



ORIGIN ENERGY CSG LIMITED  
SKULL CREEK 1  
WELL ABANDONMENT REPORT  
PPL1 / PPL8 - VICTORIA

Author/Submitted by:

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MILTON QLD 4064

14 October 2008

## WELL SUMMARY CARD

General Data	
Well Name	SKULL CREEK 1
Well Type	EXPLORATION GAS WELL
Field	OTWAY BASIN, VICTORIA
Petroleum License	PPL1 / PPL8
Location	
GDA94 Latitude	38° 33' 42.4" S
GDA94 Longitude	142° 59' 25.1" E
GDA Zone 56 Easting	673410
GDA Zone 56 Northing	5729963
Seismic Location	Waarre 3D Xline 2805 Inline 9465
Elevation	
Ground Level (mAMSL)	89.1
Rotary Table (mAMSL)	93.4
Drilling Rig(s)	
Drilling Rig 1	OD&E Rig 30
Date Spudded	19/05/96
Date TD Reached	28/05/96
Date Rig Release	6/06/96
Total Depth	
Driller:	1700 mRT
Logger:	1701.4 mRT
Well Completion Report Lodgement Date	
	Aug-97

Hole	Surface	Intermediate	
Size	12-1/4"	8-1/2"	
Depth from Rotary Table	335 m	1700 m	
Drilling Fluid (mud)	Gel spud mud	Gel/Polymer	
Drill Bits No/Type	1x 12.5" HU OSC IGJ	(1) 8.5" HU ATJ-S05D (2) 8.5" OT MFDSSH 8.5" SM MF15 8.5" SM MFDSSH	(3) (4)
Casing	Surface	Intermediate	Prod.Tubing
Size - Grade	9-5/8" 36-43.5 ppf K55/N80	7" 26 ppf K55	2-7/8" 6.5 ppf J55
Shoe Depth (mRT)	332.54	1614	1375.1

Cement	Volume - Type - Displacement - Returns
Surface	93 bbl (450 sacks) 15.8 ppg neat cement displaced with 82 bbl water. 8 bbl water return to surface. Top up cement 10 bbl (35 sacks) 15.8 ppg cement with 2% CaCl <sub>2</sub> .
Intermediate	156 bbl (482 sacks) 12.8 ppg lead cement with 2.5% PreHydGel and 48 bbl (250 sacks) 15.8 ppg tail cement with 1% Halad 322 displaced with 201 bbl water. Full returns.

Cement Plugs	
Interval	Cement volume/Type
1504 - 1294 mRT	8 bbl 15.6 ppg cement
313 - 18 mRT	26 bbl Class A neat cement
8.6 - 5.6 mRT	0.8 bbl cement surface plug

## DRILLING AND COMPLETION SUMMARY

The SKULL CREEK 1 EXPLORATION GAS WELL was drilled in the PPL1 / PPL8 permit as an exploration well in the northwest of PPL1 in the Otway Basin, Victoria. SKULL CREEK 1 is located onshore in the Port Campbell Embayment in the eastern part of the Otway Basin, Victoria.

It was anticipated that the wellbore would intersect gas zones in the Waarre Formation. Skull Creek 1 intersected gas saturated sands in the main target Waarre Formation and in the underlying Eumeralla Formation. The total net pay was estimated at 27.4 metres. Drilling and geological details are contained in the Well Completion Report lodged with the Department of Primary Industries (DPI) - Victoria in August 1997.

The casing was perforated in the upper Waarre C Unit from 1202.5 - 1207.5 mRT and in the Eumeralla 1400 sand from 1402.0 - 1417.0 mRT. The well was completed with a 2-7/8" tubing string with packers separating the perforated intervals and production comingled. Skull Creek 1 produced gas and condensate until the well loaded up with water in 1998 and was shut in. A re-completion was proposed in March 1999 (Appendix 3 - Proposed Re-completion Program), however the workover was deemed uneconomic and remained shut in.

Skull Creek 1 was deemed uneconomic for further production and permission was sought from the DPI - Victoria to plug and abandon. After determining good injectivity the well was abandoned by pumping cement plugs into the perforations, setting a casing plug and a surface cement plug. An abandonment cap was welded onto the casing stump. For further abandonment details refer to Appendix 1 - Daily Workover Reports and Appendix 2 - Abandonment Program.

The Skull Creek 1 site was rehabilitated according to the wishes of the land owner. Rehabilitation photos are included in appendix 5.

## GEOLOGICAL SAMPLES

Wireline Logs	Date	Log Type	Interval	Contractor	
Suite 1	May 1996	MSFL-DLL-GR-CAL-DT	1064 - 1370 mRT	BPB	
	May 1996	PDS-CNL-GR-CAL	1064 - 1370 mRT	BPB	
Suite 2	May 1996	MSFL-DLL-GR-CAL-DT	1350 - 1701.4 mRT	BPB	
	May 1996	RFS-GR	1350 - 1701.4 mRT (Misrun)	BPB	
	May 1996	PDS-CNL-GR-CAL	1350 - 1701.4 mRT	BPB	
	May 1996	Dipmeter	1350 - 1701.4 mRT	Reeves	
	May 1996	SRS Velocity Survey	96.3 - 1701.4 mRT	Reeves	
	May 1996	RFS-GR	1350 - 1701.4 mRT (Misrun)	BPB	
Full Hole Coring		Interval (mGL)	Size	Cut (m)	Recovered (m)
None					

Sidewall Coring	Date	Interval	Lithology
None			

Mudlogging	Date	Interval	Evaluation
			Refer to Well Completion Report
Cutting Samples	Date	Interval	Evaluation
			Refer to Well Completion Report

## WELL TESTS

Drill Stem Testing					
DST No.	Interval (mGL)	Formation	Gas Flow Rate (mmcf/d)	Fluid Recovery	Max Surface Pressure (psi)
1	1199 - 1221	Waarre Unit C	Misrun	Misrun	Misrun
2	1200.5 - 1210.5	Waarre Unit C	8.2	Nil	540
3	1402.0 - 1417.0	Eumeralla 1400 sand	1.1	Indeterminate condensate	400
4	1240.0 - 1255.0	Waarre Unit A	11.1	Nil	680
5	1500.0 - 1520.0	Eumeralla 1500 sand	Misrun	Misrun	Misrun
6	1225.0 - 1245.0	Waarre Unit B	Misrun	Misrun	Misrun
7	1234.0 - 1245.0	Waarre Unit B	6.2	1.4 bbl formation water	880

## SURVEYS

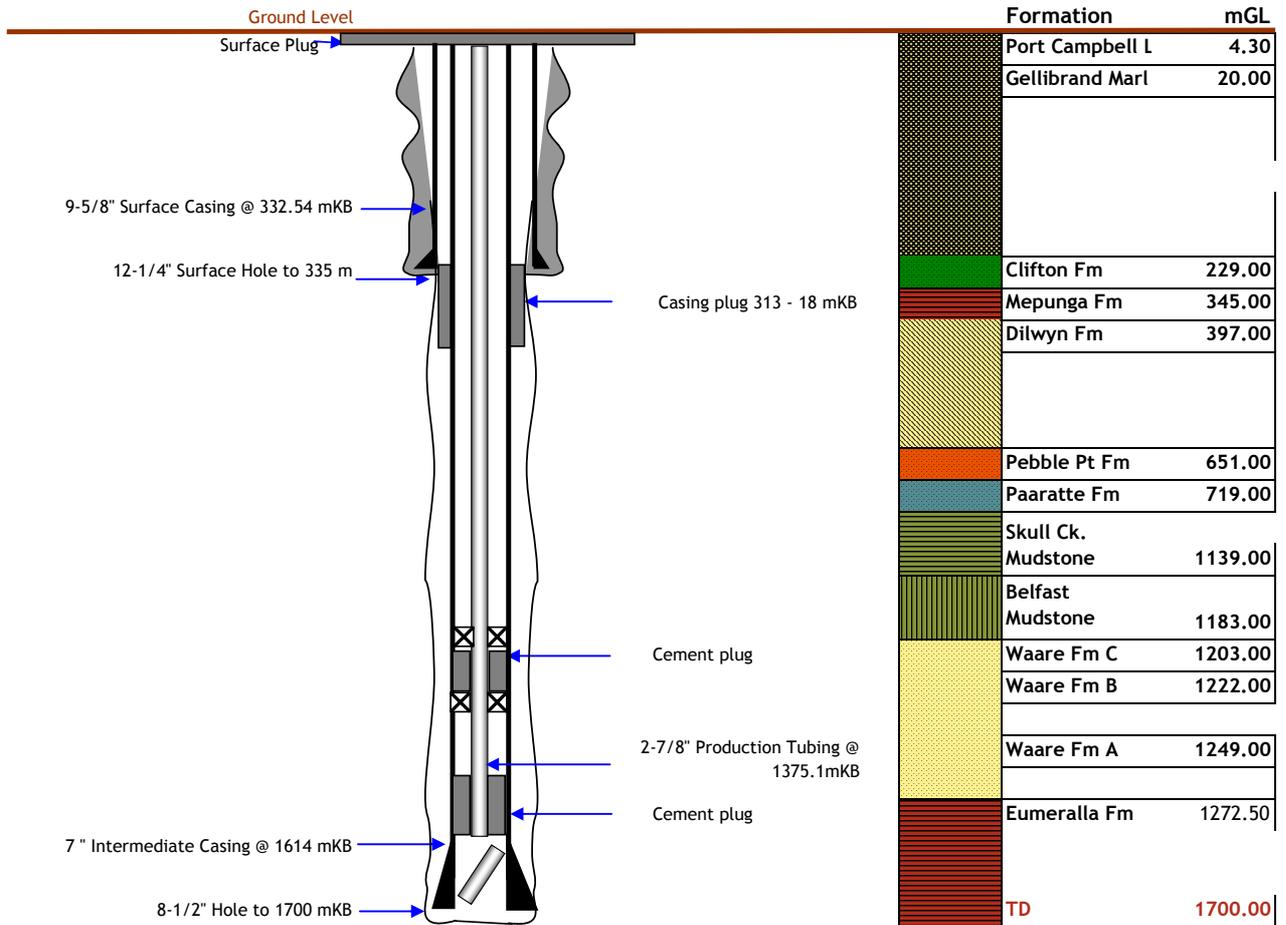
Well Location					
Date	Latitude	Longitude	Ground Level	Easting	Northing
23/10/06	38° 33' 42.4" S	142° 59' 25.1" E	89.12	673410	5729963

