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OPEN HOLE DST PROGRAMME

SKULL CREEK WEST #1

FEBRUARY 1997

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1. INTRODUCTION AND TEST OBJECTIVES

The Skull Creek West-1 well is drilling in PPL 1 with ODE Rig 30 approximately 400 east of the North Paaratte Gas Plant. The sands of the Waarre Formation are the primary objectives, while the Upper Eumeralla sands form the secondary objectives.

Further details of the reservoir geology can be found in the "Skull Creek West-1" Drilling & Evaluation Programme, January 1997".

An open hole, conventional on bottom drill stem test may be run depending upon the significance of shows encountered in a potentially productive reservoir. It is planned to test any potential hydrocarbon zone after intersecting good reservoir shows by four to fifteen metres.

Alternatively, at final total depth after wireline logging and RFT logging, select intervals may be open hole tested utilising a straddle packer test string.

The objectives of testing Skull Creek West-1 are:-

a) Establish reservoir fluid types.
b) Assess productivity, permeability and skin.
c) Measure reservoir pressure and temperature.
d) Determine hydrocarbon compositions.

Final decision on test intervals and requirements shall reside with the Managing Director.

2. TEST SUMMARY

2.1 Well Information

a)	Licence Area:	Onshore Victoria PPL 1
b)	Well Name:	Skull Creek West-1
c)	Surface location	
	Northing:	5730350.70m N
	Easting:	670814.18m E
d)	Rig Contractor:	Oil Drilling & Exploration Pty. Ltd.
e)	Drilling Rig:	ODE Rig 30
f)	Elevation:	(AMSL) 96m (to be confirmed)
h)	RT - GL:	4.3m

2.2 Primary Objective

The primary objective of this well is the Early Cretaceous Waarre Formation sandstones prognosed between 1271-1351 m RT.

2.3 Flow Procedure

Below are the planned flow periods but these may be modified depending on any additional data.

Phase	Objective	Waarre Formation (mins)	Duration (mins) Upper Eumeralla
Initial Flow	Drawdown	10	10 minutes
Initial B/U	Initial Pressure	30	30 minutes
Main Flow*	Sample/Drawdown	90	90 minutes
Main B/U	kh, Skin	90	120 minutes

* at the discretion of the site engineer

2.4 Produced Fluids and Disposal

The flow duration and rate will determine the quantity of fluids produced during a DST. The maximum anticipated gas rate is approximately 10 Mmscf/d and several hundred barrels of fluid per day. All hydrocarbons produced will be flared in accordance with good oilfield practice. Produced water will be captured in the flare pit. A surface separator will not be on site for this well.

2.5 Reservoir Parameters (Estimates only)

	Formation	
Parameter	**Waarre**	**Upper Eumeralla**
Estimated Reservoir Pressure: psia	1850 @ 1270m	2150 @ 1470m
Estimated BHS Temperature:	53	38
Dry Gas Gravity (Air = 1.00)	≅ 0.65	0.65
Wet Gas Gradient: psi/m	0.28 - 0.30	0.28 - 0.30
H_2S: ppm	0	0
$C0_2$: %	0	0-5
Max SITHP: (psig)	1480	1750
Test Interval:	TBA	TBA

2.6 Contractors

Downhole Test Tools	Australian DST
Surface Test Tools	Australian DST
Surface Test Equipment	Australian DST
Downhole Gauges	Australian DST
Electric Line Logging	BPB
Slickline	ODE
Handling Gear	ODE

2.7 Operator Personnel On Site

Drilling Supervisor	-	A Bradley
Test Engineer*	-	R Harris/A Ion/B Richardson
Geologist	-	D Horner

* Subject to availability, roster and test requirements

3. TEST REQUIREMENTS

The following points summarise certain aspects required of test equipment and procedures:

1. The well test will be conducted in a safe and efficient manner in accordance with good oilfield practice. All safety aspects will be considered of paramount importance and safety will be the overriding criteria in any decision made. Zero pollution is the target throughout the testing and every effort must be made to achieve this. Reference should be made to the following documents:

   (a) Drilling and Evaluation Programme: Skull Creek-1
   (b) Onshore Safety Manual: Drilling Operations
   (c) Onshore Operations Manual

2. A safety meeting will be conducted with all personnel on site prior to testing. In addition, safety meetings will be held on the rig floor prior to every main activity or operation with all relevant personnel.

3. Testing will be undertaken with a drilling fluid at least 200 psi hydrostatic pressure overbalance against the formation on the annulus side of the test string.

4. The conventional on bottom DST assembly will consist of a perforated anchor assembly, conventional packer, safety joint, hydraulic jars, hydraulic valve, flow control valve and reversing sub. A straddle DST assembly will comprise a belly spring, lower inflate packer, spacers and recorder carriers, upper inflate packer, deflate tool, mudscreen, inflate pump, safety joint, recorder carriers, jars, sampler, hydraulic valve.

