

SOUTH AUSTRALIA
DEPARTMENT OF MINES AND ENERGY



OPEN FILE ENVELOPE NO. 3656

PPL 15, NAPPACOONGEE-MURTEREE BLOCK

EROMANGA and COOPER BASINS

DELLA 12

TEST REPORTS

Submitted by

Delhi International Oil Corporation

1987

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ENVELOPE 3656

TENEMENT: PPL 15, Nappacoongee-Murteree Block; Eromanga and Cooper Basins

TENEMENT HOLDER: Santos Ltd (operator), Cooper Basin Unit

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WP: 3164A

DELLA #12
TWO RATE DRAWDOWN TEST EVALUATION
24TH MAR - 4TH APRIL, 1981

A.G. BURDON 26/5/81.

INTRODUCTION

Della #12 was the first of the 5 development wells drilled in the 1981 Della Field development program. The well was completed on February 20th, 1981 after being selectively perforated in the 64-7 Toolachee sand over the interval 6361' - 6388' with 2-1/8" enerjets at 4 shots per foot.

In March, the well was tested with a two rate drawdown test to determine the reservoir parameters associated with the 64-7 sand. The test procedure consisted of a two day cleanup flow period followed by a two day shutin prior to the running of static surveys. This was followed by a two rate drawdown and buildup test.

RESULTS

The following reservoir parameters were obtained from the test.

Reservoir Pressure @		6450' SS	6279' SS
	DATE	PSIA	PSIA
Static Survey	30/3/81	2659	2651
Pressure Buildup	4/4/81	2656	2648
Flow Capacity		md-ft	
Initial drawdown	31/3/81	884	
Two Rate	1/4/81	789	
Pressure Buildup	4/4/81	616	

WMD
12/11/87
3656 R1

Permeability	DATE	md
Initial Drawdown	31/3/81	35.4
Two Rate	1/4/81	31.6
Buildup	4/4/81	24.7

Apparent Skin	DATE	S'
Initial Drawdown	31/3/81	0.32
Two Rate	1/4/81	-0.29
Buildup	4/4/81	-4.78

CONCLUSIONS

The testing of Della #12 has indicated a variation in results but has established that the 64-7 sand in this well has a similar character to that found in Della #6 although of slightly better quality. The well also encountered a sand with some 8 percent depletion from original conditions, which is close to the expected field depletion at that time, indicating that it is in effective communication with other wells in the field.

RECOMMENDATIONS

The testing of this well has provided satisfactory results and the well should be further completed with additional perforations in the remainder of the pay zones.

DISCUSSIONS

Static Surveys:

Dual pressure elements were run during this survey which gave results that varied by approximately 10 psi. The calculation of datum pressures are given in Appendix A. The results obtained from both elements have been used and the reservoir datum pressures derived are an average of the two measurements.

DRAWDOWN ANALYSIS

The well was opened to flow after the pressure elements had been run in the hole. This enabled a recording of flowing bottomhole pressures to be made while the well established the first rate of the two rate drawdown test. In the early stages of flow, the choke was adjusted several times to trim the well to the desired flow rate. Stabilized flow was achieved after approximately 30 minutes and continued for 24 hours. Table 1 presents the pressure recordings made during this phase of the test. Figure 1 is a log/linear plot of the results and indicates a transient flow regime commencing at about 6 hours into the flow period. The calculations for flow capacity and apparent skin are presented in Appendix B.

The results obtained from this analysis are considered to be the most representative of the formation being tested. They are the least affected by multi-layer conditions and adjacent well interference as the data is gathered in early time production of the well and hence at a relatively small radius of investigation. At 24 hours, the radius of influence is estimated to be in the order of 500 feet.

TWO RATE DRAWDOWN ANALYSIS

At the end of the first flow period ($t = 24$ hours) the well was choked back and allowed to flow a further 24 hours at the reduced flow rate. During this period measurements of the bottomhole pressure response were recorded and they are given in Table 2. Figure 2 is a plot of the time function versus pressure response in pseudo pressures on arithmetic co-ordinates. This plot shows a deviation from the idealized response after approximately 6 hours into the second flow period. It is not clear why this phenomenon should occur but the effect being displayed is one of decreasing flow capacity with time. It can be speculated that this behaviour conforms to a situation where two different layers are present in the

formation and the tighter less permeable layer is recharging a depleted layer by a cross flow condition. This condition would be masked in the early time response by the continuing performance of the higher permeable layer, but at late times, the effect of the less depleted, low permeable layer would be dominant.

The calculations for flow capacity and apparent skin are given in Appendix C and although the results are in close agreement with the initial drawdown analysis, they are not considered as representative of the true average formation parameters as those obtained in the previous analysis.

BUILDUP ANALYSIS

At the end of the second flow period, the pressure elements were withdrawn from the hole, re-loaded and run back in. The well was then shut in and the bottomhole pressure response was recorded during the buildup.

An attempt was made to analyse the buildup in conjunction with the two-rate drawdown, but the data was severely effected by extraneous conditions and no reasonable analysis could be made.

The data was then processed as a conventional buildup with the flowing time being calculated from the total production divided by the latest measured flow rate. This gave a flow time of 118 hours. Table 3 presents the data in this form and Figure 3 is a Horner plot on log/linear co-ordinates. This plot shows a distinct two layer effect where the only usable data is obtained from the early-time slope. Calculations of flow capacity and apparent skin are presented in Appendix D and utilize the initial slope data as read from Figure 3.

In this analysis, the results show a lower value for flow capacity than previously obtained and an increasing negative skin effect. Again it can be speculated that what is being experienced is an increase in multi-layer/differential depletion effects together with the possibility of adjoining well interference as the duration of the test is extended. Thus, less confidence is given to the reservoir values obtained from this part of the testing than from the earlier results.

APPENDIX ADELLA #12 PRODUCTION TEST
RESERVOIR PRESSURE

Static Survey 30/3/81

Element # 17760

Gas Gradient

			Diff.
Depth	4000	6400	2400
Press.	2527	2638	111

Gradient = 0.046 psi/ft.

Reservoir Pressure @ -6450' is (KB = 190')

 $(6450 + 190 - 6400) 0.046 + 2638 + 14.7 = \underline{2664}$ psia.

Pressure at field datum (-6279') is:

 $(6279 + 190 - 6400) 0.046 + 2638 + 14.7 = \underline{2656}$ psia

Element # 3917

Gas Gradient

			Diff.
Depth	4000	6300	2300
Press.	2513	2624	111

Gradient = 0.048 psi/ft.

Reservoir Pressure @ -6450' is:

 $(6450 + 190 - 6300) 0.048 + 2624 + 14.7 = \underline{2655}$ psia

Pressure at field datum (-6279') is:

 $(6279 + 190 - 6300) 0.048 + 2624 + 14.7 = \underline{2646}$ psiaAverage reservoir pressure at field datum (-6279') is then 2651 psia.

APPENDIX B
DELLA #12
DRAWDOWN ANALYSIS

CALCULATIONS

$$\begin{array}{llll} \phi_{hc} & = & 0.16 & \mu_i & = & 0.0182 & C_i & = & 0.369 \times 10^{-3} \\ r_w & = & 0.354 & q_{sc} & = & 11.65 \text{ MMCFD} & T & = & 739^{\circ}\text{R} \end{array}$$

From Figure 1

$$\begin{array}{ll} \text{Slope } m & = & 15.9 \times 10^6 \text{ psia}^2/\text{cp} \\ \Delta\Psi \text{ 1 hr} & = & 87.0 \times 10^6 \text{ psia}^2/\text{cp} \end{array}$$

Flow Capacity

$$\begin{aligned} kh &= \frac{1.632 \times 10^6}{m} q_{sc} T \\ &= \frac{(1.632)(11.65)(739)}{15.9} \\ &= \underline{884} \text{ md-ft.} \end{aligned}$$

Permeability

$$k = \frac{kh}{h} = \frac{884}{25} = \underline{35.4} \text{ md.}$$

Apparent Skin

$$\begin{aligned} S' &= 1.151 \left(\frac{\Delta\Psi_1}{m} - \log \left(\frac{k}{(\phi \mu C_r)_w^2} \right) + 3.23 \right) \\ &= 1.151 \left(\frac{87.0}{15.9} - \log \left(\frac{35.4}{((0.16)(0.0182)(.000369)(.354)^2)} \right) + 3.23 \right) \\ &= \underline{+0.32} \end{aligned}$$

TABLE 1
DELLA #12
DRAW DOWN ANALYSIS

Element # 3917

q = 11.65 MMCFD

t (hours)	Pressure (psig)	ψ_{wf} (psia ² /cp x 10 ⁻⁶)	$\Delta \psi$
0	2641.7	442.62	0
0.38	2309.0	345.56	96.97
0.47	2310.4	345.94	96.68
0.63	2311.7	346.30	96.32
0.78	2312.8	346.61	96.01
0.93	2313.2	346.72	95.90
1.10	2313.0	346.67	95.95
1.25	2312.8	346.61	96.01
1.42	2312.2	346.44	96.18
1.57	2311.6	346.27	96.35
1.72	2311.4	346.22	96.40
1.88	2311.4	346.22	96.40
2.20	2311.0	346.11	96.51
2.50	2309.7	345.74	96.91
2.82	2308.8	345.49	97.13
3.28	2307.6	345.15	97.47
3.77	2306.6	344.87	97.75
4.23	2305.4	344.54	98.08
4.70	2304.4	344.26	98.36
5.63	2301.4	343.42	99.20
7.52	2294.9	341.64	100.98
9.40	2290.4	340.42	102.20
11.27	2285.2	339.00	103.60
15.03	2278.3	337.12	105.50
18.78	2273.3	335.52	107.10
22.55	2268.2	334.38	108.24
24.00	2267.1	334.08	108.54

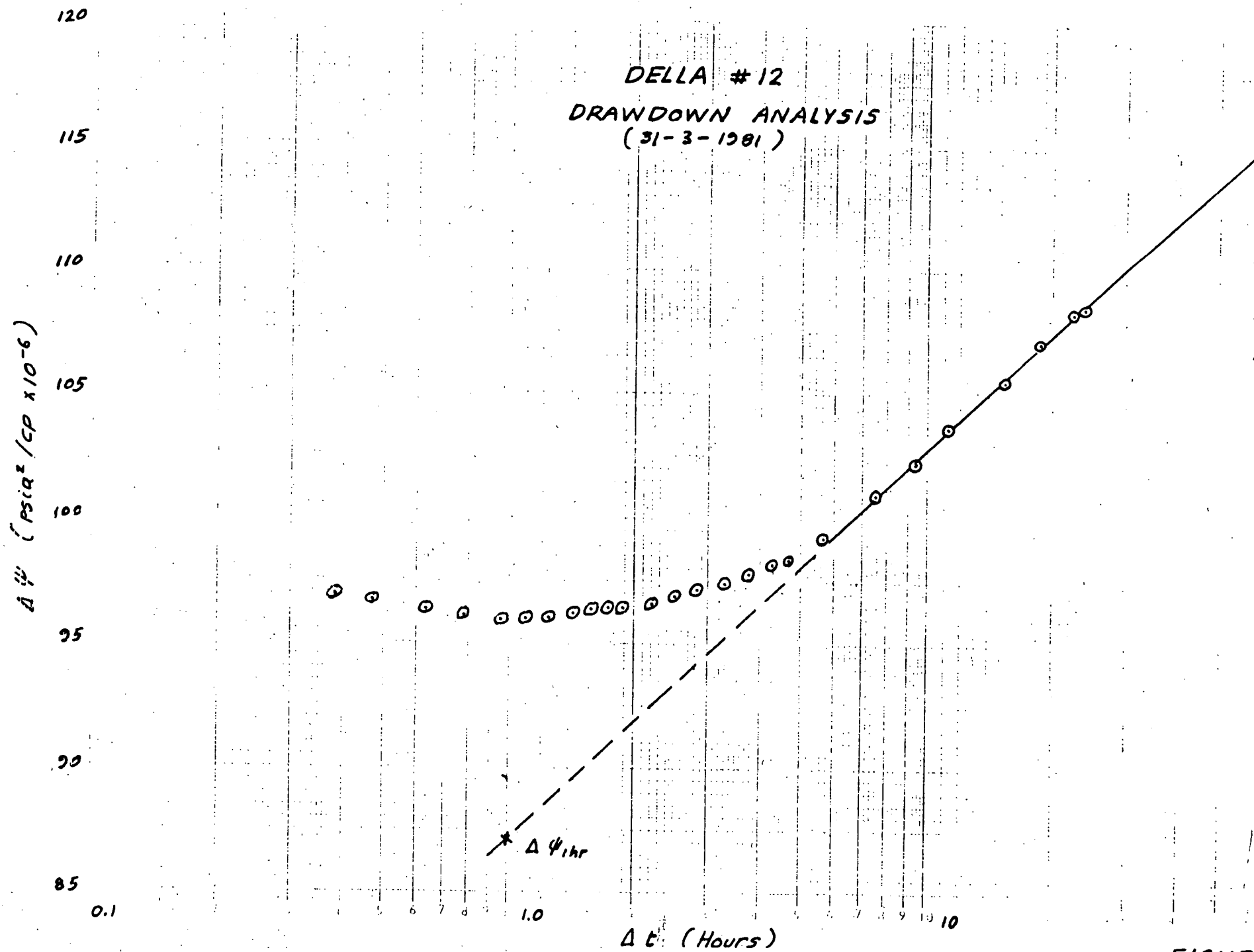


FIGURE 1.

TWO RATE DRAWDOWN ANALYSISCALCULATIONS

$$\begin{aligned} \phi_{hc} &= 0.16 & \mu_i &= 0.0182 & C_i &= 0.369 \times 10^{-3} & r_w &= 0.354 \text{ ft.} \\ T &= 739^\circ\text{R} & h &= 25 \text{ ft.} & q_1 &= 11.65 \text{ MMCFD} & q_2 &= 3.4 \text{ MMCFD} \end{aligned}$$

$$\psi_i = 442.62 \text{ psia}^2/\text{cp} \times 10^{-6}$$

$$\psi_{wfo} = 334.08$$

From Figure 2.