Deviation Survey Skull Creek 1					
Depth (m)	Angle°				
170.0	0.3				
329.0	0.0				
638.0	0.5				
940.0	1.8				
1199.0	4.0				
1360.0	3.0				
1695.0	7.5				

Hole and Casing Schematic

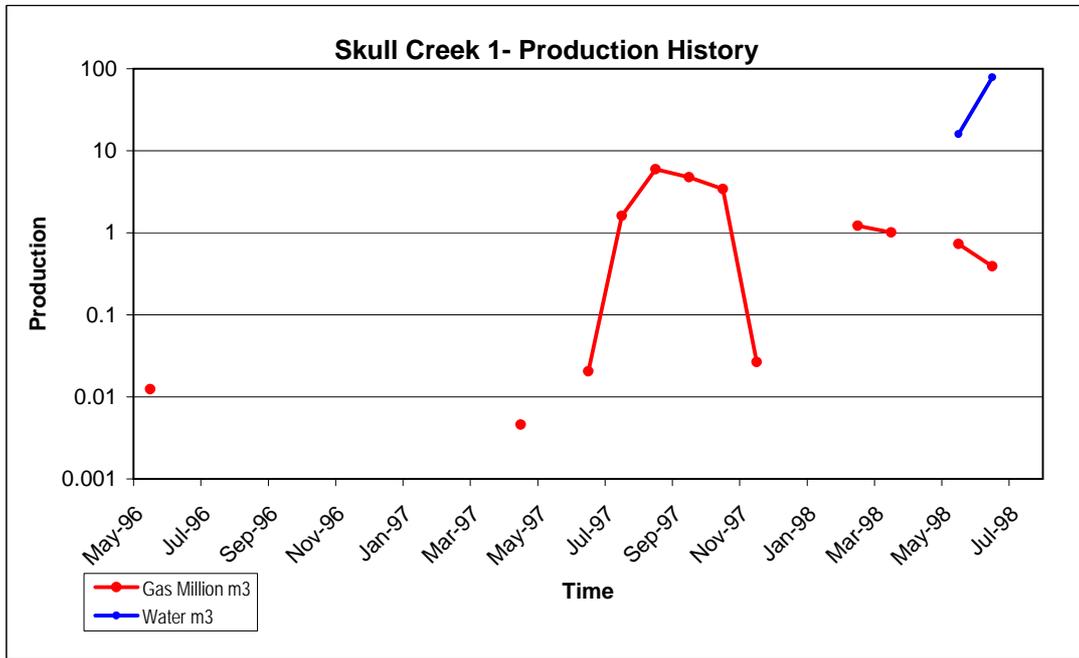
Stratigraphic Column

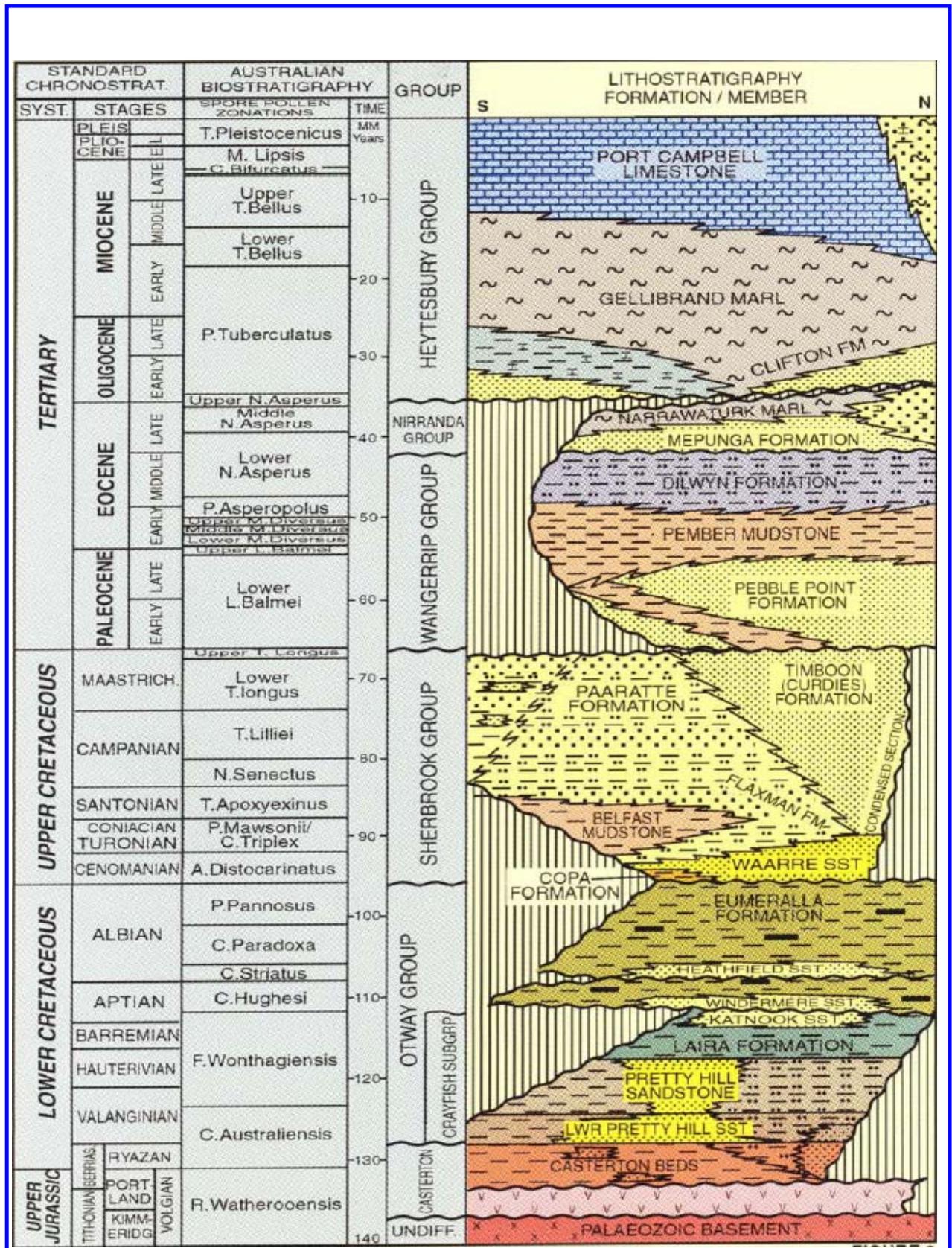
Formation tops were picked by Geoscientists from wireline log and ROP curve data. Formation thicknesses not to scale.



