

PACIFIC OIL & GAS PTY LIMITED  
 DRILL STEM TEST REPORT SUMMARY

PET-67-2.9

DST 2



WELL: Mason 1  
 DATE: 16-17 December 1991  
 LOCATION: McArthur Basin, EP 18  
 INTERVAL TESTED: 894.93m to 902.90m  
 BOTTOM HOLE DEPTH: 902.90m  
 FORMATION: Bukalorkmi Sandstone  
 TEST TYPE: Conventional bottom-hole closed-chamber  
 TESTING COMPANY: Halliburton Reservoir Services  
 Richard Dix (Tester)  
 Graham Peterson (GRC and SRO Gauges)  
 Dave Linkston (HMR Gauge)  
 OPERATOR'S REPRESENTATIVES: Kevin Lanigan (Geologist)  
 Len Norstrom (Engineer)

	INSIDE GAUGE	INSIDE GAUGE	RECOVERY GAUGE	UNITS	FLOW/ SHUT-IN TIME
Depth	887.19	887.19	860.46	metres	
Initial Hydrostatic Pressure	1384.47	1387.67	-	psiA	
1st Flow:					
-Initial Pressure	56.24	54.03	15.88	psiA	
-Final Pressure	60.82	59.11	16.51	psiA	15 mins.
-Closed Pressure	1040.16	1040.99	17.36	psiA	61 mins.
2nd Flow:					
-Initial Pressure	61.06	59.20	17.36	psiA	
-Final Pressure	80.89	75.37	40.85	psiA	209 mins
-Closed in Pressure	1139.00	1137.53	40.94	psiA	728 mins
Final Hydrostatic Pressure	1377.04	1378.85	-	psiA	
Temperature	56.2	56.0	53.2	C°	

RECOVERY: The string was pulled wet and yielded a 15.12 metre column (54.7 litres) of rat-hole mud with no indication of hydrocarbons. No gas was detected.

TIME DATA:

























16/12/91	18:22:40	TOOL OPEN	PRE-FLOW
	18:37:40	TOOL CLOSED	INITIAL SHUT-IN
	19:38:20	TOOL OPEN	MAIN FLOW
	23:07:30	TOOL CLOSED	FINAL SHUT-IN
17/12/91	11:15:00	TEST ENDED	

REMARKS:

- All surface equipment was pressure tested prior to starting the DST.
- On the surface read out (SRO) gauge the Pre-Flow showed an initially rapid rise which then fluctuated between 0.022 and 0.028 psig for the remainder of the period.
- During the Initial Shut-In the SRO pressure gradually dropped, falling to 0.000 in just over 15 minutes.
- The SRO gauge could not read negative values (ie. below 0.000 psig), so it could not be determined whether this decrease in pressure continued below the gauge zero.
- Also, since no temperature gauge was fitted to the SRO it could not be ascertained whether the falling pressure was due to a drop in temperature within the chamber.
- At the start of the main flow (19:38:20 hours) it seemed that the tool did not open, so the tool was slightly lifted and lowered repeatedly until an audible jolt (at 20:07:10 hours) suggested the opening had finally occurred. Inspection of the downhole recorder plots, after the last indicate that the tool did in fact open on the first attempt.
- No pressure change at all was observed on the SRO after the values fell to zero about 15 minutes into the Initial Shut-In. Therefore, no effective surface monitoring during the Main Flow was possible.
- Towards the end of the Main Flow and occasionally during the Final Shut-In the bubble hose was opened and a slight sucking indicated air was being drawn into the chamber.