$$\text{Slope } m = 17.8 \text{ psia}^2/\text{cp} \times 10^{-6}$$

$$\psi_{wfl} = 395.75 \text{ psia}^2/\text{cp} \times 10^{-6}$$

Flow Capacity

$$kh = \frac{1.632 \times 10^6 \times q_1 \times T}{m}$$

$$= \frac{(1.632)(11.65)(739)}{17.8}$$

$$= \underline{789 \text{ md-ft.}}$$

Permeability

$$k = \frac{kh}{h} = \frac{789}{25} = \underline{31.6 \text{ md.}}$$

Apparent Skin

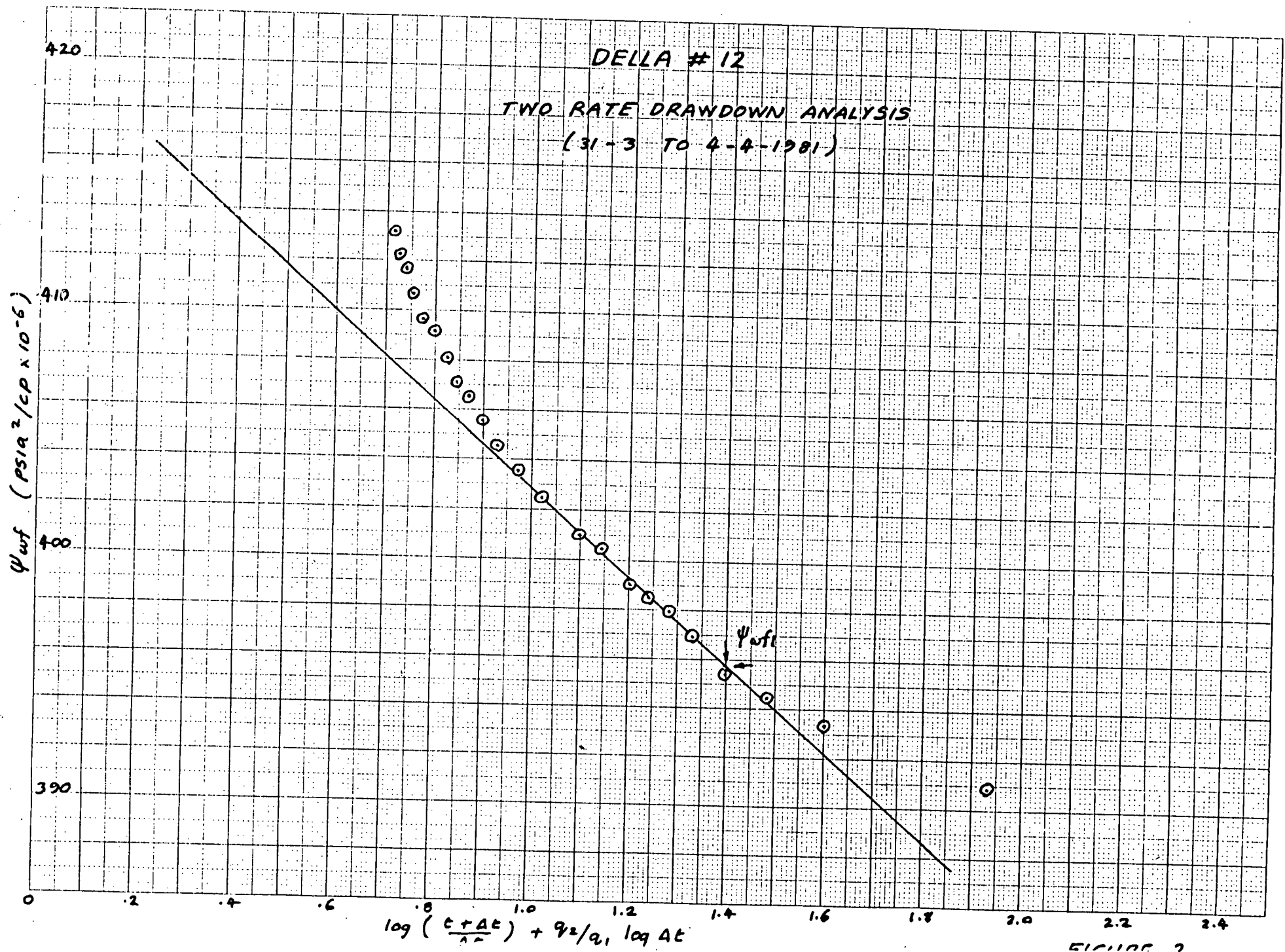
$$\begin{aligned} S' &= 1.151 \left(\left(\frac{q_1}{q_1 - q_2} \right) \left(\frac{\psi_{wfl} - \psi_{wfo}}{m} \right) - \log \left(\frac{k}{\phi \mu c r_w^2} \right) + 3.23 \right) \\ &= 1.151 \left(\left(\frac{11.65}{11.65 - 3.4} \right) \left(\frac{395.75 - 334.08}{17.8} \right) - \log \left(\frac{31.6}{((.16)(.0182)(.00369)(.354)^2)} \right) + 3.23 \right) \\ &= \underline{-0.29} \end{aligned}$$

TABLE 2
DELLA #12
TWO RATE DRAWDOWN ANALYSIS

$q_1 = 11.65$ MMCFD $q_2 = 3.4$ MMCFD $t = 24$ hrs.

ELEMENT # 3917

Δt (hrs.)	P_{wf} (psia)	$\log \frac{t + \Delta t}{\Delta t} + \frac{q_2}{q_1} \log \Delta t$	ψ_{wf} (psia ² /cp $\times 10^{-6}$)
0			
.167	2468.5	1.931	390.867
.5	2477.2	1.601	393.403
.75	2480.7	1.482	394.426
1.0	2484.1	1.398	395.419
1.25	2489.3	1.334	396.941
1.5	2492.8	1.283	397.967
1.75	2494.5	1.240	398.466
2.00	2496.2	1.203	398.965
2.5	2501.4	1.143	400.492
3.0	2503.1	1.095	400.992
4	2508.3	1.023	402.522
5	2511.8	0.970	403.553
6	2515.2	0.929	404.556
7	2518.7	0.896	405.590
8	2522.1	0.869	406.594
9	2523.8	0.846	407.097
10	2527.3	0.827	408.133
12	2530.8	0.796	409.170
14	2532.5	0.773	409.674
16	2535.9	0.754	410.682
18	2539.4	0.739	411.722
20	2541.1	0.727	412.227
22	2544.6	0.717	413.268



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015

APPENDIX D
DELLA #12
BUILDUP ANALYSIS

CALCULATIONS

$$\begin{aligned} \phi_{hc} &= 0.16 & \mu_i &= 0.0182 & C_i &= 0.369 \times 10^{-3} & r_w &= 0.354 \text{ ft.} \\ T &= 739^\circ\text{R} & h &= 25 \text{ ft.} & q &= 3.17 \text{ MMCFD} & \psi_s &= 413.44 \\ & & & & & & & \text{psia}^2/\text{cp} \times 10^{-6} \end{aligned}$$

From Figure 3.

$$\begin{aligned} \text{Slope } m &= 6.2 \text{ psia}^2/\text{cp} \times 10^{-6} \\ \psi_{1 \text{ hr.}} &= 415.0 \text{ psia}^2/\text{cp} \times 10^{-6} \\ \psi^* &= 450.5 \text{ psia}^2/\text{cp} \times 10^{-6} \end{aligned}$$

Flow Capacity

$$\begin{aligned} kh &= \frac{1.632 \times 10^6 q T}{m} \\ &= \frac{(1.632)(3.17)(739)}{6.2} \\ &= \underline{616 \text{ md-ft.}} \end{aligned}$$

$$\text{Permeability} = \frac{kh}{h} = \frac{616}{25} = \underline{24.7 \text{ md.}}$$

Apparent Skin

$$\begin{aligned} S' &= 1.151 \left(\frac{\psi_{1 \text{ hr.}} - \psi_s}{m} - \log \left(\frac{k}{\phi \mu C r_w^2} \right) + 3.23 \right) \\ &= 1.151 \left(\frac{415.0 - 413.44}{6.2} - \log \left(\frac{24.7}{((.16)(.0182)(.000369)(.354)^2)} \right) + 3.23 \right) \\ &= \underline{-4.78} \end{aligned}$$

Reservoir Pressure:

Extrapolated reservoir pressure for an infinite system is $\psi^* = 450.5 \text{ psia}^2/\text{cp} \times 10^{-6}$. The final buildup pressure recorded does correspond to the initial pressure prior to flow testing i.e. $\psi_i = 442.6$. Hence this pressure should be taken as the average reservoir pressure i.e. $\bar{\psi}_R = \psi_i = 442.6 \text{ psia}^2/\text{cp} \times 10^{-6}$ which corresponds to 2623 psig at hang depth of 6265' KB.

APPENDIX D (CONT.)

016

Datum pressures can then be calculated by:

Pressure @ 6450' SS

$$(6450 + 190 - 6265) 0.048 + 2623 + 14.7 = \underline{2656} \text{ psia}$$

Pressure @ field datum 6279' SS

$$(6279 + 190 - 6265) 0.048 + 2623 + 14.7 = \underline{2648} \text{ psia}$$

Note these pressures correspond to those as measured during the static survey.

TABLE 3
DELLA #12
BUILDUP ANALYSIS

$t = 118$ hours $q = 3.165$ MMCFD

ELEMENT # 3917

Δt (hours)	$(t + \Delta t/\Delta t)$	Pressure Pws (psig)	ψ_{ws} (psia ² /cp x 10 ⁻⁶)
0		2532	413.44
0.15	787	2565	423.50
0.25	473	2558	421.32
0.5	237	2540	415.83
0.75	158	2540	415.83
1.0	119	2541	416.13
2.0	60.0	2544	417.04
3.0	40.3	2547	417.94
4.0	30.5	2549	418.55
5.0	24.6	2551	419.16
6.0	20.7	2553	419.78
7.0	17.9	2554	420.08
8.0	15.8	2562	422.56
9.0	14.1	2577	427.30
10	12.8	2583	429.22
11	11.7	2589	431.17
12	10.8	2596	433.46
14	9.4	2603	435.78
16	8.4	2605	436.45
18	7.6	2607	437.12
20	6.9	2611	438.46
22	6.4	2613	439.14
24	5.9	2614	439.48
26	5.5	2616	440.16
28	5.2	2617	440.50
30	4.93	2618	440.84
34	4.47	2620	441.52
38	4.11	2621	441.86
40	3.95	2622	442.21
44	3.68	2623	442.55

DELLA #12
BUILDUP ANALYSIS
(4-3-1981)

1000

100

10

$$\frac{C + \Delta C}{\Delta C}$$

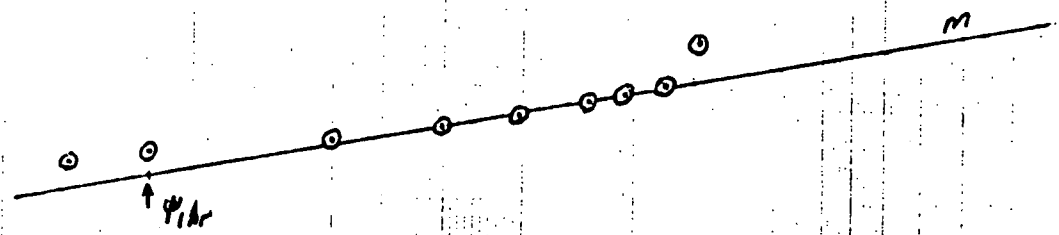


FIGURE 3

WP: 6126A

DELLA #12
ISOCHRONAL TEST

INTRODUCTION.

Della #12 was drilled as a development well in the southwest portion of the field and was completed on February 20, 1981. The well was subsequently selectively tested in the 64-7 sand over the interval 6361'-6388' K.B. (Refer report by A.G. Burdon 26/5/81). Since that time, the well has been additionally perforated between the intervals 6418' and 6585' K.B. with a total of 105 feet of perforations.

The isochronal test run between 1-4 October 1981 was a routine test conducted for the purposes of measuring the total flow potential of the well.

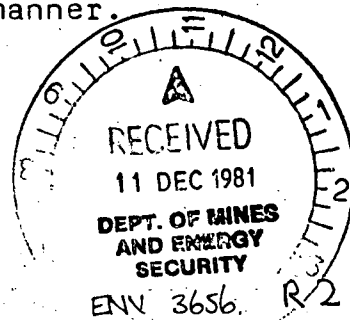
RESULTS.

Attached are the data summary sheets giving the data obtained during the test. This data has been interpreted using the Laminar Inertial Turbulence (L.I.T.) technique which has provided the following results.

Flow Potential (AOF)	=	104 MMCFD
Flow Capacity	=	9643 md-ft
Permeability	=	81.7 md
Turbulence Factor	=	0.275 MMCFD ⁻¹
Skin Factor	=	-1.64
Reservoir Pressure	=	2490 psia @ 6368' KB

CONCLUSIONS

The test has not indicated any condition that would need attention and the well should be produced on-line in the normal manner.



GAS WELL DELIVERABILITY TEST
RESULTS OF ISOCHRONAL 'LIT' ANALYSIS

WELL NAME: DELLA #12 FORMATION: TOOL/PATCH. DATE OF TEST 1/10/81
 DEPTH TESTED: 6368 K.B.

PRESSURE BUILD-UP INFORMATION

EXTRAPOLATED PRESSURE $P^* = \underline{6200} \times 10^3 \text{ psia}^2$
 $= \underline{2490} \text{ psia}$
 $\psi^* = \underline{396.945} \times 10^6 \text{ psia}^2/\text{cp}$
 HORNER BUILD-UP SLOPE $m = \underline{56.1} \times 10^3 \text{ psia}^2/\text{cycle}$
 $m(\psi) = \underline{3.303} \times 10^6 \text{ psia}^2/\text{cp/cycle}$

WELL AND TEST PARAMETERS

Porosity $\phi = \underline{0.161}$ Viscosity $\mu = \underline{0.018} \text{ cp}$
 Compressibility $C_t = \underline{0.000355}$ well radius $r_w = \underline{0.354} \text{ cp}$
 Well drainage $r_e = \underline{3000}$ thickness $h = \underline{118} \text{ ft.}$
 Final flow rate $q = \underline{26.403} \text{ MMcfd}$ Temperature $T = \underline{739} \text{ }^\circ\text{R}$
 Sandface press. $P_o = \underline{2351} \text{ psia}$ Press 1 hr $P_1 = \underline{2480} \text{ psia}$
 $\psi_o = \underline{356.503} \times 10^6 \text{ psia}^2/\text{cp}$ $\psi_1 = \underline{394.115} \times 10^6 \text{ psia}^2/\text{cp}$

BACK PRESSURE COEFFICIENTS

$$\Delta\psi = a q + b q^2$$

$$a = \underline{0.7224} \times 10^6 \text{ psia}^2/\text{cp/MMcfd}$$

$$b = \underline{0.0298} \times 10^6 \text{ psia}^2/\text{cp/MMcfd}$$

FLOW CAPACITY

$$kh = \frac{1.632 \times 10^6}{m} \quad qT = \underline{9643} \text{ md-ft}$$

PERMEABILITY

$$k = \frac{kh}{h} = \underline{81.71} \text{ md}$$

APPARENT SKIN

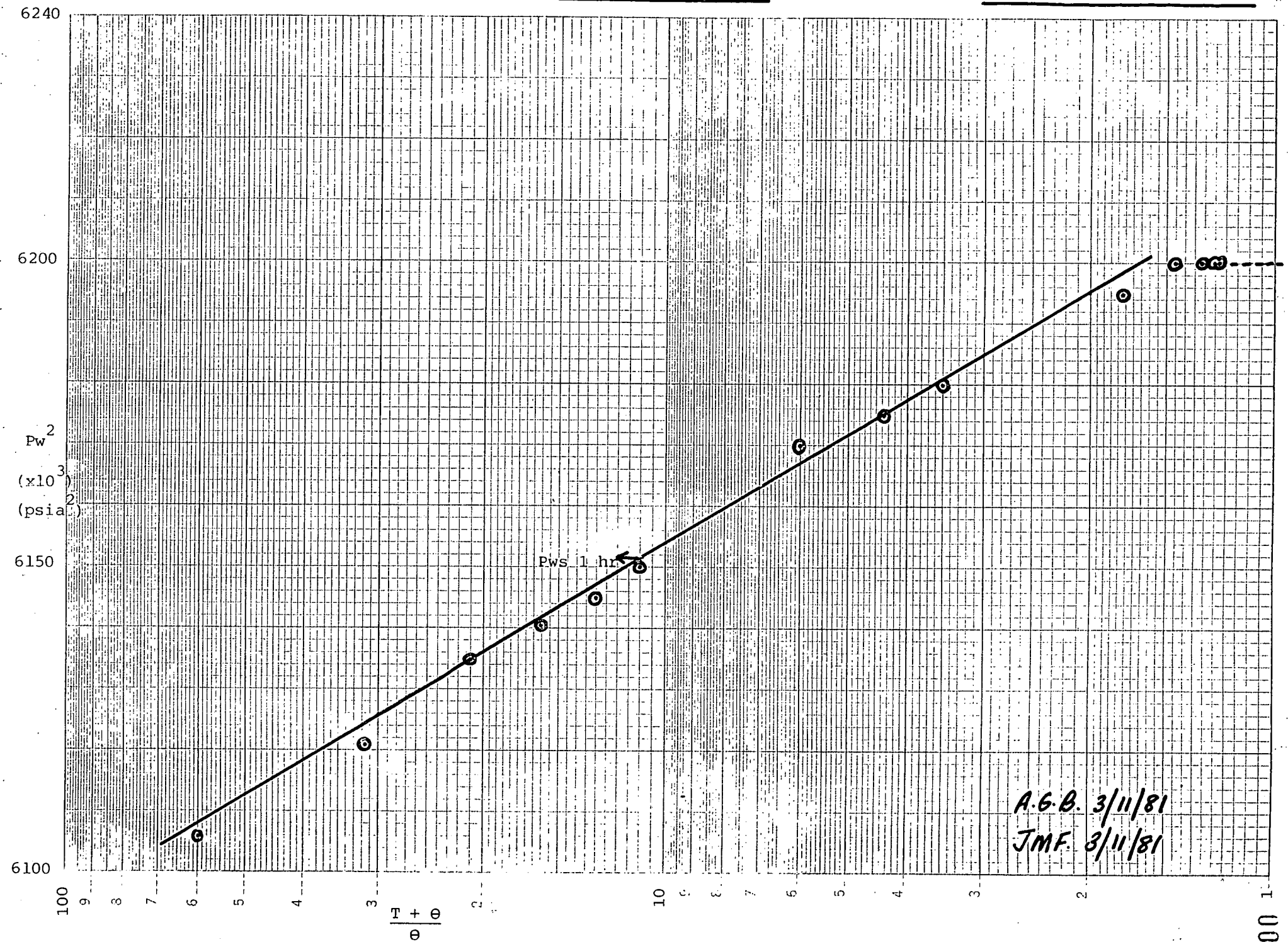
$$S' = 1.151 \left[\frac{\psi_1 - \psi_o}{m} - \log \left(\frac{k}{\phi \mu C_t r_w^2} \right) + 3.23 \right] = \underline{5.61}$$