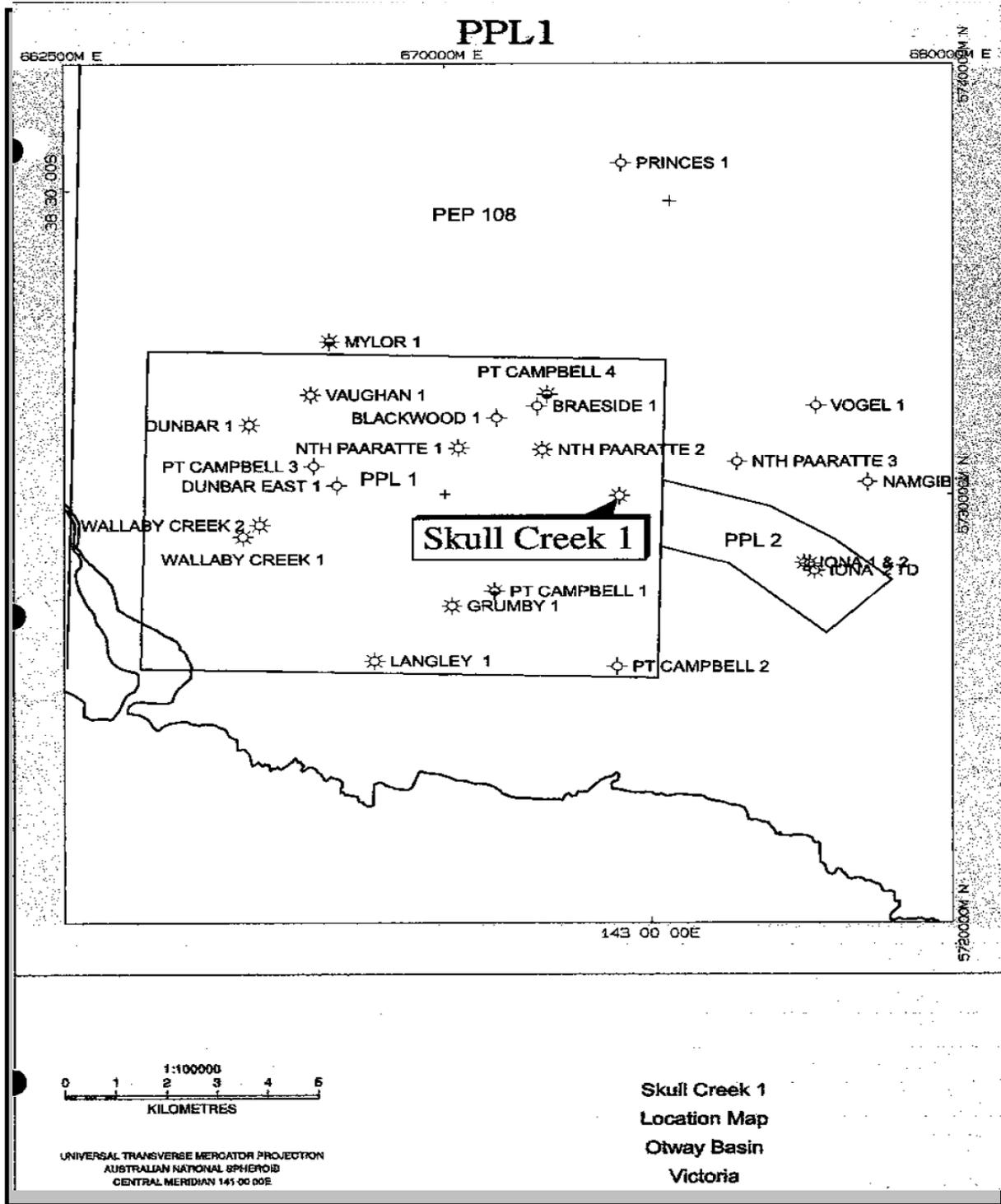
PRODUCTION AND PRESSURE DATA

	Gas Million m3	Gas MMscf	Water m3	Water bbl
May-96	0.012388	0.437478091		
Feb-97		0		
Mar-97		0		
Apr-97	0.004578	0.161670544		
May-97		0		
Jun-97	0.02043	0.721478641		
Jul-97	1.604816	56.67354215		
Aug-97	5.944696	209.9349579		
Sep-97	4.739784	167.3838922		
Oct-97	3.423637	120.9045996		
Nov-97	0.026537	0.93714531		
Dec-97		0		
Jan-98		0		
Feb-98	1.215852	42.93740814		
Mar-98	1.011539	35.72216264		
Apr-98		0		
May-98	0.728545	25.72832385	15.9	100.2
Jun-98	0.39108	13.81085985	78.7	495.3
Jul-98		0		
Totals	19.123882	675.3535188	94.6	595.5





LOCATION MAP



REFERENCES

- Boral Energy PPL1 SKULL CREEK 1, PROPOSED RE-COMPLETION PROGRAM, unpublished report prepared for Boral Energy, March 1999.
- Cultus Petroleum PPL1 OTWAY BASIN, VICTORIA, SKULL CREEK-1 WELL COMPLETION REPORT, report prepared for Cultus Petroleum, August 1997.
- Origin Energy Ltd. OTWAY BASIN PPL8, SKULL CREEK 1, WORKOVER PROGRAM, - PLUG AND ABANDONMENT - unpublished report prepared for Origin Energy Limited., May 2008.
- Taylor, Anne PPL8 ONSHORE OTWAY BASIN, Six Monthly Report to DNRE, Victoria, For the Period 1 July 2006 - 31 December 2006, unpublished report prepared for Origin Energy Limited. Jan 2007

**APPENDIX 1 - DAILY ABANDONMENT REPORTS**





## **DUNBAR 1/SKULL CREEK 1 DAILY OPERATIONS**

### **Monday 9<sup>th</sup> June**

Shoot 4ft of tubing at 3905ft with 1-11/16" pressure activated firing head guns (well pressured up to 1400psi to activate)

Perform injection test down tubing - 1.5bbls/min at 1900psi

Pump second tubing plug at Skull Creek #1

Finish removing wellhead at Dunbar #1 and weld on cap

### **Sunday 8<sup>th</sup> June 2008**

Pressure test surface casing plug to 700psi for 10mins - OK

Travel to Dunbar 1 to begin wellhead removal. No pressure, but gas detected in production casing annulus (B-section). Halliburton topped up with water, sniffed area again - OK.

Cut windows through surface casing and production casing and cut tubing

### **Saturday 7<sup>th</sup> June 2008**

Pressure test tubing plug to 1000psi for 10mins - OK

Tag cement from first tubing plug above SSD - mobilise tubing punch equipment

Pump surface casing plug

Pick up cement cutting equipment for removing cement in conductor and allow removal of wellheads

### **Friday 6<sup>th</sup> June 2008**

Pressure test tubing plug – held 1000psi for 10mins

Pressure test surface casing plug - held

R/D and move equipment to Skull Creek 1

Perform injectivity test on surface casing annulus - 1bbl/min at 600psi. Perforation equipment advised not to move

Pump first tubing plug - 6.6bbls

### **Thursday 5<sup>th</sup> June 2008**

Perform injectivity test on surface casing annulus – 2bbls/min / 500psi and tubing – 1bbl/min / 2900psi

R/U and pump cement plug over perforations – 8bbls, pressure dropped to 0psi, well shut in overnight

Pump surface casing plug - 26bbls

WOC

### **Wednesday 4<sup>th</sup> June 2008**

Water carter, crane and Halliburton cementing unit on site at Dunbar 1

Blind flange removed – wing valve holding

Begin excavating cellar to allow access to A-section

Halliburton transfer further equipment to site

### **Tuesday 3<sup>rd</sup> June 2008**

Check access to Dunbar 1, cellar has been pulled and will require excavation, 1700psi on wellhead, both master valves and swab valve leaking – unable to determine if wing valve is leaking due to a blind flange.

Meet APT security representative to arrange padlocks and keys on each wellsite

Continue to wait on Halliburton

### **Monday 2<sup>nd</sup> June 2008**

Travel to Warrnambool to pick up hand tools and inhibitor

Travel to rig working for Essential to pick up flogging spanners and check on Halliburton's progress (currently running casing)

Ensure clear access for cementing unit and water truck to Skull Creek 1

Waiting on Halliburton to be released from current work – predicted to be onsite Wednesday

### **Sunday 1<sup>st</sup> June 2008**

RIH and remove PX plug

R/D and release SGS sickline unit

### **Saturday 31<sup>st</sup> May 2008**

R/U SGS slickline unit on Skull Creek 1. SITP 500psi.

RIH to close lower SSD – incorrect tool run

POOH, change out tool, RIH and close lower SSD. SITP 380psi – PX plug discovered in nipple profile





**COMPLETION / WORKOVER DAILY REPORT**

**WELL:** Skull Creek 1 **REPORT No.:** 04  
**DATE:** 8-06-2008 **CONTRACTOR:** HES/SGS  
**WEATHER:** Fine **LTI FREE DAYS:** \_\_\_\_\_  
**OBJECTIVE:** Plug and abandon well  
**0700 STATUS:** \_\_\_\_\_

TIME		OPERATIONS PERFORMED PAST 24 HOURS
FROM	TO	
07:00	17:00	Wait on tubing puncture guns to arrive from Adelaide.

CUM. INJECTED WATER		CUM. FOAM USED		RIG TRAVEL HOURS	
CUM. PRODUCED WATER		FUEL ON SITE		RIG STANDBY HOURS	
NET WATER LOSS		FUEL DAILY USAGE		RIG REPAIR HOURS	
H <sub>2</sub> O DELIVERED TO SITE		CREW TRAVEL HRS.		RIG WORKING HOURS	

**SUPERVISOR:** Ben Corbett **DAILY COST \$A:** \_\_\_\_\_  
**CONTACT NUMBER:** 0427 692 909 **CUM. COST \$A:** \_\_\_\_\_  
**BUDGET \$A:** \_\_\_\_\_



# COMPLETION / WORKOVER DAILY REPORT

**WELL:** Skull Creek 1 **REPORT No.:** 05  
**DATE:** 9-06-2008 **CONTRACTOR:** HES/SGS  
**WEATHER:** Fine **LTI FREE DAYS:** \_\_\_\_\_  
**OBJECTIVE:** Plug and abandon well  
**0700 STATUS:** \_\_\_\_\_

TIME		OPERATIONS PERFORMED PAST 24 HOURS
FROM	TO	
07:00	07:30	Morning safety meeting to outline the day's activities and identify hazards
07:30	10:30	Make up 4' of 1-11/16" tubing puncher guns, pick up inside lubricator and make up to wellhead Bowen union. RIH guns to 1190m, pressure up tubing to 1400psi at activate guns. POOH guns and lay out. All shots fired.
10:30	11:30	Conduct injection test through new perforations, good injection at 3bbls per minute.
11:30	14:30	Make up line and pump tubing plug #2 8bbls of 15.8ppg neat cement displaced with 17.5bbls of fresh water
14:30	15:30	Commence rig down of HES equipment and tidy lease area.