*Kevin Lanigan*  
**KEVIN LANIGAN**  
GEOLOGIST







TEST STRING CONFIGURATION

	O.D. (in)	I.D. (in)	LENGTH (m)	DEPTH (m)
 DRILL PIPE .....	3.500	2.764	727.580	
 DRILL COLLARS .....	4.750	2.825	18.710	
 CROSSOVER .....	6.500	2.812	0.650	
 DRILL COLLARS .....	5.500	2.812	92.570	
 PUMP OUT REVERSING SUB..	5.000	3.000	0.305	839.520
 DRILL COLLARS .....	5.500	2.812	9.530	
 PUMPOUT & IMPACT REV. SUB	5.000	3.000	0.305	848.750
 DRILL COLLARS .....	5.500	2.812	9.090	
 BAR CATCHER SUB .....	5.750		0.305	858.10
 EMR HANGER SUB .....	5.000	2.690	0.403	
 ELECTR. GAUGE RUNNING CASE	5.000	3.270	1.529	860.457
 HYDROSPRING TESTER .....	5.000	0.750	1.678	860.700
 LOCKED OPEN BYPASS .....	5.000		0.500	
 EXTENSION JOINT .....	5.000	0.870	1.402	
 EXTENSION JOINT .....	5.000	0.870	1.402	
 CROSSOVER .....	5.750	2.250	0.305	
 DRILL COLLARS .....	5.500	2.812	18.270	
 CROSSOVER .....	5.750	2.250	0.305	
 CROSSOVER .....	4.750	2.250	0.451	
 BUNDLE CARRIER .....	5.750	2.250	2.371	887.180
 CROSSOVER .....	4.750	2.250	0.262	
 AP RUNNING CASE .....	5.000	2.250	1.262	888.040
 JAR .....	5.000	1.750	1.524	
 VR SAFETY JOINT .....	5.000	1.000	0.847	

CONTINUED

HRS

TEST STRING CONFIGURATION

	O.D. (in)	I.D. (in)	LENGTH ( m)	DEPTH ( m)
 OPEN HOLE PACKER.....	7.500	1530	1771	892.540
 DISTRIBUTOR VALVE.....	5.000	1680	9.840	
 OPEN HOLE PACKER.....	7.500	1530	1771	994.530
 ANCHOR PIPE SAFETY JOINT..	5.000	1500	1.070	
 FLUSH JOINT ANCHOR.....	5.000	2.370	4.870	
 BLANKED-OFF RUNNING CASE	5.000	2.400	1.237	901.980
TOTAL DEPTH				302.90

HRS

OPERATOR JOB LOG

Type of Flow Measuring Device: 6" Ceramic Choke

TIME HH:MM:SS	CHOKES SIZE (in)	SURFACE PRESSURE (psi)	GAS RATE (Mscf/D)	LIQUID RATE (bbl/D)	REMARKS
-----					
16-Dec-91					
09:50:00					Pick Up & Start To Make
09:50:00					Up The Test Tools.
10:00:00					Wait On The Forklift.
10:15:00					Make Up Test Tools.
10:40:00					Start The GRC Gauges.
11:55:00					Test Tools Made Up .
12:00:00					R.I.H. & Strap In.
16:15:00					Finished
16:20:00					Drill Out Plug On Top Of
16:20:00					Drop Bar Device.
16:45:00					Flush Mud Through Surface
16:45:00					Lines To Pressure Test .
18:19:00					Set Weight On Packers.
18:23:00					Tool Opened . Closed
18:23:00					Chamber Testing.
18:38:00					Pick Up To Close Tool &
18:38:00					End The First Flow.
19:38:00					Set Weight Down To Open
19:38:00					Tool. Didn't Open.
19:43:00					Pick Up & Set Down Weight
19:43:00					On The Tool 30m. 32m. 35m.
19:43:00					Tool Won't Open.
20:02:00					Pick Up About 4' (Last
20:02:00					Attempt To Open Tool Set
20:02:00					Weight On A Little Faster)
20:02:00					Tool Taking Weight.
20:04:00					Set 30m On Packers.
20:07:00					Tool Opened. For The
20:07:00					Second Flow. ( CCT ).
23:07:00					Shut Tool In , End 2nd Flow
23:07:00					Surface Pressure Did Not
23:07:00					Increase Above 0.000 Psi.
23:07:00					But Ended With Slight Vac.
17-Dec-91					
11:00:00					Open Test Manifold To Vent
11:00:00					Slight Vaccumm In The Test
11:00:00					String & Ending The CCT.
11:15:00					Break Out Master Valves.
11:30:00					POOH.
14:55:00					Test Tools At Drill Floor.
15:05:00					Break Out Test Tools.
17:45:00					Test Tools Laid Out .
17:45:00					Finished.
20:00:00					After Looking Over The
20:00:00					Test Period Times It Was