TURBULENCE COEFFICIENT

$$D = \frac{b kh}{1.417 \times 10^6 T} = \underline{0.275} \text{ MMcfd}^{-1}$$

TRUE SKIN

$$S = S' - Dq = \underline{-1.64}$$



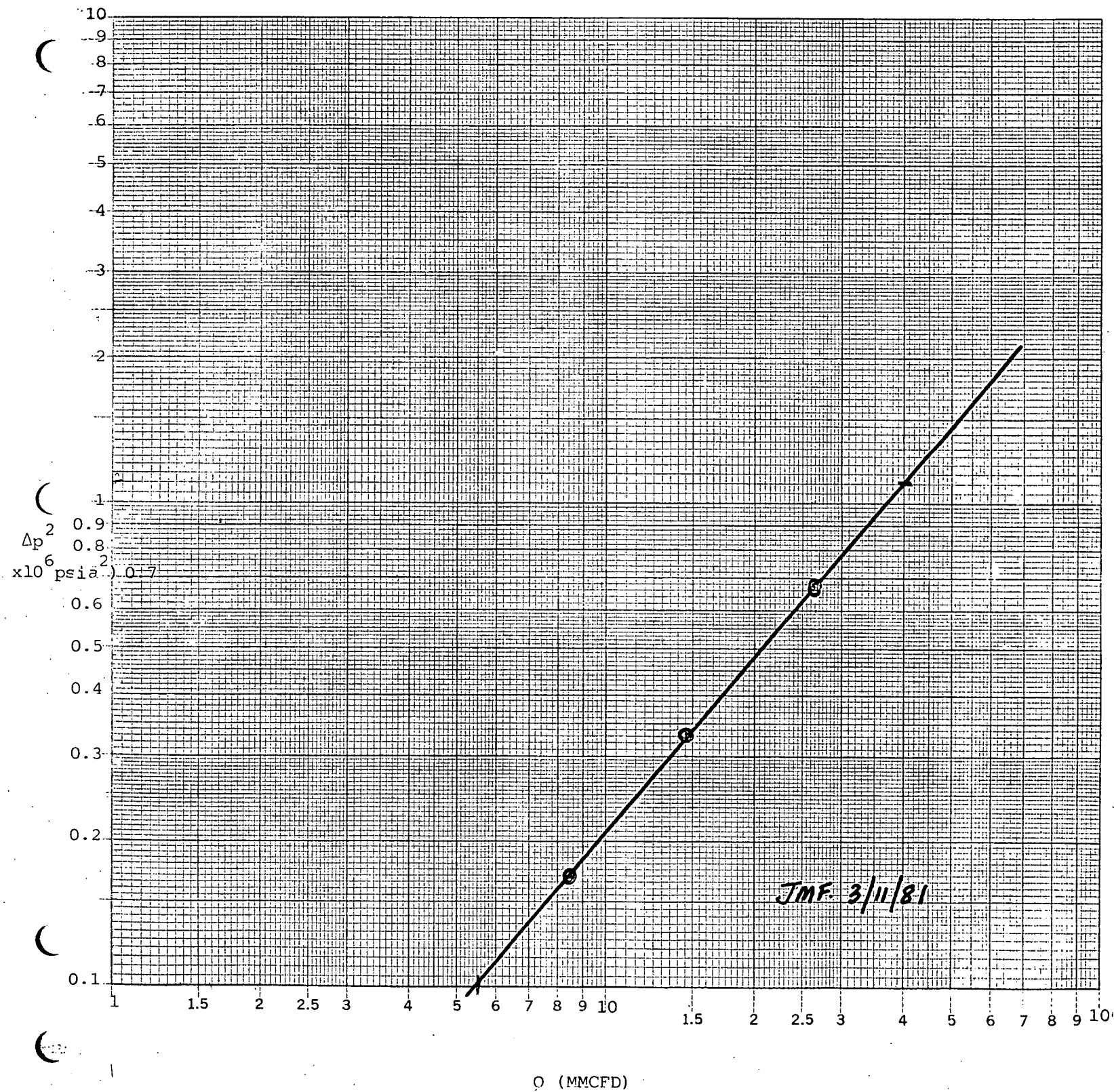
A.G.B. 3/11/81
JMF. 3/11/81

0022

DELLA #12: MODIFIED ISOCHRONAL BACK PRESSURE TEST PLOT

SEPTEMBER 25TH - OCTOBER 4TH, 1981.

ELEMENT #31720 @ 6368' K.B.



A.O.F. = 104 MMCFD (From L.I.T. Analysis)

STATIC PRESSURE

GRADIENT

(ELEMENT #21616)

WELL DELLA #12

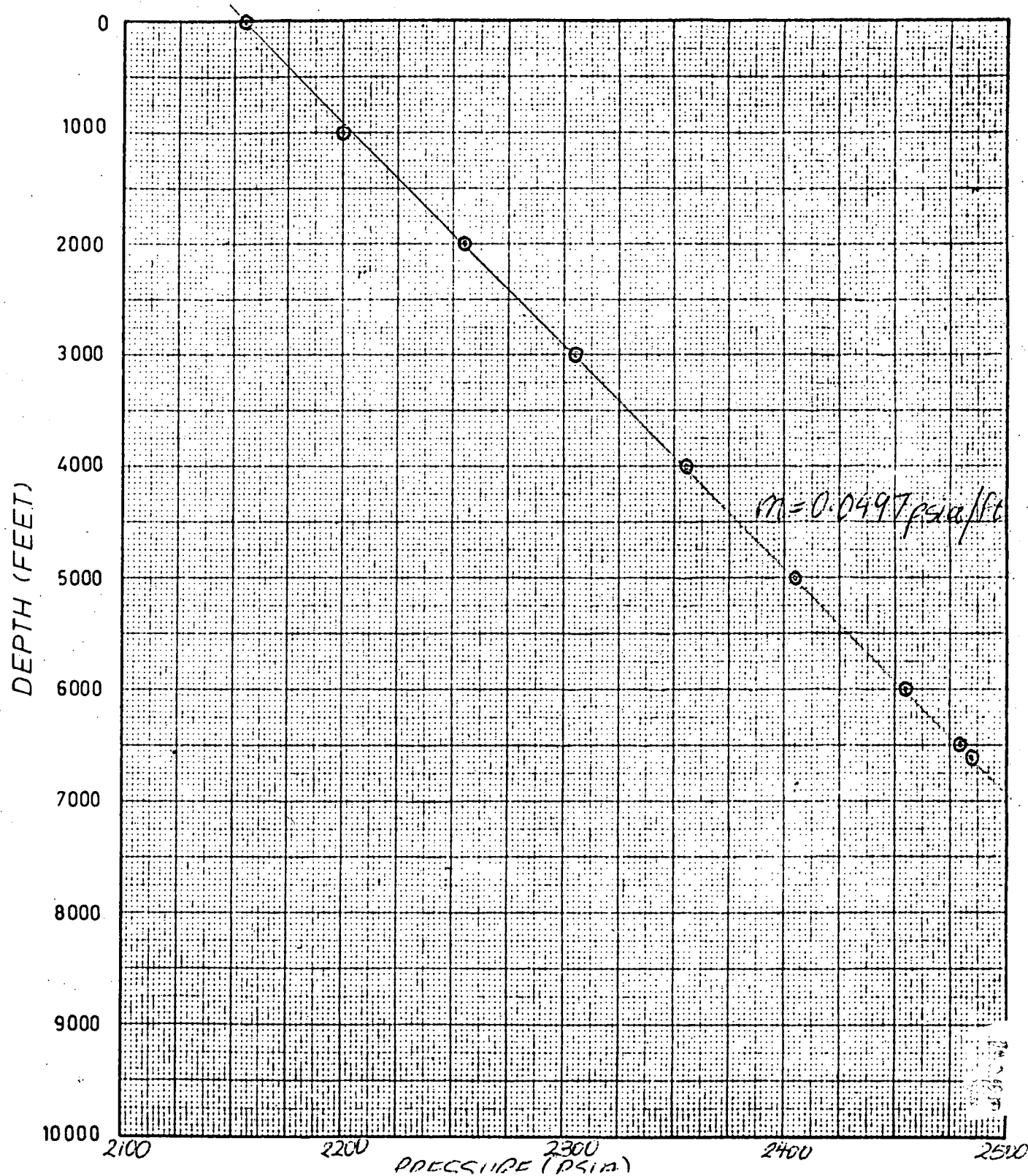
TEST DATE 1/10/81 (C942-1127)

DEPTH (FEET)	PRESSURE (PSIA)	GRADIENT PSIA/FT	DEPTH (METRES)	PRESSURE (KPa ABS)	GRADIENT KPa/MSM
LWB.	2155	—	LWB.	14862	—
1000	2201	0.0460	305	15179	1.0406
2000	2255	0.0540	610	15552	1.2215
3000	2307	0.0520	914	15910	1.1763
4000	2357	0.0500	1219	16255	1.1311
5000	2406	0.0490	1524	16593	1.1084
6000	2455	0.0490	1829	16931	1.1084
6473	2480	0.1163	1973	17103	2.6328
6585	2486	0.0536	2007	17145	1.2125
LWB.	2174	—	LWB.	14993	—

LUBRICATOR IN D.W.T. = 2152 PSIA
 IN AMERADA = 2155 PSIA
 LUBRICATOR OUT D.W.T. = 2152 PSIA
 OUT AMERADA = 2174 PSIA

1 PSIA/FT = 22.621 KPa ABS/M.

JMA 13/11/81



STATIC PRESSURE
GRADIENT

(ELEMENT # 3917)

WELL DELLA#12

TEST DATE 1/10/81 (0942-1127)

DEPTH (FEET)	PRESSURE (PSIA)	GRADIENT PSIA/FT
-----------------	--------------------	---------------------

LUB.	2180	—
1000	2229	0.0490
2000	2282	0.0530
3000	2330	0.0480
4000	2373	0.0430
5000	2418	0.0450
6000	2466	0.0480
6473	2490	0.0507
6585	2495	0.0446
LUB.	2177	—

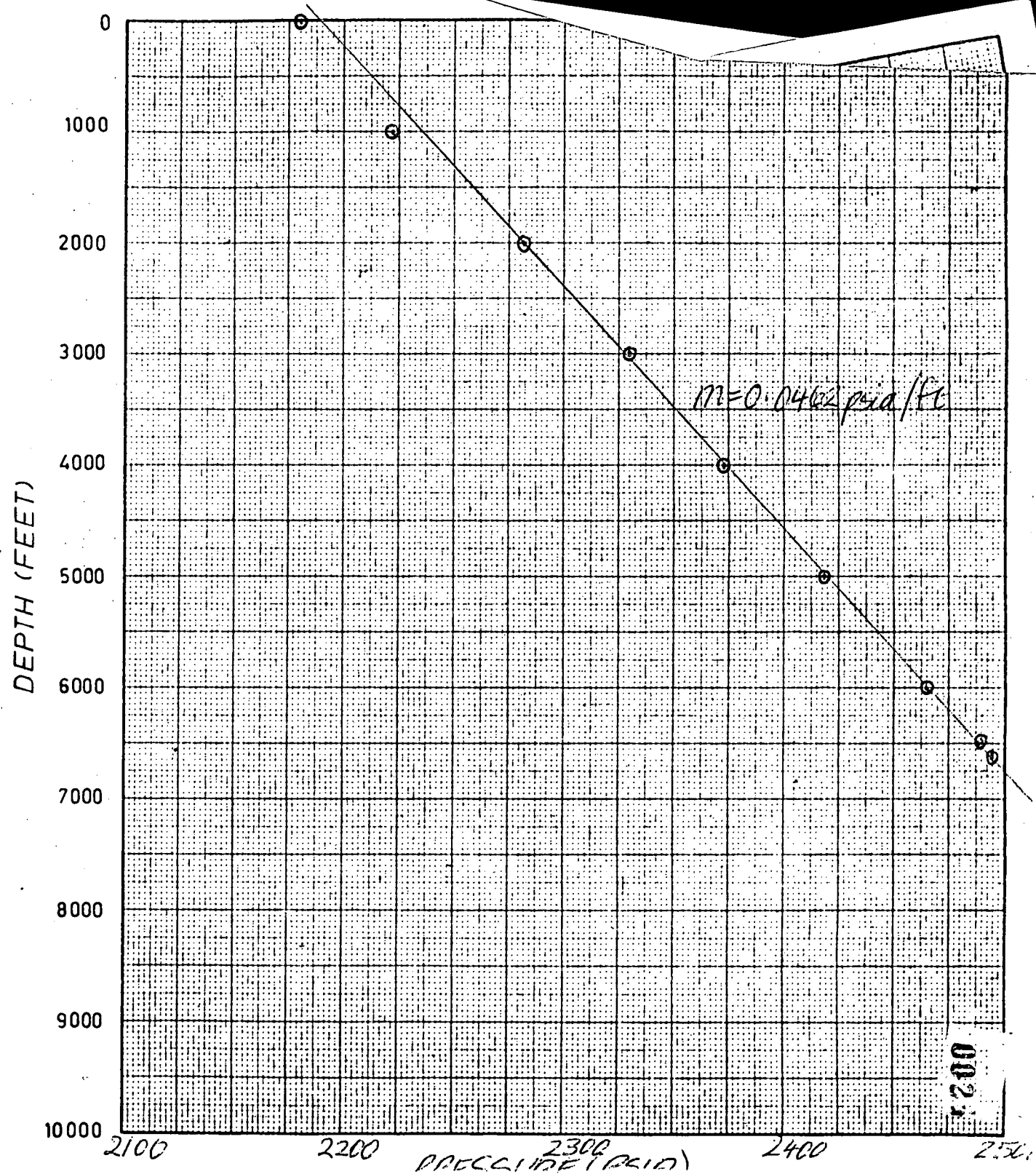
DEPTH (METRES)	PRESSURE (KPa ABS)	GRADIENT KPa/MS
-------------------	-----------------------	--------------------

LUB.	15034	—
305	15372	1.1084
610	15738	1.1939
914	16069	1.0858
1219	16366	0.9727
1524	16676	1.0179
1829	17007	1.0858
1973	17172	1.1469
2007	17207	1.0089
LUB.	15014	—

LUBRICATOR IN DWT = 2152 PSIA
IN AMERADA = 2180 PSIA
LUBRICATOR OUT DWT = 2152 PSIA
OUT AMERADA = 2177 PSIA

1 PSIA/FT = 22.621 KPa ABS/M.

GMJ. 13/11/81.

