

Glenaire-1 Pretty Hill and Laira  
Formation Testing  
26<sup>th</sup> November 2007 - 1<sup>st</sup> February 2008



Closeout Report

Author:  
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**GLENAIRE #1 PRETTY HILL AND  
LAIRA FORMATION TESTING  
NOV 07 TO FEB 08  
CLOSEOUT REPORT**



## **Background**

The Glenaire-1 well in south western Victoria, is located approximately 38km west of Casterton, to the south of the Casterton - Penola Road. In March 2007 a brief flow and build up test was conducted on the Laira Formation. An incomplete cement job had provided communication between the Laira Formation and the wellbore. Oil was recovered from the well at an uneconomic rate. Wireline investigation at that time indicated that the primary target Pretty Hill Formation could not be accessed due to heavy mud in the wellbore.

A coiled tubing cleanout was scheduled for late 2007. Wireline perforating and testing to evaluate the Pretty Hill and Laira Formations would follow the cleanout. This closeout report presents the findings from those activities.

## **Summary**

Halliburton were contracted to cleanout approximately 320m of mud fill from the bottom of the 4-1/2" liner with coiled tubing. A jetting nozzle was run in hole and a brine/gel solution circulated from the bottom up to lift out the mud. The coiled tubing cleanout operation was successfully completed in November 2007.

In late November 2007 three intervals of the Pretty Hill Formation were perforated and flow-tested with down-hole gauges. There was no indication of flow from any of these intervals. Continuing inflow of oil from the Laira Formation from behind the 4-1/2" liner was observed during flow-testing of the Pretty Hill intervals.

Following the poor testing result in the Pretty Hill Formation it was decided to perforate the 4-1/2" liner opposite the fracture zone in the Laira Formation. While this zone had already been flowing oil into the wellbore from behind the 4-1/2" liner, due to uncertainty as to the extent of the cement behind the liner, it was considered that the initial testing in March 2007 may have been restricted. To remove uncertainty, perforations were added opposite the zone with the best oil shows during drilling.

The Laira fracture zone was perforated and flow-tested with down-hole gauges in late January 2008. No increase in flow was observed when compared with the rates measured during testing of the Pretty Hill intervals.

With no indication of contribution from the Pretty Hill gas sands and oil rates less than 4bopd from the Laira, the well is considered not commercial and approval will be sought to plug and abandon.

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## **Health, Safety and Environment**

No health, safety or environmental incidents occurred during the coiled tubing cleanout or during the perforation and testing of the Pretty Hill and Laira intervals of Glenaire-1. Regular toolbox meetings were held onsite. Job safety analyses were conducted prior to significant operations. Safety meetings were held before every perforation run to remind all personnel of the dangers and safety precautions associated with perforating.

Testing operations were conducted in consultation with the local CFA and adjacent landholders to ensure fire risk was minimized. Fire-fighting equipment and water was maintained on site at all times during testing.

## **Equipment**

### **Coiled Tubing Cleanout**

Halliburton supplied an 80k Coiled Tubing Unit fitted with approximately 3700m of 1.75" tubing. RMN drilling fluids supplied KCl, Xanthan gum, Citric Acid and Caustic Soda for the cleanout.

SGS Expertest installed a 2" flare-line from the wellhead to a newly-constructed flare-pit in October 2007. This flare-line was used to flow coiled-tubing returns to the lined flare-pit. Following the coiled tubing cleanout, mud and oil was recovered from the pit and the liner removed to enable flaring.

### **Testing**

For testing of the Pretty Hill Formation intervals, SGS Expertest provided a full choke manifold which was used to direct flow into either a flare-line or a test separator. From the test separator, liquids were directed to an 880bbl production tank and gases to the flare-pit. A heater was kept onsite as a contingency in the event of high gas flows. High pressure hose and 2" knock-up line was used to rig up the wellhead, choke manifold, test separator and production tank.

The Beach-supplied 880bbl production tank remained installed inside a lined bund and fitted with appropriate electrical earthing, drain lines, valves, couplings, ladder, platform, vent, emergency hatch and flame arrestor as per the March 2007 flow-testing of the Laira formation.