Date: 16/12/91  
Test No: DST 2

Ticket No: 001631

Page No: 117.0

OPERATOR JOB LOG

Type of Flow Measuring Device: 6" Ceramic Choke

TIME	CHOKE SIZE	SURFACE PRESSURE	GAS RATE	LIQUID RATE	REMARKS
HH:MM:SS	(in)	(psi)	(Mscf/D)	(bbl/D)	
-----					
17-Dec-91					
20:00:00					Noticed That The Tool Did
20:00:00					Open @ 19:38 Hrs For The
20:00:00					Second Flow Period .
20:00:00					This Opening Time Was Not
20:00:00					Clearly Noticed And Causing
20:00:00					Some Doubt At The Time.

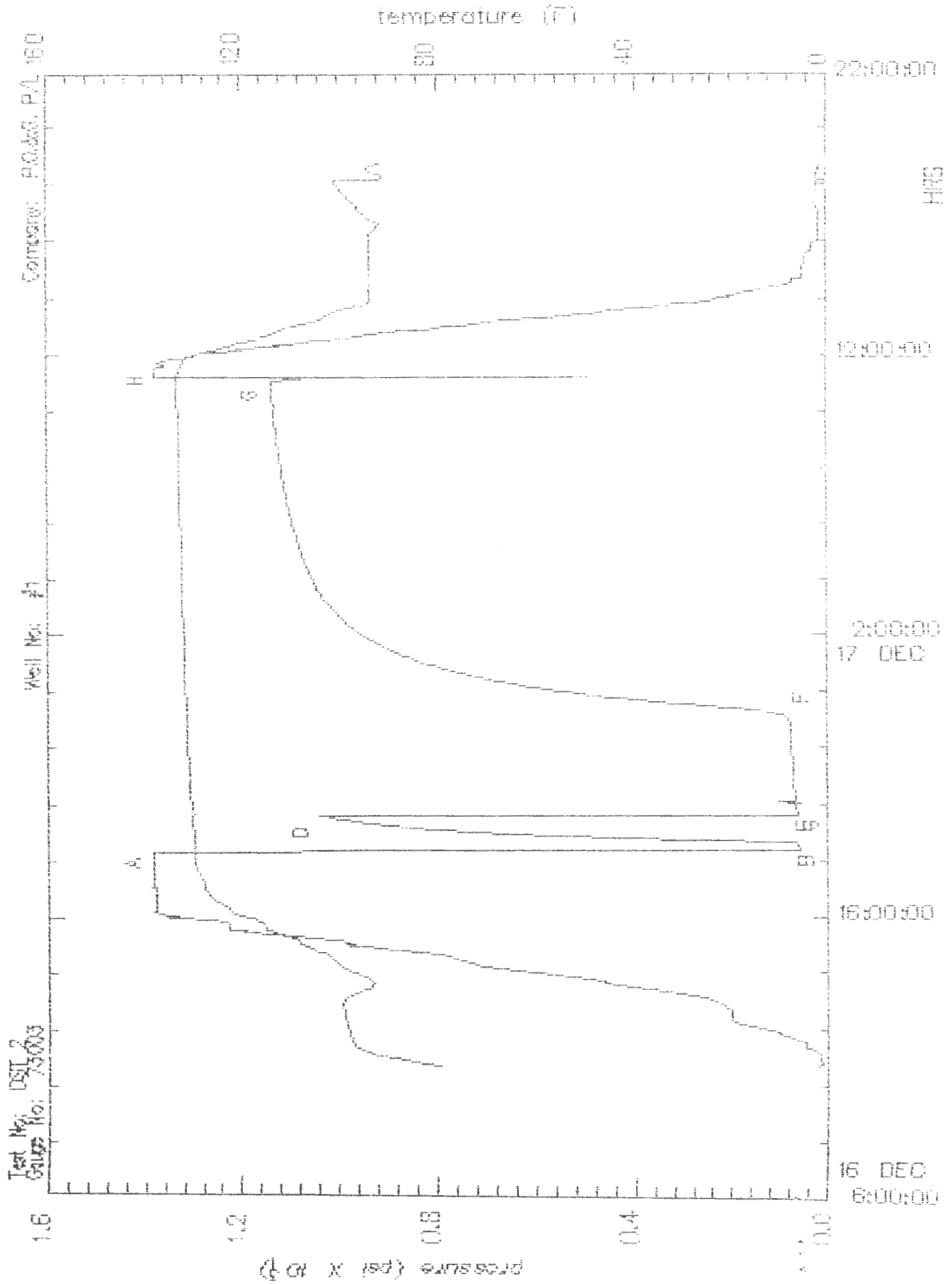
## TEST PERIOD SUMMARY

Gauge No.: 73003 Depth: 887.19 m Blanked off: No

ID	PERIOD	DESCRIPTION	PRESSURE (psi)	DURATION (min)
A		Initial Hydrostatic	1384.47	
B	1	Start Draw-down	56.24	
C		End Draw-down	60.82	14.95
C	2	Start Build-up	60.82	
D		End Build-up	1040.16	60.12
E	3	Start Draw-down	61.06	
F		End Draw-down	80.89	208.97
F	4	Start Build-up	80.89	
G		End Build-up	1139.00	724.33
H		Final Hydrostatic	1377.04	

NOTE: for Pressure vs. Time Plot, see next page.