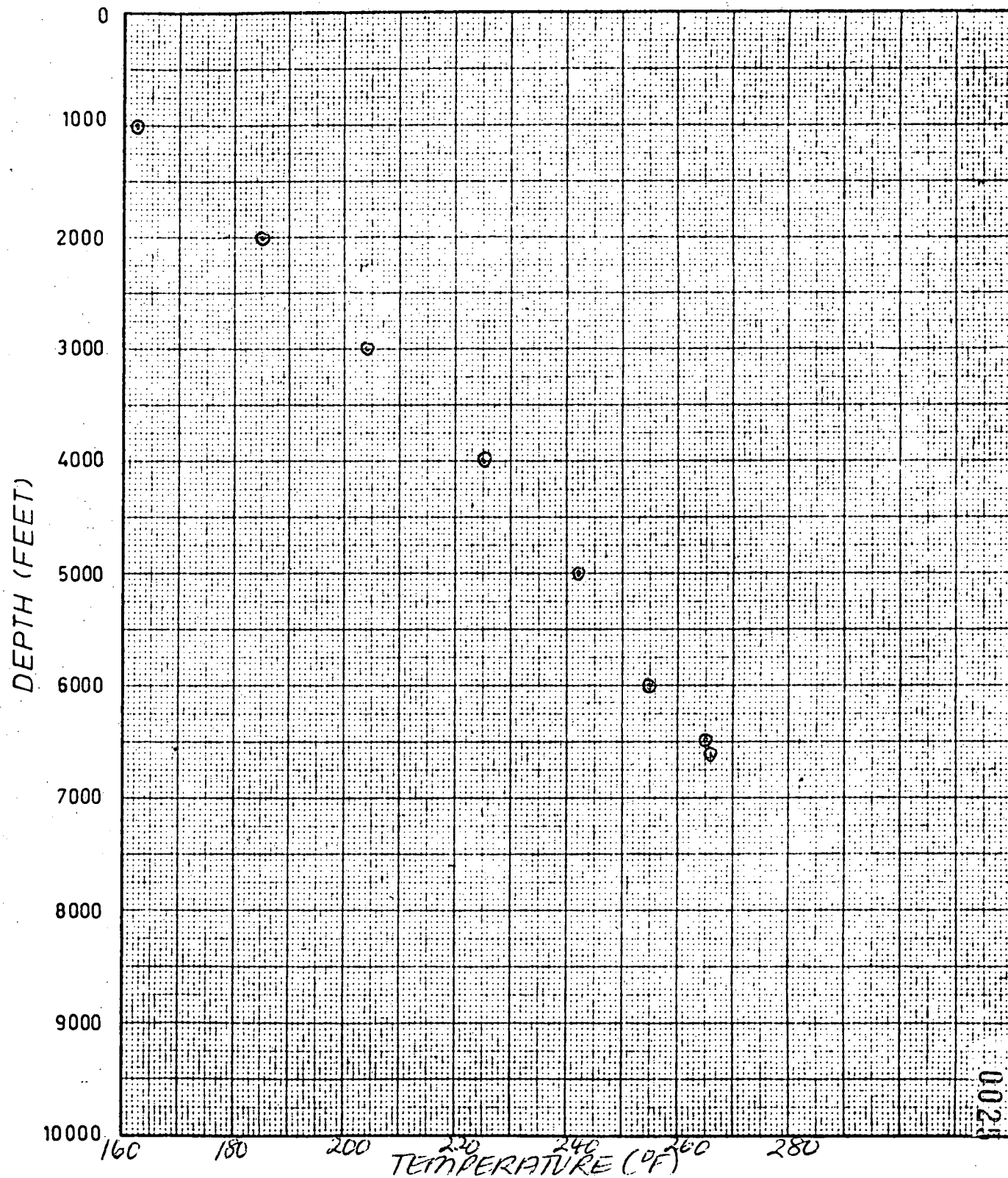


STATIC TEMPERATURE GRADIENT

WELL DELLA #12

TEST DATE 1/10/81 (0942-1127)

DEPTH (FEET)	TEMP. (°F)	GRADIENT °F / FT	DEPTH (METRES)	TEMP. (°C)	GRADIENT °C / M
LVB.	—	—	LVB.	—	—
1000	162	—	305	72	—
2000	185	0.023	610	85	0.043
3000	204	0.019	914	96	0.036
4000	225	0.019	1219	107	0.036
5000	242	0.017	1524	117	0.033
6000	255	0.013	1829	124	0.023
6473	265	0.021	1973	129	0.035
6585	266	0.009	2007	130	0.029
LVB.	—	—	LVB.	—	—



JMF 13/11/81

0023

WELL TEST SUMMARY

WELL: DELLA #12
TESTED BY: GRM&A/G. DZIEDZIC

CASING SIZE: 7 ins/ 177.8 mm
TUBING SIZE: 4 ins/ 101.6 mm

Lat. 28° 07' 21.81" S
LOCATION: Long. 140° 37' 03.74" E
PERFORATIONS: 6361-6585 ft/ 1939-2007 m
WEIGHT: 23 lb/ft 34.2 kg/m
WEIGHT: 11 lb/ft 16.4 kg/m

DATE: OCTOBER 1ST-4TH, 1981 FIELD: DELLA
PRODUCING THROUGH: TUBING
GRADE: J55 + N80
GRADE: J55

DESCRIPTION OF TEST

INITIAL SHUT IN PERIOD

Time of Observations			Observed Pressures						REMARKS
Date	Time	Shut In Time (Hours)	Tubing		Casing		Temp.		
			psia	kPa ABS	psia	kPa ABS	°F	°C	
25/9/81	1207	Ø							STABILIZATION PERIOD PRIOR TO ISOCHRONAL SURVEY.
1/10/81	1735	149.46	2152	148.41					START OF TEST

FLOW PERIOD

Run No.: 1 Duration of Run: 2 Hours. Orifice Size: 1.75 ins/ 44.45 mm
Flowed Well On: 8/64" Choke. Meter Run: 5.761 ins/ 146.3 mm
Avg. G.O.R.: Avg. Water Cut:

Remarks:

Date	Time	Flow Time (Hours)	Wellhead Readings						Meter or Prover				Data		Condensate Production		Water Production	
			Tubing		Casing		Temp.		Pf		Hw		Temp.		Bbls	m3	Bbls	m3
			psia	kPa ABS	psia	kPa ABS	°F	°C	psia	kPa ABS	inches	cms	°F	°C				
1/10/81	1805	0.5	2141	14766			123	51	1295	8931	28	71	113	45				
	1835	1	2137	14738			129	54	1295	8931	28	71	118	48				
	1905	1.5	2133	14710			129	54	1295	8931	28	71	120	49				
	1935	2	2128	14672			131	55	1295	8931	28	71	122	50	NIL	NIL	NIL	NIL

[illegible]

Run No.: 3	Duration of Run: 2	Hours.	Orifice Size: 3.0	ins/ 76.2	mm
Flowed Well On: 36/64"	Choke.		Meter Run: 5.761	ins/ 146.3	mm
Avg. G.O.R.:			Avg. Water Cut:		
Remarks:					

[illegible]

[illegible][illegible]

0029

5TH. SHUT IN PERIOD

Time of Observation			Observed Pressures						REMARKS
Date	Time	Shut In Time (Hours)	Tubing		Casing		Wellhead Temp.		
			psia	kPa ABS	psia	kPa ABS	°F	°C	
2/10/81	0805	0.5	2165	14931					
	0835	1.0	2165	14931					
	0905	1.5	2164	14924					
	0935	2.0	2164	14924					

FINAL STABILIZATION FLOW PERIOD

[illegible]

0031

WELL TEST SUMMARY

PAGE 7.

FINAL BUILD-UP PERIOD

[illegible]

0032

ELEMENT NO. 31720

BOMB DEPTH 6368

'K.B. DWT IN 2152 (14841kPa)/OUT = 2151 psia (14834 kPa).
LUB. IN 2176 (15007 kPa)/OUT = 2179 psia (15028 kPa)

[illegible]

2

CALCULATION SHEET

CASE 1: FLOW THROUGH METER RUN

Run No.	Hw (inches in water)	Pf (psia)	Size Orifice Plate (inches)	Ft (°F)	b	$\frac{Hw}{Pf}$
1	28	1295	1.75	122	0.0314	0.0216
2	68	1245	2.25	143	0.0281	0.0546
3	64	1255	3.00	167	0.0366	0.0510
4	110	1305	3.50	210	0.0472	0.0843
5	110	1335	3.50	226	0.0472	0.0824

Specific Gravity = 0.7205
(Field Average)

TC = 380

PC = 718

CASE 2: FLOW THROUGH METER RUN

Run No.	Fb	Fg	Ftf	Fpv	Fpb	Ftb
1	621.79	1.1781	0.9452	1.0634	1.0055	1.0000
2	1039.5	1.1781	0.9286	1.0517	1.0055	1.0000
3	1907.8	1.1781	0.9107	1.0429	1.0055	1.0000
4	2695.1	1.1781	0.8810	1.0310	1.0055	1.0000
5	2695.1	1.1781	0.8706	1.0276	1.0055	1.0000

Meter Run = 5.761

= 146.3

FLOW THROUGH METER RUN (Continued)

Run No.	Fr	Y	C'	$\sqrt{HwPf}$	* Q		* Q	
					MCF/HOUR	10 ³ m ³ /HOUR	MCFD	10 ³ m ³ /d
1	1.0002	1.0001	740.557	190.421	142.791	4.023	3426.985	96.551
2	1.0001	1.0004	1203.168	290.964	353.088	9.948	8474.109	238.748
3	1.0001	1.0003	2147.280	283.408	612.592	17.259	14702.197	414.216
4	1.0001	1.0004	2991.288	378.880	1104.622	31.121	26510.925	746.913
5	1.0001	1.0004	2857.584	383.210	1100.106	30.994	26402.539	743.859

* Used programmable calculator.

GAS WELL DELIVERABILITY TEST CALCULATIONS

(Base Conditions = 14.65 psia and 60°F)

WELL NAME: DELLA #12 DATE: 25/9/81 - 4/10/81 ELEMENT NO: 31720 DEPTH TESTED: 6368' KB
 DWT IN: 2152 psia (14841 kPa) OUT: 2151 psia (14834 kPa)
 LUB IN: 2176 psia (15007 kPa) OUT: 2179 psia (15028 kPa)

SIMPLIFIED ANALYSIS

	Duration (hours)	Sandface Pressure (psia)	Cal.	Meas.	Δp^2 ($\times 10^6$ psia ²)	Flow Rate (Mmscfd)	H/carbon Prod. (BBLs/D)	Water Prod. (BBLs/D)	RESULTS
Initial Shut In	149.46	2489		X	/	/	/	/	$q = C(\bar{p}_R^2 - p_{wf}^2)^n$ slope n = _____ $\bar{p}_R =$ _____ psia $C = \frac{q}{(\bar{p}_R^2 - p_{wf}^2)^n}$ = _____ AOF (MMscfd) = _____
Flow 1	2	2484		X	0.025	3.427	NIL	NIL	
Shut In	2	2492		X	/	/	/	/	
Flow 2	2	2458		X	0.168	8.474	NIL	NIL	
Shut In	2	2491		X	/	/	/	/	
Flow 3	2	2423		X	0.334	14.702	NIL	35.9	
Shut In	2	2489		X	/	/	/	/	
Flow 4	2	2349		X	0.677	26.511	NIL	75.4	
Extended Flow	6	2351		X	0.673	26.403	NIL	56	
Final Shut In	40	2490		X	/	/	/	/	

GAS WELL DELIVERABILITY TEST CALCULATIONS

(Base Conditions = 14.65 psia and 60°F)

LIT(Ψ) ANALYSIS

	Duration (hours)	Sandface Pressure (psia)	Ψ ($\times 10^6$ psia ² /cp)	$\Delta\Psi$ ($\times 10^6$ psia ² /cp)	Flow Rate(q) (MMscfd)	$\Delta\Psi/q$	q^2	$\Delta\Psi - bq^2$
Initial Shut In	149.46	2489	396.652					
Flow 1	2	2484	395.190	1.462	3.427	0.427	11.744	1.112
Shut In	2	2492	397.531					
Flow 2	2	2458	387.618	9.913	8.474	1.170	71.809	7.773
Shut In	2	2491	397.238					
Flow 3	2	2423	377.517	19.721	14.702	1.341	216.149	13.280
Shut In	2	2489	396.652					
Flow 4	2	2349	356.503	40.149	26.511	1.514	702.833	19.205
Total=Σ				71.245	79.517	4.452	1002.535	
Extended Flow	6	2351	357.065	39.880	26.403	1.510	697.118	19.106
Final Shut In	40	2490	396.945					

b = 0.0298

GAS WELL DELIVERABILITY TEST CALCULATIONS

DISCARDED POINT -

L.I.T. (Ψ) ANALYSIS

RESULTS

$$N = 4 \quad \bar{\Psi}_R = 396.945 \text{ MMpsia}^2/\text{cp}$$

$$a, a_t = \frac{\sum \frac{\Delta \Psi}{q} \sum q^2 - \sum q \sum \Delta \Psi}{N \sum q^2 - \sum q \sum q} = 0.5197$$

$$b = \frac{N \sum \Delta \Psi - \sum q \sum \frac{\Delta \Psi}{q}}{N \sum q^2 - \sum q \sum q} = 0.0298$$

(EXTENDED FLOW)

$$\Delta \Psi = 39.880 \quad q = 26.403 \quad b = 0.0298$$

$$a = \frac{\Delta \Psi - bq^2}{q} = 0.7224$$

$$\text{TRANSIENT FLOW: } \bar{\Psi}_R - \Psi_{wf} = a_t q + bq^2$$

$$\text{i.e. } 396.945 - \Psi_{wf} = 0.5197 q + 0.0298 q^2$$

$$\text{STABILIZED FLOW: } \bar{\Psi}_R - \Psi_{wf} = a q + bq^2$$

$$\text{i.e. } 396.945 - \Psi_{wf} = 0.7224 q + 0.0298 q^2$$

DELIVERABILITY:

$$q = \frac{1}{2b} \{-a + \sqrt{a^2 + 4b(\bar{\Psi}_R - \Psi_{wf})}\}$$

$$\text{FOR } \Psi_{wf} = 0, q = \text{AOF} = 104 \text{ MMscfd}$$

$$\text{A.O.F.} = 104 \text{ Mmcfd} / 2.930 \times 10^6 \text{ m}^3 \text{d} \quad n =$$

$$\text{Total Volume of Gas Produced During Test} = 11,027 \text{ Mmcf} / 0.311 \times 10^6 \text{ m}^3$$

$$\text{Condensate} = \text{NIL} \text{ Bbls} / \text{NIL} \text{ m}^3$$

$$\text{Water} = 23.3 \text{ Bbls} / 3.7 \text{ m}^3$$

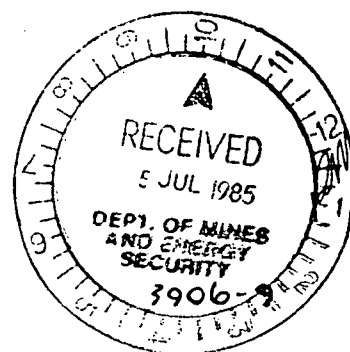
Remarks:

OCTOBER 1984

DELLA PRESSURE SURVEY

(RAW PRESSURE DATA)

WELLS: #5A, #12, #13



SANTOS LTD
39 GRENFELL ST
ADELAIDE

SUB-SURFACE PRESSURE SURVEY

CO. SANTOS		RUN 01 FIELD DELLA	WELL 12
EFF DEPTH		WELL STAT	TOOL HUNG 6467'KB
CASING 7"	-	CASING PRESS	ON BOTTOM 7/10 0510
LINER	-	TUBING PRESS	OFF BOTTOM 7/10 1350
DATE 841006		ELEMENT RANGE 0 - 3122	ZERO POINT
ELEVATION		ZONE TOOL/PATCH	SHUT-IN 7/10 0030
MAX TEMP		PICK-UP	ON-PROD
PERF 6418'-6585'		CAL SER NO. 57413	MPP 6473'KB
TUBING	-		
UNITS ENGLISH		PURPOSE BUILD-UP SURVEY	

SURVEY DATA

SHUT WELL IN @ 0030 HRS

CO. SANTOS				RUN 01 FIELD DELLA				WELL 12			
TIME	P-T	DP-DT	DTIME	TIME	P-T	DP-DT	DTIME	TIME	P-T	DP-DT	DTIME
5:10	1780.0	0.0	4.7 0.672	11:14	1780.9	.9 1.05	10.7				
5:54	1781.5	1.5	5.4 0.732	13:20	1780.4	.4 1.11	12.8				
7:22	1782.0	1.9	6.9 0.839	13:50	1780.3	.2 1.12	13.3				
9:11	1780.9	.8	8.7 0.940	0:00	0.0	0.0					

LUB OUT DWT = 1537 PSIG

LUB OUT AMERADA = 1545.0 PSIG

ELEMENT #57413 : CLOCK STOPPED AT THE START OF THE SURVEY.