Petrolab provided liquid and gas sampling equipment and a technician onsite in anticipation of Pretty Hill Formation fluid flow.

### **Slickline**

SGS Expertest provided a combination slickline unit, swabbing cups, tandem 10,000psi memory gauges, digital wellhead recorder, vaetrix gauges, gas detectors and all pipe/hose necessary for connections.

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## **Operations**

### **Coiled Tubing Mud Cleanout**

The Halliburton coiled tubing crew mobilized to the Glenaire well-site on the 1<sup>st</sup> November 2007. Equipment was unloaded and BOPs tested on the 2<sup>nd</sup> and 3<sup>rd</sup> November. Approximately 600bbls water for the cleanup was trucked from Katnook gas field. A 2%KCl brine/gel solution including ~500lbs Xanthan polymer (to increase viscosity) was mixed up in the 880bbl production tank.

On the 4<sup>th</sup> November a Pulsonix 200 BHA was run in hole on 1.75" coil to ~3250mRT. At this point the mud pump was turned on and the brine /gel solution was pumped at a rate of 1.2bbls/min while running in hole at ~150m per hour. At 3420mRT the brine/gel pumping rate was increased to 1.5bbls/min and the coil was run in hole to a maximum depth of 3657mRT. At this point the well was circulated 1.5x bottoms-up volume and then the coiled tubing was pulled out of hole.

An SGS slickline crew confirmed the wellbore was accessible to 3660mRT following the coiled tubing cleanout.

### **Pretty Hill Formation Perforation & Testing**

The SGS perforating and testing crew was mobilized to Glenaire on the 26<sup>th</sup> November. Perforating and testing operations took place during daylight hours with the crew typically working a 12-hour day.

The slickline crew initially swabbed the fluid level in the well down to ~1370mRT in order to give an estimated under-balance of more than 3000psi prior to perforating the Pretty Hill Formation.

As part of the slickline perforating process, a Gamma Ray/CCL logging run with memory gauges on slickline was required. This memory log would enable the end of tubing and slickline depths to be correlated to the open-hole logs. The end of tubing would be used as a reference point in the perforation runs. Due to some initial problems with the memory gauges, several correlating runs took place before the onsite supervisors were satisfied with the quality of the correlating log.

On the 29<sup>th</sup> November the first interval of the Pretty Hill Formation 3595 – 3606mRT was perforated. Fluid level at time of perforation was ~1190mRT. The well was opened to the flare-line. A small flare was sustained however this was attributed to gas associated with hydrocarbon inflow from the Laira Formation. Down-hole pressure gauges were run to the perforation depth and the well shut-in overnight for buildup. There was no indication of any fluid inflow from the Pretty Hill Formation.

On the 30<sup>th</sup> November the second interval of the Pretty Hill Formation 3554-3564mRT was perforated on slickline. The well was opened to the flare-line. Again a small flare

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was sustained by the hydrocarbon inflow from the Laira Formation. Down-hole pressure gauges were run to the perforation depth and the well shut-in overnight for buildup. There was no indication of any fluid inflow from this Pretty Hill Formation interval.

On the 1<sup>st</sup> December the final Pretty Hill interval 3512-3535mRT was perforated on slickline in two runs. The well was opened to the flare-line with no significant flow. After the second perforating run, down-hole pressure gauges were run to the perforation depth and the well was shut-in overnight for buildup. There was no indication of any fluid inflow from this Pretty Hill interval.

On the 2<sup>nd</sup> December the well was swabbed to bring the fluid level down and increase the drawdown on the perforated Pretty Hill Formation. The fluid level had risen from ~1370mRT after swabbing on the 27<sup>th</sup> November to ~900mRT following perforation of the top Pretty Hill interval. The well was swabbed down to the effective limit of the wire, a total depth of ~1630mRT. There was no indication of flow from the Pretty Hill.

### **Laira Formation Perforation & Testing**

The SGS perforating and testing crew was mobilized to Glenaire on the 29<sup>th</sup> January 2008.