CUM. INJECTED WATER		CUM. FOAM USED		RIG TRAVEL HOURS	
CUM. PRODUCED WATER		FUEL ON SITE		RIG STANDBY HOURS	
NET WATER LOSS		FUEL DAILY USAGE		RIG REPAIR HOURS	
H <sub>2</sub> O DELIVERED TO SITE		CREW TRAVEL HRS.		RIG WORKING HOURS	

**SUPERVISOR:** Ben Corbett  
**CONTACT NUMBER:** 0427 692 909

**DAILY COST \$A:** \_\_\_\_\_  
**CUM. COST \$A:** \_\_\_\_\_  
**BUDGET \$A:** \_\_\_\_\_



# COMPLETION / WORKOVER DAILY REPORT

**WELL:** Skull Creek 1 **REPORT No.:** 06  
**DATE:** 10-06-2008 **CONTRACTOR:** HES/SGS  
**WEATHER:** Scattered Showers **LTI FREE DAYS:** \_\_\_\_\_  
**OBJECTIVE:** Plug and abandon well  
**0700 STATUS:** \_\_\_\_\_

TIME		OPERATIONS PERFORMED PAST 24 HOURS
FROM	TO	
07:00	07:30	Morning safety meeting to discuss the day's operations.
07:30	08:30	Make up lines and pressure test tubing plug#2 to 1000psi for 10 minutes, solid test.
8:30	12:30	Nipple down wellhead C-section and cut wellhead A-section 1.5 m below ground level. Using tremi pipe mix and pump surface cement plug from 4m to surface in the tubing, production casing annulus and surface casing annulus.
12:00	17:00	Continue to rig down and move HSE equipment of location. Weld abandonment cap onto casing stub.

CUM. INJECTED WATER		CUM. FOAM USED		RIG TRAVEL HOURS	
CUM. PRODUCED WATER		FUEL ON SITE		RIG STANDBY HOURS	
NET WATER LOSS		FUEL DAILY USAGE		RIG REPAIR HOURS	
H <sub>2</sub> O DELIVERED TO SITE		CREW TRAVEL HRS.		RIG WORKING HOURS	

**SUPERVISOR:** Ben Corbett  
**CONTACT NUMBER:** 0427 692 909

**DAILY COST \$A:** \_\_\_\_\_  
**CUM. COST \$A:** \_\_\_\_\_  
**BUDGET \$A:** \_\_\_\_\_

**APPENDIX 2 - ABANDONMENT PROGRAM**



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OTWAY BASIN

PPL 8

SKULL CREEK 1

WORKOVER PROGRAM

- PLUG AND ABANDONMENT -

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Electronic Copy

DPI (Vic)  
Simon Smith / Ross Evans  
/ Andrew Mayers  
J Rodda  
T Scholefield  
B Corbett  
Halliburton (Brisbane)  
SGS Expertest (Adelaide)  
Well File

Hard Copy

Wellsite - OECSG Representative  
Completions Superintendent  
Halliburton Cementing Supervisor  
SGS Slickline Supervisor

Origin Energy CSG Limited  
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339 Coronation Drive  
MILTON QLD 4064  
A.B.N. 68 001 646 331

May 2008  
Version 1.0

## Skull Creek 1 - COMPLETION PROGRAM

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Prepared: Drilling & Completions Engineer

Signed: 

Date: 26/5/08

Reviewed: Completions & Workover Advisor

Signed: 

Date: 26/5/08

Approved: Engineering Leader for onshore Otway, Victoria

Signed: 

Date: 26/05/08

Approved: Manager workover and completions

Signed: 

Date: 26/5/08

***Person to Contact Regarding Matters Contained in this Program:***

Full Name: Mr. Jamie Rodda

Manger – workover and completions

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***Program Schedule:***

Proposed Commencement Date: May, 2008

Estimated Program Duration: 3 days

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## 1. GENERAL INFORMATION

WELL NAME: SKULL CREEK 1

OPERATOR AND PERMIT HOLDER: Origin Energy CSG Limited\*  
A.B.N. 68 001 646 331  
Ground Floor, South Court, John Oxley Centre,  
339 Coronation Drive,  
MILTON Qld 4064  
Tel: (07) 3858 0600

\*Origin Energy CSG Limited is a 100% owned subsidiary of Origin Energy Limited.

OTHER PARTICIPANTS: Nil

PERMIT: PPL 8

BASIN: Otway Basin

SURFACE LOCATION: 38 33 42.4 S; 142 59 25.1 E

SEISMIC LOCATION: Line: 2805  
Inline 9465

ELEVATION: Ground Level: 88.6 m  
Rotary Table: 92.9 m

## 2. PROJECT

### 2.1 Description

Skull Creek 1 was spudded in May 1996 and completed as a single string gas well with production commingled from the Waarre "C" Sandstone and Eumeralla Formation. Over time, the water-gas ratio increased and the well loaded up with water and was unable to kick-off against line pressure. The well was shutin.

The well has now been deemed uneconomic for further production and will be plugged and abandoned. The objective of this program is to plug and abandon Skull Creek 1. This program outlines the tasks necessary to isolate the producing reservoir and other porous formations with cement plugs and to remove the wellhead.

## 2.2 Account Code

<i>Project Description</i>	<i>AFE Number</i>
Skull Creek 1 Plug and Abandonment	153 0012 52XXX

Purchase Orders must be issued by Brisbane Office to all Contractors except Halliburton and SGS.

## 2.3 Wellsite Control

Control of the wellsite is to be managed in the following manner:

<i>Stage</i>	<i>From</i>	<i>To</i>	<i>Document</i>	<i>Attachments</i>
Pre Rig Up	Heytesbury Operations Superintendent	OECSG Wellsite Representative	Well Handover Form Gas Well	Site Specific Issues
Post Rig Down	OECSG Wellsite Representative	Heytesbury Operations Superintendent	Well Handover Form Gas Well	Downhole Diagram (draft)

The Wellsite Representative should liaise with the Heytesbury Superintendent to ensure there is full awareness by both parties of the planned activities at all times. The Wellsite Representative will report to the Manager Workover and Completions or delegate on a minimum daily basis during the course of the work program.

## 2.4 Compliance Documents

This program is directly linked to and must be read in conjunction with the Wellsite Safety Management Plan (SMP). The Wellsite SMP includes a list of Regulatory Documents, Safety Standards and Operating Procedures (Appendix 5) which, in addition to the documents referenced below, are the governing documents for this program of work. These documents must be accessible in electronic or hard copy form to all personnel at the wellsite.

<i>Document Title</i>	<i>Supplied by</i>
Material Safety Data Sheets	Halliburton
Halliburton Services Agreement (with Origin)	Origin
Wellsite ERP issue August 2007 with appendix 1	Origin
Occupational Health and Safety Act 2004 (Victoria)	Origin
Dangerous Goods Act 1985 (Victoria)	Origin
Dangerous Goods (Storage and Handling) Regulations 2000 (Victoria)	Origin

## **BELIEVE TO HAVE AN UNACCEPTABLE LEVEL OF RISK**

### **Key Activities**

- Obtain handovers
- Move in and rig up
- RIH with slickline and close lower sliding sleeve at 1212.6mRT
- Perform injectivity test on Eumeralla perforations
- Pump cement plug across Eumeralla perforations
- RIH with slickline and open lower sliding sleeve at 1212.6mRT
- Perform injectivity test on Waarre "C" perforations
- Pump cement plug across Waarre "C" perforations
- Remove wellhead
- Pour surface cement plugs
- Rig down, move out and hand back wellsite

## **ALL PERSONNEL ONSITE HAVE THE AUTHORITY TO STOP ANY ACTIVITY THEY BELIEVE TO HAVE AN UNACCEPTABLE LEVEL OF RISK**

### **3.1 General**

1. The tasks listed in this program form a guide for the anticipated workover activities and may need to be modified as the work progresses. Minor changes to the program may be made at the discretion of wellsite personnel in consultation with the Wellsite Representative and the Manager Completions and Workovers. A Drilling Change Control Record approved by the Brisbane Office will be required when:
  - An equipment or well design change has a potential impact on safety
  - There is a material change to what is documented in this program
  - The cost impact of the change is greater than 10% of the AFE.
2. All personnel participating in the project must receive a Site Specific Induction from the OECSG Wellsite Representative prior to commencement of activities on the site and be outfitted with appropriate PPE. Non-essential personnel and casual visitors should be discouraged from entering the wellsite. Any visitors to the wellsite must receive the Site Specific Induction or a Visitors Induction.

3. Toolbox Meetings (TBM) or Job Safety Analysis (JSA) meetings must be conducted prior to any new or critical operation and any change or variation in the procedure.
4. The Origin Wellsite Representative will liaise with Operations Superintendent Heytesbury Gas Plant, prior to the equipment mobilising to the wellsite to arrange handover and discuss local issues that may impact on the project.