ELEMENT #57414 (BOTTOM) : CLOCK FAILED.



amdel

0040

WATER ANALYSIS REPORT

JOB NO. 1187/85

METHOD W2/1

PAGE W15

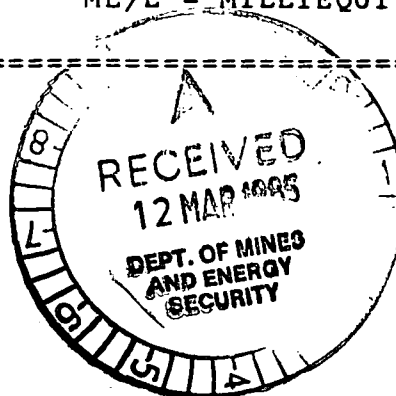
SAMPLE ID. DELLA #12

CHEMICAL COMPOSITION				DERIVED DATA	
CATIONS				MG/L	
		MG/L	ME/L		
CALCIUM	(CA)	3.70	0.185	TOTAL DISSOLVED SOLIDS	
MAGNESIUM	(MG)	1.00	0.082	A. BASED ON E.C.	
SODIUM	(NA)	45.0	1.96	B. CALCULATED (HCO3=CO3)	
POTASSIUM	(K)	1.50	0.038		
ANIONS				TOTAL HARDNESS	
HYDROXIDE	(OH)			CARBONATE HARDNESS	
CARBONATE	(CO3)			NON-CARBONATE HARDNESS	
BICARBONATE	(HCO3)	55.4	0.907	TOTAL ALKALINITY	
SULPHATE	(SO4)	3.0	0.063	(EACH AS CaCO3)	
CHLORIDE	(CL)	73.6	2.08	TOTALS AND BALANCE	
NITRATE	(NO3)	<4.0	0.065		
				CATIONS (ME/L) 2.26 DIFF= 0.849	
				ANIONS (ME/L) 3.11 SUM = 5.37	
				DIFF*100./SUM = 15.8%	
				SODIUM / TOTAL CATION RATIO 86.5%	
				REMARKS	
				IMBALANCE DUE TO PRESENCE OF	
				AMMONIA (NESSLER REAGENT SPOT	
				TEST)	
REACTION - PH				5.3	
CONDUCTIVITY (E.C.)					
MICRO-S/CM AT 25 C				390	
RESISTIVITY OHM/M @ 25C				25.6	
				NOTE: MG/L = MILLIGRAMS PER LITRE	
				ME/L = MILLIEQUIVS. PER LITRE	

NAME- MR. G. ROBERTS
ADDRESS- SANTOS LTD
ADELAIDE

DATE COLLECTED
DATE RECEIVED
COLLECTED BY

3656



R 4

SANTOS LTD
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ADELAIDE

0041

SUB-SURFACE PRESSURE SURVEY

CO. SANTOS	RUN 01 FIELD DELLA	WELL 12
EFF DEPTH	WELL STAT	TOOL HUNG 6324'
CASING 7" -	CASING PRESS	ON BOTTOM 1043 15/2
LINER -	TUBING PRESS	OFF BOTTOM 1300 18/2
DATE 860218	ELEMENT RANGE 0 - 4063	ZERO POINT
ELEVATION	ZONE	SHUT-IN 1300 16/2
MAX TEMP 278	PICK-UP	ON-PROD
PERF 6361' - 6585'	CAL SER NO. 45735	MPP
TUBING		
UNITS ENGLISH	PURPOSE BUILD-UP	

SURVEY DATA

CO. SANTOS				RUN 01 FIELD DELLA				WELL 12			
TIME	P-T	DP-DT	DTIME	TIME	P-T	DP-DT	DTIME	TIME	P-T	DP-DT	DTIME
13:00	1585.8	0.0	0.0	15:14	1665.4	79.6	2.2				
13:01	1603.8	18.1	.0	16:22	1668.7	83.0	5.4				
13:01	1622.5	36.8	.0	23:31	1672.4	86.7	10.5				
13:02	1630.5	44.7	.0	8:42	1674.4	88.6	19.7				
13:02	1642.4	56.7	.0	12:59	1674.6	88.8	24.0				
13:03	1649.8	64.0	.1	17:50	1675.0	89.2	28.8				
13:06	1653.0	67.2	.1	23:00	1676.0	90.2	34.0				
13:11	1655.8	70.0	.2	3:19	1676.7	91.0	38.3				
13:22	1657.9	72.1	.4	8:02	1677.4	91.7	43.0				
13:55	1661.6	75.8	.9	13:00	1675.1	89.4	48.0				
14:15	1662.8	77.0	1.2	0:00	0.0	0.0	0.0				

LUB IN DWT = 1169 psi

LUB IN AMERADA = 1174 psi / OUT = 1466 psi

N.B. BOTTOM ELEMENT WAS NOT READ AS BUILD-UP NOT PRESENT ON CHART.

FLOW RATE = 12.548 MMSCF / D

CUMULATIVE PRODUCTION = 29327.460 MMSCF

MMO 13/11/87
R 5



WIRELINE REPORT

0042

WELL: DELLA #12

DATE: 15/2/86 → 18/2/86

PROGRAM: Flow / Build Up Survey

PURPOSE OF WORK: Run Elements for Survey

REPORT OF WORK PERFORMED:

Dummy Run done on 25/1/86 with 1.750" Blind
Box Tagged P.B.T.D @ 6624' K.B.
15/2/86 08:00 Arrive on location
08:51 Press Lub
10:21 R.I.H.
10:43 Hang @ 6330' K.B.
16/2/86 13:00 Shut well in for 48HR Build Up.
18/2/86 13:00 P.O.D.H.
13:20 Arrive Lub
14:50 Depress Lub
Rig down & Return well to Production
KLL

OPERATOR'S SIGNATURE

WORK PERFORMED BY: K. KEANE OF EXPERTEST

WELL DATA:

Tubing Size: 4" FWHP: 1169 PSI SIWHP: 1452 PSI
Sub Surface S.V./Landing Nipple @ — S.S.D. @ —
"X" Nipple @ 6294' "N"/"X" Nipple @ 6303' other —
Min I.D. 3.135' @ 6303' Packer @ 6280'
Perforated Interval: 6361' - 6585'

Forward to: Petroleum Engineering — Adelaide
Production Department — Moomba

ISO - CHRONAL AND BUILD-UP SURVEY

0043

Well: DELLA # 12 1174 1166 Page 1 of 2 Date: 15/2/86

Lubricator Data:

Pressure with D.W.T. 1169 PSITime Pressured 08:51 15/2/86 Time Depressed 14:50 18/2/86Time Run in Hole 10:21 15/2/86 Time off Bottom 13:00 18/2/86

Bomb No. 1 Data

Bomb No. 2 Data

Element No. and Range	45735 x 4000 PSI	45743 x 4000 PSI
Recorder No.	55337 x 15 TLS	55338 x 15 TLS
Clock and Lead Screw Data	15694 x 120 HRS	15695 x 120 HRS
Engage Stylus	Date: <u>15/2/86</u> Time: <u>08:33</u>	Date: <u>15/2/86</u> Time: <u>08:33</u>
Disengage	Date: <u>18/2/86</u> Time: <u>15:00</u>	Date: <u>18/2/86</u> Time: <u>15:00</u>

Remarks: M.B.H.T 278°F

Well-Head Data for Final Build-up

Date	Time	Hours shut-in Time	Wellhead P.S.I.G.	Casing P.S.I.G.	Wellhead Temp. °C	Remarks
<u>15/2/86</u>	<u>08:51</u>					<u>PRESS LUB</u>
	<u>10:21</u>		<u>1169</u>	<u>5</u>		<u>R.I.H.</u>
	<u>10:43</u>					<u>Hang at 6330' K.B.</u>
	<u>12:00</u>		<u>1167</u>	<u>5</u>	<u>96</u>	<u>START TEST</u>
	<u>18:00</u>		<u>1207</u>	<u>4</u>	<u>99</u>	
<u>16/2/86</u>	<u>00:00</u>		<u>1227</u>	<u>4</u>	<u>99</u>	<u>100% CHOKE.</u>
	<u>06:00</u>		<u>1240</u>	<u>5</u>	<u>96</u>	
	<u>12:00</u>		<u>1259</u>	<u>4</u>	<u>97</u>	
	<u>13:00</u>	<u>0</u>	<u>1263</u>	<u>4</u>	<u>97</u>	<u>Shut Well In.</u>
	<u>13:15</u>		<u>1451</u>	<u>4</u>		
	<u>13:30</u>		<u>1454</u>	<u>4</u>		
	<u>13:45</u>		<u>1456</u>	<u>4</u>		
	<u>14:00</u>	<u>1</u>	<u>1455</u>	<u>4</u>		
	<u>14:30</u>		<u>1456</u>	<u>3</u>		
	<u>15:00</u>	<u>2</u>	<u>1458</u>	<u>3</u>		
	<u>15:30</u>		<u>1456</u>	<u>4</u>		
	<u>16:00</u>	<u>3</u>	<u>1458</u>	<u>4</u>		
	<u>16:30</u>		<u>1459</u>	<u>4</u>		
	<u>17:00</u>	<u>4</u>	<u>1455</u>	<u>4</u>		
<u>17/2/86</u>	<u>01:00</u>	<u>12</u>	<u>1464</u>	<u>4</u>		
	<u>09:00</u>	<u>20</u>	<u>1456</u>	<u>0</u>		
	<u>17:00</u>	<u>28</u>	<u>1459</u>	<u>0</u>		
<u>18/2/86</u>	<u>01:00</u>	<u>36</u>	<u>1456</u>	<u>1</u>		
	<u>09:00</u>	<u>44</u>	<u>1455</u>	<u>2</u>		

ISO - CHRONAL AND BUILD-UP SURVEY

Page 2 of 2.

Date: 18/2/96 0044

Well: DEWA #12.

Pressure with D.W.T.....