5. At least two gauge carriers with electronic gauges shall be run. There shall be one carrier located above the downhole shut in valve reading internal pipe pressure and one carrier located below the packer as close to the reservoir as possible reading reservoir pressure. If possible, there shall be a third carrier run with external gauges below the packer reading rathole pressure which will confirm any tailpipe plugging problems. Mechanical gauges shall be run as backup in available corner slots.

6. The produced fluids will be monitored for H_2S, especially during the initial clean-up periods. Should surface sampling show surface levels of 10 ppm H_2S or greater, the well will be immediately shut-in and preparations made to kill the well. In addition, the produced fluid will also be tested for CO_2

7. The initial flow period of the first test will be initiated during daylight hours, at the discretion of the Drilling Superintendent and/or with the approval of the DNRE.

4. TIME ESTIMATES & GAUGE PROGRAMME

The estimated time in minutes for each operation before, during and after the planned DST's as well as the preliminary EMR sampling schedule are shown in the table below. The test engineer should record the operation and chronology in detail and submit the log with the DST report.

OPERATION	FORMATION					
	Waarre Sandstone (≅ 1300m)			**Upper Eumeralla** (≅ 1400mRT)		
	Time (mins)	samples /minute	Total Readings	Time (mins)	samples /minute	Total Readings
Condition Hole/Mud	120			120		
Wiper Trip to surface casing	120			130		
POH	150			180		
Make up test tools/BHA	120	1	120	120	1	120
RIH on 4½" DP, Space Out	110	1	110	140	1	140
Cont, RIH, Space Out Set packers/Open tools	40	15	600	140	15	600
Set packers/Open tools/Initial Flow	10	15	150	10	15	150
Initial Build-Up	30	15	450	30	15	450
Main Flow	90	15	1350	90	15	1350
Main Build-Up	90	15	1350	120	15	1800
Unseat packers, Reverse circulate	30	15	450	30	15	450
POH	150	2	160	180	2	180
Layout tools	120			120		
Total (hrs)	19:40		4740	21:50		5240

Sampling rates may be modified to maximise the recorded data.

Electronic gauges will be run with one below the packer reading rathole pressure, one below the packer reading tubing pressure and one above the packer reading string hydrostatic pressure. Mechanical gauges are to be run as backup in available carrier slots.

5. PROCEDURE

Testing will be decided on the basis of hydrocarbon shows while drilling. The wellsite geologist in conjunction with the Cultus Exploration Group will endeavour to drill 10-15m into each hydrocarbon show and if indications are still positive will make the decision to test the zone with approval of the Managing Director. The packer will be set just above the interval in the most competent formation.

1. Upon penetrating a test zone, cease drilling and circulate bottoms up.

2. Circulate hole clean and condition mud. Work pipe throughout.

3. Conduct wiper trip to last casing shoe, noting any tight spots. RIH to TD, reaming tight spots. Condition mud as per drilling programme.

4. POH, Strap out of well (SLM).

5. Make up DST tools, load and set gauges and pressure test same.
   Note: Ensure all tools are function tested and shear pins checked prior to RIH.

6. RIH test string on 4½" drillpipe

7. Space out tools. Rig up surface equipment.

8. Hold safety meeting.

9. The section below summarises the procedure depending upon the type of test selected for the target zone.

Conventional Test

a. Ensure choke valves are correctly aligned via the variable choke initially set on ½" to the flare pit.

b. Fill drill pipe with cushion (if used), Set packer and open hydraulic valve.

c. Commence initial flow period. Do not adjust choke size. Monitor flow initially with bubble hose. Switch to flare if flow significant, ie. very strong blow.

d. Shut-in for initial build-up.

e. Open tools for main flow. Adjust choke based on results from initial flow, resist temptation to change chokes during the flow period unless such change can be confirmed to alter the sandface production rate. Collect three gas samples during the flow plus one sample for DNRE. Clearly label and report test data using standard CPNL forms

f. Shut in for main build-up.

a. Ensure choke valves are correctly aligned via the variable choke initially set on ½" to the flare pit.

b. Fill drill pipe with cushion (if used). Commence rotating to inflate packers. Once set, set down weight to open hydraulic valve.

c Commence initial flow period. Do not adjust choke size. Monitor flow initially with bubble hose. Switch to flare if flow significant.

d. Shut-in for initial build-up.

e. Open tools for main flow. Adjust choke based on results from initial flow, resist temptation to change chokes during the flow period unless such change can be confirmed to alter the sandface production rate. Collect three gas samples during the flow plus one sample for DNRE. Clearly label and report test data using standard CPNL forms

f. Shut in for main build-up.

10. At the completion of the build-up period release packer. Maintain full annulus.
Note: Ensure drillpipe contents are sampled for oil/water recovery.
Note: Monitor annulus throughout test.

11. Drop bar and reverse circulate out hydrocarbons. Circulate through rig choke manifold using well control procedures in Cultus operating manual. Circulate and condition mud the long way.

12. POH with test assembly, layout tools, recover and check gauges and down load pressure and temperature data for immediate analysis.