On the 30<sup>th</sup> January the slickline and E-line units were rigged up and the fluid level tagged at 650mRT. A 3m length of perforating guns was made up to the E-line toolstring. While running in hole the shear pin in the E-line toolstring broke and the guns were dropped in hole. Slickline was used to fish the guns. Guns were recovered intact.

On the 31<sup>st</sup> January a new 3m section of perforating guns was made up and run in hole on E-line. The interval 3190-3193mRT was perforated. The well was shut-in to observe any pressure build-up. Down-hole pressure gauges were run and the well shut-in overnight for buildup. Interpretation of the pressure-gauge data indicates there was no change in the rate of hydrocarbon inflow following perforation.

### **Emissions**

A total of 40.4bbbls liquid was recovered from the well during this testing program. These liquid emissions comprised:

- 1.8bbbls oil and 23.1bbbls brine swabbed on the 27<sup>th</sup> November
- 9.0bbbls oil and 4.9 bbbls brine swabbed on the 2<sup>nd</sup> December
- 1.6bbbls oil lifted out of the well when bleeding off THP on 30<sup>th</sup> January

Total liquid emissions from the well were therefore:

**12.4bbbls (2000L) oil and  
28.0bbbls (4450L) brine**

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Gas associated with the Laira Formation was also bled off during testing of both the Pretty Hill and Laira Formations. Based on choke size, THP and bleed-off duration, the volumes of gas emitted are estimated at:

~**7mcf** when bleeding off pressure prior to swabbing and then perforating the first Pretty Hill interval

~**3mcf** in total while the well was open to the flare-pit following perforation of each of the Pretty Hill intervals

~**10mcf** when bleeding off pressure prior to perforating the Laira Formation

**Data Available From Testing**

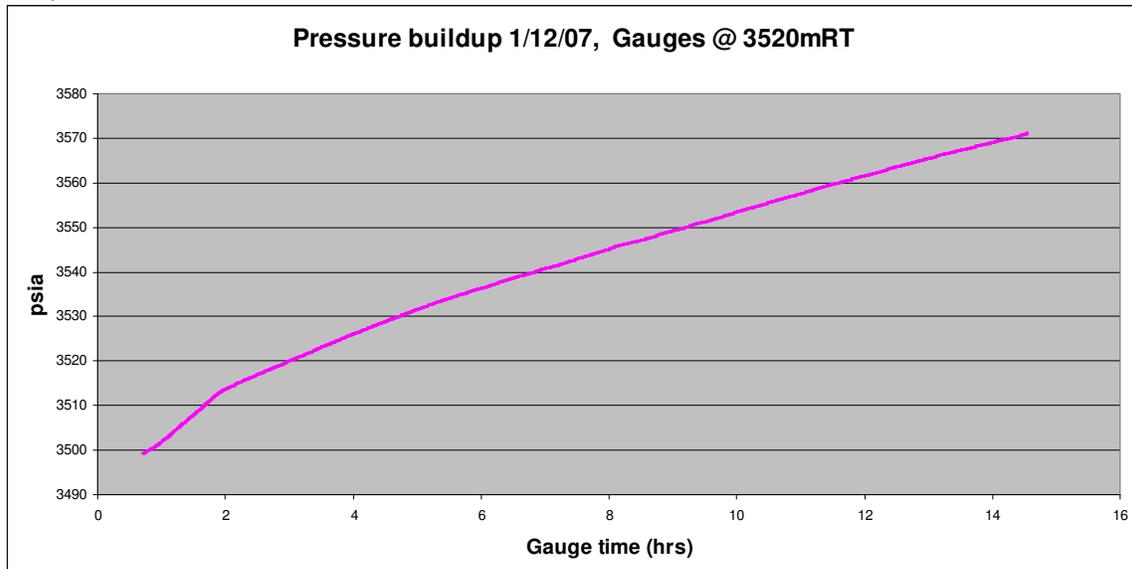
Supervisor's reports, slickline reports, perforating reports, well testing reports, swabbing reports and pressure gauge data is attached to this Closeout Report in either printed or electronic form (CD-ROM attached).