Time Pressured..... **Time Depressed.....**

Time Run in Hole..... **Time off Bottom.....**

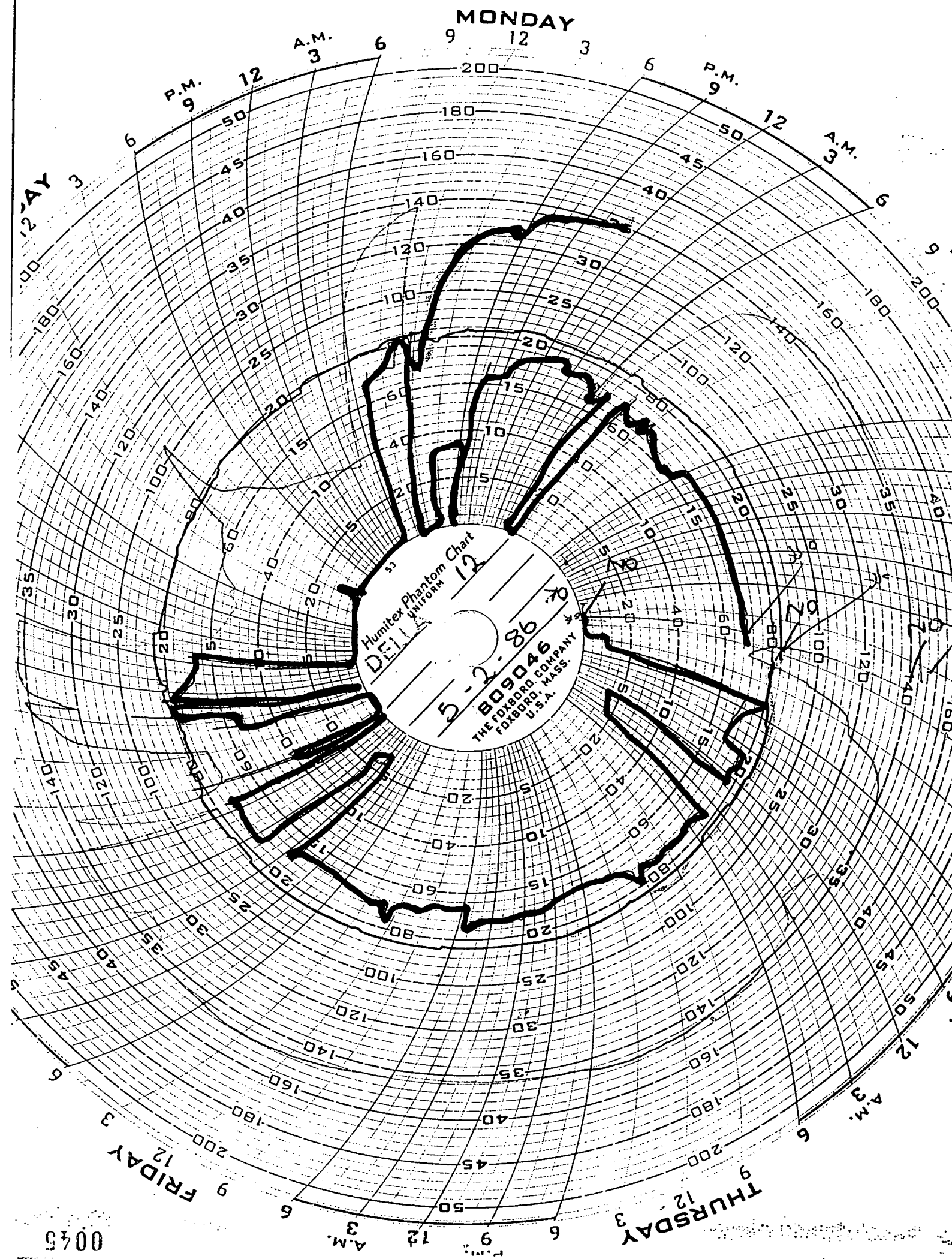
Bomb No. 2 Data

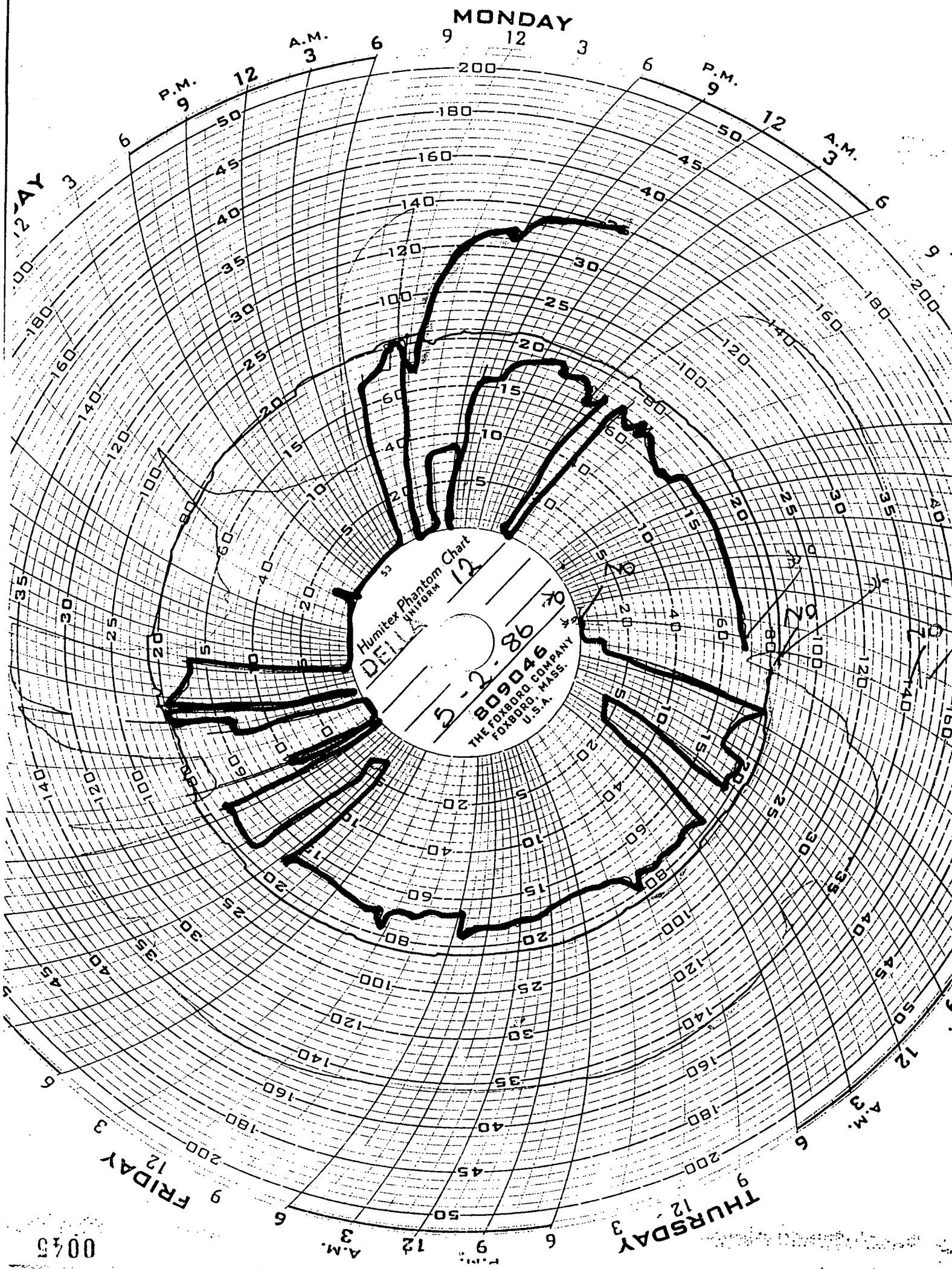
Element No. and Range				
Recorder No.				
Clock and Lead Screw Data				
Engage Stylus	Date:	Time:	Date:	Time:
Disengage	Date:	Time:	Date:	Time:

Remarks:.....

Well-Head Data for Final Build-up

[illegible]





SATURDAY
9 12 3

P.M.
6 9

A.M.
12 3 6

D/P SURVEY

2500
2000
1500
1000
500

1000
500

Humitex Phantom Chart
UNIFORM
DELLA

809046
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.

SS FOR BHP

TUESDAY
9 12 3

WEDNESDAY
9 12 3

0046

Della 12

12/2 $\rightarrow$ 19/2

0047

O.P. 73.025

m.r. 146.329

Cumulative Production to end of January = $821.112 \text{ m}^3 \times 10^6$

No. hours on line in January = 278

January Production = $4.255 \text{ m}^3 \times 10^6$

$\therefore$ Average Flow Rate = $\frac{4.255}{278} \times 24 = 0.367 \text{ m}^3 \times 10^6 / \text{day}$

No. days on line in February = 14.04

$\therefore$ Production in Feb. upto 16/2 = $14.04 \times 0.367 = 5.153 \text{ m}^3 \times 10^6$

$\Rightarrow$ Total Cumulative Prod to 16/2 = $821.112 + 5.153 = 826.265 \text{ m}^3 \times 10^6$
= 29327.460 MMSCF

Flow Rate just prior to shut in 16/2 = $0.354 \text{ m}^3 \times 10^6 / \text{day}$
= 12.548 MMSCF / day

ROLLING BOTTOMHOLE PRESSURE SURVEY GAS CALCULATION SHEETWELL: Della # 12

Pf = 5400 kPa ✓

ORIFICE SIZE: 82.550 mm 3.250 " ✓

T = 108 °C ✓

LINE SIZE: 146.325 mm 5.761 " ✓

Diff = 38.5 kPa ✓

Cumulative Production to end of March = 891.145 m³ x 10⁶

Number of hours online in March = 475

Production in March = 6.617 m³ x 10⁶. . Average flow rate in March = (6.617 / 475) x 24 = 0.334 m³ x 10⁶ / dNumber of days online in April before Shut In 2020 hrs 17 / 4 / 87
= 16.847. . Production up to 2020 hrs 17 / 4 / 87 = 16.847 x 0.334 = 5.633 m³ x 10⁶Total cumulative production = 5.633 + 891.145
= 896.778 m³ x 10⁶
= 31830.223 mmscf ✓Flow rate just prior to Shut In = 0.565 m³ x 10⁶ ✓
= 20.067 mmscf/d ✓

SANTOS LTD
39 GRENFELL ST
ADELAIDE

SUB-SURFACE PRESSURE SURVEY

CO. SANTOS		RUN 01 FIELD DELLA	WELL 12
EFF DEPTH		WELL STAT	TOOL HUNG 6318'
CASING 7"	-	CASING PRESS	ON BOTTOM 1049 17/4
LINER	-	TUBING PRESS	OFF BOTTOM 0800 19/4
DATE 870419		ELEMENT RANGE 0 - 3140	ZERO POINT
ELEVATION		ZONE	SHUT-IN 2020 17/4
MAX TEMP		PICK-UP	ON-PROD
PERF 6361'-6585'		CAL SER NO. 28513	MPP 6473'
TUBING 4"	-		
UNITS ENGLISH		PURPOSE BUILD-UP	

SURVEY DATA

CO. SANTOS			RUN 01 FIELD DELLA			WELL 12		
TIME	P-T	DP-DT	DTIME	TIME	P-T	DP-DT	DTIME	
S.I. 20:20	1423.4	0.0	0.0	16:39	1545.2	121.9	20.317	
20:23	1469.3	45.9	.05	16:42	1502.2	78.8	20.4367	
20:23	1510.9	87.6	.058	17:41	1498.9	75.5	21.435	
20:24	1554.7	131.3	.067	18:19	1500.2	76.8	22.02198	
20:25	1559.6	136.2	.083	18:53	1501.5	78.1	22.55	
20:25	1561.8	138.4	.091	18:56	1479.2	55.8	22.6	
20:26	1565.1	141.7	.1	19:04	1475.7	52.4	22.73	
20:28	1568.3	145.0	.133	19:06	1467.2	43.9	22.877	
20:30	1570.8	147.4	.20167	20:06	1466.4	43.0	23.877	
20:32	1573.5	150.1	.2	20:59	1462.5	39.2	24.65	
20:36	1575.9	152.6	.30-267	21:55	1480.8	57.4	25.858	
20:39	1578.6	155.2	.317	22:31	1488.6	65.2	26.2183	
20:49	1582.5	159.1	.50483	22:31	1517.2	93.8	26.2192	
21:08	1585.5	162.2	.8	22:32	1549.8	126.4	26.2	
21:45	1589.7	166.4	1.417	22:33	1574.5	151.1	26.208	
23:00	1592.3	168.9	2.767	22:36	1579.2	155.8	26.2267	
0:05	1595.0	171.7	3.75	22:39	1581.6	158.2	26.317	
1:16	1596.9	173.5	4.93	22:49	1584.9	161.6	26.548	
3:16	1599.0	175.6	6.93	23:30	1591.0	167.6	27.2167	
6:33	1601.2	177.8	10.217	0:58	1595.4	172.1	28.633	
11:14	1602.5	179.1	14.9	2:52	1597.1	173.8	30.533	
B.O.L. 16:20	1604.1	180.7	20.0	4:52	1597.8	174.5	32.533	
16:22	1584.7	161.4	20.033	6:43	1588.5	165.1	34.438	
16:30	1584.7	161.3	20.2167	6:49	1545.0	121.7	34.548	
16:31	1546.9	123.6	20.2183	8:00	1546.7	123.4	35.767	

LUB IN DWT = 890 PSI / OUT = 1059 PSI
LUB IN AMERADA = 893 PSI / OUT = 1064 PSI

SANTOS LTD
39 GRENFELL ST
ADELAIDE

SUB-SURFACE PRESSURE SURVEY

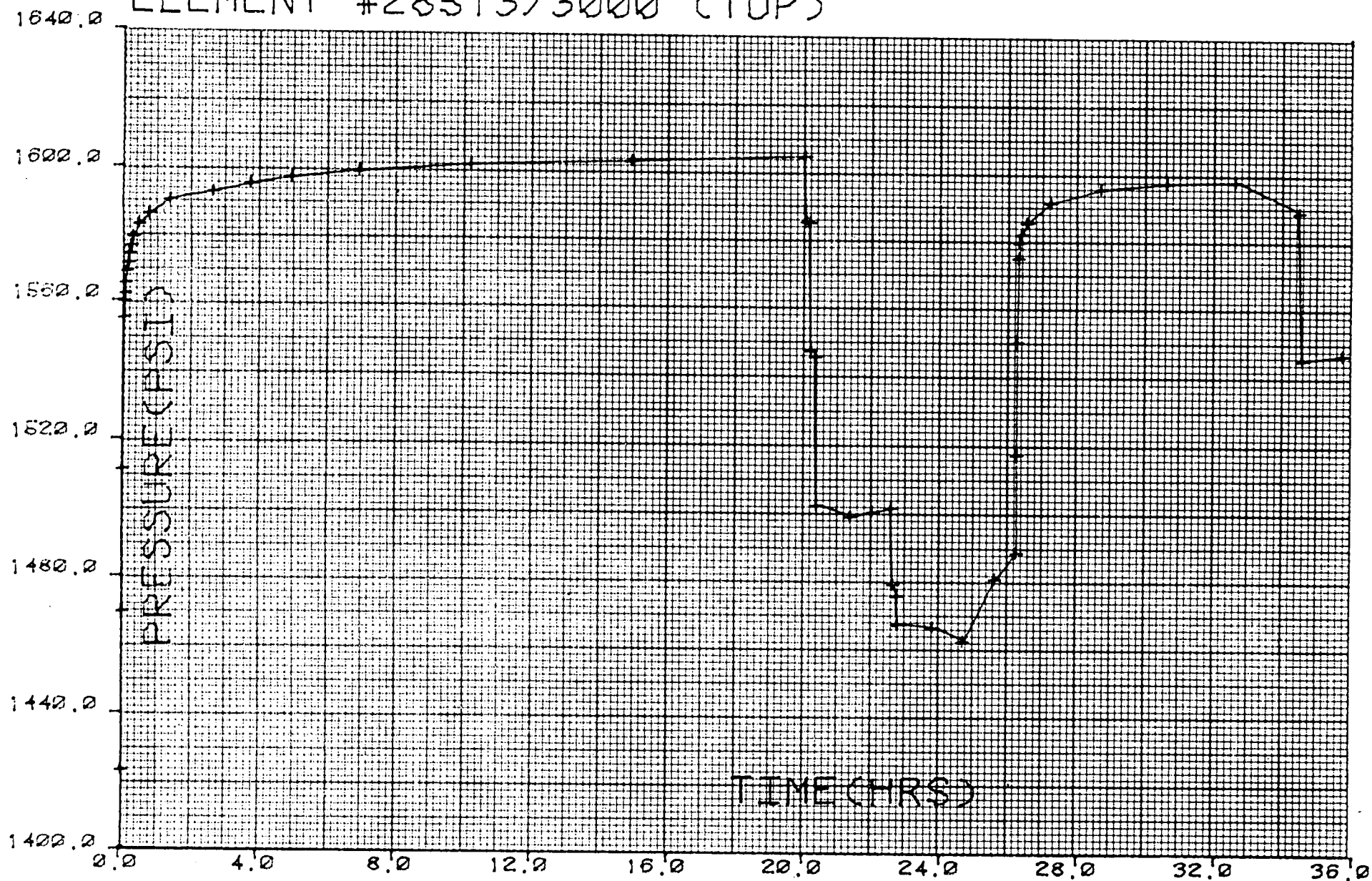
CO. SANTOS		RUN 02 FIELD DELLA		WELL 12
EFF DEPTH		WELL STAT		TOOL HUNG 6324'
CASING 7"	-	CASING PRESS		ON BOTTOM 1049 17/4
LINER	-	TUBING PRESS		OFF BOTTOM 0800 19/4
DATE 870419		ELEMENT RANGE 0 - 3117		ZERO POINT
ELEVATION		ZONE		SHUT-IN 2020 17/4
MAX TEMP		PICK-UP		ON-PROD
PERF 6361' - 6585'		CAL SER NO. 28515		MPP 6473'
TUBING 4"	-			
UNITS ENGLISH		PURPOSE BUILD-UP		

SURVEY DATA

CO. SANTOS			RUN 02 FIELD DELLA			WELL 12		
TIME	P-T	DP-DT	DTIME	TIME	P-T	DP-DT	DTIME	
S.I. 20:20	1420.2	0.0	0.0	16:40	1544.1	123.9	20.3	
20:22	1463.3	43.2	.0	16:42	1500.5	80.3	20.4	
20:22	1518.6	98.4	.0	18:55	1501.6	81.4	22.6	
20:23	1550.9	130.7	.1	18:55	1481.5	61.3	22.6	
20:25	1560.0	139.8	.1	19:05	1467.5	47.4	22.7	
20:27	1564.8	144.7	.1	19:48	1466.8	46.6	23.5	
20:30	1569.0	148.9	.2	20:51	1462.2	42.0	24.5	
20:33	1572.4	152.3	.2	21:54	1480.1	59.9	25.6	
20:37	1575.4	155.2	.3	22:31	1484.6	64.4	26.2	
20:43	1577.8	157.6	.4	22:31	1518.7	98.5	26.2	
20:52	1580.3	160.1	.5	22:31	1543.8	123.6	26.2	
21:19	1583.8	163.6	1.0	22:34	1576.4	156.3	26.2	
21:43	1585.7	165.6	1.4	22:37	1580.0	159.8	26.3	
22:21	1588.7	168.5	2.0	22:42	1582.8	162.6	26.4	
23:20	1591.3	171.2	3.0	22:53	1585.6	165.4	26.5	
0:21	1594.1	173.9	4.0	23:17	1590.2	170.0	27.0	
2:31	1596.1	176.0	6.2	0:03	1592.3	172.1	27.7	
4:49	1598.5	178.4	8.5	1:32	1595.2	175.0	29.2	
7:22	1599.7	179.5	11.0	3:20	1597.6	177.4	31.0	
12:53	1602.0	181.8	16.5	5:28	1589.9	169.7	33.1	
B.O.L. 16:22	1603.2	183.0	20.0	6:47	1588.6	168.4	34.5	
16:22	1583.7	163.5	20.0	6:54	1543.8	123.6	34.6	
16:31	1582.1	161.9	20.2	8:00	1548.0	127.8	35.7	
16:31	1546.1	125.9	20.2	0:00	0.0	0.0	0.0	

LUB IN DWT = 890 PSI / OUT = 1059 PSI
LUB IN AMERADA = 898 PSI / OUT = 1069 PSI

DELLA #12 - BUILD-UP
ELEMENT #28513/3000 (TOP)





SANTOS LTD
ISO-CHRONAL AND BUILD-UP SURVEY

Well: DELA #12.....Date: 17TH APRIL 1987.....Lubricator Data: ① 893
② 8981064
1069Pressure with D.W.T. In 890 PSI.....17.4.87..Out 1059 PSI.....19.4.87..Time Pressured 09.08.....17.4.87..Time Depressed 09.50.....17.4.87..Time Run in Hole 10.30.....17.4.87..Time off Bottom 08.00.....19.4.87..Top Bomb No. 1 DataMiddle Bomb No. 2 Data

Element No. and Range	<u>28513 x 3000 PSI</u>		<u>28515 x 3000 PSI</u>
Recorder No.	<u>59280 x 157LS</u>		<u>13027 x 157LS</u>
Clock and Lead Screw Data	<u>E-14539 x 72hr</u>		<u>E-1524 x 72hr</u>
Engage Stylus	Date: <u>17.4.87</u> Time: <u>09.00</u>	Date: <u>17.4.87</u> Time: <u>09.00</u>	
Disengage	Date: <u>19.4.87</u> Time: <u>09.54</u>	Date: <u>19.4.87</u> Time: <u>09.54</u>	

Remarks: Bottom Bomb: RE 63256 x 150-480P.....Max. S.I.B.H. Temp. = 271.5 °F.....