**IN ALL EMERGENCY SITUATIONS THE PROTECTION OF PERSONNEL IS PARAMOUNT.  
NO ATTEMPT SHOULD BE MADE TO ENTER A DESIGNATED EMERGENCY AREA.**

### 3.2 Tasks

1. Prior to rigging up, hold safety meeting outlining overall work scenario, designated smoking / hot work areas, emergency phone numbers, designated first aiders, emergency muster point and location of extinguishers and first aid kits.
2. Throughout this workover, all fluids used and produced are to be trucked away for disposal. No fluids are to be discharged onto the ground or into pits.
3. Confirm and record shutin tubing head pressure and shutin casing head pressure.
4. Rig cement / water line into tubing via 2 1/16" 3K wing valve.
5. R/U slickline lubricator to well head tree cap and pressure test lubricator and slickline BOPs to SITP. RIH with a gauge ring to ensure the tubing is clear and there is no plug in the XN nipple.
6. RIH with Otis B type shifting tool 42B0118 to lower 2-7/8" XD-SSD at 1212.6mRT, ensuring tool is run in the correct orientation (reverse) for allowing closing of sliding sleeves (XD SSD is shifted down to open and up to close).
7. RIH past the lower XD-SSD and pull back through the SSD to engage the keys and jar up to close the SSD. The tool will be released from the SSD as it closes, and POOH with the slickline string.
8. Pump one tubing volume of water (approx 26bbbls) down the tubing via 2-1/16" wing valve. Perform an injectivity test, pumping water down the tubing at 3 bbls/min (or less if required to keep the pressures low). Continue for 10 mins, constantly monitoring and recording wellhead pressure.

***Do not allow the surface pressure to exceed 3000psi.***

***Confirm injectivity results with Brisbane office and obtain approval to continue with the program.***

9. Mix and pump 6.6 bbls of class A neat cement down the tubing and displace with 25.6 bbls water. Hesitation squeeze approx 1bbl of the cement into the formation.
10. Wait on cement to thicken for approximately 4 hours (or overnight - if left overnight, ensure the well is shut in at the master valve). Check that there is no surface pressure on the tubing or annulus. If there is pressure, contact Brisbane office before proceeding.
11. Pressure test tubing to 1000psi, confirm plug set. If test fails, perform and record injectivity test, contact Brisbane office for second cement plug volume and composition.
12. RIH with selective Otis Type B shifting tool 42B0118 on slickline to lower 2-7/8" XD-SSD at 1212.6mRT, ensuring the tool is attached to the tool string in the correct direction for allowing opening of the XD-SSD (the opposite direction to the previous run).
13. Tag the top of the XD-SSD, engage the selective tool and jar down to open. When the sliding sleeve is fully open, the tool will be released and able to pass through the XD-SSD. Continue to RIH, tag the cement plug and record tag depth. POOH with slickline.
14. R/D slickline lubricator and de-mobilise.
15. Perform an injectivity test, pumping water treated with inhibitor down the tubing at 3 bbls/min (or less if required to keep the pressures low). Continue for 10 mins (well should already be full of fluid), constantly monitoring wellhead pressure.  
  
*Do not allow the surface pressure to exceed 3000psi.*  
  
*Confirm injectivity results with Brisbane office and obtain approval to continue with the program.*
16. Mix and pump 4 bbls of class A neat cement down the tubing and displace with approx 21.4 bbls water (this amount of cement allows for an excess of approx 100m in the 2-7/8" tubing. Hesitation squeeze approx 1 bbl of the cement into the formation.
17. Close in well and wait on cement for 4 hours or overnight.

18. Pressure test tubing to 1000psi, confirm plug set. If test fails, perform and record injectivity test, contact Brisbane office for second cement plug volume and composition.
19. Pump 34bbls via 2" 3k ball valve. Perform an injectivity test, pumping water down the surface casing at 3 bbls/min. Continue for 10 mins, constantly monitoring wellhead pressure.

Do not allow the surface pressure to exceed 500psi.

Confirm injectivity results with Brisbane office and obtain approval to continue with the program.

Depending on injectivity results, there will be 2 different ways to set plug over the surface casing shoe. If injectivity is poor, use option 2. If injectivity is acceptable, use option 1.

#### Option 1

20. Mix and pump 27 bbls of class A neat cement down the surface casing and displace with 5 bbls water.
21. Close in well and wait on cement for 4 hours or overnight.
22. Pressure test surface casing to 500psi, confirm plug set. If test fails, perform and record injectivity test, contact Brisbane office for second cement plug volume and composition.
23. R/D Halliburton cementing unit and de-mobilise. Continue to Step 23.

#### Option 2

24. Rig cement / water line into tubing via 2-1/16" 5K gate valve.
25. R/U slickline lubricator to well head tree cap. RIH with Shogun 1-11/16" Spiral Strip Guns (Gun length to be 2ft, loaded with high penetration HMX charges at 6 shots per foot with 40 degree phasing). Perforate tubing and intermediate casing at 370mRT (approx 40m below surface casing shoe). POOH slickline.

26. Pump 44bbls of water treated with inhibitor via 2-1/16" 3K gate valve. Perform an injectivity test, pumping water down the tubing at 3 bbls/min. Continue for 10 mins, constantly monitoring wellhead pressure.  
  
**Do not allow the surface pressure to exceed 500psi.**  
  
**Confirm injectivity results with Brisbane office and obtain approval to continue with the program.**
27. Mix and pump 45 bbls of class A neat cement down the tubing and displace with 3 bbls water.
28. Close in well and wait on cement for 4 hours or overnight.
29. Pressure test surface casing to 500psi, confirm plug set. If test fails, perform and record injectivity test, contact Brisbane office for second cement plug volume and composition.
30. R/D Halliburton cementing unit and de-mobilise.
31. Ensure there is no surface pressure on the well - in the tubing or the annulus. Perform a gas test around the wellhead and record results. *If there is pressure on the well, or gas around the wellhead, contact the Brisbane office for further instructions.*
32. Cut a window in the surface casing below the A-section bowl. The cut must be at least 1m below ground level - excavate cellar if required. Cut another window in the production casing. Cut through the 2-7/8" tubing completely, allowing the tension to be released from the hanger.
33. Cut through production casing completely, then the surface casing completely, and remove wellhead.
34. Load wellhead for transport to Origin Energy Roma Stores.
35. Treat annuli and tubing fluid with inhibitor.
36. Set surface plugs approximately 7m down in the surface casing annulus, the production casing and the tubing.
37. Weld abandonment well cap on casing stub (at least 1m below ground level).
21. RDMO, clean lease of all equipment. Rig release and notify the Heytesbusby Plant Superintendent. The Landman will commence site rehabilitation as

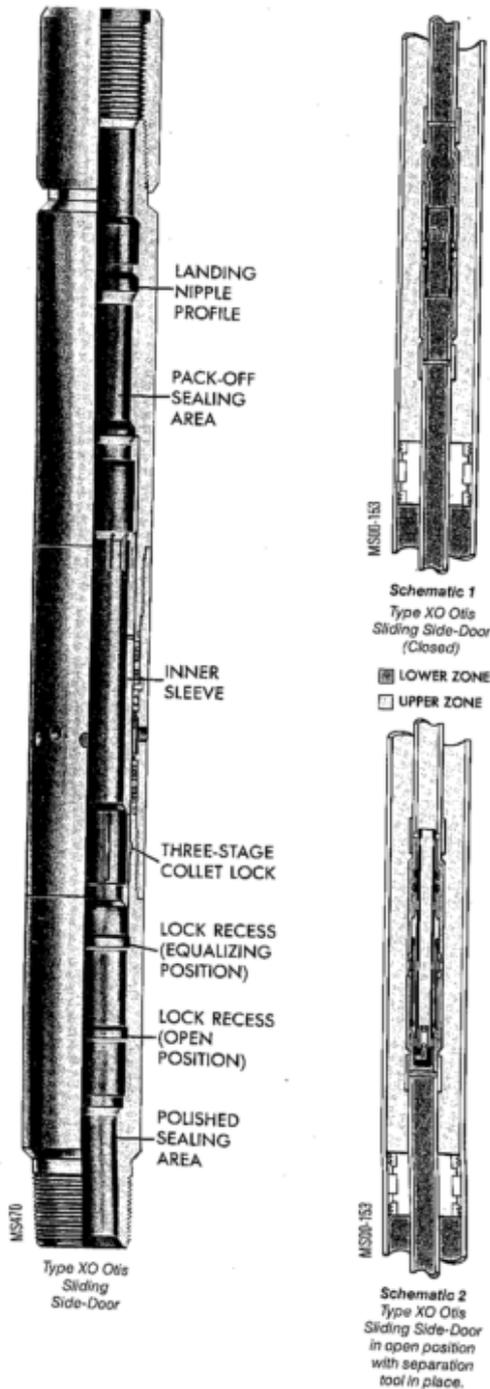
agreed with the landholder.

4. TECHNICAL DATA

4.1 XD-SSD



OTIS SLIDING SIDE-DOOR® EQUIPMENT



Otis Control-A-Flo® Sliding Side-Doors are the most widely used selective circulating tools in the oil and gas industry today and are universally accepted with a design thoroughly proven through years of use. Otis Sliding Side-Doors are essentially full-opening devices with an inner sleeve that can be opened or closed, using standard wireline methods to provide communication between the tubing and tubing/casing annulus. They feature a nipple profile (Otis Type X or R) above the inner sliding sleeve and a polished pack-off area below as an integral part of the assembly. This provides a location for an additional landing nipple in the tubing string for a wide variety of Otis flow control equipment.