Pressure/Temperature History





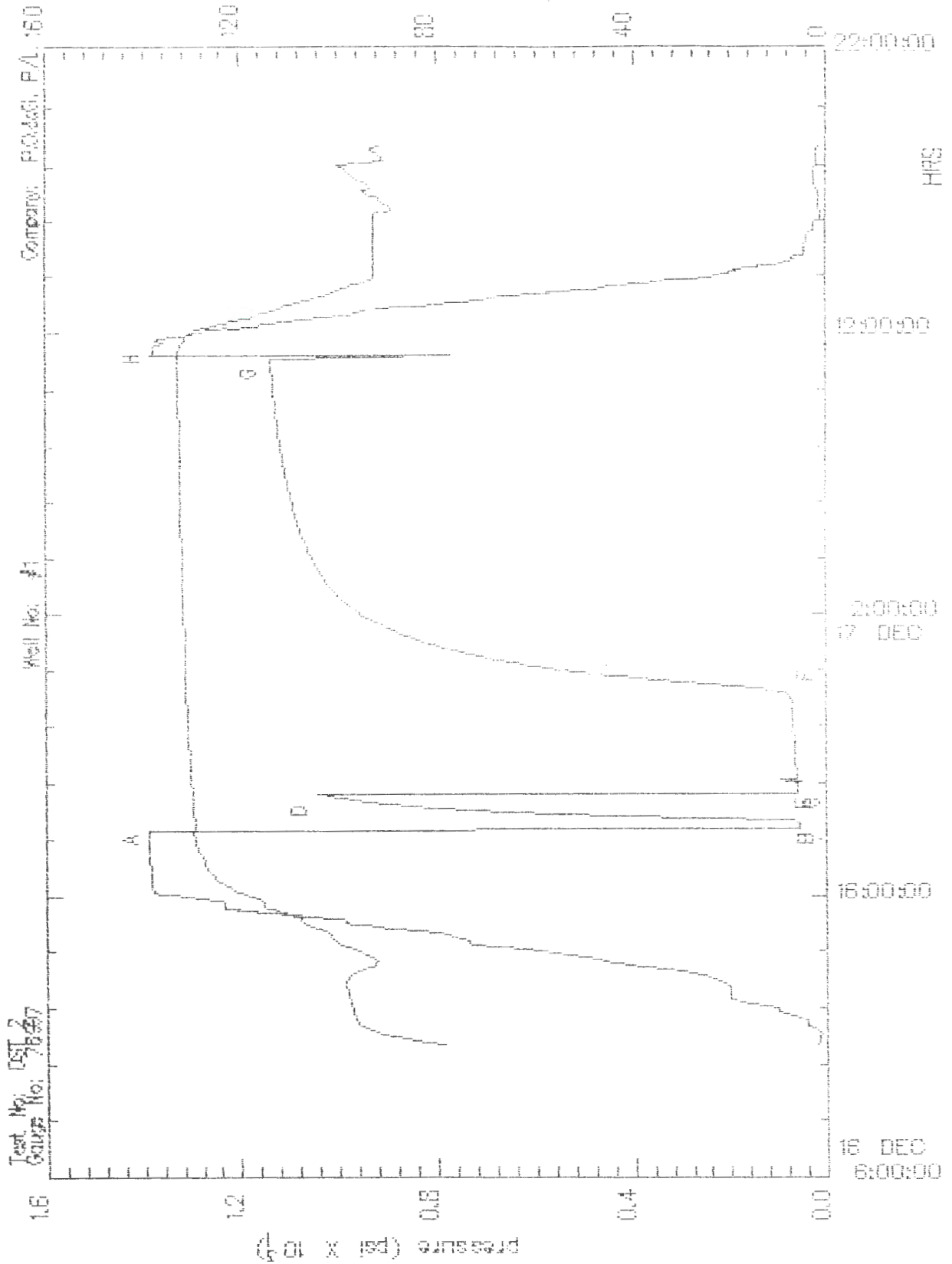
## TEST PERIOD SUMMARY

Gauge No.: 76997 Depth: 887.19 m Blanked off: No

ID	PERIOD	DESCRIPTION	PRESSURE (psi)	DURATION (min)
A		Initial Hydrostatic	1387.67	
B	1	Start Draw-down	54.03	
C		End Draw-down	59.11	14.93
C	2	Start Build-up	59.11	
D		End Build-up	1040.99	60.13
E	3	Start Draw-down	59.20	
F		End Draw-down	75.37	208.98
F	4	Start Build-up	75.37	
G		End Build-up	1137.53	724.32
H		Final Hydrostatic	1378.85	

NOTE: for Pressure vs. Time Plot, see next page.

Pressure/Temperature History



## TEST PERIOD SUMMARY

Gauge No.: 10096 Depth: 860.46 m Blanked off: No

ID	PERIOD	DESCRIPTION	PRESSURE (psi)	DURATION (min)
A	1	Start Draw-down	15.88	
B		End Draw-down	16.51	14.83
B	2	Start Build-up	16.51	
C		End Build-up	17.36	60.33
C	3	Start Draw-down	17.36	
D		End Draw-down	40.85	209.17
D	4	Start Build-up	40.85	
E		End Build-up	40.94	724.27