RE 61275 x 157LS.....

Clock E-19376 x 72hr.....

Well-Head Data for Build-up

Date	Time	Hours shut-in Time	Wellhead P.S.I.G.	Casing P.S.I.G.	Wellhead Temp. °F	Remarks
<u>17TH APRIL 1987</u>						
	<u>10.49</u>		<u>886</u>	<u>0</u>	<u>205</u>	<u>Bombs on bottom @ 6330' -</u>
						<u>Flow well until due for S/I</u>
						<u>As required by production dept</u>
	<u>20.20</u>					<u>S.W.I - Commence Build-up</u>
<u>19TH APRIL 1987</u>						
	<u>08.00</u>		<u>1283</u>	<u>0</u>	<u>181</u>	<u>Bombs off bottom - End of</u>
						<u>Build up period</u>
						<u>End of survey</u>

WELL: ...*DELA #12*.....OPERATOR: ...*G. GIANCOPPO*.....

SANTOS LTD WELL TEST DATA METRIC SUMMARY SHEET

DATE: ...*17TH APRIL 1987*.....PAGE No: ...*ONE*.....

DATE TIME	WELLHEAD							FLUID PRODUCTION				GAS PRODUCTION			
	CASING PSI	CASING KPA	TUBING PSI	TUBING KPA	CHOKE SIZE INS.	TEMP °F	TEMP °C	FLOWRATE OIL-COND BBL'S/D	FLOWRATE OIL-COND M ³ /D	FLOWRATE H ₂ O BBL'S/D	FLOWRATE H ₂ O M ³ /D	MMSCF/D	Mm ³ /D	G.O.R. Cu/FT BBL	G.O.R. M ³ /M ³
<i>17TH APRIL 1987.</i>															
<i>10:30</i>	<i>0</i>	<i>0</i>	<i>889</i>	<i>6129</i>	<i>100%</i>	<i>205</i>	<i>96</i>	<i>R.I.H WITH B.H.P / D.H.T GAUGES</i>							
<i>10:49.</i>	<i>0</i>	<i>0</i>	<i>886</i>	<i>6108</i>	<i>100%</i>	<i>205</i>	<i>96</i>	<i>BOMBS ON BOTTOM @ 6330' NS - WELL FLOWING ON 100% CHOKE</i>							
								<i>WELL SHUT IN BY SANTOS PRODUCTION IN ACCORDANCE WITH SHUT DOWN REQUIREMENTS</i>							
<i>18TH APRIL 1987.</i>															
								<i>WELL PUT B.O.L BY SANTOS PRODUCTION IN ACCORDANCE WITH S/DOWN REQUIREMENTS.</i>							
<i>19TH APRIL 1987</i>															
<i>08:00</i>	<i>0</i>	<i>0</i>	<i>1283</i>	<i>8846</i>	<i>20%</i>	<i>190</i>	<i>88</i>	<i>BOMBS OFF BOTTOM - END OF SURVEY</i>							
								<i>* RIG OUT W/LINE UNIT - NO FIELD OPERATOR AVAILABLE TO SWI TO REMOVE SWAB VALVE</i>							

CONVERSION FACTORS:

• BBL'S x 0.15899 = M³

• MMSCF x 28.174 = 10³ M³

• Cu/FT PER BBL x 0.1773 = M³/M³

• PSI x 6.895 = KPA

• °C x 9 ÷ 5 + 32 = °F

0053



0054

WIRELINE REPORT

WELL: DELA #12

DATE: 15TH APRIL 1987

PROGRAM: BOTTOM HOLE PRESSURE SURVEY - RUN IN CONJUNCTION WITH DELA FIELD S/DOWN

PURPOSE OF WORK: BLIND BOX RUN, FLOW/BUILD UP SURVEY

REPORT OF WORK PERFORMED:

15TH APRIL 1987

16:00 - S.W.I. AND FIT SWAB VALVE - PRESSURE TEST O.K.

16:15 - WELL BOL @ 100% CHOKED - RIG UP AND SECURE 0.05" W/LINE UNIT

16TH APRIL 1987

13:45 - R.I.H. WITH 1.75" BLIND BOX

14:05 - TAG T.D. @ 6695' MS - P.O.O.H.

14:20 - ARRIVE SURFACE AND SECURE LEASE OVERNIGHT

17TH APRIL 1987

10:30 - R.I.H. WITH B.H.P./B.H.T. GAUGES FOR FLOW BUILD UP SURVEY

10:49 - BONDS ON BOTTOM @ 6330' MS - FLOW WELL UNTIL FIELD SHUT DOWN

- S.W.I. - COMMENCE BUILD UP - WELL S/I BY SANTOS PRODUCTION IN ACCORDANCE WITH S/DOWN REQUIREMENTS

19TH APRIL 1987

08:00 - BONDS OFF BOTTOM - END OF SURVEY

OPERATOR'S SIGNATURE

WORK PERFORMED BY: G. GIANCASPO/A SMITH OF ENERTEST

WELL DATA:

Tubing Size: 4" FWHP: 889 PSI 17-4-87 SIWHP: 1283 PSI 19-4-87

Sub Surface S.V./Landing Nipple @ S.S.D. @

"X" Nipple @ 6293' MS "N"/"X" Nipple @ 6303' MS other

Min I.D. 3.135" @ 6303' MS Packer @ 6277' MS

Perforated Interval: 6361' - 6585' MS

Forward to: Petroleum Engineering - Adelaide
Production Department - Moomba

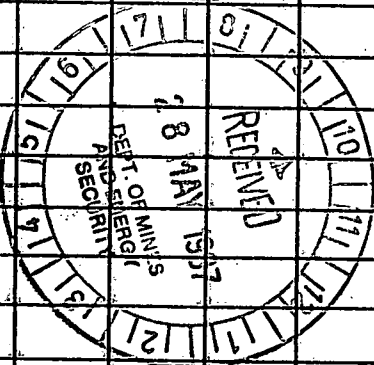
WELL: DELLA #12TYPE OF TEST: L.E.T.

SANTOS LTD.

WELL TEST DATA SHEET

DATE: 22-4-87PAGE No: ONE OF 2

DATE TIME	WELLHEAD					GAS FLOW DATA SEP. # V-459				OIL/CONDENSATE PRODUCTION			WATER PRODUCTION		WELL TEST RESULTS				
	CASING PSI	TUBING PSI	TEMP. °F	CHOKE SIZE INS.	B.S.W. %	PI PSI	HW INSH ₂ O	TEMP. °F	ORIFICE SIZE INS.	TANK DIP INS.	TANK PROD BBLs	API GRAVITY @60 °F	TANK DIP INS.	TANK PROD BBLs	GAS FLOW RATE MMSCFD	OIL FLOW RATE BBLs/ DAY	WATER FLOW RATE BBLs/ DAY	TOTAL LIQUID FLOW RATE BBLs/ DAY	lg.R BBL/SCF
APRIL-22-87																			
1500															Q _g = 13.644 mmscfd				✓
APRIL-23-87															HIC = NIL	BPP			✓
0800															H ₂ O = 24.698	BPP			✓
0830																			
0905																			
0915																			
1000																			
1200	0	1096	190	100%															
1400	0	1122	190			1050	204	226	2.25	Ø	TARE DIP	Ø							
1600	0	1125	190			1060	201	226		Ø			1	1.677	14.5	Ø	20.1	20.1	1.3
1800	0	1152	192			1085	174	226					2.5	2.515	13.7	Ø	30.1	30.1	2.2
2000	0	1170	192			1100	153	226					4	2.515	12.9	Ø	30.1	30.1	2.3
2200	0	1185	192			1137	137	226					5.5	2.515	12.5	Ø	30.1	30.1	2.4
2400	0	1159	192			1090	162	224					6.5	1.677	13.3	Ø	20.1	20.1	1.5
APRIL-24-87																			
0200	0	1157	192			1090	162	224					7.5	1.677	13.3	Ø	20.1	20.1	1.5
0400	0	1157	192			1090	162	224					9	2.515	13.3	Ø	30.1	30.1	2.2
0600	0	1155	192			1090	164	226					10	1.677	13.3	Ø	20.1	20.1	1.5
0800	0	1155	192			1090	164	226					11	1.677	13.3	Ø	20.1	20.1	1.5

OPERATOR: Tony Hoff

0055

WELL: ... <u>DELLA #12</u>						 SANTOS LTD. WELL TEST DATA SHEET										DATE: <u>24-4-87</u>				
TYPE OF TEST: ... <u>L.E.T.</u>						PAGE No: ... <u>Two of 2</u>														
DATE TIME	WELLHEAD					GAS FLOW DATA <u>SEP. # V 459</u>					OIL/CONDENSATE PRODUCTION			WATER PRODUCTION		WELL TEST RESULTS				
	CASING PSI	TUBING PSI	TEMP. °F	CHOKE SIZE INS.	B.S.W. %	PI PSI	HW INS. H ₂ O	TEMP. °F	ORIFICE SIZE INS.	TANK DIP INS.	TANK PROD BBLs	API GRAVITY @ 60 °F	TANK DIP INS.	TANK PROD BBLs	GAS FLOW RATE MMSCFD	OIL FLOW RATE BBLs/ DAY	WATER FLOW RATE BBLs/ DAY	TOTAL LIQUID FLOW RATE BBLs/ DAY	<u>L.g.R.</u> BBL/SCF	
<u>APRIL - 24th - 87</u>																				
<u>Liquid Evaluation Test Tool-Jackee Formation</u>																				
<u>0914</u> <u>PRESSURE LUB WITH TANDEM PRESSURE ELEMENTS + ONE TEMPERATURE ELEMENT</u>																				
<u>0929</u> <u>1157 192</u> <u>RUN IN HOLE FOR FLOWING GRADIENT QD PER PROGRAMME</u>																				
<u>1000</u>	<u>0</u>	<u>1140</u>	<u>192</u>	<u>100%</u>		<u>1060</u>	<u>186</u>	<u>224</u>	<u>2.25</u>	<u>Ø</u>			<u>12.25</u>	<u>2.096</u>	<u>14.0</u>	<u>Ø</u>	<u>25.1</u>	<u>25.1</u>	<u>1.8</u>	
<u>TWO H₂O SAMPLES TAKEN</u>																				
<u>1046</u>	<u>PULL BOMBS OUT OF HOLE</u>																			
<u>1104</u>	<u>ARRIVE IN LUB.</u>																			
<u>1119</u>	<u>DEPRESSURE LUB RECOVER CHARTS OK.</u>																			
<u>1130</u>	<u>Rig out wire line UNIT</u>																			
<u>1200</u>	<u>0</u>	<u>1127</u>	<u>192</u>	<u>100%</u>		<u>1050</u>	<u>200</u>	<u>224</u>	<u>2.25</u>	<u>Ø</u>			<u>13.5</u>	<u>2.096</u>	<u>14.5</u>	<u>Ø</u>	<u>25.1</u>	<u>25.1</u>	<u>1.7</u>	
<u>Flow well on By Pass End of L.E.T.</u>																				
<u>1350</u>	<u>SHUT IN WELL + Blow down METER RUN + REMOVE TEST FLANGES + SWING BLIND</u>																			
<u>HAND WELL BACK TO PRODUCTION</u>																				
<u>TOTAL GAS THRU. SEP. = 13.727 MMSCFD</u>										<u>WATER RESISTIVITY TEST</u>										
<u>TOTAL H₂O PRODUCED = 22.62 BBLs</u>										<u>SAMPLE# conductivity Resistivity TEMP. RPM VACI</u>										
<u>NO CONDENSATE PRODUCED</u>																				
										<u>1</u>	<u>.031 x 10⁴</u>	<u>32.258</u>	<u>26°C</u>	<u>Ø</u>						
										<u>2</u>	<u>.051 x 10⁴</u>	<u>19.067</u>	<u>57°C</u>	<u>Ø</u>						
										<u>3</u>	<u>.051 x 10⁴</u>	<u>19.067</u>	<u>57°C</u>	<u>Ø</u>						

OPERATOR: ... Tony HOFF

0056

WELL: *DELLA #12*OPERATOR: *J. Hoff*

SANTOS LTD
WELL TEST DATA
METRIC SUMMARY SHEET

DATE: *23-4-87*PAGE No: *ONE OF 2*

DATE TIME	WELLHEAD						FLUID PRODUCTION				GAS PRODUCTION			
	CASING PSI	CASING KPA	TUBING PSI	TUBING KPA	TEMP °F	TEMP °C	FLOWRATE OIL-COND BBL'S/D	FLOWRATE OIL-COND M3/D	FLOWRATE H2O BBL'S/D	FLOWRATE H2O M3/D	MMSCF/D	Mm3/D	L.G.R. BBL/SCF	G.O.R. M3/M3
<i>APRIL-23-87 Liquid EVALUATION TEST TOOLACHEE FORMATION</i>														
<i>1200</i>	<i>0</i>	<i>0</i>	<i>1096</i>	<i>7557</i>	<i>190</i>	<i>TRIM FLOW THRU. SEPARATOR.</i>								
<i>1400</i>	<i>↑</i>	<i>↑</i>	<i>1122</i>	<i>7736</i>	<i>190</i>	<i>88</i>	<i>∅</i>	<i>∅</i>	<i>∅</i>	<i>∅</i>	<i>14.6</i>	<i>411.34</i>		
<i>1600</i>			<i>1125</i>	<i>7757</i>	<i>190</i>	<i>88</i>	<i>↑</i>	<i>↑</i>	<i>20.1</i>	<i>3.2</i>	<i>14.5</i>	<i>408.52</i>	<i>1.38</i>	
<i>1800</i>			<i>1152</i>	<i>7943</i>	<i>192</i>	<i>89</i>			<i>30.1</i>	<i>4.78</i>	<i>13.7</i>	<i>385.98</i>	<i>2.2</i>	
<i>2000</i>			<i>1170</i>	<i>8067</i>	<i>192</i>	<i>89</i>			<i>30.1</i>	<i>4.78</i>	<i>12.9</i>	<i>363.44</i>	<i>2.3</i>	
<i>2200</i>			<i>1184</i>	<i>8163</i>	<i>192</i>	<i>89</i>			<i>30.1</i>	<i>4.78</i>	<i>12.5</i>	<i>352.17</i>	<i>2.4</i>	
<i>2400</i>			<i>1159</i>	<i>7991</i>	<i>192</i>	<i>89</i>			<i>20.1</i>	<i>3.2</i>	<i>13.3</i>	<i>374.71</i>	<i>1.5</i>	
<i>APRIL-24th 87</i>														
<i>0200</i>	<i>↓</i>	<i>↓</i>	<i>1157</i>	<i>7977</i>	<i>192</i>	<i>89</i>			<i>20.1</i>	<i>3.2</i>	<i>13.3</i>	<i>374.71</i>	<i>1.5</i>	
<i>0400</i>			<i>1157</i>	<i>7977</i>	<i>192</i>	<i>89</i>			<i>30.1</i>	<i>4.78</i>	<i>13.3</i>	<i>374.71</i>	<i>2.2</i>	
<i>0600</i>	<i>0</i>	<i>0</i>	<i>1155</i>	<i>7964</i>	<i>192</i>	<i>89</i>	<i>∅</i>	<i>∅</i>	<i>20.1</i>	<i>3.2</i>	<i>13.3</i>	<i>374.71</i>	<i>1.5</i>	

CONVERSION FACTORS:

• BBL'S. x 0.15899 = M³

• MMSCF x 28.174 = 10³ M³

• Cu/FT PER BBL x 0.1773 = M³/M³

• PSI x 6.895 = KPA

• °C x 9 ÷ 5 + 32 = °F

WELL: ...DELLA #12.....