Otis has adapted the sliding-sleeve concept into three basic tools: **Sliding Side-Door** Types XA, RA, XO and XD used for a variety of installations with models that can be opened by jarring up—closed by jarring down; or models opened by jarring down—closed by jarring up. **Concentric Otis Gas Lift Mandrel** permits the installation of concentric, wireline-retrievable gas lift valves by wireline methods. In addition to serving as a landing location for gas lift valves, this versatile mandrel can be used for many production procedures before the well is placed on gas lift. **Safety-Valve Nipples** provide a location for wireline-retrievable, surface-controlled safety valves. This design permits the hydraulic control port to be closed-off from the tubing bore during testing. Running tools can be assembled so the inner sleeve is opened when the safety valve is run and closed when the valve is retrieved.

**BENEFITS OF DESIGN PRINCIPLE**

- Permits shifting of sleeve—even when outside of sleeve is packed with sand as packing is retained in the nipple and does not move when the sleeve is shifted.
- Compression, tensile and burst strength of Otis Sliding Side-Doors are equal to or greater than N-80 tubing. Models are also available in strengths equal to or greater than P-110 tubing.
- Three-stage collet lock helps to keep sleeve in full-opening, equalizing or full-closed position.
- Equalizing ports in the inner sleeve are designed to allow pressure differential between the tubing and casing annulus to equalize before shifting into the open or closed position.
- Any number of Otis Sliding Side-Doors may be run in a single tubing string and all opened or all closed on a single trip of the wire line. Also, individual sleeves may be opened or closed selectively as desired.
- The use of stationary V-packing is designed to permit greater clearance between the inner sleeve and outer nipple than can be accomplished if "O" rings are used.

5. SCHEMATIC

5.1 Existing Downhole



**BAKER OIL TOOLS**  
Completion Schematic for  
Cultus Petroleum  
Skull Creek 1

4

WF

Skull Creek 1

DESCRIPTION	ID (min) (in)	OD (max) (in)	LENGTH (m)	DEPTH (top of item) (mRT)
				2.813
Tubing Hanger			0.065	2.813
1 Joint 2 7/8" eue tubing 6.5#	2.441	3.668	9.647	2.878
3 x 2 7/8" eue pup jts(1.85/1.85/0.645m)	2.441	3.668	4.345	12.525
120 Joints 2 7/8" eue tubing 6.5#	2.441	3.668	1154.198	16.87
2.313 XD SSD	2.313	3.92	1.29	1171.068
1 Joint 2 7/8" eue tubing 6.5#	2.441	3.645	9.653	1172.358
E-22 Anchor w/2 V Ryte seal stacks Size 80-32	2.4	4.62	0.22	1182.011
Baker model GD-3 Packer Size 84-32 Comm no 409 06 0802	3.25	5.675	1.3	1182.231
X/O 2 7/8" - 4 1/2"	2.441	5	0.125	1183.531
3 Joints 2 7/8" eue tubing 6.5#	2.441	3.645	28.947	1183.656
2.313 XD SSD	2.313	3.92	1.29	1212.603
1 Joint 2 7/8" eue tubing 6.5#	2.441	3.645	9.647	1213.893
G-22 size 80-32 locator w/4 V ryte seal stacks Space out of locator shoulder	2.426	3.435	0.31 0.25	1223.54 1223.85
Baker model SB-3 Packer Size 84-32 Comm no 409 06 0802	3.25	5.675	1.3	1224.1
Millout ext	3.948	4.5	1.69	1225.4
X/O 2 7/8" - 4 1/2"	2.441	5	0.21	1227.09
1 Joint 2 7/8" eue tubing 6.5#	2.441	3.645	9.641	1227.3
XN landing nipple size 2.313" no go 2.205"	2.205	3.5	0.435	1236.941
12 Joints 2 7/8" eue tubing 6.5#	2.441	3.645	115.266	1237.376
Pip tag				
2 Joints 2 7/8" eue tubing 6.5#	2.441	3.645	18.321	1352.642
2 7/8" eue Perforsted pup jt	2.441	3.645	3.075	1371.963
Mechanical gun release				

## 5.2 Proposed Downhole Diagram - option 1

Origin		Downhole Installation Diagram				Proposed	<input checked="" type="checkbox"/>
		Skull Creek 1				Completion	<input type="checkbox"/>
						Re-Completion	<input type="checkbox"/>
	Item	Description	ID (")	OD (")	Length (m)	MD (mRT)	TVD (mRT)
		Class A cement plug			2.813	0	0.00
	3	1 joint 2-7/8" EUE tubing, 6.5#	2.441	3.668	9.647	2.878	2.88
	4	3 pup joints 2-7/8" EUE tubing, 6.5#			4.345	12.525	12.53
	5	120 joint 2-7/8" EUE tubing	2.441	3.668	1154.198	16.87	16.87
	6	Sliding Sleeve, XD-SSD, 2-7/8"	2.313	3.92	1.29	1171.068	1171.07
	7	1 joint 2-7/8" EUE tubing			9.653	1172.358	1172.36
	8	Tubing Anchor seal assembly, model "E", 2-7/8"	2.4	4.62	0.22	1182.011	1182.01
	9	7" SB-3 Packer	3.25	5.675	1.425	1182.231	1182.23
	10	3 joints 2-7/8" EUE tubing	2.441	3.668	28.947	1183.656	1183.66
	11	Sliding Sleeve, XD-SSD, 2-7/8"	2.313	3.92	1.29	1212.603	1212.60
	12	1 joint 2-7/8" EUE tubing	2.441	3.668	9.647	1213.893	1213.89
	13	Locator seal assembly, model "G", 2-7/8"	2.426	3.435	0.56	1223.54	1223.54
	14	7" SB-3 Packer with millout extension with XO 4-1/2" to 2-7/8"	3.25	5.675	3.2	1224.1	1224.10
	15	1 joint 2-7/8" EUE tubing			9.641	1227.3	1227.30
	16	Nipple, no-go, 2-7/8" XN	2.205	3.5	0.435	1236.941	1236.94
	17	14 joints 2-7/8" EUE tubing (pip tag between joint 12 and 13)	2.441	3.645	134.587	1237.376	1237.38
	18	Perforated pup joint, 2-7/8"			3.075	1371.963	1371.96
	19	Mechanical release sub, 2-7/8"	2.25		0.58	1375.038	1375.04
	20	Pup joint, 2-7/8"			7.6	0	0
	21	3/8" EUE pin	1.995		0.24	7.6	7.6
	22	1 joint 2-3/8" EUE tubing			9.4	7.84	7.84
	23	Nipple, no-go, 2-3/8", 1.5" shoulder	1.5		0.38	17.24	17.24
	24	Mechanical Firing Head, 2-3/8"			0.29	17.62	17.62
	25	TCP guns, 2-3/8"			15	17.91	17.91
	End of tail pipe				32.91	32.91	
Rod String (from bottom up):							
A							
B							
C							
D							
E							
F							
Notes							
the cement should also be squeezed through their perforations and into the formations							
Some of							
Perforations							
Formation	Interval (mRT)	Gun Size	Gun Type	SPF	Charges Type	Ph	gm
Waarre "C"	mKB 1202.5 to 1207.5						
Eumeralla	mKB 1402 to 1417						
Cementing Details							
Surface Casing	size 9 5/8"	weight (ppf) 43.5	Grade N80	Thread BTC	Shoe Depth (mRT) 332.5		
Production Casing	size 7"	weight (ppf) 26	Grade K55	Thread LTC	Shoe Depth (mRT) 1614		
TOC						Est 605m	
Remarks							
String Weight Calculated (lb)				Actual (lb)			
Designed By	L Nitschke			Date	09-May-08		
Installed By	xxxxx xxxxxx			Date			
Checked By	xx xxxxxx			Date	xx/xx/xx		

