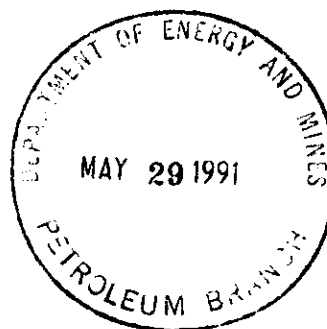




1300 SUN LIFE PLAZA III  
112 - 4th AVENUE S.W.  
CALGARY, ALBERTA, CANADA T2P 0H3  
TELEPHONE (403) 261-0743  
FAX (403) 264-5691

FILE:  
WASKADA UNIT  
PRESSURE SURVEYS

May 23, 1991



Manitoba Energy & Mines  
Petroleum Branch  
555 - 330 Graham Avenue  
Winnipeg, Manitoba  
R3C 4E3

Attention: Mr. John Fox  
Chief Petroleum Engineer

Dear Sir:

**RE: Waskada Reduced Spacing Pilot Project  
Initial Reservoir Pressure Survey  
Omega Waskada 8A-23-1-26 WPM  
Omega Waskada 3C-24-1-26 WPM  
Omega Waskada 4C-24-1-26 WPM  
Omega Waskada 6A-24-1-26 WPM**

In accordance with the rules contained in Board Order No. PM58 and SU7, please find attached a copy of a recently conducted pressure test and pressure analysis for the above mentioned wells. Attachment 1 contains a summary of the results obtained from the buildup tests for each of the wells.

Attachment 2 contains an isobaric map for the reduced spacing pilot project area. The data indicates that an area of low pressure presently exists within the pilot project and that the infill well pressures correspond closely to the pressure obtained at injection well 5-24-1-26 WPM. The cumulative VRR within injection pattern 5-24-1-26 WPM is 44.8% as a result of efforts to prevent premature water breakthrough and deplete free gas caused by gas injection.

Should there be any questions or comments, please contact the undersigned at (403)261-0743.

Yours truly,

OMEGA HYDROCARBONS LTD.

R.A. Brekke, P. Eng  
Senior Exploitation Engineer

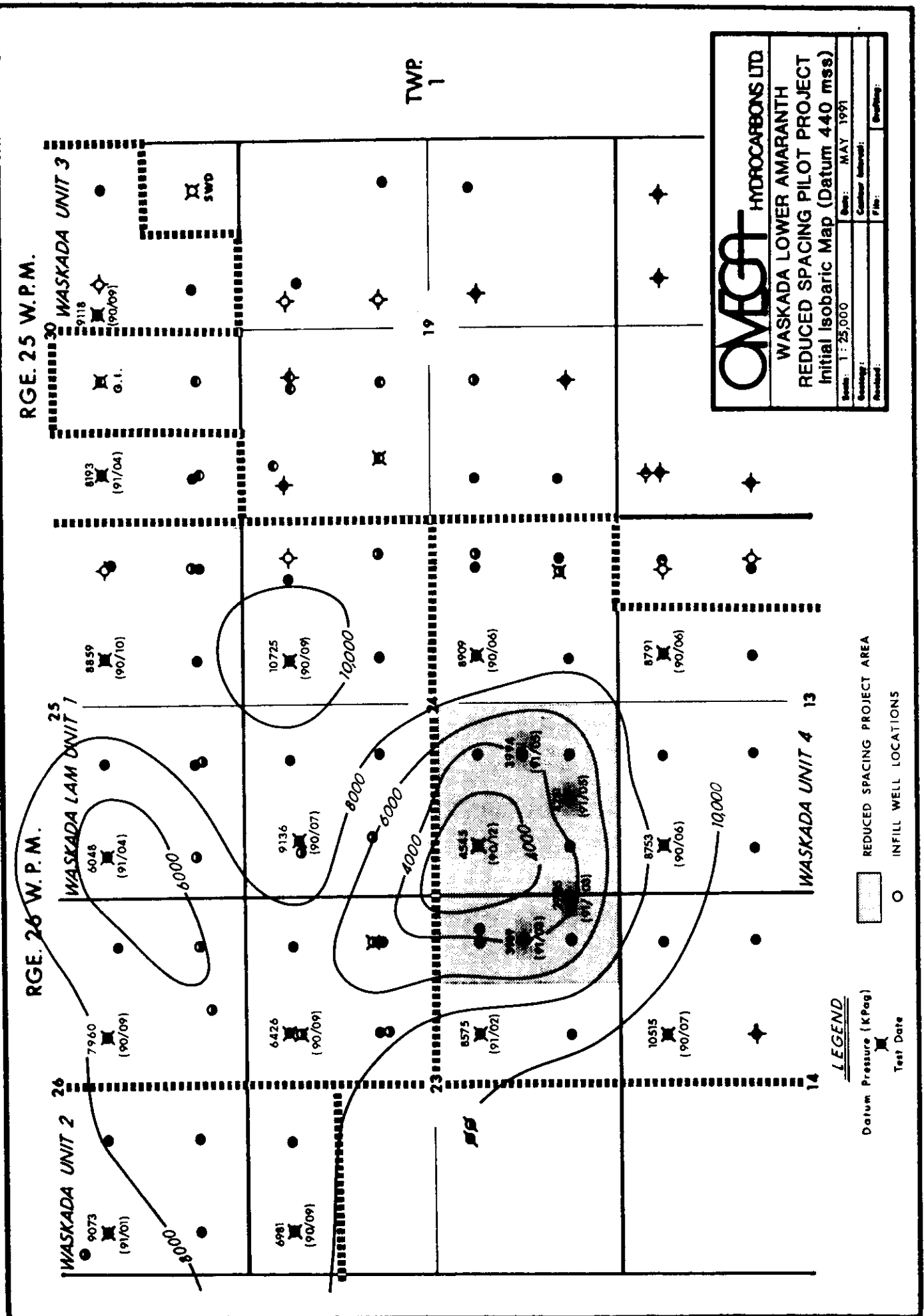
RB/ns

c.c.: J. Beardsworth  
Waskada Reduced Spacing Unit Application File  
Waskada Pressure Data Binder

**Waskada Reduced Spacing Pilot Project  
Pressure Survey Results**

Well	Pool	Test Dates	Shut-In Time (hrs.)	Reservoir Pressure @ MPP (kPag)	Reservoir Pressure @ Datum (kPag)	Slope kPa/Cycle	Radius of Investigation (m)	Skin	Perm (mD)
8A-23-1-26 WPM	LAm	91/03/13 - 03/20	166.4	4020	3989	968	41	-3.9	41.9
3C-24-1-26 WPM	LAm	91/05/02 - 05/09	173.2	4323	4281	1253	52	-3.9	8.4
4C-24-1-26 WPM	LAm	91/03/22 - 04/01	236.6	4086	3985	1399	41	-4.6	36.6
6A-24-1-26 WPM	LAm	91/05/02 - 05/09	171.3	4022	3994	1165	64	-2.3	13.0

Lower Amaranth Datum Depth = 440 m subsea



### General Well Information

8A-23-1-26 WPM (Infill Pilot Project Well)  
Test Date: 91/03/13-91/03/20

GL: 463.8 m  
KB: 468.0 m  
MPP: 912.0 mKB (907.8 mCF)  
Datum: 908.0 mKB (903.8 mCF)  
Hydrostatic Head: 90 kPag (Correction to MPP, Lower Guage)  
Last Shut In Date: N/A

Actual Prod. (Hrs.) 69  
Actual Prod. (m<sup>3</sup>) 23.6 Oil 0.0 Water  
Avg. Rate (m<sup>3</sup>/d) 8.2 Oil

$\phi$  = 4.1%  
h = 4.38 m

P\* = 4117 kPa  
Pws = 3970 kPa  
PR = 4110 KPa

Assume a gradient of 7.7 kPa/m for hydrostatic head calculations.

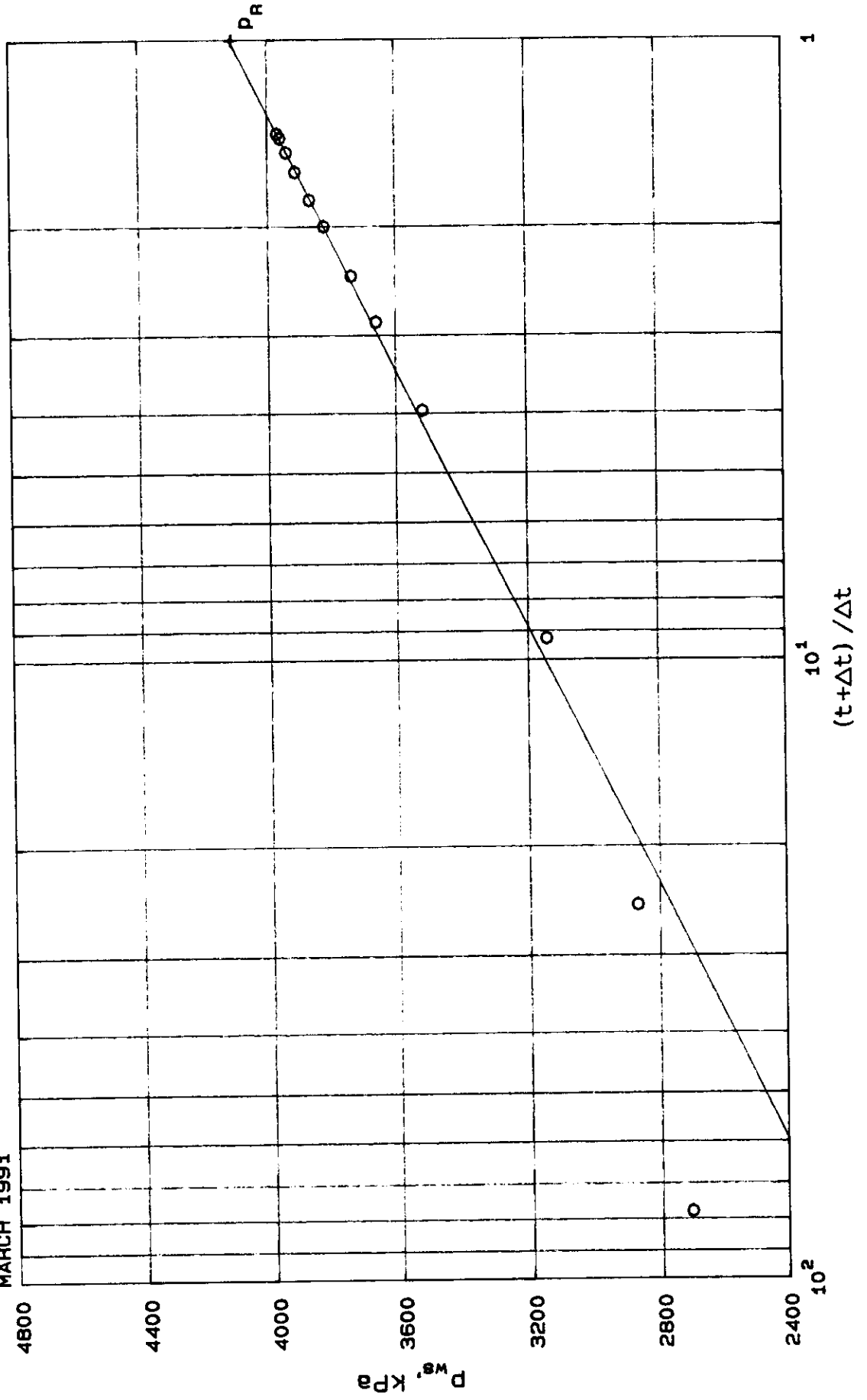
\*Average reservoir pressure at MPP = 4110 kPa (4020 kPag)  
Average reservoir pressure @ Datum = 4079 kPa (3989 kPag)

# HORNER PRESSURE BUILDUP PLOT

OMEGA WASKADA  
 8A-23-1-26 WPM  
 LOWER AMARANTH INFILL WELL  
 MARCH 1991

$m = 968 \text{ kPa}$   
 $P_R = 4110 \text{ kPa}$   
 $19.23 \text{ mD.m/mPa.s}$   
 $s = -3.9$

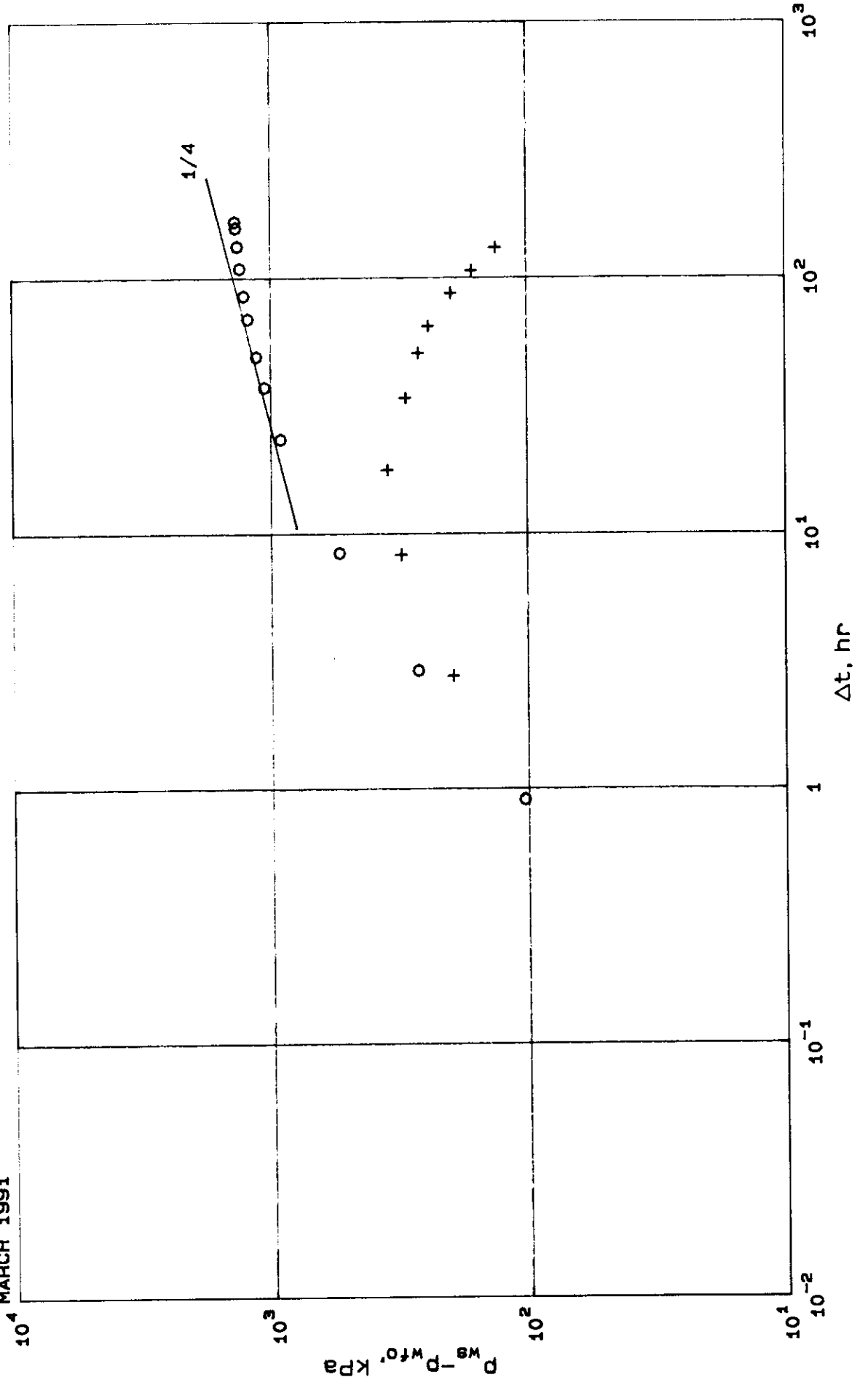
$[kh/\mu]_t =$



# TYPE CURVE PRESSURE BUILDUP PLOT

OMEGA WASKADA  
 8A-23-1-26 WPM  
 LOWER AMARANTH INFILL WELL  
 MARCH 1991

○ Data points  
 + Derivative



PRESSURE BUILDUP DATA  
IN TERMS OF PRESSURE  
-----

OMEGA WASKADA  
8A-23-1-26 WPM

LOWER AMARANTH INFILL WELL  
MARCH 1991

Shut-in time hr	Horner time	Equiv time hr	Super time	Super Equiv time hr	Gauge Press RRD kPa	pws MPP kPa	del p kPa
-----	-----	-----	-----	-----	-----	-----	-----
0.00	---	---	---	---	2422	2602	---
0.90	77.75	0.89	---	---	2526	2706	104
2.90	24.82	2.78	---	---	2689	2869	267
8.40	9.22	7.49	---	---	2963	3143	540
23.40	3.95	17.48	---	---	3337	3517	915
37.40	2.85	24.26	---	---	3481	3661	1059
49.40	2.40	28.80	---	---	3558	3738	1136
69.40	2.00	34.62	---	---	3644	3824	1222
85.40	1.81	38.19	---	---	3689	3869	1267
109.40	1.63	42.34	---	---	3734	3914	1312
133.40	1.52	45.51	---	---	3761	3941	1339
157.40	1.44	48.01	---	---	3781	3961	1359
166.40	1.42	48.81	---	---	3790	3970	1368