**Analysis of Test Data**

**Deliverability**

Pressure-gauge data from the overnight build-ups following each of the perforation runs was analyzed.

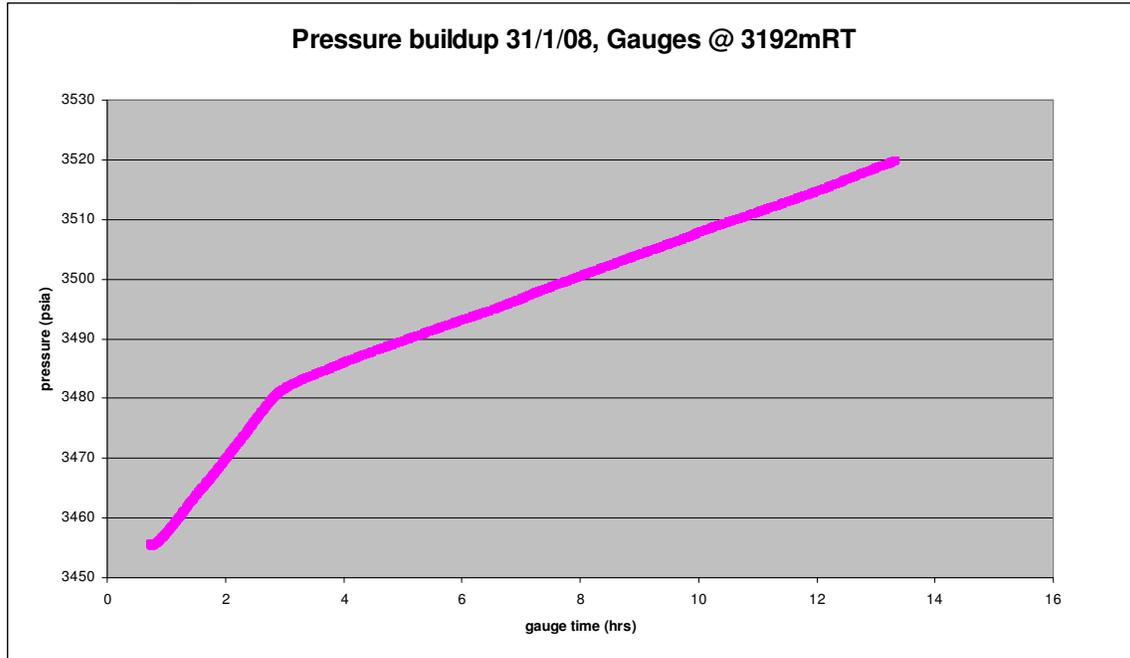
The plot below shows the slow pressure buildup following perforation of all three Pretty Hill intervals. Note that gauges were on depth at 3520mRT, the mid-point of Top Pretty Hill perforations.



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The plot below shows the pressure buildup following perforation of the Laira Formation on 31/1/08. The build-up is similarly slow, with the initially higher rate attributable to inflow of heavy brine/mud from behind the liner.



The table below shows the average PI for Laira flow for each of the overnight buildups, and a calculated maximum production rate given completion constraints:

Date	Fluid Inflow (bbls)	Ave PI (bpd/psi)	Maximum prod on beam pump (bpd)
29/11/2007	1.1	0.00084	4.2
30/11/2007	0.8	0.00059	2.9
1/12/2007	1.0	0.00076	3.8
31/01/2008	0.6	0.00059	2.9

As can be seen above, there was no distinguishable change in PI following perforation of each of the Pretty Hill intervals. The change following perforation of the Laira Formation was also negligible.

**Formation Pressure and Temperature**

Due to the lack of flow, no reservoir pressure could be established for the Pretty Hill Formation.