### 5.3 Proposed Downhole Diagram - option 2



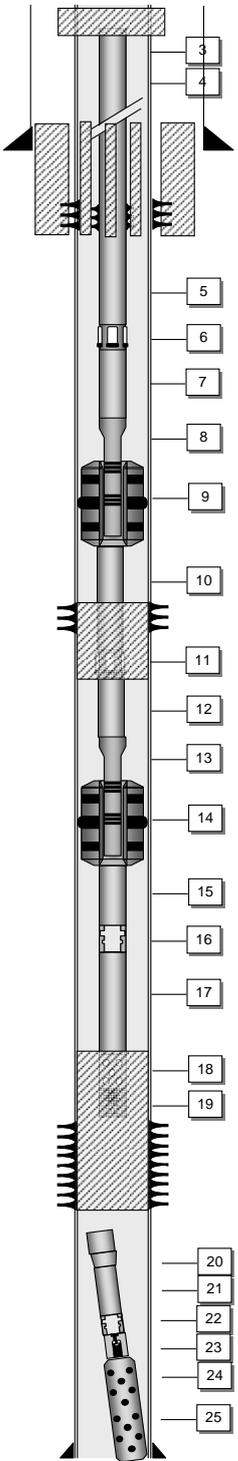
#### Downhole Installation Diagram

Skull Creek 1

Proposed

Completion

Re-Completion



Not To Scale

PBDT: 1601.59mKB

Item	Description	ID (")	OD (")	Length (m)	MD (mRT)	TVD (mRT)
	Class A cement plug			2.813	0	0.00
				0.065	2.813	2.81
3	1 joint 2-7/8" EUE tubing, 6.5#	2.441	3.668	9.647	2.878	2.88
4	3 pup joints 2-7/8" EUE tubing, 6.5#			4.345	12.525	12.53
5	120 joint 2-7/8" EUE tubing	2.441	3.668	1154.198	16.87	16.87
6	Sliding Sleeve, XD-SSD, 2-7/8"	2.313	3.92	1.29	1171.068	1171.07
7	1 joint 2-7/8" EUE tubing			9.653	1172.358	1172.36
8	Tubing Anchor seal assembly, model "E", 2-7/8"	2.4	4.62	0.22	1182.011	1182.01
9	7" SB-3 Packer	3.25	5.675	1.425	1182.231	1182.23
10	3 joints 2-7/8" EUE tubing	2.441	3.668	28.947	1183.656	1183.66
11	Sliding Sleeve, XD-SSD, 2-7/8"	2.313	3.92	1.29	1212.603	1212.60
12	1 joint 2-7/8" EUE tubing	2.441	3.668	9.647	1213.893	1213.89
13	Locator seal assembly, model "G", 2-7/8"	2.426	3.435	0.56	1223.54	1223.54
14	7" SB-3 Packer with millout extension with XO 4-1/2" to 2-7/8"	3.25	5.675	3.2	1224.1	1224.10
15	1 joint 2-7/8" EUE tubing			9.641	1227.3	1227.30
16	Nipple, no-go, 2-7/8" XN	2.205	3.5	0.435	1236.941	1236.94
17	14 joints 2-7/8" EUE tubing (pip tag between joint 12 and 13)	2.441	3.645	134.587	1237.376	1237.38
18	Perforated pup joint, 2-7/8"			3.075	1371.963	1371.96
19	Mechanical release sub, 2-7/8"	2.25		0.58	1375.038	1375.04
20	Pup joint, 2-7/8"			7.6	0	
21	3/8" EUE pin	1.995		0.24	7.6	
22	1 joint 2-3/8" EUE tubing			9.4	7.84	
23	Nipple, no-go, 2-3/8", 1.5" shoulder	1.5		0.38	17.24	
24	Mechanical Firing Head, 2-3/8"			0.29	17.62	
25	TCP guns, 2-3/8"			15	17.91	
	End of tail pipe				32.91	

**Rod String (from bottom up):**

A  
B  
C  
D  
E  
F

**Notes**

Some of

the cement should also

Perforations				Gun		Charges		
Formation		Interval (mRT)		Size	Type	SPF	Type	Ph gm
Waarre "C"	mKB	1202.5	to 1207.5					
Eumeralla	mKB	1402	to 1417					

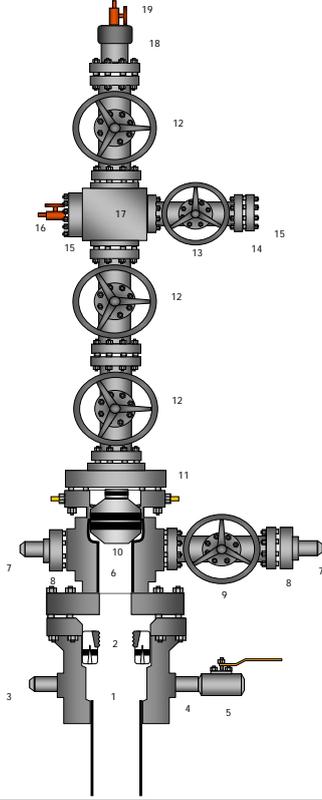
	size	weight (ppf)	Grade	Thread	Shoe Depth (mRT)
Surface Casing	9 5/8"	43.5	N80	BTC	332.5
Production Casing	7"	26	K55	LTC	1614
<b>Cementing Details</b>					
<b>TOC</b>					Est 605m

**Remarks**

<b>String Weight Calculated (lb)</b>	<b>Actual (lb)</b>
--------------------------------------	--------------------

Designed By	L Nitschke	Date	09-May-08
Installed By	xxxxx xxxxxx	Date	
Checked By	xx xxxxxx	Date	xx/xx/xx

## 5.4 Current Wellhead Diagram

	Wellhead Diagram																																					
	Skull Creek #1	Proposed <input type="checkbox"/> Completion <input checked="" type="checkbox"/> Recompletion <input type="checkbox"/>																																				
		Not to scale																																				
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**CONVENTIONAL DRILLING  
- WORKOVER AND COMPLETIONS -  
SITE SPECIFIC INDUCTION**

Origin Wellsite Rep:		Date:	
Primary Contractor:	Halliburton / SGS	Well Name:	Skull Creek 1
Contractor Rep:		Project Engineer:	Ben Corbett

The undersigned have attended and contributed to the minutes of this meeting.

Attendee Name:	Company:	Signature:

<b>Project Overview</b>
<b>Description:</b> The well has been completed to produce via 2-7/8" EUE AB tubing with two Baker SB-3 packers set to isolate the Waarre 'C' and Eumeralla Formations. The Waarre 'C' is perforated from 1202.5 to 1207.5m RT. The Eumeralla formation is perforated from 1402-1417m RT. The well is currently shutin.
<b>Objectives:</b> Set a cement plug across the Eumeralla and Waarre "C" perforations and squeeze. Retrieve wellhead and set a surface cement plug. Abandon the well as per regulations.
<b>Scope of Work:</b>
1. Close lower XD-SSD on slickline
2. Perform injection test over Eumeralla perforations
3. Mix and pump cement plug over Eumeralla perforations and squeeze
4. RIH on slickline and open lower XD-SSD
5. Perform Injection test over Waarre "C" perforations
6. Mix and pump cement plug over Waarre "C" perforations and squeeze
4. Remove wellhead and set a surface plug
4. Install well cap and RDMO

Mandatory Discussion Topics
Confirmation of Origin Wellsite Representative as the Site Emergency Controller
Location of the Origin & Contractor Safety Management Plans, Emergency Response Plans and Site Rules
Emergency phone numbers are listed in the Emergency Response Plan
Actions and authorities in well control situation is documented in Emergency Response Plan
Discussion of Permit to Work System and designated Permit Authority
Assignment of two safe evacuation areas (muster points) to ensure area is upwind of hazardous situation
Assignment of safe smoking area, butt bins required, cigarettes and lighters to stay in this area
Assignment of a dedicated Hot Work area if welding/cutting etc is required
All chemicals onsite must have an MSDS, discuss location of MSDS and chemical storage area
All personnel must conduct work in a manner compliant with the requirements outlined in the induction
Keep on access roads, observe speed limits, advise Rig Manager / Origin Wellsite Rep if leaving location
All personnel must report any safety incidents, environmental incidents, accidents or near misses in accordance with Safety Management Plan
All personnel must abide by Site Rules (Health, Safety and Environmental Requirements)
In all emergency situations the protection of personnel is paramount - no attempt should be made to enter a designated emergency area.

Site Specific Topics / Current Local Issues
Program, SOP's, JSA's to be followed - if necessary do a new JSA to suit the task
Keep on access roads, observe speed limits, advise Origin Wellsite Rep if leaving location
All fluids used and produced are to be trucked away for disposal. No fluids are to be discharged onto the ground or into pits.

Activity	Nominee
Site Safety Manager (Origin)	Wellsite Representative
Site Safety Manager (SGS)	Slickline supervisor
Site Safety Manager (Halliburton)	Cementing Supervisor
Permit to Work System	Wellsite Permit to Work System
Permit Authority	Origin Wellsite Representative
Emergency Response Plan	Wellsite ERP (August 2007 issue) with annexure 1

**APPENDIX 3 - CORRESPONDENCE WITH DPI VICTORIA**



## Department of Primary Industries

Our Ref: PPL8 (Skull Creek-1 and Dunbar-1)  
30 May 2008

**Lisa Nitschke**  
**Graduate Drilling and Completions Engineer**  
**Origin Energy CSG Limited**  
**Ground Floor, South Tower**  
**339 Coronation Drive**  
**Milton, Queensland 4064**

1 Spring Street  
GPO Box 4440 Melbourne  
Victoria 3001 Australia  
Telephone:(03) 9658 4000  
Facsimile: (03) 9658 4400  
ABN 42 579 412 233  
DX 210404

Dear Ms Nitschke

### **CONSENT TO PLUG AND ABANDON THE SKULL CREEK-1 AND DUNBAR-1 WELLS IN PPL8, OTWAY, VICTORIA**

I refer to the documents submitted on 26 May 2008 as follows:

- Origin Energy Otway Basin PPL8 Dunbar-1 DW1 Workover Program Plug and Abandonment, Ver. 1.0, May 2008
- Origin Energy Otway Basin PPL8 Skull Creek-1 Workover Program Plug and Abandonment, Ver. 1.0, May 2008
- Origin Energy Wellsite Safety Management Plan 2008, Document no. BR10062055, Rev. 3/1, April 2008
- Origin Energy Onshore Australia Wellsite Emergency Response Plan Rev. 0/0, August 2007
- Origin Energy Wellsite Emergency Plan Appendix 1: Site Specific Information Skull Creek-1, Dunbar-1, Rev. 0, May 2007

In accordance with Section 161 of the *Petroleum Act 1998*, I, as the Minister's delegate, hereby accept these documents as the Operations Plan for the plug and abandonment activities at Skull Creek-1 and Dunbar-1 in production licence PPL8.

In accordance with Section 138 of the *Petroleum Act 1998* and Regulation 23 of the *Petroleum Regulations 2000*, I, as the Minister's delegate, hereby consent to the plug and abandonment operations for Skull Creek-1 and Dunbar-1 in production licence PPL8.