# OIL PRESSURE BUILDUP ANALYSIS - HORNER

OMEGA WASKADA  
8A-23-1-26 WPM

LOWER AMARANTH INFILL WELL  
MARCH 1991

## PRODUCTION AND TIMES

Cumulative Production	=	23.6 m <sup>3</sup>
Actual Flow Time	=	69.00 hr
Horner Flow Time	=	69.07 hr
Final Flow Rate qo	=	8.2 m <sup>3</sup> /d
Final Flow Rate qg	=	0.000 10 m <sup>3</sup> /d
Final Flow Rate qw	=	0.0 m <sup>3</sup> /d

## RESERVOIR PARAMETERS

Wellbore Radius rw	=	0.100 m	Reservoir Temp TR	=	307 K
Net Pay h	=	4.4 m	Water Saturation Sw	=	0.400
Total Porosity phit	=	0.041	Oil Saturation So	=	0.600

## FLUID PROPERTIES

Compress. cg	=	0.00027576 1/kPa	Viscosity uo	=	9.543 mPa.s
Compress. co	=	0.00010127 1/kPa	Vol. Fac. Bg	=	0.0248745
Compress. cw	=	0.00000046 1/kPa	Vol. Fac. Bo	=	1.070
Compress. cf	=	0.00000102 1/kPa	Vol. Fac. Bw	=	1.002
Compress. ct	=	0.00006197 1/kPa	Sol. Gas Rso	=	17.6 m <sup>3</sup> /m <sup>3</sup>

## PRESSURES

Horner Extrap. p*	=	4117 kPa
Initial Reservoir pi	=	--- kPa
Final Flowing pwfo	=	2602 kPa
1 Hour Shut-in pws1	=	2330 kPa
Average Test pavg	=	3970 kPa

# OIL PRESSURE BUILDUP ANALYSIS - HORNER

OMEGA WASKADA  
8A-23-1-26 WPM

LOWER AMARANTH INFILL WELL  
MARCH 1991

## SEMILOG STRAIGHT LINE RESULTS

Slope	m	=	968 kPa
Transmissivity	[kh/ult	=	19.23 mD.m/mPa.s
	[kh/ulo	=	19.23 mD.m/mPa.s
Mobility	[k/ult	=	4.39 mD/mPa.s
	[k/ulo	=	4.39 mD/mPa.s
Flow Capacity	[kh]o	=	183.51 mD.m
Permeability	ko	=	41.90 mD
Skin Factor	s	=	-3.9
Pressure Drop Due to Skin		=	--- kPa
Flow Efficiency	FE	=	3.20
Damage Ratio	DR	=	0.31
Productivity Index	PI	=	0.00543942 m <sup>3</sup> /d/kPa
Radius of Inv.	rinv	=	41 m

## AVERAGE PRESSURE CALCULATION

Drainage Area	A	=	32 ha
Shape/Well Configuration		=	R1A
Average Reserv. Pressure	pR	=	4110 kPa

## STABILIZED RATE PREDICTIONS

Time to Stabilization	ts	=	5143 hr
Stabilized Rate	qs	=	4.3 m <sup>3</sup> /d
Productivity Index	PI	=	0.00287852 m <sup>3</sup> /d/kPa

Omega Waskada 8A-23  
8A-23-001-26 WLM  
Lower Amaranth Formation

Build-up Test  
March 13 - 20, 1991

## BASIC DATA

COMPANY: Omega Hydrocarbons Ltd.		WELL NAME: Omega Waskada BA-23	
ADDRESS: Calgary, Alberta		UNIQUE WELL IDENTIFIER: BA-23-001-26 W1M	
FIELD AND POOL: Waskada / Lower Amaranth		STATUS: In-fill	
TYPE OF TEST: Build-up Test		DATE OF TEST: Y 91 M 03 D 13 TO Y 91 M 03 D 20	
PRODUCING INTERVAL (m,CF): 901.8-913.8		PERF PRODUCING THROUGH: 60.3 mm TUBING	
ELEVATION: (CF) 463.8 m (KB) 468.0 m		114.3 mm CASING	
POOL DATUM (SUBSEA): -440.0		MID POINT OF PRODUCING (MPP) INTERVAL (m,CF): 907.8	
ELEMENT SERIAL NO: RANGE(GAUGE) kPa		DATUM DEPTH OF WELL FROM (m,CF): 903.8	
CALIBRATION EQUATION: See calibration report		CLOCK RANGE: 180 hrs LAST CALIBRATION: See Cal. Report	

## STATIC TEST

TUBING PRESSURE:	kPag	SHUT-IN DATE: 0700 Mar. 13/91	DURATION:	hrs
CASING PRESSURE:	kPag	DATE ON BOTTOM:	e	hrs
RUN DEPTH (m,CF):		DATE OFF BOTTOM:	e	hrs
B.H. TEMP:	°C R.D. PRESSURE	kPa	MPP PRESSURE:	kPag
SURFACE TEMP:	°C GRADIENT	kPa/m	DATUM DEPTH PRESSURE (GAUGE):	kPag

## ACOUSTIC WELL SOUNDER TEST

NOT APPLICABLE
----------------

## BUILD-UP OR DRAWDOWN TEST

NOT APPLICABLE
----------------

## CHART READINGS AND CALCULATIONS FOR STATIC TEST

SEE NEXT PAGE
---------------

## COMMENTS

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SURVEYED BY: M.M.	TESTED BY: S. Hourd	COMPUTED BY: Rory Hal	CHECKED BY:
-------------------	---------------------	-----------------------	-------------

Reporting Date: Mar 25, 1991

Page

Well Name: Omega Waskada 8A-23  
Pool: Lower Amaranth

Location: 8A-23-001-26 W1M  
Test Date: Mar. 13 - 20/91

			--- Lower Gauge ---		--- Upper Gauge ---	
			Ser # 051953		Ser # 051955	
			Range 13790		Range 13790	
			Depth 896.0		Depth 894.0	
Date	Time	Period (hrs.)	Deflect (mm)	Corrected Pressure (kPag)	Deflect (mm)	Corrected Pressure (kPag)
13-Mar-91	10:36	0.00	<Set recorders at 896.0 m, CF >			
	10:36	0.00	8.662	2421.9	8.695	2419.2
	10:40	0.07	8.689	2429.4		
	10:45	0.15	8.723	2438.9		
	11:00	0.40	8.840	2471.7		
	11:15	0.65	8.939	2499.3		
	11:30	0.90	9.033	2525.6		
	11:45	1.15	9.103	2545.2		
	12:00	1.40	9.198	2571.8	9.233	2568.4
	12:30	1.90	9.348	2613.7		
	13:00	2.40	9.488	2652.8		
	13:30	2.90	9.617	2688.9		
	14:00	3.40	9.730	2720.5		
	14:30	3.90	9.848	2753.5		
	15:00	4.40	9.972	2788.0		
	15:30	4.90	10.059	2812.2		
	16:00	5.40	10.145	2836.1	10.193	2834.7
	17:00	6.40	10.314	2883.1		
	18:00	7.40	10.455	2922.2		
	19:00	8.40	10.600	2962.5		
	20:00	9.40	10.716	2994.8	10.763	2992.8
	21:00	10.40	10.841	3029.5		
	22:00	11.40	10.953	3060.6		
	24:00	13.40	11.134	3110.9	11.173	3106.6
14-Mar-91	02:00	15.40	11.287	3153.5		
	04:00	17.40	11.463	3202.4		
	06:00	19.40	11.636	3250.5		
	08:00	21.40	11.831	3304.7		
	10:00	23.40	11.948	3337.2		
	12:00	25.40	12.044	3363.8	12.089	3360.7
	16:00	29.40	12.212	3410.5		
	20:00	33.40	12.348	3448.3		
	24:00	37.40	12.464	3480.6	12.517	3479.4
15-Mar-91	04:00	41.40	12.574	3511.1		
	08:00	45.40	12.665	3536.4		
	12:00	49.40	12.742	3557.8		
	16:00	53.40	12.826	3581.2		
	20:00	57.40	12.881	3596.5		
	24:00	61.40	12.948	3615.1	12.994	3611.7
16-Mar-91	08:00	69.40	13.052	3644.0		
	16:00	77.40	13.138	3667.9		

Reporting Date: Mar 25, 1991

Page

Well Name: Omega Waskada 8A-23  
Pool: Lower Amaranth

Location: 8A-23-001-26 W1M  
Test Date: Mar. 13 ~ 20/91

--- Lower Gauge ---

Ser # 051953

Range 13790

Depth 896.0

--- Upper Gauge ---

Ser # 051955

Range 13790

Depth 894.0

Date	Time	Period (hrs.)	Deflect (mm)	Corrected Pressure (kPag)	Deflect (mm)	Corrected Pressure (kPag)
16-Mar-91	24:00	85.40	13.214	3689.0	13.263	3686.3
17-Mar-91	08:00	93.40	13.278	3706.8		
	16:00	101.40	13.337	3723.2		
	24:00	109.40	13.375	3733.7	13.417	3729.1
18-Mar-91	08:00	117.40	13.429	3748.8		
	16:00	125.40	13.457	3756.5		
	24:00	133.40	13.474	3761.3	13.497	3751.3
19-Mar-91	08:00	141.40	13.502	3769.0		
	16:00	149.40	13.522	3774.6		
	24:00	157.40	13.546	3781.3	13.571	3771.8
20-Mar-91	08:00	165.40	13.574	3789.0		
	09:00	166.40	13.576	3789.6	13.601	3780.1
	09:00	166.40	<Recovered recorders from well >			

CB 0-12

## SUBSURFACE PRESSURE MEASUREMENT

Page of

## BASIC DATA

COMPANY: Omega Hydrocarbons Ltd.		WELL NAME: Omega Waskada BA-23	
ADDRESS: Calgary, Alberta		UNIQUE WELL IDENTIFIER: BA-23-001-26 WIM	
FIELD AND POOL: Waskada / Lower Amaranth		STATUS: In-fill	
TYPE OF TEST: Static Gradient Test		DATE OF TEST: Y 91 M 03 D 20 TO Y M D	
PRODUCING INTERVAL (m,CF): 901.8-913.8 PERF		PRODUCING THROUGH: 60.3 mm TUBING	
ELEVATION: (CF) 463.8 m (KB) 468.0 m		114.3 mm CASING	
POOL DATUM (SUBSEA): -440.0		MID POINT OF PRODUCING (MPP) INTERVAL (m,CF): 907.8	
ELEMENT SERIAL NO: RANGE(GAUGE) kPa		DATUM DEPTH OF WELL FROM (m,CF): 903.8	
CALIBRATION EQUATION: See calibration report		CLOCK RANGE: 3 hrs LAST CALIBRATION: See Cal. Report	

## STATIC TEST

TUBING PRESSURE: 1350 kPag	SHUT-IN DATE: 0700 Mar. 13/91	DURATION: 173.08 hrs
CASING PRESSURE: 1685 kPag	DATE ON BOTTOM: Mar. 20/91	@ 1200 hrs
RUN DEPTH (m,CF): 846.0	DATE OFF BOTTOM: Mar. 20/91	@ 1205 hrs
B.H. TEMP: 45 °C R.D. PRESSURE 3791 kPag	MPP PRESSURE: 3880	kPag
SURFACE TEMP: °C GRADIENT 7.570 kPa/m	DATUM DEPTH PRESSURE (GAUGE): 3850	kPag

## ACOUSTIC WELL SOUNDER TEST

NOT APPLICABLE
----------------

## BUILD-UP OR DRAWDOWN TEST

NOT APPLICABLE
----------------

## CHART READINGS AND CALCULATIONS FOR STATIC TEST

SEE NEXT PAGE
---------------

## COMMENTS

Estimated liquid level at 594 m,CF
------------------------------------

SURVEYED BY: M.M.	TESTED BY: S. Hourd	COMPUTED BY: Rory Hale	CHECKED BY:
-------------------	---------------------	------------------------	-------------

Reporting Date: Mar 25, 1991,

Page

WellName: Omega Waskada 8A-23  
Pool : Lower AmaranthLocation : 8A-23-001-26 W1M  
Date Of Test: Mar. 20/91----- Upper Gauge -----  
Serial # 051955 Range 13790----- Lower Gauge -----  
Serial # 051953 Range 13790

Start Time	End Time	Depth	Deflect	Corrected Pressure	Grad.	Depth	Deflect	Corrected Pressure	Grad.
hh:mm	hh:mm	CF(m)	(mm)	(kPag)	(kPa/m)	CF(m)	(mm)	(kPag)	(kPa/m)
11:15	11:18	Surf	4.949	1379.1	0.000	Surf	4.920	1375.7	0.000
11:20	11:23	98.0	5.005	1394.8	0.160	100.0	4.983	1393.3	0.176
11:24	11:27	198.0	5.039	1404.2	0.094	200.0	5.027	1405.6	0.123
11:28	11:31	298.0	5.079	1415.4	0.112	300.0	5.053	1412.8	0.072
11:32	11:35	398.0	5.129	1429.3	0.139	400.0	5.108	1428.2	0.154
11:37	11:40	498.0	5.192	1446.9	0.176	500.0	5.160	1442.8	0.146
11:42	11:45	598.0	5.348	1490.3	0.434	600.0	5.365	1500.1	0.573
11:46	11:49	698.0	8.186	2281.2	7.909	700.0	8.187	2289.1	7.890
11:51	11:54	798.0	10.962	3053.2	7.720	800.0	10.939	3056.8	7.677
11:56	11:59	848.0	12.352	3438.6	7.708	850.0	12.327	3442.5	7.714
12:00	12:05	894.0	13.580	3779.0	7.400	896.0	13.580	3790.7	7.570

## Comments:

TBG pressure by DWG = 1350 kPag  
 CSG pressure by DWG = 1685 kPag  
 Temperature at run depth = 45 C  
 Estimated liquid level at 594 m,CF