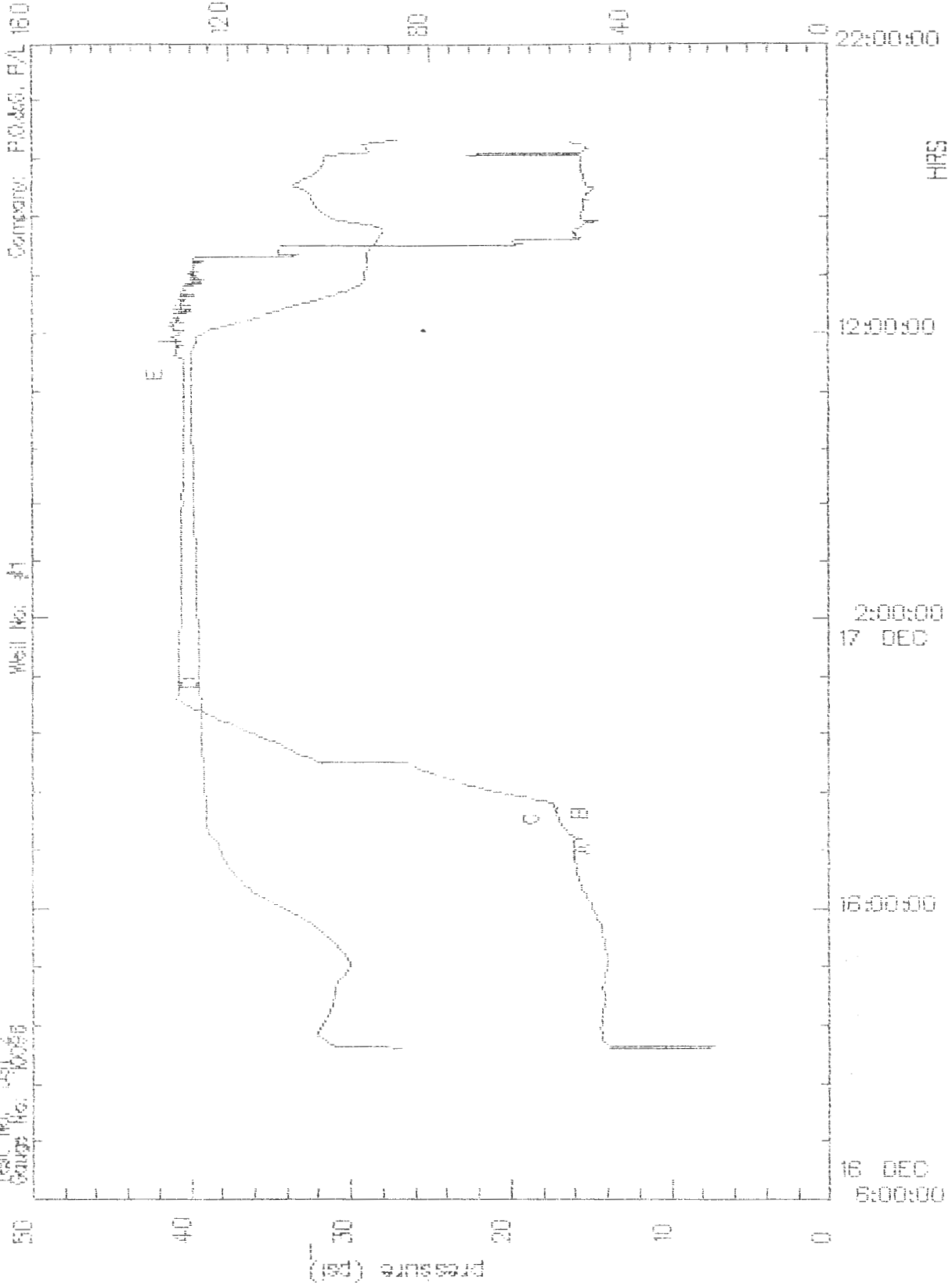
NOTE: for Pressure vs. Time Plot, see next page.

# Pressure/Temperature History

Test No. DST  
Gauge No. 1058

Well No. #1

Company: P.O. & S. P/L 160



## PACIFIC OIL & GAS PTY LIMITED

### MASON 1 DRILL STEM TEST #2 COMMENTARY

#### The Rationale

While rotary drilling into the top of the Bukalorkmi Sandstone total gas readings mostly ranged from tens to a few hundred ppm, mostly C1 with only minor C2 and C3 detected, and no fluorescence observed above 890 metres. In anticipation of encountering the equivalent of the hydrocarbon-bearing interval from 895-900m in Jamison 1 a core was cut at 893.9-902.9 metres. This core displayed relatively minor shows of 20-40% dull yellow, patchy fluorescence and 5-10% pinpoint bright pale yellow fluorescence, the latter being most abundant over a one-metre interval around 897 metres (over which a gas peak of 3 units Total Gas (C1= 593 ppm, C2= 14 ppm, C3= 3 ppm, C4= 4 ppm) was detected). Given that these were the most encouraging shows encountered, it was decided to run a test.

#### The Test

The test was designed as a conventional closed-chamber bottom-hole test, with two electric recorders run beneath the shut-in valve, a high-accuracy electronic recorder run as the recovery gauge, and a Surface Read Out (SRO) gauge to monitor pressure at the top of the chamber.

After running in the hole with the tool and making up the test head the surface equipment was filled with mud and pressure tested to about 100 psi. No leaks were observed. The lines were cleared by blowing out to the flare pit and the test was started by setting the packer at 18:19:50 hours on 16/12/91.

Pre-Flow began at 18:22:40 hours, as indicated by a small (but rapid) rise in SRO pressure. (To avoid compromising the chamber pressure data the bubble hose was kept closed).

