn around time to send AHSVs to and from Eden. Consider having a dedicated standby vessel in order to make better use of the AHSVs.
- Drilling Fluids: The systems used were reasonable and fit for purpose.

## FIGURES



**Figure 2. Time versus Depth Curve.**

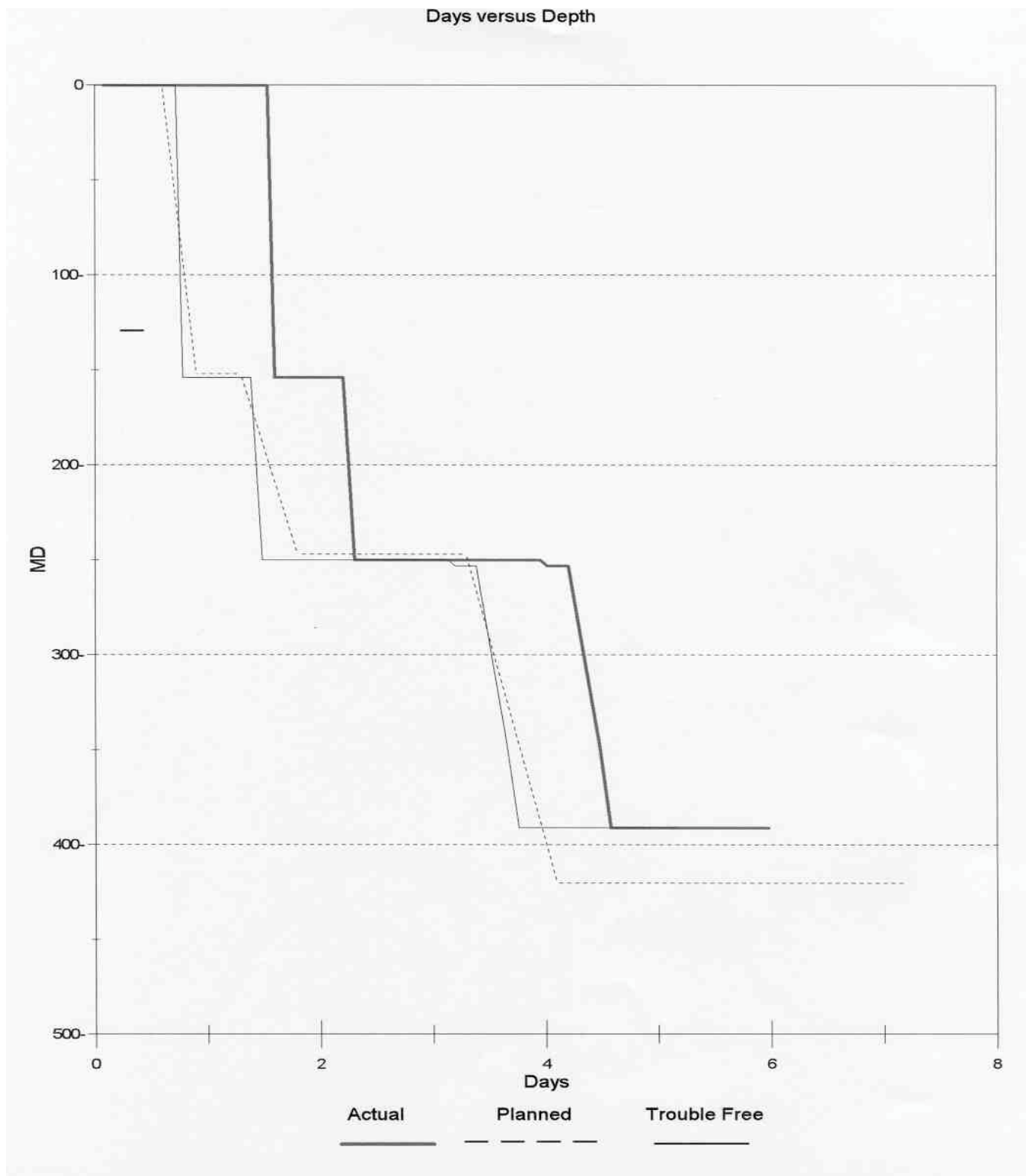




Figure 3. Logistics and Support Infrastructure Diagram.