OPERATOR: ...Tony Hoff.....



SANTOS LTD
WELL TEST DATA
METRIC SUMMARY SHEET

DATE: ...24-4-87.....

PAGE No: ...Two... of 2.....

DATE TIME	WELLHEAD						FLUID PRODUCTION				GAS PRODUCTION			
	CASING FSI	CASING KPA	TUBING PSI	TUBING KPA	TEMP °F	TEMP °C	FLOWRATE OIL-COND BBL'S/D	FLOWRATE OIL-COND M3/D	FLOWRATE H2O BBL'S/D	FLOWRATE H2O M3/D	MMSCF/D	Mm3/D	L.G.R. BBL/SCF	G.O.R. M3/M3
APRIL-24 th 87 Liquid EVALUATION TEST TOLACHEE FORMATION														
0800	0	0	1155	7964	192	89	Ø	Ø	20.12	3.2	13.3	374.71	1.5	
1000	0	0	1140	7860	192	89			25.15	3.99	14.0	394.43	1.8	
1200	0	0	1127	7770	192	89	Ø	Ø	25.15	3.99.	14.5	408.52	1.7	
			END OF L.E.T				TOTAL GAS = 13.727							
							GAS = 386.74 10 ³ M ³							
							TOTAL H ₂ O = 22.62 BBLs							
							H ₂ O = 3.59 M ³							
							No CONDENSATE PRODUCED.							

CONVERSION FACTORS:

• BBL'S. x 0.15899 = M³

• MMSCF x 28.174 = 10³ M³

• Cu/FT PER BBL x 0.1773 = M³/M³

• PSI x 6.895 = KPA

• °C x 9 ÷ 5 + 32 = °F

CLIENT ... <u>SANTOS L.T.L.</u> WELL ... <u>DELLA #12</u>	 138 RICHMOND ROAD HAMILTON SA 9021 TELEPHONE 081 354 0488 TELEFAX 081 354 1883	Date <u>23-4-87</u> Page No. <u>ONE OF 2</u> Operator ... <u>T. Hoff</u>
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Orifice Fitting Type <u>DANIELS SENIOR</u> Gas Flow Recorder Type <u>FOXBORO</u> Date of Last Calibration <u>7-11-86</u>	Orifice Fitting Size <u>3.068</u> Pressure Range <u>0-3000 PSI</u> Differential Range <u>0-300.420</u>	Gas Specific Gravity <u>.7205</u> Perforated Interval <u>N/A</u> Formation Tested <u>TOOLACHEE</u>
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Base Conditions = 14.73psi @ 60°F
☒ Flange Taps ☐ Pipe Taps

TIME DATA		Choke Size 64ths Inch	METER RUN DATA				$\sqrt{P_1 \times H_w}$	$C' = F_u \times F_b \times F_g \times F_{tf} \times F_{pv} \times Y_2$							Flow Rate $Q = C' \times \sqrt{P_1 \times H_w}$	
Date	Elapsed Time Hours		(P1) Press P.S.I.A.	Diff (Hw) Inches Water	Temp. °F	Plate Size Inches		F _u	F _b	F _g	F _{tf}	F _{pv}	Y ₂	C'		
APRIL - 23 rd 87 Liquid Evaluation Test Toolachee Formation																
1400	2	100%	1065	204	226	2.250	466.052	24	1223.2	1.1781	.8706	1.0423	1.0000	31385.50	14.627	
1600	4		1075	201	226		464.780	↑	↑	↑	.8706	1.0426	↑	31395.13	14.592	
1800	6		1100	174	226		437.439				.8706	1.0434		31418.99	13.744	
2000	8		1115	153	226		412.981				.8706	1.0439		31433.16	12.981	
2200	10		1152	137	226		397.224				.8706	1.0450		31467.63	12.500	
2400	12		1105	162	224		423.044				.8719	1.0441		31484.67	13.319	
APRIL - 24 th 87																
0200	14		1105	162	224		423.044				.8719	1.0441		31484.67	13.319	
0400	16		1105	162	224		423.044				.8719	1.0441		31484.67	13.319	
0600	18		1105	164	226		425.647				.8706	1.0436		31423.73	13.375	
0800	20		1105	164	226		425.647				.8706	1.0436		31423.73	13.375	
1000	22		1075	186	224		447.101	↓	↓	↓	.8719	1.0431	↓	31455.64	14.064	
1200	24	100%	1065	200	224		461.460	24	1223.2	1.1781	.8719	1.0428	1.0000	31445.86	14.511	
END OF L.E.T																
TOTAL GAS THRU SEPARATOR = 13.727 MMSCF/D														Average : 13.644		

E11

0059

WELL <u>DELLA #12</u>		 SANTOS LTD FLUID PRODUCTION SHEET										DATE <u>23-4-87</u>	
TANK: ⁶⁶ CAPACITY <u>356 BBLs</u> SCALE <u>1.677 BBLs/INCH</u>												PAGE No. <u>ONE</u>	
												OPERATOR <u>J. Hoff</u>	
DATE TIME	CUM. TIME	OIL/CONDENSATE PRODUCTION					WATER PRODUCTION					REMARKS	
		TANK DIP INS	TANK PROD. BBLs	FLOWRATE BBLs/D	CUM.PROD. BBLs	OIL CONDENSATE GRAVITY "API60F"	TANK DIP INS	TANK PROD. BBLs	FLOWRATE BBLs/D	CUM.PROD. BBLs	SALINITY PPM		
<u>APRIL -23rd 87</u> <u>Liquid EVALUATION TEST TOOLACHEE FORMATION</u>													
<u>0800</u>		<u>WATER SAMPLE TAKEN FROM METER RUN PRIOR TO SHUT IN FOR L.E.T.</u>									<u>Ø</u>		
<u>1400</u>		<u>START Producing Fluid TO TANK.</u>											
		<u>Ø</u>			<u>Ø</u>		<u>Ø</u>	<u>TARE DIP</u>		<u>Ø</u>			
<u>1600</u>	<u>2</u>	<u>Ø</u>					<u>1</u>	<u>1.677</u>	<u>20.12</u>	<u>1.677</u>			
<u>1800</u>	<u>4</u>	<u>Ø</u>					<u>2.5</u>	<u>2.516</u>	<u>30.18</u>	<u>4.18</u>			
<u>2000</u>	<u>6</u>	<u>Ø</u>					<u>4</u>	<u>2.516</u>	<u>30.18</u>	<u>6.69</u>			
<u>2200</u>	<u>8</u>	<u>Ø</u>					<u>5.5</u>	<u>2.516</u>	<u>30.18</u>	<u>9.22</u>			
<u>2400</u>	<u>10</u>	<u>Ø</u>					<u>6.5</u>	<u>1.677</u>	<u>20.12</u>	<u>10.89</u>			
<u>APRIL -24th 87</u>													
<u>0200</u>	<u>12</u>	<u>Ø</u>					<u>7.5</u>	<u>1.677</u>	<u>20.12</u>	<u>12.57</u>			
<u>0400</u>	<u>14</u>	<u>Ø</u>					<u>9</u>	<u>2.515</u>	<u>30.18</u>	<u>15.09</u>			
<u>0600</u>	<u>16</u>	<u>Ø</u>					<u>10</u>	<u>1.677</u>	<u>20.12</u>	<u>16.76</u>			
<u>0800</u>	<u>18</u>	<u>Ø</u>					<u>11</u>	<u>1.677</u>	<u>20.12</u>	<u>18.43</u>			
<u>1000</u>	<u>20</u>	<u>Ø</u>					<u>12.25</u>	<u>2.096</u>	<u>25.15</u>	<u>20.53</u>			
			<u>TWO WATER SAMPLES TAKEN</u>										
<u>1200</u>	<u>22</u>	<u>Ø</u>					<u>13.5</u>	<u>2.096</u>	<u>25.15</u>	<u>22.62</u>			
			<u>END OF L.E.T.</u>		<u>TOTAL H₂O PRODUCED = 22.62 BBLs</u>								
			<u>WATER RESISTIVITY TEST</u>		<u>SAMPLE #1: Conductivity = .031 x 10⁴ Resistivity = 32.258 Temp: 26°C PPM NaCl = Ø</u>								
					<u>SAMPLES #2+3: Conductivity = .051 x 10⁴ Resistivity = 19.067 Temp: 57°C PPM NaCl = Ø</u>								

• 0/5576

DD3

0060



**** DELLA #12 ****

FLOWING PRESSURE GRADIENT

TEST DATE: 24/4/87

TOP PRESSURE ELEMENT 28514/3000				BOTTOM PRESSURE ELEMENT 57413/3000		
DEPTH (FT.)	DEFLECTION (INCHES)	PRESSURE (PSIG)	GRADIENT (PSI/FT)	DEFLECTION (INCHES)	PRESSURE (PSIG)	GRADIENT (PSI/FT)
LUB	0.7480	1147.8	----	0.7390	1153.5	----
1000	0.7880	1209.7	0.0619	0.7770	1212.9	0.0594
2000	0.8230	1263.9	0.0542	0.8150	1272.3	0.0594
3000	0.8560	1315.1	0.0511	0.8490	1325.5	0.0532
4000	0.8880	1364.7	0.0496	0.8820	1377.1	0.0516
5000	0.9200	1414.3	0.0496	0.9130	1425.6	0.0485
5500	0.9350	1437.5	0.0465	0.9280	1449.0	0.0469
6000	0.9520	1463.9	0.0527	0.9450	1475.6	0.0532
6473	0.9670	1487.2	0.0492	0.9590	1497.5	0.0463
6585	0.9700	1491.8	0.0415	0.9640	1505.3	0.0698
LUB	0.7280	1116.8	----	0.7210	1125.3	----

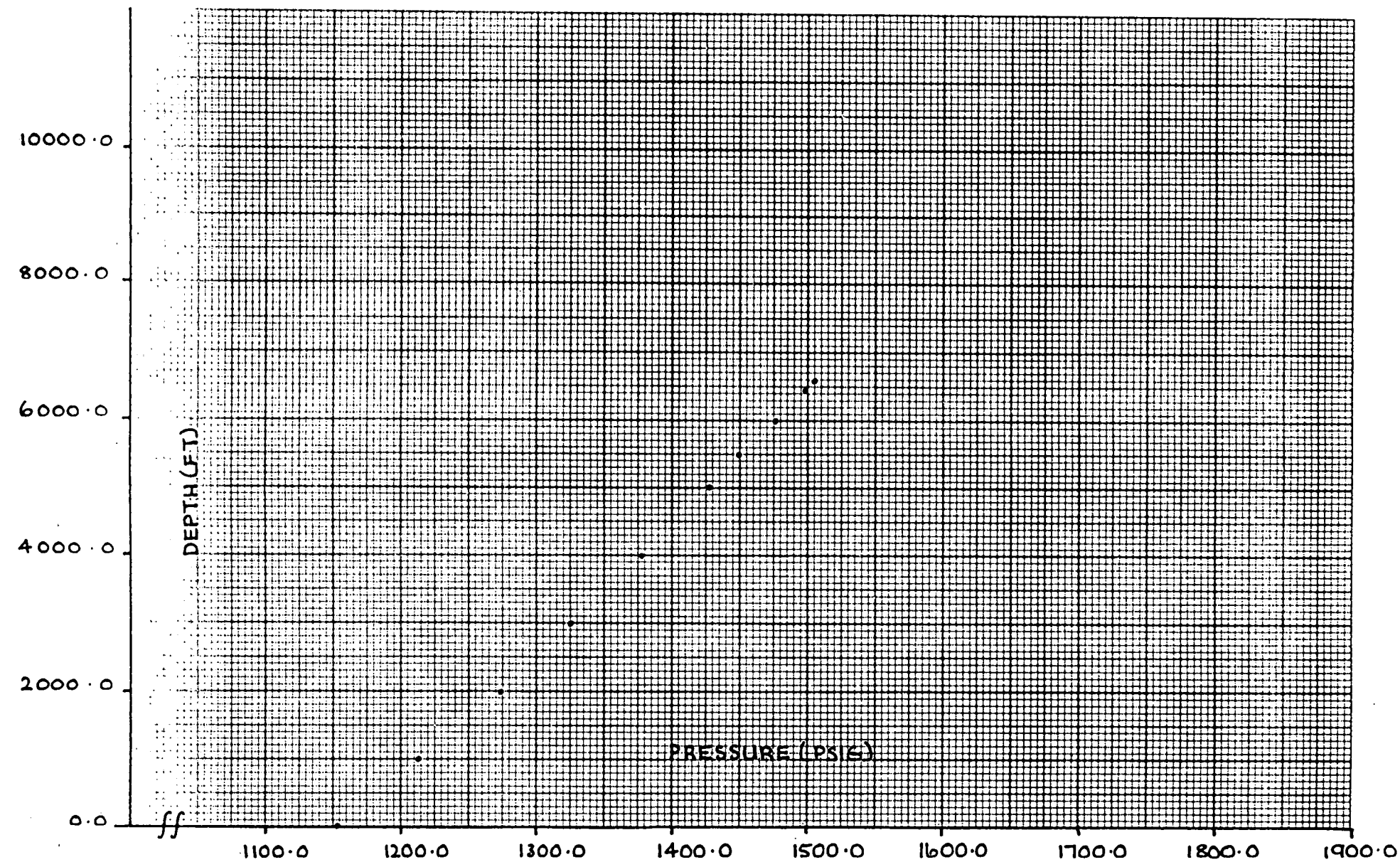
GENERAL REMARKS:

L.E.T. CHOKE @ 100% FLOW RATE - 14.5 mmscf/d WATER RATE - 25.1 BPD
CONDENSATE RATE - 0 BPD FTHT - 192 F

DWT IN: 1159
DWT OUT: 1127
MAX BHT: TEMP. ELE. RUN

ELEMENT 28514/3000 CALIBRATED 13.4.87
ELEMENT 57413/3000 CALIBRATED 12.4.87

DELLA # 12 - FLOWING PRESSURE GRADIENT - 24 / 4 / 87
ELEMENT # 57413 / 3000 (BOT)



DATE: 24-4-87

LUBRICATOR DATA

PRESSURE WITH D.W.T: 1159 IN 1127 OUT
TIME PRESSURED: 09:14
TIME DEPRESSURED: 11:19

[illegible]

GOIO



WIRELINE REPORT

0064

WELL: DELLA # 12

DATE: 24-4-87

PROGRAM: L.E.T

PURPOSE OF WORK: Flowing GRADIENT

REPORT OF WORK PERFORMED:

23-4-87 - Rig up wire line unit

24-4-87 - 09:29 - Run in Hole with Tandem Ameradas & Temperature Element
as per Programme for Flowing Gradient

1046 - Pull out of Hole

1104 - IN LOG RECOVER CHARTS OK.

[Signature]
OPERATOR'S SIGNATURE

WORK PERFORMED BY: Tony Hoff OF EXPERTEST

WELL DATA:

Tubing Size: $4\frac{1}{2}$ FWHP: 1127 psi SIWHP: N/A.

Sub Surface S.V./Landing Nipple @ S.S.D. @

"X" Nipple @ "N"/"XN" Nipple @ other

Min I.D. @ Packer @

Perforated Interval:

Forward to: Petroleum Engineering — Adelaide
Production Department — Moomba