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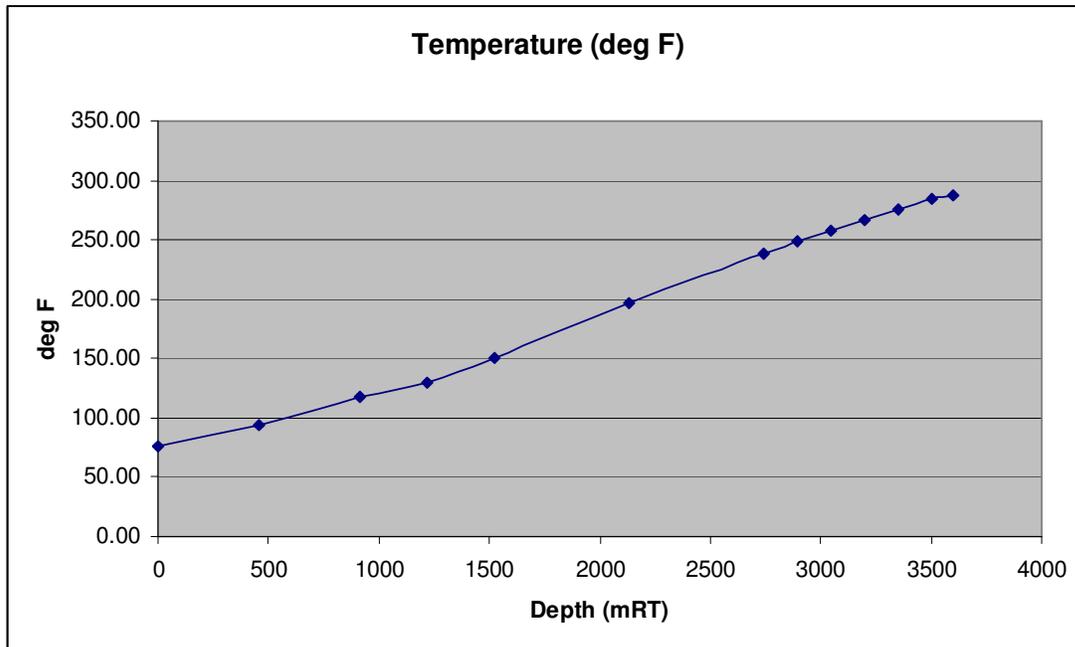
Prior to perforating the Pretty Hill Formation in late-November 2007, pressure at 3192mRT had build-up from ~4300psi on 5/11/07 to ~4850psi on 27/11/07. Prior to perforating the Laira Formation in January 2008, pressure at 3192mRT had built up from ~2200psi on 2/12/07 to ~4300psi on 30/1/08.

Given the very small flow-rates and limited duration of the pressure build-ups, it was not possible to determine a definitive reservoir pressure for the Laira Formation or to determine if pressure depletion had occurred. Current reservoir pressure is interpreted to be in excess of 5000psi.

Maximum temperatures recorded by down-hole gauges during the overnight pressure build-ups are shown in the table below:

Date	Gauge Depth (mRT)	Temperature (deg F)
29/11/2007	3600	294
30/11/2007	3556	292
1/12/2007	3520	290
31/01/2008	3192	272

The temperature gradient as recorded on 29/11/07 is plotted below:



**Economic Viability**

A production cost estimate conducted prior to testing the Laira Formation indicated a production rate of 20bopd with 20Mstb reserves would be required to satisfy go-forward economics.

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The maximum production rate of ~3-4bopd indicated by this testing is well below the minimum economic rate. This well could not be produced economically now or within the foreseeable future.

**Status of the Well**

As shown in the attached down-hole diagram, the well is shut-in with perforations across 4 intervals. There is 2%KCl brine in the well from approximately 1630 to 3660mRT. Some heavy drilling mud remains in the well from approximately 3660 to 3675mRT (PBSD). On 1/2/08 there was oil in the well from approximately 1630 to 650mRT with oil inflow from the Laira Formation continuing slowly.

Beach is preparing a work program for the plugging and abandonment of the well. Two available rig options are being evaluated for suitability for the P&A job.