This consent is subject to the following that:

1. Notification of the operations schedule to the local emergency services and the local community must be made prior to the commencement of the operations. Confirmation of the notifications should be provided to Department of Primary Industries as discussed in paragraphs 1 and 2 of the Emergency Response Plan (ERP).
2. A site layout diagram detailing equipment, emergency facilities and muster points as detailed in the "Site Specific Induction" topics of the Skull Creek-1 and Dunbar-1 P & A programs should be prepared and included in the documents.

3. Origin Energy, Halliburton and SGS should prepare and submit a clear organisational chart with names and provide details of the person on each shift, who is nominated to report incidents to the appropriate authorities in accordance with the requirements of the *Occupational Health and Safety Act 2004* and *Dangerous Goods Act 1985*.
4. Origin Energy should apply appropriate Victorian references to its Operation plans and in the Emergency Response Plan.
5. Review of the Wellsite Safety Management Plan reveals the omission of Victorian prescribed incident reporting under appendix 9B. Origin Energy's attention is drawn to incident reporting, scene preservation and emergency services reporting requirements under the *Occupational Health and Safety Act 2004*, *Dangerous Goods Act 1985* and the *Dangerous Goods (Storage and Handling) Regulations 2000*. Therefore, Origin Energy is hereby advised to update the Emergency Response Plan with an appendix depicting this protocol and make appropriate references in the body of the Plan.
6. All well plug and abandonment operations at Skull Creek-1 and Dunbar-1 should comply with the requirements of the *Dangerous Goods Act 1985* and *Occupational Health and Safety Act 2004* and their subordinate legislation.
7. All health and safety incidents should be reported directly to WorkSafe at telephone 132 360. Environmental incidents should be reported to the Department of Primary Industries at telephone 03-9658 4414 or 03-9658 4415.
8. Origin Energy ensures all contractor's equipment and personnel are fit for purpose and competent to carry out the operations, with equipment maintenance current and to manufacture's specifications.

Please note that this consent does not include consent for any other petroleum activity. Further consents are required for these activities under the *Petroleum Act 1998* and the *Petroleum Regulations 2000*.

If you have any questions or comments regarding the above, please contact David Wong on 03 9658 4415.

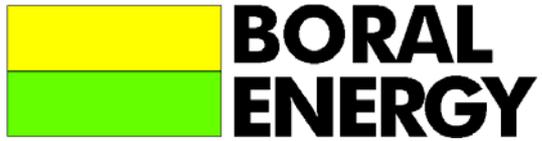
Yours sincerely



TERRY MCKINLEY  
**Manager, Petroleum Regulation**

c.c **WorkSafe Victoria** (Pieter Rienks, Director Hazard Management Division)

**APPENDIX 4 - PROPOSED RECOMPLETION PROGRAM MARCH 1999**



PPL 1

SKULL CREEK 1

PROPOSED RE-COMPLETION PROGRAM

MARCH 1999

## **PROPOSAL**

Skull Creek 1 was drilled in May/June 1996 to a total depth of 1700 mkb and intersected gas in Waarre "C", "B", "A" and Eumeralla. The well was perforated over the upper part of Waarre "C" and Eumeralla "1400" sands and completed with 2 7/8" string. After a cumulative production of 0.675 bcf from the "C" sand, the well was virtually watered out in May 1998. During the production phase the well performed very poorly in terms of pressure behaviour. Recent attempts to flow the well have failed, probably due to water build up in the well bore.

Considerations were given for improving gas recovery from Skull Creek 1 by taking into account the field remaining gas reserves, well deliverability, well re-configuration options, cost factor and time constraints. On the basis of Cultus evaluation of the field, there are only limited reserves (0.28 PJ) in Skull Creek "A" sand ("C" sand has been depleted and "B" sand has negligible reserves). This sand has never been produced.

There is no provision for accessing the Waarre "A" and "B" sands in the existing well configuration and in order to be able to access these sands it will be required to perforate them using a through tubing perforating system. It is therefore proposed to isolate the "C" by closing the sliding sleeve and perforate and flow the "A" sand in order to maximise gas recovery from the field and to confirm the likely reserves estimate. Additionally, an RST log will be run to verify the current gas water contents with the sand units.

The proposed recompletion will result in Waarre "A" sand production. The Eumeralla perforations will also be open to flow. However based on previous performance from this reservoir, minimal contribution is anticipated (see below).

## **BACKGROUND**

Skull Creek-1 was drilled in May/June 1996 in PPL1, Onshore Otway Basin, Victoria (Figure 1). An 8½" hole was drilled from 316mkb to a total depth of 1700mkb. The well intersected gas bearing sands in Waarre "C" (1202.5 – 1222.0 mkb), Waarre "B" (1229.5 – 1238.0 mkb), Waarre "A" (1249.0 – 1272.5) and Eumeralla (1402.0 – 1439.0 mkb). Seven open hole DSTs were conducted in this well which have been summarised below (figures 2 and 3 show composite log displays of the Waarre and Eumeralla sands).

DST No.	Formation	Interval mkb	Choke size	Gas Rate mmscf/d	WHP psig	Remarks
DST 1	Waarre "C"	1199.0 – 1221.0	-	-	-	Misrun
DST 2	Waarre "C"	1200.5 – 1210.5	¾"	8.2	540	-
DST 4	Waarre "A"	1240.0 – 1255.0	5/8"	8.6	760	-
DST 6	Waarre "B"	1225.0 – 1245.0	-	-	-	Misrun
DST 7	Waarre "B"	1234.0 – 1245.0	½"	6.2	870	Produced formation water
DST 3	Eumeralla	1402.0 – 1417.0	3/8"	1.1	400	-
DST 5	Eumeralla	1502.0 – 1522.0	-	-	-	Misrun

The well was cased with 7", 26#, K55, LTC string with casing shoe at 1613.0 mkb and estimated top of cement at 605 mkb (figure 4). The well was completed with 2-7/8" tubing string (6.5#, J55, EUE-AB) and two Baker SB-3 packers separating the two perforating intervals (as shown in figure 5 and 6). The upper part of Waarre "C" Sandstone and Eumeralla "1400" sand were perforated as shown below.

<u>Depth mkb</u>	<u>Formation</u>	<u>Perforating system</u>
1202.5 – 1207.5	Waarre "C" (upper part)	4" casing gun
1402.0 – 1417.0	Eumeralla "1400" sand	5" TCP

An extended production test was carried out over the Eumeralla "1400" sand in April 1997. During a 20 day flow period the gas flow rate and well head flowing pressure were gradually decreasing and the final recorded measurements were 1.14 mmscf/day and 177 psig respectively. The Eumeralla perforation was isolated by a wireline plug set in the "XN" nipple. The well was connected to the North Paaratte plant via the Iona flowline to be produced from the Waarre "C" sand.

Skull Creek-1 came on production from July 1997 with an initial gas flow rate of around 8.0 mmscf/day and a well head flowing pressure of 1250 psig. As shown in figure 7, the well production rate and flowing pressure decreased rapidly and subsequently the well was shut-in in October (after three months). The well was kept shut in (for the reservoir pressure to build up) until February 1998 when it was put back on production for another two months at a very low flow rate. In May 1998 when the well was reopened for the third time, it started to produce formation water and within three weeks of production (at low rate) it was virtually watered out.

The well has been shut in since June 1998 while the well head shut in pressure has been slowly increasing from 1070 psig to 1227 psig (figure 7). Recent attempts to flow the well have failed due to water build up in the wellbore.

The total gas production from Skull Creek-1 is 0.675 bcf.

The following table summarises estimates with respect to Skull Creek initial gas reserves.

#### **SKULL CREEK FIELD RESERVES ESTIMATE**

<b><u>FORMATION</u></b>	<b><u>OGIP (bcf)</u></b>			<b><u>RESERVES (PJ)</u></b>		
	<b><u>1P</u></b>	<b><u>2P</u></b>	<b><u>3P</u></b>	<b><u>1P</u></b>	<b><u>2P</u></b>	<b><u>3P</u></b>
Waarre "C"	1.05	1.25	4.16	0.68	0.82	2.70
Waarre "B"	0.03	0.10	0.56	0.02	0.06	0.37
Waarre "A"	0.31	0.52	0.52	0.16	0.28	0.28
Total Waarre	<b><u>1.39</u></b>	<b><u>1.87</u></b>	<b><u>5.24</u></b>	<b><u>0.86</u></b>	<b><u>1.16</u></b>	<b><u>3.35</u></b>

The Skull Creek Waarre "C" production performance appears to match the volumetric reserves evaluation. The field has produced approximately 0.71PJ of an estimated 0.82 PJ initial 2 P reserve from the Waarre "C" and appears to have watered out. The well is perforated at the upper part of the "C" sand (figure 5). Unless the upper and lower parts of the sand are separated by an extended shale barrier (which is unlikely based on the open hole logs) the "C" sand reserve is almost finished consistent with the estimate. The reserves evaluation suggests that there is only a very limited reserves remaining in Skull Creek (the "B" sand has negligible reserves and the "A" sand has 0.28 PJ).

Any future production from the Eumeralla would be subject to evaluation of the viability of fracture stimulation and/or compression.

**APPENDIX 5 - SURFACE REHABILITATION PHOTOS**