OPSCO

BUILD-UP

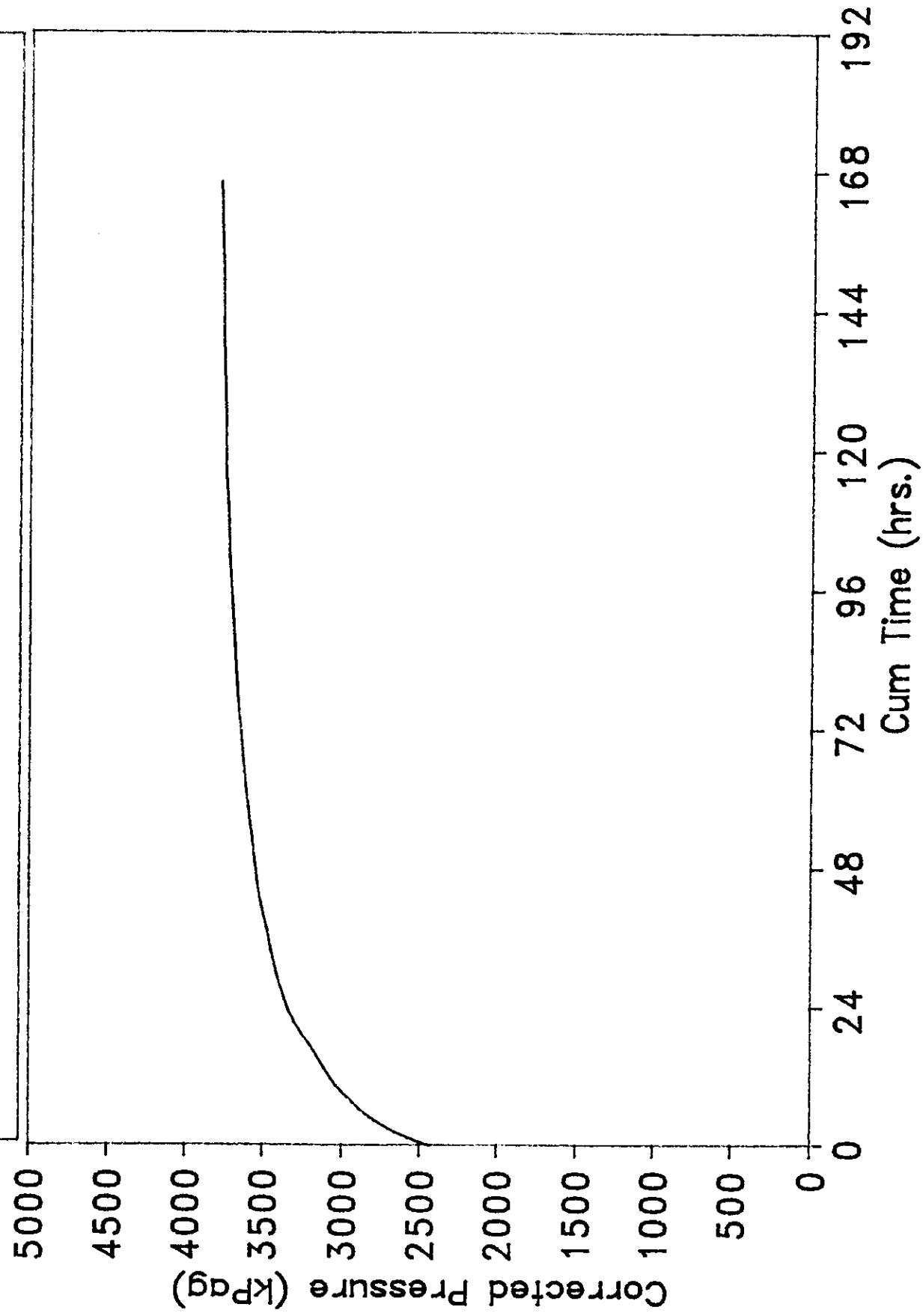
GAUGE # 051955

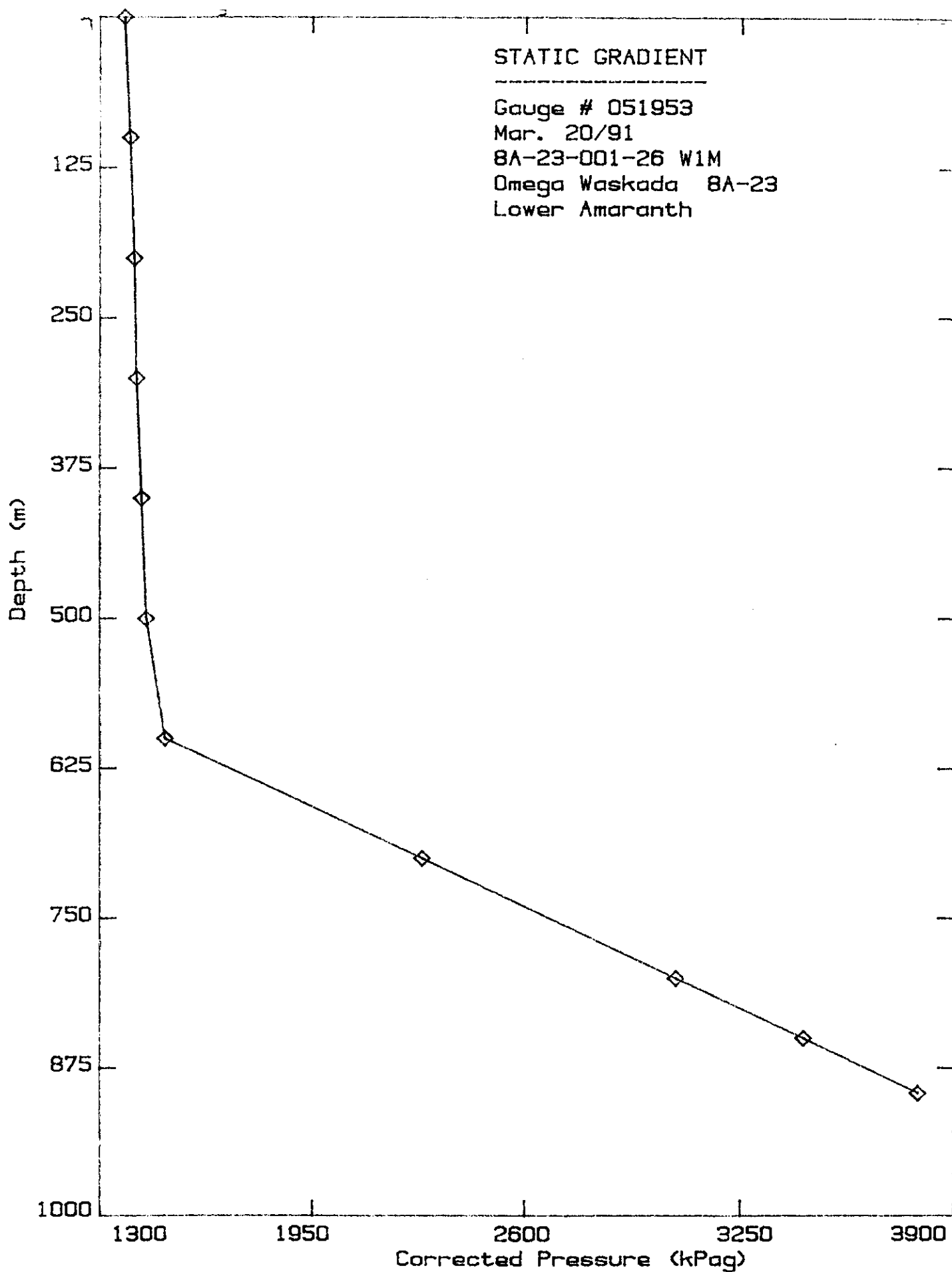
Mar. 13 - 20, 1991

Omega Waskada 8A-23

Lower Amaranth

8A-23-001-26 W1M





OPSCO Industries Ltd.

- Sub-Surface Pressure Instrument  
Calibration Report

Reporting Date: Mar 25, 1991

Page

Serial No: 051955  
Range: 13790  
Cal Temp (air): 20  
Cal Temp (bath):  
Bath Cal Date: 05-01-90  
Last Air Cal Date: 08-25-90  
Curr Air Cal Date: 01-30-91  
Recorder Section No:  
Comment: MOOSE MOUNTAIN  
Owner: MOOSE MOUNTAIN

Press (kPag)	First (mm)	Second (mm)	Average (mm)	P - Pc (kPa)	Bath (mm)
0	0.000	0.000	0.000	-7.11	0.000
2758	9.897	9.897	9.897	5.40	9.897
5516	19.846	19.846	19.846	3.50	19.846
8274	29.790	29.790	29.790	2.98	29.790
11032	39.752	39.752	39.752	-2.54	39.752
13790	49.693	49.693	49.693	-2.23	49.693
Sum:				-0.00	

Previous m = 277.410  
Previous A = 7.110

Present m = 277.406  
Present A = 7.113

Present Press = 14099.31  
Previous Press = 14099.54

Deviation = -0.22  
Acc. Deviation = 34.47

OPSCO Industries Ltd.

- Sub-Surface Pressure Instrument  
Calibration Report

Reporting Date: Mar 25, 1991

Page

Serial No: 051953  
Range: 13790  
Cal Temp (air): 20  
Cal Temp (bath):  
Bath Cal Date: 02-13-90  
Last Air Cal Date: 10-24-90  
Curr Air Cal Date: 02-13-91  
Recorder Section No:  
Comment: MOOSE MOUNTAIN  
Owner: MOOSE MOUNTAIN

Press (kPag)	First (mm)	Second (mm)	Average (mm)	P - Pc (kPa)	Bath (mm)
0	0.000	0.000	0.000	-9.38	0.000
2758	9.864	9.864	9.864	6.55	9.864
5516	19.788	19.788	19.788	5.80	19.788
8274	29.723	29.723	29.723	2.00	29.703
11032	39.654	39.654	39.654	-0.75	39.654
13790	49.588	49.588	49.588	-4.22	49.588
Sum:				0.00	

Previous m = 277.990  
Previous A = 9.380

Present m = 277.987  
Present A = 9.383

Present Press = 14131.14  
Previous Press = 14131.27

Deviation = -0.13  
Acc. Deviation = 34.47

### GENERAL WELL INFORMATION

3C-24-1-26 WPM (Infill Pilot Project Well)  
Test Date: 91/05/02 - 91/05/09

GL: 467.9 m  
KB: 472.1 m  
MPP: 916.5 mKB (912.3 mCF)  
Datum: 912.1 mKB (907.9 mCF)  
Hydrostatic Head: N/A  
Last Shut-in Date: N/A  
Actual Prod. (Hrs): 304  
Actual Prod. (m<sup>3</sup>): 53.2 Oil 6.5 Water  
Avg. Rate (m<sup>3</sup>/d): 4.2 Oil 0.5 Water

$\phi$  = 4.3%  
h = 5.0 m

P\* = 4430 kPa  
Pws = 3835 kPa  
PR = 4413 kPa

Assume a gradient of 9.6 kPa/m for hydrostatic head calculations

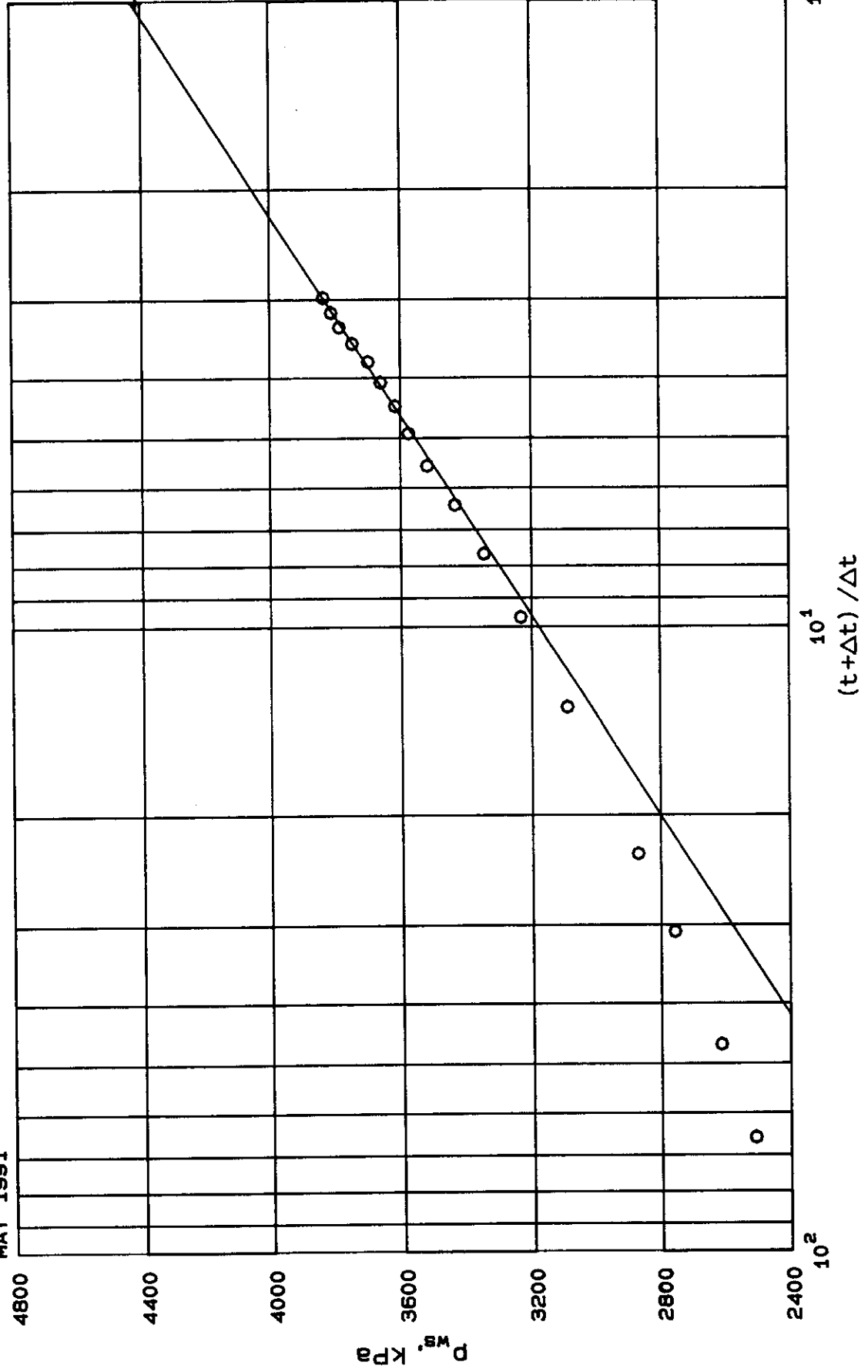
\* Average reservoir pressure at MPP = 4413 kPa (4323 kPag)  
Average reservoir pressure @ Datum = 4371 kPa (4281 kPag)

# HORNER PRESSURE BUILDUP PLOT

OMEGA WASKADA  
3C-24-1-26 WPM  
LOWER AMARANTH INFILL WELL  
MAY 1991

$m = 1253 \text{ kPa}$   
 $p_R = 4413 \text{ kPa}$   
 $s = 8.55 \text{ mD}\cdot\text{m}/\text{mPa}\cdot\text{s}$   
 $-3.9$