The SRO pressure data was plotted against time (Figure 1) and showed a fluctuation between 0.020 and 0.028 psig over this initial flow period, averaging around 0.025 psig, but showing a slight overall increase with time. By the end of the Pre-Flow (18:37:40 hours) the SRO pressure appeared to be stabilizing around 0.027-0.028 psig.

As soon as the tool was closed (commencing the Initial Shut-In the SRO pressure dropped, initially rapidly (approx. 0.005 psig in 20 seconds) and then more gradually (from 0.022 to 0.000 psig in 17 minutes), displaying a slightly step-wise character.

This pressure drop was presumed to be due to either a leak in the chamber or a temperature decrease. The latter could not be checked due to there not being a temperature sensor fitted to the SRO equipment.

Also, since the SRO gauge could not read "negative" values (ie. those below the gauge zero set at the start of the test) it was not possible to tell whether or not the chamber pressure continued to fall below, or was stabilized at, the 0.000 psig "baseline".

The SRO pressure did not rise above 0.000 psig for the remainder of the test period, thus precluding the monitoring at surface of any subtle changes in pressure which may have occurred. Since the test interval seemed tight it may have been that no appreciable changes in chamber pressure occurred, but this remains questionable.

At 19:38:20 hours the hydrospring was reactivated to end the Initial Shut-In and commence the Main Flow period. After several minutes it seemed that the tool had not opened (the expected "jolt" of the drillpipe had not occurred) so the test string was repeatedly raised and lowered slightly, thereby varying the weight on the tool (see Table 1). The obvious jolt at 20:07:10 hours was taken to indicate that the tool had finally opened. (Inspection of the downhole charts after the test indicated that the tool actually did open on the first attempt, so that the Main Flow did commence at 19:38:20 hours).

Because the SRO gauge continued to display 0.000 psig no changes in Main Flow conditions were observed, so the tool was left open for almost 3½ hours until Main Flow was terminated at 23:07:30 hours, commencing the Final Shut-In period (which also showed no variation on the SRO gauge).

Near the end of the Main Flow and occasionally during the Final Shut-In period the bubble hose was opened briefly, and a slight sucking indicated air was being drawn into the chamber. At around 11:00:00 hours the valve to the flare line was opened to blow "down" the chamber prior to ending the test.

At about 11:15:00 hours the test was ended with the unseating of the packer and the string being pulled from the hole.

The liquid recovery comprised a 15.12 metre (54.7 litre) column of rat-hole mud, in which no indication of hydrocarbons or formation water was apparent. (The contract mud engineer on-site ran tests on three samples of the recovered mud (see attached mud report) and concluded there was no significant change in mud properties). Two mud samples were sent for analysis. No gas was detected.

#### Preliminary Conclusions

Indications from the Pre-Flow SRO readings suggest an initial minor slug followed by very low flow occurred. A quick look at the recovery gauge data suggests this very low flow continued during the Main Flow (including an apparent 5 psi "jump" at 20:59:00 hours) but was not detectable on the surface gauge.

The interval tested appears to have been very tight and only yielded very little flow; the substance of which was not detected.

While cleaning the tools after the test a thin, yellow, oily film was observed on some internal components, but whether or not this came from the formation remains uncertain.

*Kevin Lanigan*

Kevin Lanigan  
(Geologist)