6. PRESSURE TESTING SCHEDULE

	Test Pressure (psi)	Duration
Surface test - DST tools	500	5 mins
Surface Equipment (tree, choke manifold)	1500	5 mins
Surface Equipment (flare lines, separator, etc)	n/r	n/a

Note:

1. All personnel to clear area when pressure testing.
2. Final surface test pressures to be held 5 minutes with no decline.
3. Ensure all potential trapped pressure is released before commencing operations.
4. Pressure test not to shear pump out sub. Check shear pin settings.

7. PERSONNEL RESPONSIBILITIES

The following guidelines are in addition to those set out in the Cultus Onshore Drilling Operations Manual.

Cultus Drilling Supervisor

He has overall responsibility for conducting the test in a safe and efficient manner. The Cultus Test/Drilling Engineer will generally supervise the well test and testing contractors but will report to the Drilling Supervisor.

Responsible for:-

a) Safety.
b) Ensuring all equipment is available and that it has the correct inspection certification.
c) Ensure that all equipment is prepared as per programme.
d) Running and testing the test string.
e) Making up the pipe tally and ensuring that tools are at the correct depth.
f) Carrying out all operations in a safe and efficient manner.
g) Co-ordination of all transportation of equipment and personnel.
h) Liaison with drilling contractor.
i) Functioning of the BOP stack.
j) Outgoing communications.
k) Conducting safety and procedures meetings (to be carried out jointly with Test/ Drilling Engineer).
l) Ensuring test programme is followed and approving any onsite changes to the programme.
m) Reporting of any oil spill incidents.

Test Engineer/WSG

The Test Engineer and WSG reports directly to the Drilling Supervisor and assists him in his responsibilities as detailed below. If no Test Engineer is available the WSG shall assume the duties and responsibilities of the Test Engineer.

a) General supervision of the Well Test Programme.
b) Gather test data and verifying accuracy and completeness.
c) Analyse the test data to assess the performance and properties of the reservoir. Decide the duration of the flow and build up periods in consultation with head office.
d) Assist with the collection and supervision of labelling and despatch of surface samples and a daily report on the progress.
e) Ensuring that all sampling is carried out as per programme.
f) Collating and transmitting all well test information as required.
g) Advising the Drilling Supervisor of any equipment faults or malfunctions.

Driller

Responsible for all actions taking place on the drill floor in particular the following:-

a) All operations concerning the annulus. Annulus pressure must be monitored at all times during the test and instrumentation checked on a regular basis.
b) Ensuring adequate monitoring of flaring operations.
c) The drill floor is the control centre during the test and all operations carried out during the test must be cleared through the Driller. The Driller must inform all key personnel immediately of any problems or changes in the programme.

Note: Either the Driller or Toolpusher and two floormen must be on the rig floor at all times during the testing.

Prior to running a test, a final test string configuration shall be faxed to Sydney for approval indicating all components in the string, shear pin settings, etc.

Downhole Equipment

Reverse Circulation Sub:
The reverse circulation sub is operated by a drop bar which shears a set of hollow plugs to allow direct communication between the annulus and inside drillpipe. After a successful test any produced fluids remaining in the drill string can be reversed to surface.

Flow Control Valve:
The flow control valve is operated from surface by either drillstring rotation or application of drill string weight. This valve allows a number of flow and shut-in periods to be conducted and a sample of the wellbore fluid to be taken just prior to the final shut-in.

Hydraulic Valve:
After setting the test packers, the hydraulic valve opens to allow direct communication from below to the drillstring. The valve prevents drilling fluid entry into the test string while running in hole.

Gauge Carrier:
The gauge carrier will hold an electronic pressure and temperature gauge to record conditions inside the drillpipe during the test. In addition backup mechanical gauges shall be installed in spare slots.

Hydraulic Jars:
If the test tools become stuck due to hole problems or differential sticking the hydraulic jars can be used to provide a sudden impact force to assist pulling the tools free.

Safety Joint:
If the test tools become stuck and a combination of drillpipe tension, jarring or circulating does not free the tools, the safety joint can be backed off to free the tools above. Consists of two housings joined by a coarse right hand thread. To retrieve the test string if stuck, the joint can be unscrewed by reciprocation and rotating.

Packer:
The test packer is used to isolate the test zone from the overlying hydrostatic pressure. The solid rubber packer is expanded by a mandrel and makes contact with the entire wellbore circumference.

Perforated Anchor:
Once the hydraulic valve opens, wellbore and formation fluids can flow through the perforated anchor and up into the drillpipe.

Gauge Carrier:
A second gauge carrier will hold another electronic pressure and temperature gauge to record conditions outside the perforated anchor during the test.

Surface Equipment

Test Tree:
The tree, suspended by extended bails, controls the flow of fluids from the well to the surface equipment. The test tree encompasses the surface safety valve, a swivel to allow rotation of the drillstring and sample or pressure ports.

Choke/Choke Manifold:
The choke manifold allows diversion of produced fluids between either a fixed or variable choke or to completely bypass the chokes.

Flow Prover:
Under conditions of low gas flow, a flow prover will be used to accurately determine flowrate.

Gauge Tank:
If appreciable amounts of water are produced the flow will be diverted to a gauge tank to measure the flow.