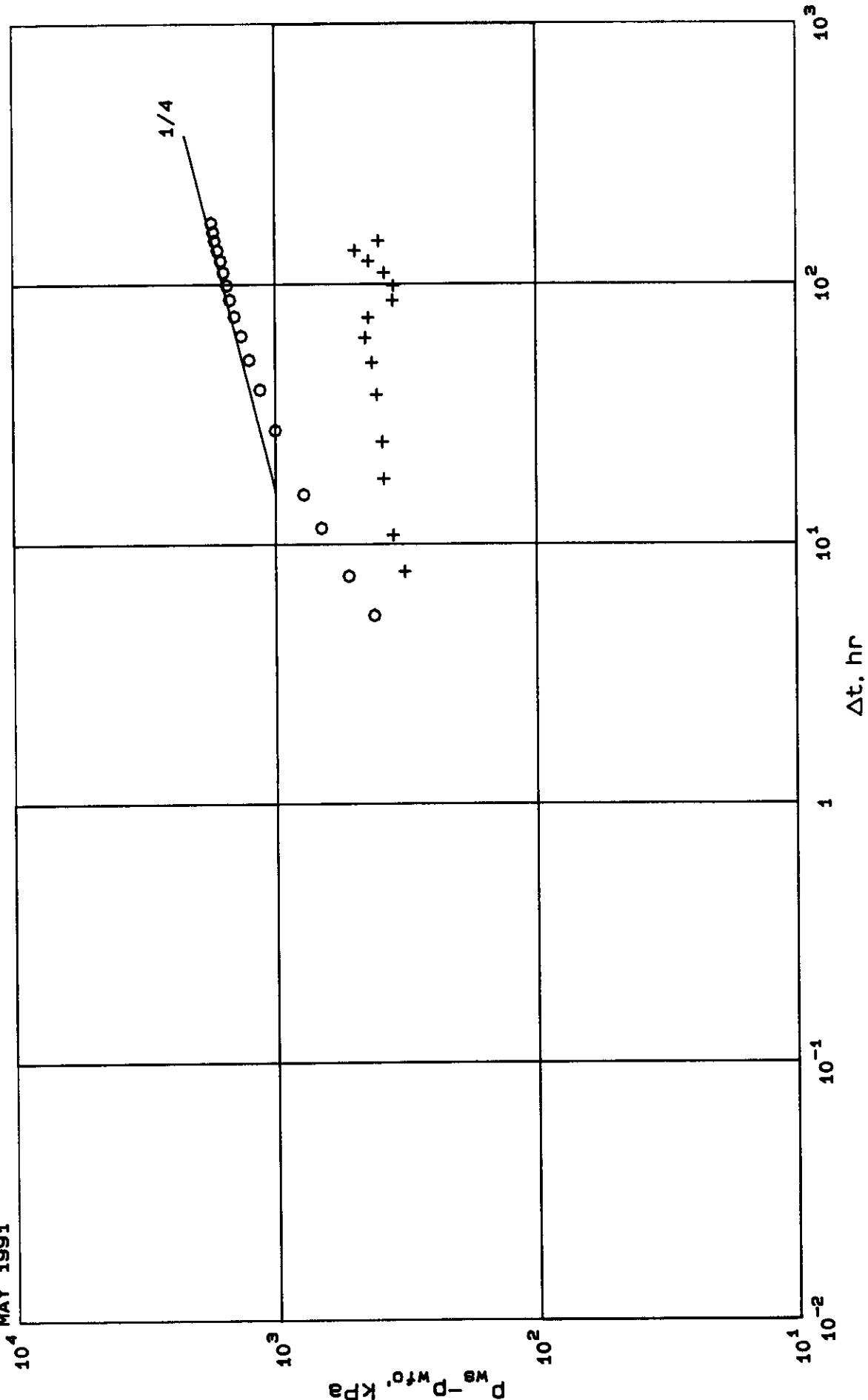
$[kh/\mu]_t =$



# TYPE CURVE PRESSURE BUILDUP PLOT

OMEGA WASKADA  
3C-24-1-26 WPM  
LOWER AMARANTH INFILL WELL  
MAY 1991

o Data points  
+ Derivative



PRESSURE BUILDUP DATA  
IN TERMS OF PRESSURE

-----

OMEGA WASKADA  
3C-24-1-26 WPM

LOWER AMARANTH INFILL WELL  
MAY 1991

Shut-in time hr	Horner time	Equiv time hr	Super time	Super Equiv time hr	Gauge Press RRD kPa	pws MPP kPa	del p kPa
-----	-----	-----	-----	-----	-----	-----	-----
0.00	---	---	---	---	2000	2090	---
5.28	65.61	5.20	---	---	2419	2509	419
7.50	46.49	7.34	---	---	2524	2614	524
11.50	30.66	11.12	---	---	2667	2757	667
15.50	23.01	14.83	---	---	2781	2871	781
27.50	13.41	25.45	---	---	3001	3091	1001
39.50	9.64	35.40	---	---	3144	3234	1144
51.50	7.62	44.75	---	---	3257	3347	1257
63.50	6.37	53.54	---	---	3346	3436	1346
75.50	5.52	61.82	---	---	3429	3519	1429
87.50	4.90	69.64	---	---	3486	3576	1485
99.50	4.43	77.03	---	---	3526	3616	1526
111.50	4.06	84.03	---	---	3571	3661	1571
123.50	3.76	90.67	---	---	3608	3698	1608
135.50	3.52	96.98	---	---	3656	3746	1656
147.50	3.31	102.98	---	---	3696	3786	1696
159.50	3.14	108.68	---	---	3721	3811	1721
173.17	2.97	114.86	---	---	3745	3835	1745

# OIL PRESSURE BUILDUP ANALYSIS - HORNER

-----

OMEGA WASKADA  
3C-24-1-26 WPM

LOWER AMARANTH INFILL WELL  
MAY 1991

## PRODUCTION AND TIMES

-----

Cumulative Production	=	59.7 m <sup>3</sup>	
Actual Flow Time	=	304.00 hr	
Horner Flow Time	=	341.14 hr	
Final Flow Rate q <sub>o</sub>	=	4.2 m <sup>3</sup> /d	
Final Flow Rate q <sub>g</sub>	=	0.000 10 m <sup>3</sup> /d	
Final Flow Rate q <sub>w</sub>	=	0.5 m <sup>3</sup> /d	

## RESERVOIR PARAMETERS

-----

Wellbore Radius	r <sub>w</sub>	= 0.100 m	Reservoir Temp	T <sub>R</sub>	= 319 K
Net Pay	h	= 5.0 m	Water Saturation	S <sub>w</sub>	= 0.400
Total Porosity	phit	= 0.043	Oil Saturation	S <sub>o</sub>	= 0.600

## FLUID PROPERTIES

-----

Compress.	c <sub>g</sub>	= 0.00028117 1/kPa	Viscosity	u <sub>o</sub>	= 5.444 mPa.s
Compress.	c <sub>o</sub>	= 0.00010479 1/kPa	Vol. Fac.	B <sub>g</sub>	= 0.0271530
Compress.	c <sub>w</sub>	= 0.00000045 1/kPa	Vol. Fac.	B <sub>o</sub>	= 1.083
Compress.	c <sub>f</sub>	= 0.00000100 1/kPa	Vol. Fac.	B <sub>w</sub>	= 1.007
Compress.	c <sub>t</sub>	= 0.00006406 1/kPa	Sol. Gas	R <sub>so</sub>	= 16.1 m <sup>3</sup> /m <sup>3</sup>

## PRESSURES

-----

Horner Extrap.	p*	= 4430 kPa
Initial Reservoir	p <sub>i</sub>	= --- kPa
Final Flowing	p <sub>wfo</sub>	= 2090 kPa
1 Hour Shut-in	p <sub>ws1</sub>	= 1255 kPa
Average Test	p <sub>av</sub>	= 3835 kPa

# OIL PRESSURE BUILDUP ANALYSIS - HORNER

---

OMEGA WASKADA  
3C-24-1-26 WPM

LOWER AMARANTH INFILL WELL  
MAY 1991

## SEMILOG STRAIGHT LINE RESULTS

---

Slope	m	=	1253 kPa
Transmissivity	[kh/ult	=	8.55 mD.m/mPa.s
	[kh/ulo	=	7.70 mD.m/mPa.s
Mobility	[k/ult	=	1.71 mD/mPa.s
	[k/ulo	=	1.54 mD/mPa.s
Flow Capacity	[kh]o	=	41.90 mD.m
Permeability	ko	=	8.38 mD
Skin Factor	s	=	-3.9
Pressure Drop Due to Skin		=	--- kPa
Flow Efficiency	FE	=	2.81
Damage Ratio	DR	=	0.36
Productivity Index	PI	=	0.00180764 m <sup>3</sup> /d/kPa
Radius of Inv.	rinv	=	52 m

## AVERAGE PRESSURE CALCULATION

---

Drainage Area	A	=	32 ha
Shape/Well Configuration		=	R1A
Average Reserv. Pressure	pR	=	4413 kPa

## STABILIZED RATE PREDICTIONS

---

Time to Stabilization	ts	=	14319 hr
Stabilized Rate	qs	=	2.6 m <sup>3</sup> /d
		=	0.00111681 m <sup>3</sup> /d/kPa
Productivity Index	PI	=	0.00111681 m <sup>3</sup> /d/kPa

Omega Waskada 3C-24  
3C-24-1-26 WLM  
Lower Amaranth Formation

Build-up Test  
May 2-9, 1991

## BASIC DATA

COMPANY: Omega Hydrocarbons Ltd.		WELL NAME: Omega Waskada 3C-24	
ADDRESS: Calgary, Alberta		UNIQUE WELL IDENTIFIER: 3C-24-001-26 W1M	
FIELD AND POOL: Waskada / Lower Ameranth		STATUS:	
TYPE OF TEST: Build-up Test		DATE OF TEST: Y 91 M 05 D 02 TO Y 91 M 05 D 09	
PRODUCING INTERVAL (m,CF): 907.8-916.8		PERF	PRODUCING THROUGH: 60.3 mm TUBING
ELEVATION: (CF) 467.9 m (KB) 472.1 m		114.3 mm CASING	
POOL DATUM (SUBSEA): -440.0		MID POINT OF PRODUCING (MPP) INTERVAL (m,CF): 912.3	
ELEMENT SERIAL NO: RANGE(GAUGE) kPa		DATUM DEPTH OF WELL FROM (m,CF): 907.9	
CALIBRATION EQUATION: See calibration report		CLOCK RANGE: 180 hrs LAST CALIBRATION: See Cal. Report	

## STATIC TEST

TUBING PRESSURE:	kPag	SHUT-IN DATE: 0830 May 02/91	DURATION:	hrs
CASING PRESSURE:	kPag	DATE ON BOTTOM:	e	hrs
RUN DEPTH (m,CF):		DATE OFF BOTTOM:	e	hrs
B.H. TEMP:	°C R.D. PRESSURE	kPag	MPP PRESSURE:	kPag
SURFACE TEMP:	°C GRADIENT	kPa/m	DATUM DEPTH PRESSURE (GAUGE):	kPag

## ACOUSTIC WELL SOUNDER TEST

NOT APPLICABLE
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## BUILD-UP OR DRAWDOWN TEST

NOT APPLICABLE
----------------

## CHART READINGS AND CALCULATIONS FOR STATIC TEST

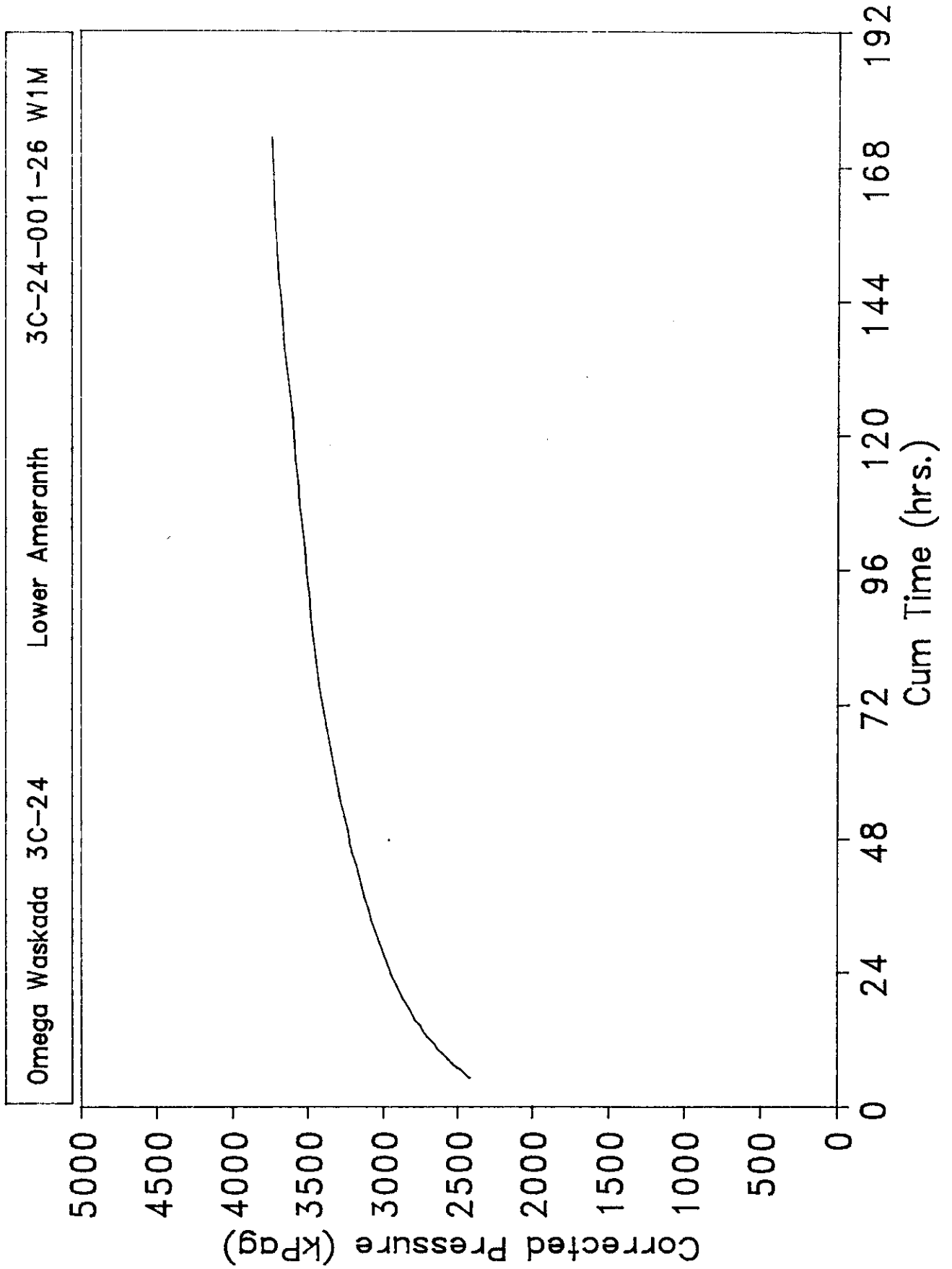
SEE NEXT PAGE
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## COMMENTS

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SURVEYED BY: M.M	TESTED BY: S. Hourd	COMPUTED BY: R. Hale	CHECKED BY:
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OPSCO BUILD-UP GAUGE # 051953 May 02 - 09, 1991



Reporting Date: May 13, 1991

Page 3 of 9

Well Name: Omega Waskada 3C-24  
Pool: Lower Ameranth

Location: 3C-24-001-26 W1M  
Test Date: May 02 - 09/91

--- Lower Gauge ---	--- Upper Gauge ---
Ser # 051953	Ser # 045300
Range 13790	Range 13790
Depth 912.3	Depth 910.3

Date	Time	Period (hrs.)	Deflect (mm)	Corrected Pressure (kPag)	Deflect (mm)	Corrected Pressure (kPag)
02-May-91	08:30	0.00	<Shut-in well for build-up >			
	13:47	5.28	<Set recorders at 912.3 m,CF >			
	13:47	5.28	8.652	2419.2	8.927	2436.3
	13:50	5.33	8.672	2424.8		
	13:55	5.42	8.682	2427.6		
	14:00	5.50	8.709	2435.2		
	14:15	5.75	8.758	2448.9		
	14:30	6.00	8.790	2457.8		
	15:00	6.50	8.852	2475.1		
	15:30	7.00	8.945	2501.1		
	16:00	7.50	9.027	2524.1	9.382	2560.3
	16:30	8.00	9.099	2544.2		
	17:00	8.50	9.160	2561.3		
	18:00	9.50	9.297	2599.6		
	19:00	10.50	9.424	2635.1		
	20:00	11.50	9.538	2666.9	9.889	2698.4
	21:00	12.50	9.656	2699.9		
	22:00	13.50	9.761	2729.3		
	23:00	14.50	9.841	2751.5		
	24:00	15.50	9.947	2781.0	10.306	2812.0
03-May-91	02:00	17.50	10.111	2826.5		
	04:00	19.50	10.262	2868.5		
	06:00	21.50	10.388	2903.5		
	08:00	23.50	10.517	2939.4		
	10:00	25.50	10.639	2973.3		
	12:00	27.50	10.739	3001.1	11.124	3034.9
	14:00	29.50	10.840	3029.1		
	16:00	31.50	10.930	3054.2		
	18:00	33.50	11.023	3080.0		
	20:00	35.50	11.101	3101.7		
	22:00	37.50	11.182	3124.2		
	24:00	39.50	11.254	3144.2	11.679	3186.2
04-May-91	02:00	41.50	11.329	3165.0		
	04:00	43.50	11.396	3183.7		
	06:00	45.50	11.478	3206.4		
	08:00	47.50	11.542	3224.2		
	10:00	49.50	11.600	3240.4		
	12:00	51.50	11.659	3256.8	12.089	3297.9
	16:00	55.50	11.775	3289.0		
	20:00	57.50	11.894	3322.1		
	24:00	63.50	11.979	3345.7	12.430	3390.8