**Attachments**

1. Current Downhole Diagram – Printed
2. Daily reports for Coiled Tubing Cleanout Nov 07 – Printed / Electronic
3. Daily reports & gauge data for Pretty Hill testing Nov 07 – Printed / Electronic
4. Daily reports & gauge data for Laira testing Jan – Feb 08 - Printed / Electronic

# GLENAIRE #1 PRETTY HILL AND LAIRA FORMATION TESTING NOV 07 TO FEB 08 CLOSEOUT REPORT

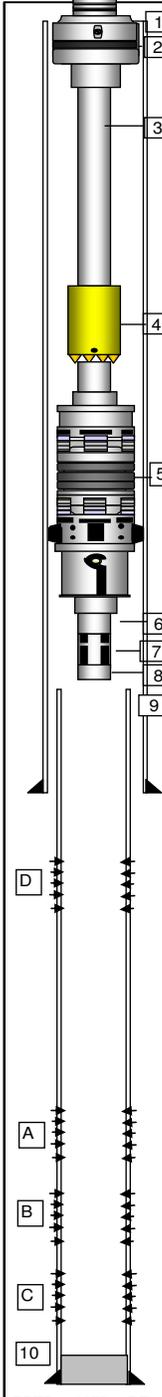


## Attachment 1 - Completion DHD 2-7/8" EUE TEST STRING

WELL: \_\_\_\_\_

Glenaire 1

DATE: 22/112007



ITEM No.	DESCRIPTION	LENGTH (m)	DEPTH KB (m KB)	MIN. ID. (in)
1	K.B. to top of tubing spool flange	5.80	0.00	
2	WG - 7-1/16"x 2-7/8" EUE "EN" tubing hanger 10000 psi 2-1/2 bpv	0.28	5.80	
3	307 Jts 2-7/8" EUE, J55, 6.5 lb/ft new tubing torqued to 2060 f-lb	2857.59	6.08	
4	On/Off conn 2-7/8" L10 2.31 X profile pinned shear up	0.61	2863.67	2.31"
5	Baker 7" x 2-7/8" EUE Hornet retrievable packer.	2.42	2864.28	c/l rubbers
6	1 Jt of 2-7/8" EUE, 6.5 lb/ft new tubing	9.32	2866.70	
7	X Nipple 2-7/8" 2.31	0.43	2876.02	2.31"
8	Underbalancing disk, glass, 4000 psi burst, with collar as WEG	0.31	2876.45	
	(Disk sheared with drop bar 22-11-06)	EOT	2876.76	
<b>Baker Oil Tools liner hanger system</b>				
9	Tieback extension, type 11, 5.75"	1.83	2897.00	5.25
	Spacer nipple Brown type, 5"	0.61		4.276
	Nipple, RS, 5"			4.25
4	HMC hyd set liner hanger, 5" <b>Note: Liner hanger not set</b>			
	4-1/2" 13.5# liner			
5	10 Top of mud fill after clean-up with Coiled Tubing 4/11/2007		3660.00	
6				
7				
8				
9				
FORMATION		PERFORATED INTERVALS: (m / RT)	GUN: SIZE   TYPE   SPF	CHARGES: TYPE   WT(g)
D) Laira		3190 - 3193	2.125   STP   6	HMX   13.9
A) Pretty Hill		3512 - 3535	2.125   SDP   6	HMX   6.5
B) Pretty Hill		3554 - 3564	2.125   SDP   6	HMX   6.5
C) Pretty Hill		3595 - 3606	2.125   SDP   6	HMX   6.5
REMARKS: 7" 26/29 # casing to 2998 mRT				
ANNULUS FLUID: 3% KCl brine				
INDICATED STRING WEIGHT:				
CALCULATED STRING WEIGHT:				
LANDED WEIGHT:				
COMPRESSION: 10,000 lbs was slacked off				
NOT TO SCALE		WELLSITE SUPERVISOR	Paul Newton	
PROPOSED:		TUBING INSTALLATION	DATE: 5/11/2006	
RE-COMPLETION:		DRAFTED:	DATE:	
COMPLETION: X		REVISED: A Silz	DATE: 17/01/2008	
CHECKED BY:				

PBTD ~ 3675m RT