TABLE 1

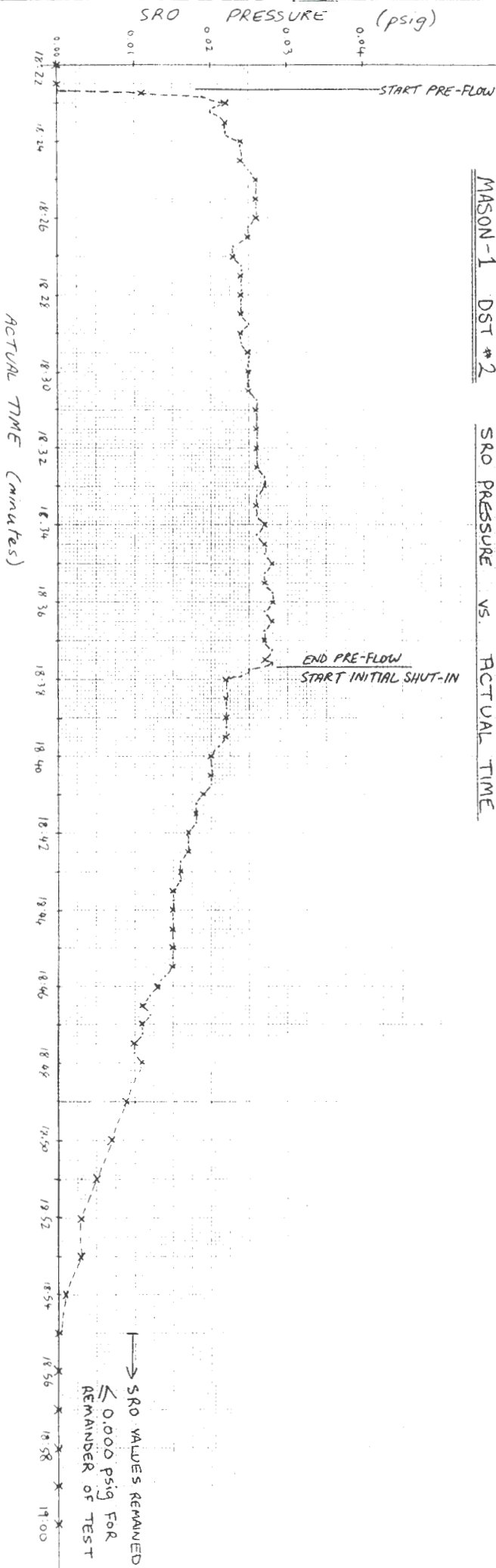
String Shifts at start of Main Flow period

Time	Action	String Weight
19:38:20	lower string to put weight on tool	26000
19:45:45	start picking up again	50000
19:46:00	start lowering again	
19:46:15	stop lowering	24000
19:48:35	lower a bit more	22500
19:51:00	lower a bit more	21000
19:56:35	lift string again	50000
19:56:55	lower string again	23000
20:04:00	lift string again	56000
20:04:45	lower string again, and wait	24000
20:07:10	strong "jolt" of drillpipe	

FIGURE 1

MASON-1 DST #2

SRO PRESSURE VS. ACTUAL TIME





MASON-1 DST #2 TEST STRING SCHEMATIC SKETCH

	LENGTH (m)	I.D. (in.)	RADIUS (cm)	AREA (cm <sup>2</sup> )	VOLUME (LITRES)	
	732.485	2.764	3.510	38.711	2835.52	
3 1/2" DRILL PIPE (includes 4.9m stick up)						
4 3/4" DRILL COLLARS	18.71	2.825	3.588	40.438	75.66	
6 1/2" DRILL COLLARS (including 0.66m crossover sub at top)	93.33	2.812	3.571	40.067	373.95	
P.O. REV. SUB	0.305	3.00	3.81	45.604	1.39	∴ 12.71 L in COLLARS
6 1/2" DRILL COLLARS	8.83	2.812	3.571	40.067	35.38	∴ 3.17m in COLLARS
P.O. & I. REV. SUB	0.305	3.00	3.81	45.604	1.39	14.1 LITRES of measured recovery
6 1/2" DRILL COLLARS	9.05	2.812	3.571	40.067	36.26	
BAR CATCHER SUB	0.305	← NEGLIGIBLE →				∴ RECOVERY = 15.12 m ABOVE HYDROSPRING VALVE
EMR HANGER SUB	0.463	2.00	2.54	20.268	0.94	
EMR RUNNING CASE	1.829			18.581*	3.403	= 54.7 LITRES RECOVERED
HYDROSPRING AND OTHER COMPONENTS	5.327					
6 1/2" DRILL COLLARS	18.27	2.812				
REMAINDER OF TOOL	18.592					
TOTAL LENGTH	907.80					TOTAL VOL. of CHAMBER
TOTAL BELOW D.F.	902.90					3363.89

\*GIVEN AS 2.88 in<sup>2</sup> WITH HMR INSIDE