Reporting Date: May 13, 1991

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Well Name: Omega Waskada 3C-24  
Pool: Lower AmeranthLocation: 3C-24-001-26 W1M  
Test Date: May 02 - 09/91

			--- Lower Gauge ---		--- Upper Gauge ---	
			Ser # 051953		Ser # 045300	
			Range 13790		Range 13790	
			Depth 912.3		Depth 910.3	
Date	Time	Period (hrs.)	Deflect (mm)	Corrected Pressure (kPag)	Deflect (mm)	Corrected Pressure (kPag)
05-May-91	04:00	67.50	12.095	3377.9		
	08:00	71.50	12.196	3406.0		
	12:00	75.50	12.280	3429.3		
	16:00	79.50	12.345	3447.4		
	20:00	83.50	12.399	3462.4		
	24:00	87.50	12.482	3485.5	12.912	3522.1
06-May-91	04:00	91.50	12.525	3497.4		
	08:00	95.50	12.567	3509.1		
	12:00	99.50	12.629	3526.3		
	16:00	103.50	12.684	3541.6		
	20:00	107.50	12.744	3558.3		
	24:00	111.50	12.788	3570.5	13.256	3615.9
07-May-91	04:00	115.50	12.838	3584.4		
	08:00	119.50	12.878	3595.5		
	12:00	123.50	12.924	3608.3		
	16:00	127.50	12.990	3626.6		
	20:00	131.50	13.038	3640.0		
	24:00	135.50	13.095	3655.8	13.582	3704.7
08-May-91	04:00	139.50	13.146	3670.0		
	08:00	143.50	13.187	3681.4		
	12:00	147.50	13.238	3695.6		
	16:00	151.50	13.261	3702.0		
	24:00	159.50	13.328	3720.6	13.827	3771.5
09-May-91	08:00	167.50	13.391	3738.1		
	13:40	173.17	13.417	3745.3	13.939	3802.0
	13:40	173.17	<Recovered recorders from well >			

## BASIC DATA

COMPANY: Omega Hydrocarbons Ltd.	WELL NAME: Omega Waskada 3C-24
ADDRESS: Calgary, Alberta	UNIQUE WELL IDENTIFIER: 3C-24-001-26 W1M
FIELD AND POOL: Waskada / Lower Ameranth	STATUS:
TYPE OF TEST: Static Gradient Test	DATE OF TEST: Y 91 M 05 D 09 TO Y M D
PRODUCING INTERVAL (m,CF): 907.8-916.8	PRODUCING THROUGH: 60.3 mm TUBING
ELEVATION: (CF) 467.9 m (KB) 472.1 m	114.3 mm CASING
POOL DATUM (SUBSEA): -440.0	MID POINT OF PRODUCING (MPP) INTERVAL (m,CF): 912.3
ELEMENT SERIAL NO: RANGE(GAUGE) kPa	DATUM DEPTH OF WELL FROM (m,CF): 907.9
CALIBRATION EQUATION: See calibration report	CLOCK RANGE: 180 hrs LAST CALIBRATION: See Cal. Report

## STATIC TEST

TUBING PRESSURE: 415 kPag	SHUT-IN DATE: 0830 May 02/91	DURATION: 174.63 hrs
CASING PRESSURE: 3505 kPag	DATE ON BOTTOM: May 09/91	@ 1515 hrs
RUN DEPTH (m,CF): 912.3	DATE OFF BOTTOM: May 09/91	@ 1520 hrs
B.H. TEMP: 46 °C R.D. PRESSURE 3717 kPag	MPP PRESSURE: 3717	kPag
SURFACE TEMP: °C GRADIENT 9.512 kPa/m	DATUM DEPTH PRESSURE (GAUGE): 3675	kPag

## ACOUSTIC WELL SOUNDER TEST

NOT APPLICABLE

## BUILD-UP OR DRAWDOWN TEST

NOT APPLICABLE

## CHART READINGS AND CALCULATIONS FOR STATIC TEST

SEE NEXT PAGE

## COMMENTS

Estimated oil level at 481 m,CF  
 Estimated water level at 841 m,CF

SURVEYED BY: M.M	TESTED BY: J. Hourd	COMPUTED BY: J. Hale	CHECKED BY:
------------------	---------------------	----------------------	-------------

## STATIC GRADIENT

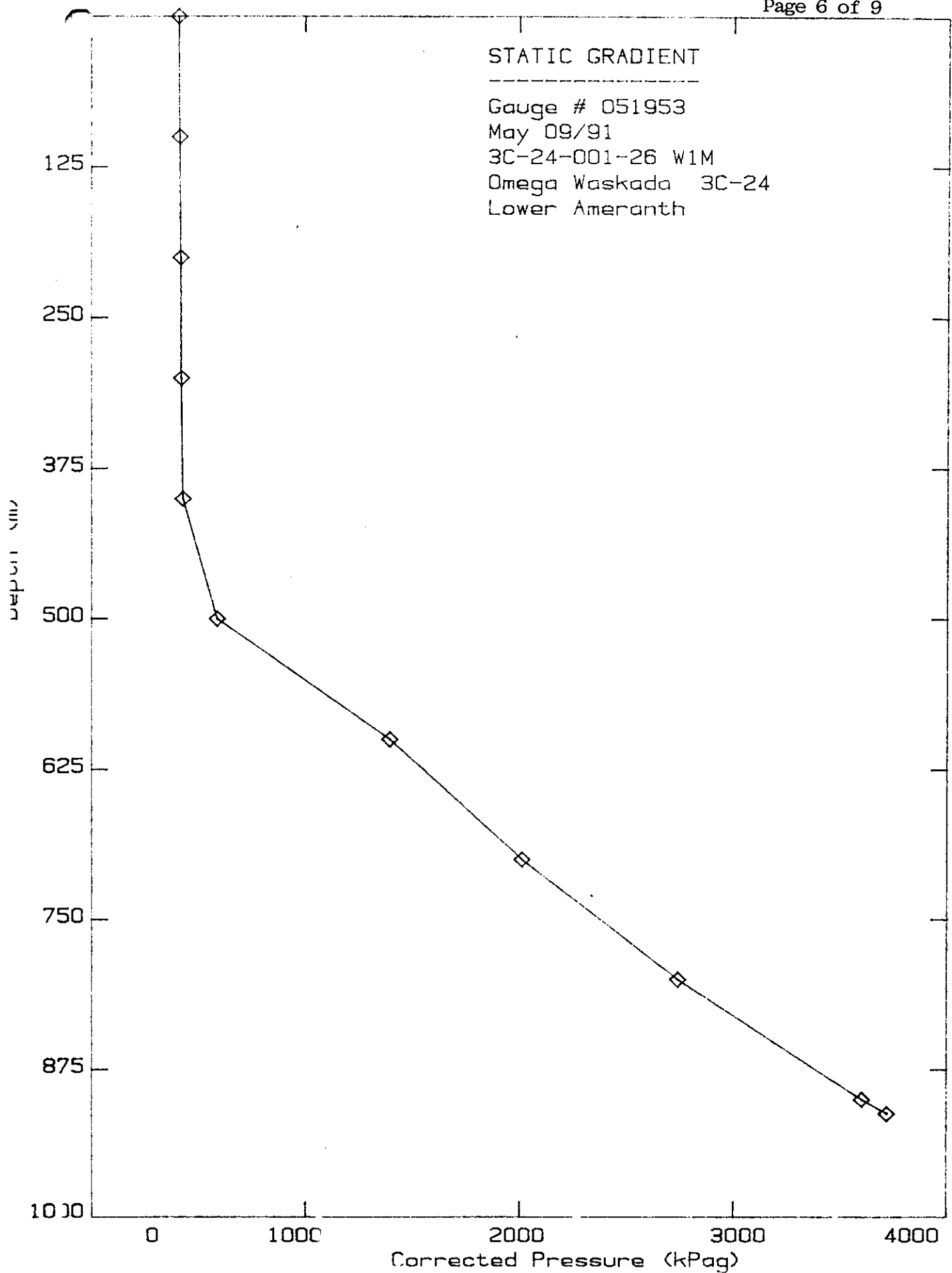
Gauge # 051953

May 09/91

3C-24-001-26 W1M

Omega Waskada 3C-24

Lower Ameranth



Reporting Date: May 13, 1991,

Page 7 of 9

WellName: Omega Waskada 3C-24

Location : 3C-24-001-26 W1M

Pool : Lower Ameranth

Date Of Test: May 09/91

----- Upper Gauge -----						----- Lower Gauge -----			
Serial # 045300 Range 13790						Serial # 051953 Range 13790			
Start Time	End Time	Depth	Deflect	Corrected Pressure	Grad.	Depth	Deflect	Corrected Pressure	Grad.
hh:mm	hh:mm	CF(m)	(mm)	(kPag)	(kPa/m)	CF(m)	(mm)	(kPag)	(kPa/m)
14:32	14:35	Surf	1.524	410.0	0.000	Surf	1.476	412.8	0.000
14:37	14:40	98.0	1.551	417.3	0.074	100.0	1.494	417.8	0.050
14:41	14:44	198.0	1.554	418.1	0.008	200.0	1.508	421.7	0.039
14:46	14:49	298.0	1.566	421.3	0.032	300.0	1.517	424.3	0.025
14:50	14:53	398.0	1.586	426.7	0.054	400.0	1.543	431.5	0.073
14:54	14:57	498.0	2.123	571.2	1.445	500.0	2.116	591.7	1.602
14:58	15:01	598.0	5.106	1373.8	8.024	600.0	4.988	1394.8	8.030
15:02	15:05	698.0	7.438	2001.2	6.274	700.0	7.197	2012.4	6.176
15:06	15:09	798.0	10.150	2730.9	7.297	800.0	9.800	2740.1	7.277
15:11	15:14	898.0	13.356	3595.9	8.650	900.0	12.894	3600.0	8.598
15:15	15:20	910.3	13.794	3714.1	9.608	912.3	13.315	3717.0	9.512

## Comments:

TBG pressure by DWG = 415 kPag  
 CSG pressure by DWG = 3505 kPag  
 Temperature at run depth = 46 C  
 Estimated oil level at 481 m,CF  
 Estimated water level at 841 m,CF

Reporting Date: May 13, 1991

Page 8 of 9

Serial No: 045300  
Range: 13790  
Cal Temp (air): 20  
Cal Temp (bath):  
Bath Cal Date: 02-13-91  
Last Air Cal Date: 10-24-90  
Curr Air Cal Date: 02-13-91  
Recorder Section No:  
Comment:  
Owner: MOOSE MOUNTAIN

Press (kPag)	First (mm)	Second (mm)	Average (mm)	P - Pc (kPa)	Bath (mm)
0	0.000	0.000	0.000	-3.81	0.000
2758	10.249	10.249	10.249	-38.51	10.249
5516	20.470	20.470	20.470	-65.58	20.470
8574	30.640	30.640	30.640	221.25	30.640
11032	40.733	40.733	40.733	-70.94	40.733
13790	50.750	50.750	50.750	-42.42	50.750
Sum:				-0.01	

Previous m = 272.485  
Previous A = 3.813

Present m = 272.485  
Present A = 3.813

Present Press = 13846.04  
Previous Press = 13846.05

Deviation = -0.01  
Acc. Deviation = 34.47

OPSCO Industries Ltd.

- Sub-Surface Pressure Instrument  
Calibration Report

Reporting Date: May 13, 1991

Page 9 of 9.

Serial No: 051953  
Range: 13790  
Cal Temp (air): 20  
Cal Temp (bath):  
Bath Cal Date: 02-13-91  
Last Air Cal Date: 10-24-90  
Curr Air Cal Date: 02-13-91  
Recorder Section No: ++  
Comment:  
Owner: MOOSE MOUNTAIN

Press (kPag)	First (mm)	Second (mm)	Average (mm)	P - Pc (kPa)	Bath (mm)
0	0.000	0.000	0.000	-38.01	0.000
2758	9.864	9.864	9.864	-30.59	9.864
5516	19.788	19.788	19.788	-39.91	19.788
8574	29.723	29.723	29.723	247.71	29.723
11032	39.654	39.654	39.654	-63.55	39.654
13790	49.588	49.588	49.588	-75.65	49.588

Sum: 0.00

Previous m = 278.851  
Previous A = 38.012

Present m = 278.851  
Present A = 38.012

Present Press = 14203.62  
Previous Press = 14203.64

Deviation = -0.03  
Acc. Deviation = 34.47

### General Well Information

4C-24-1-26 WPM (Infill Pilot Project Well)  
Test Date: 91/03/22-91/04/01

GL: 465.7 m  
KB: 469.9 m  
MPP: 920.75 mKB (916.55 mCF)  
Datum: 909.9 mKB (905.7 mCF)  
Hydrostatic Head: N/A  
Last Shut In Date: N/A

Actual Prod. (Hrs.) 72  
Actual Prod. (m<sup>3</sup>) 31.6 Oil 7.2 Water  
Avg. Rate (m<sup>3</sup>/d) 10.5 Oil 2.4 Water

$\phi$  = 4.1%  
h = 5.0 m

P\* = 4188 kPa  
Pws = 3995 kPa  
PR = 4176 KPa

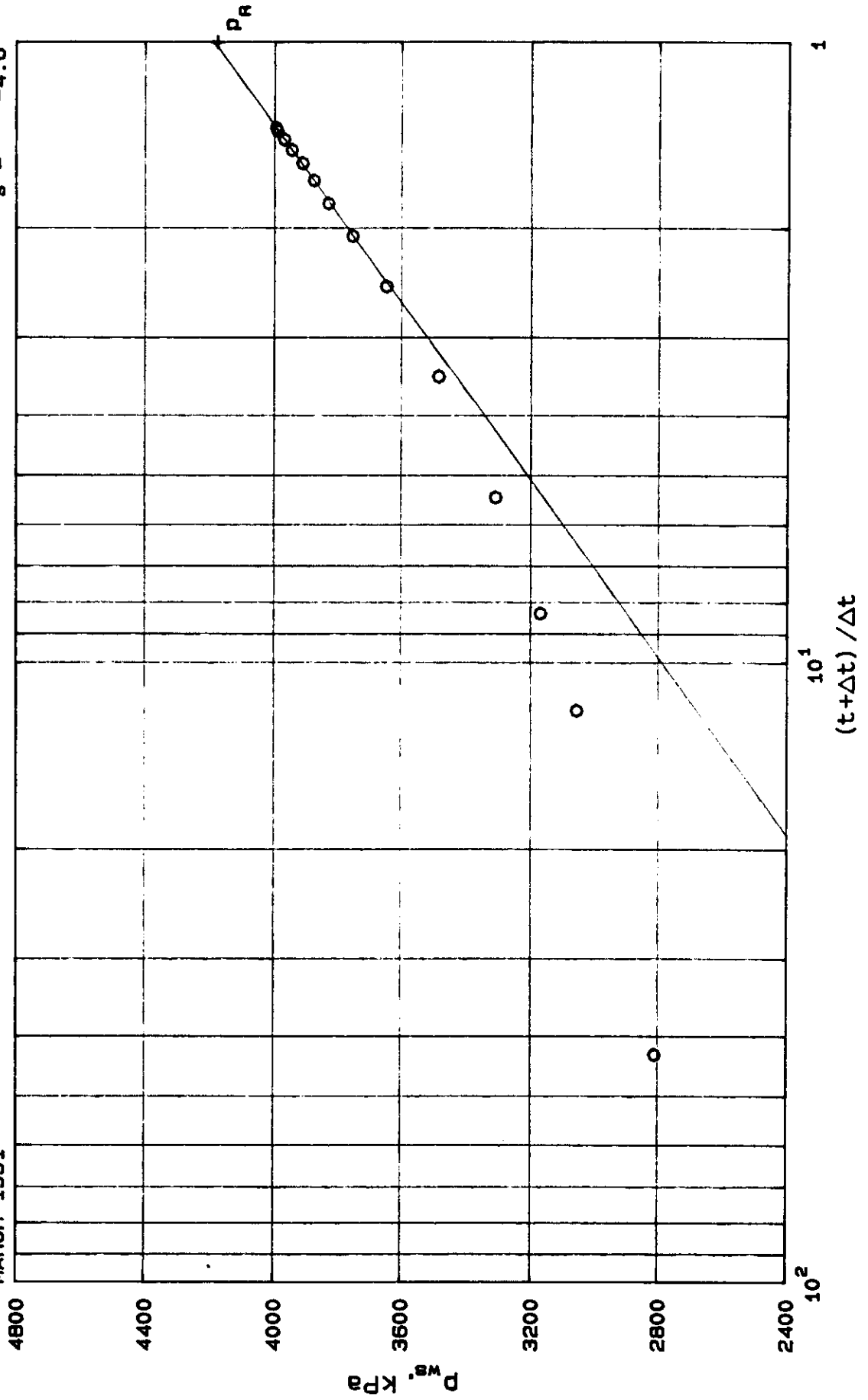
Assume a gradient of 9.3 kPa/m for hydrostatic head calculations.

\*Average reservoir pressure at MPP = 4176 kPa (4086 kPag)  
Average reservoir pressure @ Datum = 4075 kPa (3985 kPag)

# HORNER PRESSURE BUILDUP PLOT

OMEGA WASKADA  
4C-24-1-26 WPM  
LOWER AMARANTH INFILL WELL  
MARCH 1991

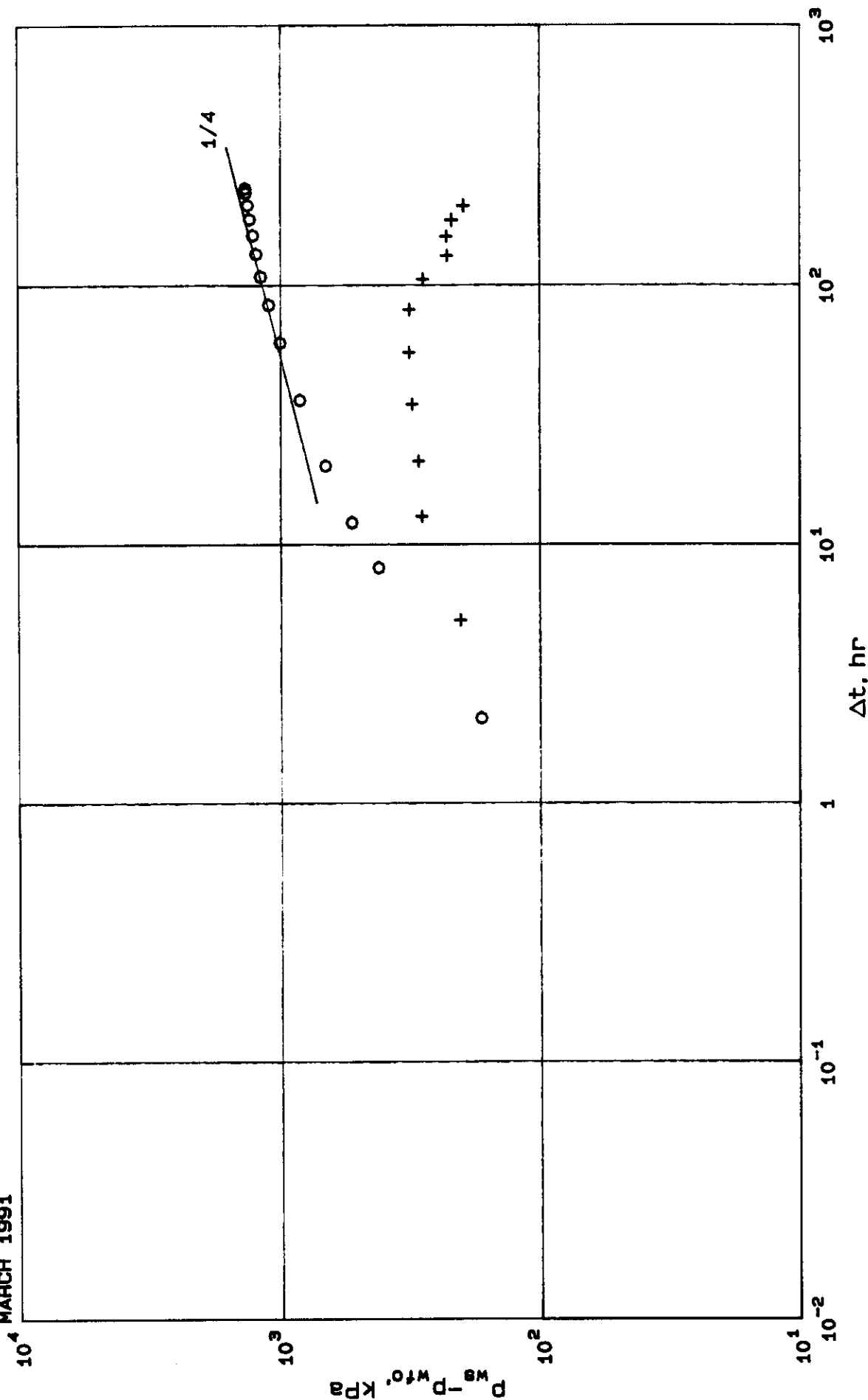
$m = 1399 \text{ kPa}$   
 $p_R = 4176 \text{ kPa}$   
 $[kh/\mu]_t = 20.65 \text{ mD.m/mPa.s}$   
 $s = -4.6$



# TYPE CURVE PRESSURE BUILDUP PLOT

OMEGA WASKADA  
4C-24-1-26 WPM  
LOWER AMARANTH INFILL WELL  
MARCH 1991

○ Data points  
+ Derivative



PRESSURE BUILDUP DATA  
IN TERMS OF PRESSURE

OMEGA WASKADA  
4C-24-1-26 WPM

LOWER AMARANTH INFILL WELL  
MARCH 1991

Shut-in time hr	Horner time	Equiv time hr	Super time	Super Equiv time hr	Gauge Press RRD kPa	pws MPP kPa	del p kPa
0.00	---	---	---	---	2552	2642	---
2.12	42.83	2.07	---	---	2719	2809	168
8.12	11.92	7.44	---	---	2965	3055	414
12.12	8.32	10.66	---	---	3080	3170	528
20.12	5.41	16.40	---	---	3220	3310	669
36.12	3.46	25.67	---	---	3395	3485	843
60.12	2.48	35.83	---	---	3555	3645	1003
84.12	2.05	43.17	---	---	3660	3750	1108
108.12	1.82	48.72	---	---	3739	3829	1187
132.12	1.67	53.07	---	---	3785	3875	1233
156.12	1.57	56.56	---	---	3821	3911	1269
180.12	1.49	59.43	---	---	3855	3945	1303
204.12	1.43	61.82	---	---	3879	3969	1327
228.12	1.39	63.86	---	---	3901	3991	1349
236.65	1.37	64.51	---	---	3905	3995	1353

# OIL PRESSURE BUILDUP ANALYSIS - HORNER

OMEGA WASKADA  
4C-24-1-26 WPM

LOWER AMARANTH INFILL WELL  
MARCH 1991

## PRODUCTION AND TIMES

Cumulative Production	=	38.8 m <sup>3</sup>
Actual Flow Time	=	72.00 hr
Horner Flow Time	=	88.69 hr
Final Flow Rate q <sub>o</sub>	=	10.5 m <sup>3</sup> /d
Final Flow Rate q <sub>g</sub>	=	0.000 10 m <sup>3</sup> /d
Final Flow Rate q <sub>w</sub>	=	2.4 m <sup>3</sup> /d

## RESERVOIR PARAMETERS

Wellbore Radius r <sub>w</sub>	=	0.100 m	Reservoir Temp TR	=	305 K
Net Pay h	=	5.0 m	Water Saturation S <sub>w</sub>	=	0.400
Total Porosity phit	=	0.041	Oil Saturation S <sub>o</sub>	=	0.600

## FLUID PROPERTIES

Compress. c <sub>g</sub>	=	0.00027489 1/kPa	Viscosity u <sub>o</sub>	=	10.751 mPa.s
Compress. c <sub>o</sub>	=	0.00010059 1/kPa	Vol. Fac. B <sub>g</sub>	=	0.0244854
Compress. c <sub>w</sub>	=	0.00000046 1/kPa	Vol. Fac. B <sub>o</sub>	=	1.069
Compress. c <sub>f</sub>	=	0.00000102 1/kPa	Vol. Fac. B <sub>w</sub>	=	1.002
Compress. c <sub>t</sub>	=	0.00006156 1/kPa	Sol. Gas R <sub>so</sub>	=	17.9 m <sup>3</sup> /m <sup>3</sup>

## PRESSURES

Horner Extrapolation p*	=	4188 kPa
Initial Reservoir p <sub>i</sub>	=	--- kPa
Final Flowing p <sub>wfo</sub>	=	2642 kPa
1 Hour Shut-in p <sub>ws1</sub>	=	1456 kPa
Average Test p <sub>av</sub>	=	3995 kPa

# OIL PRESSURE BUILDUP ANALYSIS - HORNER

OMEGA WASKADA  
4C-24-1-26 WPM

LOWER AMARANTH INFILL WELL  
MARCH 1991

## SEMILOG STRAIGHT LINE RESULTS

Slope	m	=	1399 kPa
Transmissivity	[kh/ult	=	20.65 mD.m/mPa.s
	[kh/ulo	=	17.00 mD.m/mPa.s
Mobility	[k/ult	=	4.13 mD/mPa.s
	[k/ulo	=	3.40 mD/mPa.s
Flow Capacity	[kh]o	=	182.79 mD.m
Permeability	ko	=	36.56 mD
Skin Factor	s	=	-4.6
Pressure Drop Due to Skin		=	--- kPa
Flow Efficiency	FE	=	4.62
Damage Ratio	DR	=	0.22
Productivity Index	PI	=	0.00684401 m <sup>3</sup> /d/kPa
Radius of Inv.	rinv	=	41 m

## AVERAGE PRESSURE CALCULATION

Drainage Area	A	=	32 ha
Shape/Well Configuration		=	R1A
Average Reserv. Pressure	pR	=	4176 kPa

## STABILIZED RATE PREDICTIONS

Time to Stabilization	ts	=	5433 hr
Stabilized Rate	qs	=	4.8 m <sup>3</sup> /d
Productivity Index	PI	=	0.00312628 m <sup>3</sup> /d/kPa

Omega Waskada Dir 4c-24  
4c-24-001-26 WLM  
Lower Amaranth Formation

Build-up Test  
March 22 - April 1, 1991

## BASIC DATA

COMPANY: Omega Hydrocarbons Ltd.		WELL NAME: Omega Waskada Dir 4c-24	
ADDRESS: Calgary, Alberta		UNIQUE WELL IDENTIFIER: 4c-24-001-26 W4M	
FIELD AND POOL: Waskada / Lower Amaranth		STATUS: Infill well	
TYPE OF TEST: Build-up Test		DATE OF TEST: Y 91 M 03 D 22 TO Y 91 M 04 D 01	
PRODUCING INTERVAL (m,CF): 910.8-922.3		PRODUCING THROUGH: 60.3	
ELEVATION: (CF) 465.7		TUBING 900	
(KB) 469.9		114.3	
POOL DATUM (SUBSEA): -440.0		Casing	
ELEMENT SERIAL NO: RANGE(GAUGE)		MID POINT OF PRODUCING (MPP) INTERVAL (m,CF): 916.55	
kPa		DATUM DEPTH OF WELL FROM (m,CF): 905.7	
CALIBRATION EQUATION: See calibration report		CLOCK RANGE: 360 hrs LAST CALIBRATION: See Cal. Report	

## STATIC TEST

TUBING PRESSURE:	kPag	SHUT-IN DATE: 0800 hrs Mar. 23/91	DURATION:	hrs
CASING PRESSURE:	kPag	DATE ON BOTTOM:	e	hrs
RUN DEPTH (m,CF):		DATE OFF BOTTOM:	e	hrs
B.H. TEMP:	°C R.D. PRESSURE	MPP PRESSURE:		kPag
SURFACE TEMP:	°C GRADIENT	DATUM DEPTH PRESSURE (GAUGE):		kPag

## ACOUSTIC WELL SOUNDER TEST

NOT APPLICABLE
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## BUILD-UP OR DRAWDOWN TEST

NOT APPLICABLE
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## CHART READINGS AND CALCULATIONS FOR STATIC TEST

SEE NEXT PAGE
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## COMMENTS

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SUR EYED BY: M.M.	TESTED BY: S. Hourd	COMPUTED BY: Rory Hale	CHECKED BY:
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Reporting Date: Apr 4, 1991

Page

Well Name: Omega Waskada Dir 4c-24  
Pool: Lower AmaranthLocation: 4c-24-001-26 W1M  
Test Date: Mar. 22 - Apr. 01/91

			--- Lower Gauge ---		--- Upper Gauge ---	
			Ser # 051953		Ser # 051955	
			Range 13790		Range 13790	
			Depth 918.0		Depth 916.0	
Date	Time	Period (hrs.)	Deflect (mm)	Corrected Pressure (kPag)	Deflect (mm)	Corrected Pressure (kPag)
22-Mar-91	11:53	0.00	<Set recorders at 918 m, CF >			
	11:53	0.00	9.195	2570.9	9.173	2551.8
	12:00	0.12	9.224	2579.0		
	12:15	0.37	9.286	2596.4		
	12:30	0.62	9.349	2614.0		
	12:45	0.87	9.420	2633.8		
	13:00	1.12	9.500	2656.2		
	13:30	1.62	9.654	2699.2		
	14:00	2.12	9.764	2730.0	9.777	2719.3
	14:30	2.62	9.886	2764.1		
	15:00	3.12	9.988	2792.5		
	16:00	4.12	10.146	2836.4		
	17:00	5.12	10.310	2881.9		
	18:00	6.12	10.447	2920.0		
	19:00	7.12	10.552	2949.2		
	20:00	8.12	10.649	2976.2	10.664	2965.4
	21:00	9.12	10.767	3009.0		
	22:00	10.12	10.842	3029.8		
	23:00	11.12	10.966	3064.3		
	24:00	12.12	11.059	3090.1	11.076	3079.7
23-Mar-91	01:00	13.12	11.158	3117.6		
	02:00	14.12	11.237	3139.6		
	04:00	16.12	11.358	3173.2		
	06:00	18.12	11.467	3203.5		
	08:00	20.12	11.575	3233.5	11.583	3220.3
	10:00	22.12	11.681	3263.0		
	12:00	24.12	11.774	3288.8		
	16:00	28.12	11.947	3336.9		
	20:00	32.12	12.085	3375.2		
	24:00	36.12	12.220	3412.8	12.213	3395.1
24-Mar-91	04:00	40.12	12.330	3443.3		
	08:00	44.12	12.408	3465.0		
	12:00	48.12	12.517	3495.3		
	16:00	52.12	12.628	3526.1		
	24:00	60.12	12.793	3572.0	12.789	3554.9
25-Mar-91	08:00	68.12	12.937	3612.0		
	16:00	76.12	13.071	3649.3		
	24:00	84.12	13.180	3679.6	13.168	3660.0
26-Mar-91	08:00	92.12	13.266	3703.5		
	16:00	100.12	13.349	3726.5		
	24:00	108.12	13.438	3751.3	13.451	3738.5

Reporting Date: Apr 4, 1991

Page

Well Name: Omega Waskada Dir 4c-24  
Pool: Lower AmaranthLocation: 4c-24-001-26 W1M  
Test Date: Mar. 22 - Apr. 01/91

--- Lower Gauge ---  
 Ser # 051953  
 Range 13790  
 Depth 918.0

--- Upper Gauge ---  
 Ser # 051955  
 Range 13790  
 Depth 916.0

Date	Time	Period (hrs.)	Deflect (mm)	Corrected Pressure (kPag)	Deflect (mm)	Corrected Pressure (kPag)
27-Mar-91	08:00	116.12	13.505	3769.9		
	16:00	124.12	13.554	3783.5		
	24:00	132.12	13.608	3798.5	13.618	3784.8
28-Mar-91	08:00	140.12	13.664	3814.1		
	16:00	148.12	13.703	3824.9		
	24:00	156.12	13.757	3839.9	13.749	3821.2
29-Mar-91	08:00	164.12	13.817	3856.6		
	16:00	172.12	13.839	3862.7		
	24:00	180.12	13.868	3870.8	13.871	3855.0
30-Mar-91	08:00	188.12	13.898	3879.1		
	16:00	196.12	13.942	3891.3		
	24:00	204.12	13.963	3897.2	13.958	3879.1
31-Mar-91	08:00	212.12	14.000	3907.4		
	16:00	220.12	14.010	3910.2		
	24:00	228.12	14.044	3919.7	14.037	3901.1
01-Apr-91	08:00	236.12	14.046	3920.2		
	08:32	236.65	14.047	3920.5	14.051	3904.9
	08:32	236.65	<Recovered recorders from well >			

ERC 0-12

## SUBSURFACE PRESSURE MEASUREMENT

Page of

## BASIC DATA

COMPANY: Omega Hydrocarbons Ltd.		WELL NAME: Omega Waskada Dir 4c-24	
ADDRESS: Calgary, Alberta		UNIQUE WELL IDENTIFIER: 4c-24-001-26 W4M	
FIELD AND POOL: Waskada / Lower Amaranth		STATUS: Infill well	
TYPE OF TEST: Static Gradient Test		DATE OF TEST: Y 91 M 04 D 01 TO Y M D	
PRODUCING INTERVAL (m,CF): 910.8-922.3		PRODUCING THROUGH: 60.3	
ELEVATION: (CF) 465.7		TUBING 900	
(KB) 469.9		114.3	
POOL DATUM (SUBSEA): -440.0		Casing	
ELEMENT SERIAL NO: RANGE(GAUGE) kPa		MID POINT OF PRODUCING (MPP) INTERVAL (m,CF): 916.55	
CALIBRATION EQUATION: See calibration report		DATUM DEPTH OF WELL FROM (m,CF): 905.7	
		CLOCK RANGE: 3 hrs LAST CALIBRATION: See Cal. Report	

## STATIC TEST

TUBING PRESSURE: 0	kPag	SHUT-IN DATE: 0800 hrs Mar. 23/91	DURATION: 240.53	hrs
CASING PRESSURE: 3675	kPag	DATE ON BOTTOM: April 01/91	@ 0958	hrs
RUN DEPTH (m,CF): 918.0		DATE OFF BOTTOM: April 01/91	@ 1003	hrs
B.H. TEMP: 45 °C	R.D. PRESSURE 3894	kPag	MPP PRESSURE: 3880	kPag
SURFACE TEMP: °C	GRADIENT 9.714	kPa/m	DATUM DEPTH PRESSURE (GAUGE): 3778	kPag

## ACOUSTIC WELL SOUNDER TEST

NOT APPLICABLE

## BUILD-UP OR DRAWDOWN TEST

NOT APPLICABLE

## CHART READINGS AND CALCULATIONS FOR STATIC TEST

SEE NEXT PAGE

## COMMENTS

Estimated oil level at 485 m,CF  
 Estimated water level at 700 m,CF

SURVEYED BY: M.N.	TESTED BY: S. Hourd	COMPUTED BY: Rory Hale	CHECKED BY:
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Reporting Date: Apr 04, 1991,

Page

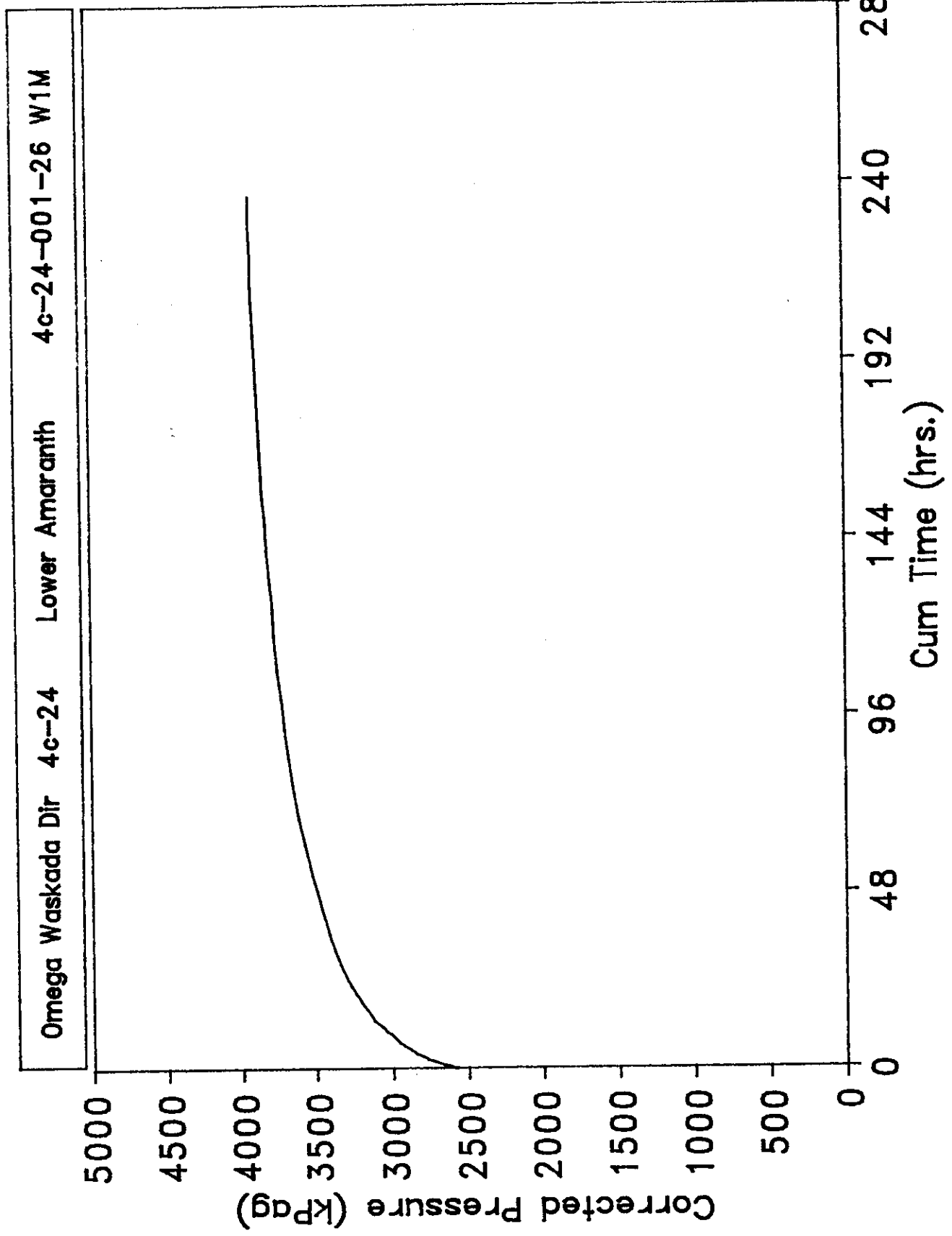
WellName: Omega Waskada Dir 4c-24  
Pool : Lower AmaranthLocation : 4c-24-001-26 W1M  
Date Of Test: April 01/91----- Upper Gauge -----  
Serial # 051955 Range 13790----- Lower Gauge -----  
Serial # 051953 Range 13790

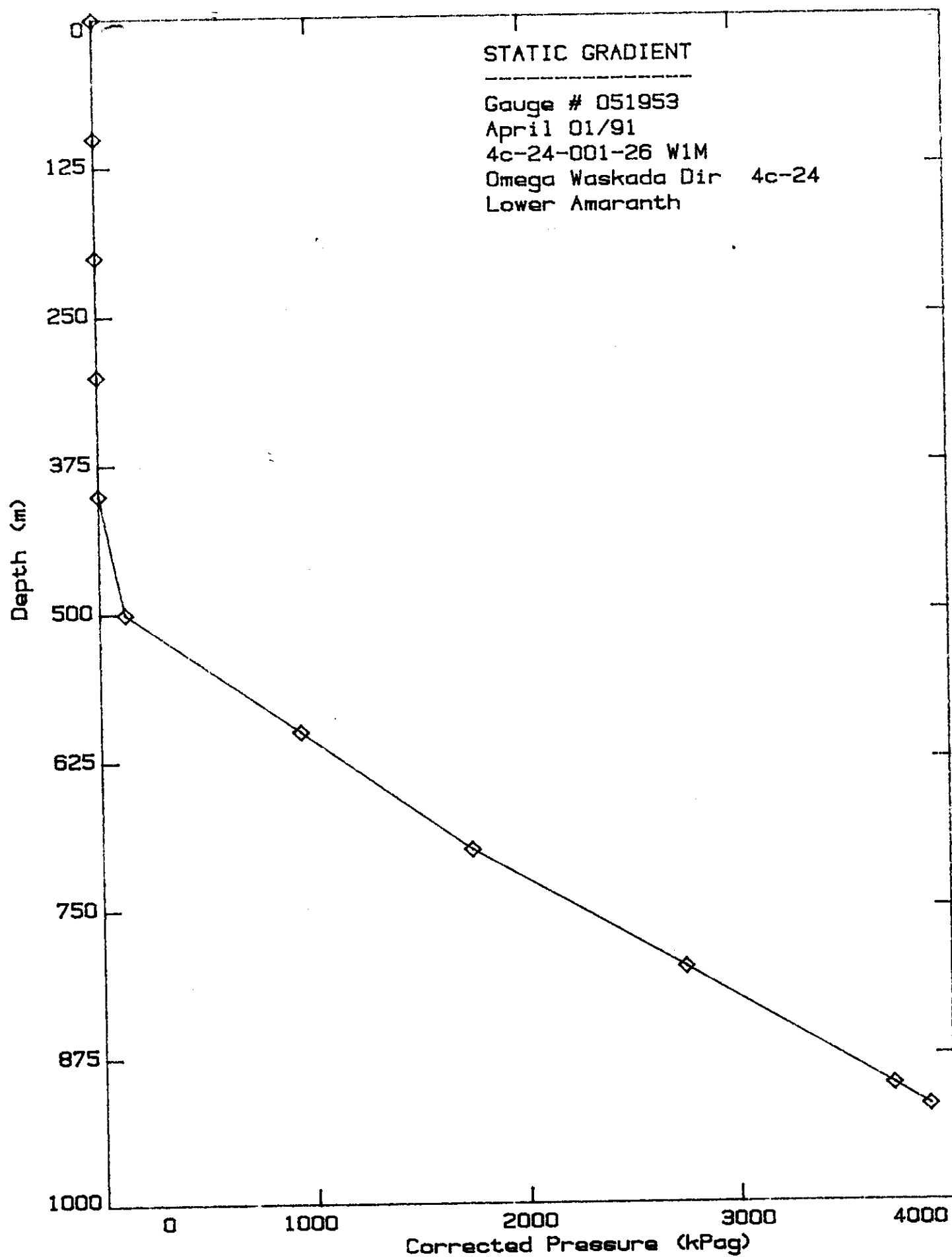
Start Time	End Time	Depth	Deflect	Corrected Pressure	Grad.	Depth	Deflect	Corrected Pressure	Grad.
hh:mm	hh:mm	CF(m)	(mm)	(kPag)	(kPa/m)	CF(m)	(mm)	(kPag)	(kPa/m)
09:05	09:08	Surf	0.000	0.0	0.000	Surf	0.000	0.1	0.000
09:14	09:17	98.0	0.000	0.0	0.000	100.0	0.000	0.1	0.000
09:19	09:22	198.0	0.000	0.0	0.000	200.0	0.000	0.1	0.000
09:23	09:26	298.0	0.000	0.0	0.000	300.0	0.000	0.1	0.000
09:28	09:31	398.0	0.000	0.0	0.000	400.0	0.000	0.1	0.000
09:33	09:36	498.0	0.394	109.8	1.098	500.0	0.430	120.3	1.202
09:39	09:42	598.0	3.354	934.7	8.249	600.0	3.370	942.3	8.220
09:44	09:47	698.0	6.259	1744.2	8.095	700.0	6.236	1743.6	8.013
09:49	09:52	798.0	9.834	2740.4	9.962	800.0	9.821	2745.9	10.023
09:54	09:57	898.0	13.382	3724.1	9.837	900.0	13.341	3724.3	9.784
09:58	10:03	916.0	13.952	3882.1	8.778	918.0	13.951	3893.8	9.417

## Comments:

TBG pressure by DWG = 0 kPag  
 CSG pressure by DWG = 3675 kPag  
 Temperature at run depth = 45 C  
 Estimated oil level at 485 m,CF  
 Estimated water level at 700 m,CF

OPSCO      BUILD-UP      GAUGE # 051953      Mar. 22 - Apr. 01, 1991





OPSCO Industries Ltd.

- Sub-Surface Pressure Instrument  
Calibration Report

Reporting Date: Apr 04, 1991

Page

Serial No: 051955  
Range: 13790  
Cal Temp (air): 20  
Cal Temp (bath):  
Bath Cal Date: 05-01-90  
Last Air Cal Date: 08-25-90  
Curr Air Cal Date: 01-30-91  
Recorder Section No:  
Comment: MOOSE MOUNTAIN  
Owner: MOOSE MOUNTAIN

Press (kPag)	First (mm)	Second (mm)	Average (mm)	P - Pc (kPa)	Bath (mm)
0	0.000	0.000	0.000	-7.11	0.000
2758	9.897	9.897	9.897	5.40	9.897
5516	19.846	19.846	19.846	3.50	19.846
8274	29.790	29.790	29.790	2.98	29.790
11032	39.752	39.752	39.752	-2.54	39.752
13790	49.693	49.693	49.693	-2.23	49.693
Sum:				0.00	

Previous m = 277.410  
Previous A = 7.110

Present m = 277.406  
Present A = 7.113

Present Press = 14099.31  
Previous Press = 14099.54

Deviation = -0.22  
Acc. Deviation = 34.47

OPSCO Industries Ltd.

- Sub-Surface Pressure Instrument  
Calibration Report

Reporting Date: Apr 04, 1991

Page

Serial No: 051953  
Range: 13790  
Cal Temp (air): 20  
Cal Temp (bath):  
Bath Cal Date: 02-13-90  
Last Air Cal Date: 10-24-90  
Curr Air Cal Date: 02-13-91  
Recorder Section No:  
Comment: MOOSE MOUNTAIN  
Owner: MOOSE MOUNTAIN

Press (kPag)	First (mm)	Second (mm)	Average (mm)	P - Pc (kPa)	Bath (mm)
0	0.000	0.000	0.000	-9.38	0.000
2758	9.864	9.864	9.864	6.55	9.864
5516	19.788	19.788	19.788	5.80	19.788
8274	29.723	29.723	29.723	2.00	29.703
11032	39.654	39.654	39.654	-0.75	39.654
13790	49.588	49.588	49.588	-4.22	49.588

Sum: 0.00

Previous m = 277.990  
Previous A = 9.380

Present m = 277.987  
Present A = 9.383

Present Press = 14131.14  
Previous Press = 14131.27

Deviation = -0.13  
Acc. Deviation = 34.47

### GENERAL WELL INFORMATION

6A-24-1-26 WPM (Infill Pilot Project Well)  
Test Date: 91/05/02 - 91/05/09

GL: 467.9 m  
KB: 472.1 m  
MPP: 914.5 mKB (910.3 mCF)  
Datum: 912.1 mKB (907.9 mCF)  
Hydrostatic Head: N/A  
Last Shut-in Date: N/A  
Actual Prod. (Hrs): 330  
Actual Prod. (m<sup>3</sup>): 72.7 Oil 12.1 Water  
Avg. Rate (m<sup>3</sup>/d): 5.3 Oil 0.9 Water

$\phi$  = 4.2%  
h = 4.9 m

P\* = 4132 kPa  
Pws = 3609 kPa  
PR = 4112 kPa

Assume a gradient of 11.8 kPa/m for hydrostatic head calculations

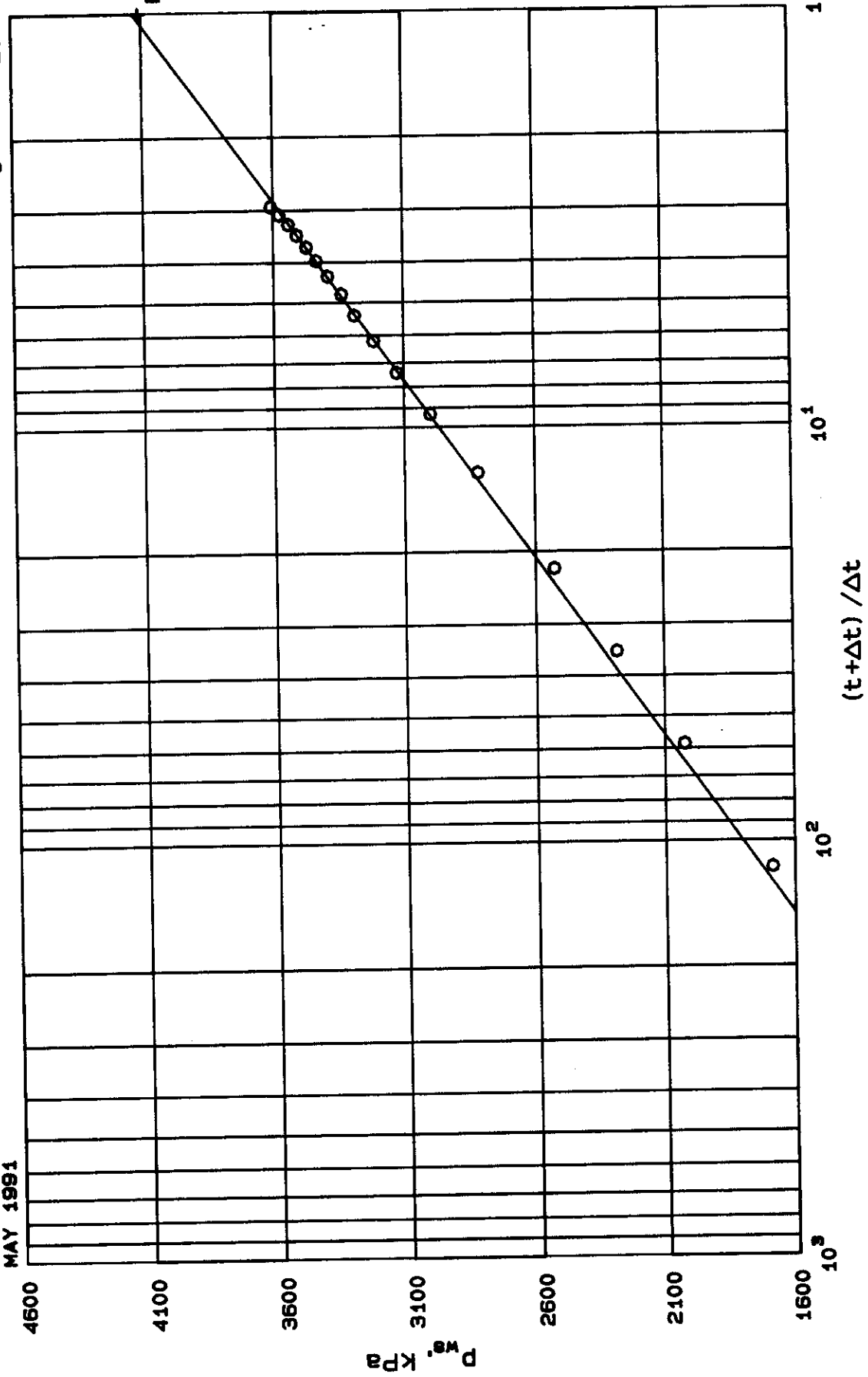
\* Average reservoir pressure at MPP = 4112 kPa (4022 kPag)  
Average reservoir pressure @ Datum = 4084 kPa (3994 kPag)

# HORNER PRESSURE BUILDUP PLOT

OMEGA WASKADA  
6A-24-1-26 WPM  
LOWER AMARANTH INFILL WELL  
MAY 1991

$m =$  1165 kPa  
 $P_R =$  4112 kPa  
 $12.05 \text{ mD.m/mPa.s}$   
 $s =$  -2.3

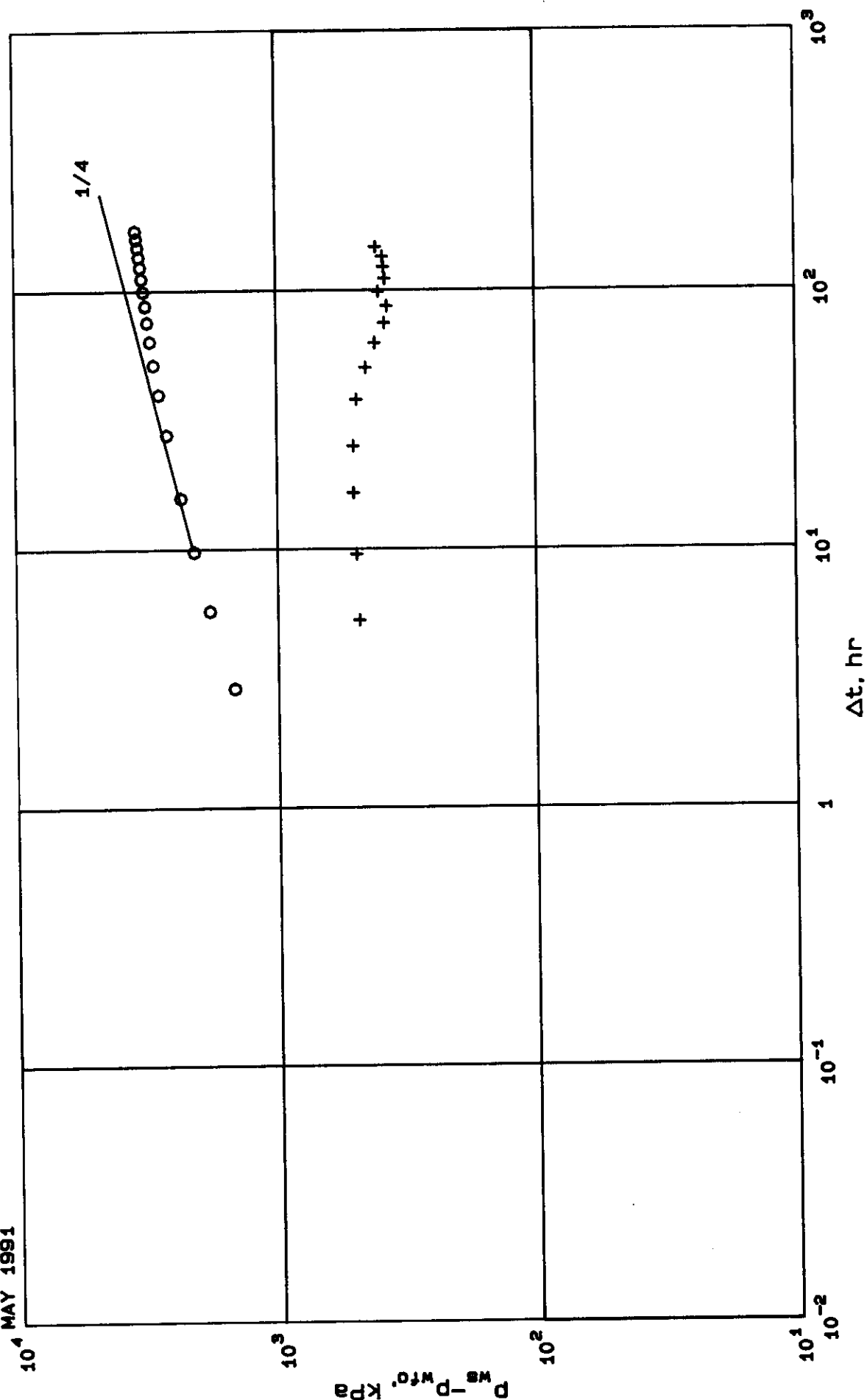
$[kh/\mu]_e =$



# TYPE CURVE PRESSURE BUILDUP PLOT

OMEGA WASKADA  
6A-24-1-26 WPM  
LOWER AMARANTH INFILL WELL  
MAY 1991

○ Data points  
+ Derivative



PRESSURE BUILDUP DATA  
IN TERMS OF PRESSURE  
-----

OMEGA WASKADA  
6A-24-1-26 WPM

LOWER AMARANTH INFILL WELL  
MAY 1991

Shut-in time hr	Horner time	Equiv time hr	Super time	Super Equiv time hr	Gauge Press RRD kPa	pws MPP kPa	del p kPa
0.00	---	---	---	---	136	226	---
2.87	115.71	2.85	---	---	1598	1688	1462
5.75	58.25	5.65	---	---	1936	2026	1800
9.75	34.76	9.47	---	---	2195	2285	2059
15.75	21.90	15.03	---	---	2438	2528	2302
27.75	12.86	25.59	---	---	2729	2819	2593
39.75	9.28	35.47	---	---	2910	3000	2774
51.75	7.36	44.72	---	---	3037	3127	2901
63.75	6.16	53.41	---	---	3124	3214	2988
75.75	5.35	61.58	---	---	3197	3287	3061
87.75	4.75	69.28	---	---	3247	3337	3111
99.75	4.30	76.55	---	---	3300	3390	3164
111.75	3.95	83.43	---	---	3344	3434	3208
123.75	3.66	89.94	---	---	3382	3472	3246
135.75	3.43	96.12	---	---	3419	3509	3283
147.75	3.23	101.98	---	---	3451	3541	3315
159.75	3.06	107.56	---	---	3487	3577	3351
171.25	2.92	112.65	---	---	3519	3609	3383

# OIL PRESSURE BUILDUP ANALYSIS - HORNER

OMEGA WASKADA  
6A-24-1-26 WPM

LOWER AMARANTH INFILL WELL  
MAY 1991

## PRODUCTION AND TIMES

Cumulative Production	=	72.7	<sup>3</sup>	m
Actual Flow Time	=	330.00		hr
Horner Flow Time	=	329.21		hr
Final Flow Rate	qo	=	5.3	m /d <sup>3</sup>
Final Flow Rate	qg	=	0.000	10 m /d <sup>3 3</sup>
Final Flow Rate	qw	=	0.9	m /d <sup>3</sup>

## RESERVOIR PARAMETERS

Wellbore Radius	rw	=	0.100	m	Reservoir Temp	TR	=	317	K
Net Pay	h	=	4.9	m	Water Saturation	Sw	=	0.400	
Total Porosity	phit	=	0.042		Oil Saturation	So	=	0.600	

## FLUID PROPERTIES

Compress.	cg	=	0.00029813	1/kPa	Viscosity	uo	=	6.112	mPa.s
Compress.	co	=	0.00011231	1/kPa	Vol. Fac.	Bg	=	0.0287572	
Compress.	cw	=	0.00000045	1/kPa	Vol. Fac.	Bo	=	1.078	
Compress.	cf	=	0.00000101	1/kPa	Vol. Fac.	Bw	=	1.006	
Compress.	ct	=	0.00006858	1/kPa	Sol. Gas	Rso	=	15.2	m /m <sup>3 3</sup>

## PRESSURES

Horner Extrap.	p*	=	4132	kPa
Initial Reservoir	pi	=	---	kPa
Final Flowing	pwfo	=	226	kPa
1 Hour Shut-in	pws1	=	1199	kPa
Average Test	pav	=	3609	kPa

# OIL PRESSURE BUILDUP ANALYSIS - HORNER

OMEGA WASKADA  
6A-24-1-26 WPM

LOWER AMARANTH INFILL WELL  
MAY 1991

## SEMILOG STRAIGHT LINE RESULTS

Slope	m	=	1165 kPa
Transmissivity	[kh/ult	=	12.05 mD.m/mPa.s
	[kh/ulo	=	10.40 mD.m/mPa.s
Mobility	[k/ult	=	2.46 mD/mPa.s
	[k/ulo	=	2.12 mD/mPa.s
Flow Capacity	[khlo	=	63.57 mD.m
Permeability	ko	=	12.97 mD
Skin Factor	s	=	-2.3
Pressure Drop Due to Skin		=	--- kPa
Flow Efficiency	FE	=	1.60
Damage Ratio	DR	=	0.63
Productivity Index	PI	=	0.00136376 m <sup>3</sup> /d/kPa
Radius of Inv.	rinv	=	64 m

## AVERAGE PRESSURE CALCULATION

Drainage Area	A	=	32 ha
Shape/Well Configuration		=	R1A
Average Reserv. Pressure	pR	=	4112 kPa

## STABILIZED RATE PREDICTIONS

Time to Stabilization	ts	=	10410 hr
Stabilized Rate	qs	=	4.1 m <sup>3</sup> /d
Productivity Index	PI	=	0.00104247 m <sup>3</sup> /d/kPa

Omega Waskada 6A-24  
6A-24-1-26 WLM  
Lower Amaranth Formation

Build-up Test  
May 2-9, 1991

## BASIC DATA

COMPANY: Omega Hydrocarbons Ltd.		WELL NAME: Omega Waskada 6A-24	
ADDRESS: Calgary, Alberta		UNIQUE WELL IDENTIFIER: 6A-24-001-26 WIM	
FIELD AND POOL: Waskada - Lower Ameranth		STATUS:	
TYPE OF TEST: Build-up Test		DATE OF TEST: Y 91 M 05 D 02 TO Y 91 M 05 D 09	
PRODUCING INTERVAL (m,CF): 905.8-914.8		PERF PRODUCING THROUGH: 60.3 mm TUBING	
ELEVATION: (CF) 467.9 m (KB) 472.1 m		114.3 mm CASING	
POOL DATUM (SUBSEA): -440.0		MID POINT OF PRODUCING (MPP) INTERVAL (m,CF): 910.3	
ELEMENT SERIAL NO: RANGE(GAUGE) kPa		DATUM DEPTH OF WELL FROM (m,CF): 907.9	
CALIBRATION EQUATION: See calibration report		CLOCK RANGE: 180 hrs LAST CALIBRATION: See Cal. Report	

## STATIC TEST

TUBING PRESSURE:	kPag	SHUT-IN DATE: 0815 May 02/91	DURATION:	hrs
CASING PRESSURE:	kPag	DATE ON BOTTOM:	e	hrs
RUN DEPTH (m,CF):		DATE OFF BOTTOM:	e	hrs
B.H. TEMP:	°C R.D. PRESSURE	kPag	MPP PRESSURE:	kPag
SURFACE TEMP:	°C GRADIENT	kPa/m	DATUM DEPTH PRESSURE (GAUGE):	kPa

## ACOUSTIC WELL SOUNDER TEST

NOT APPLICABLE

## BUILD-UP OR DRAWDOWN TEST

NOT APPLICABLE

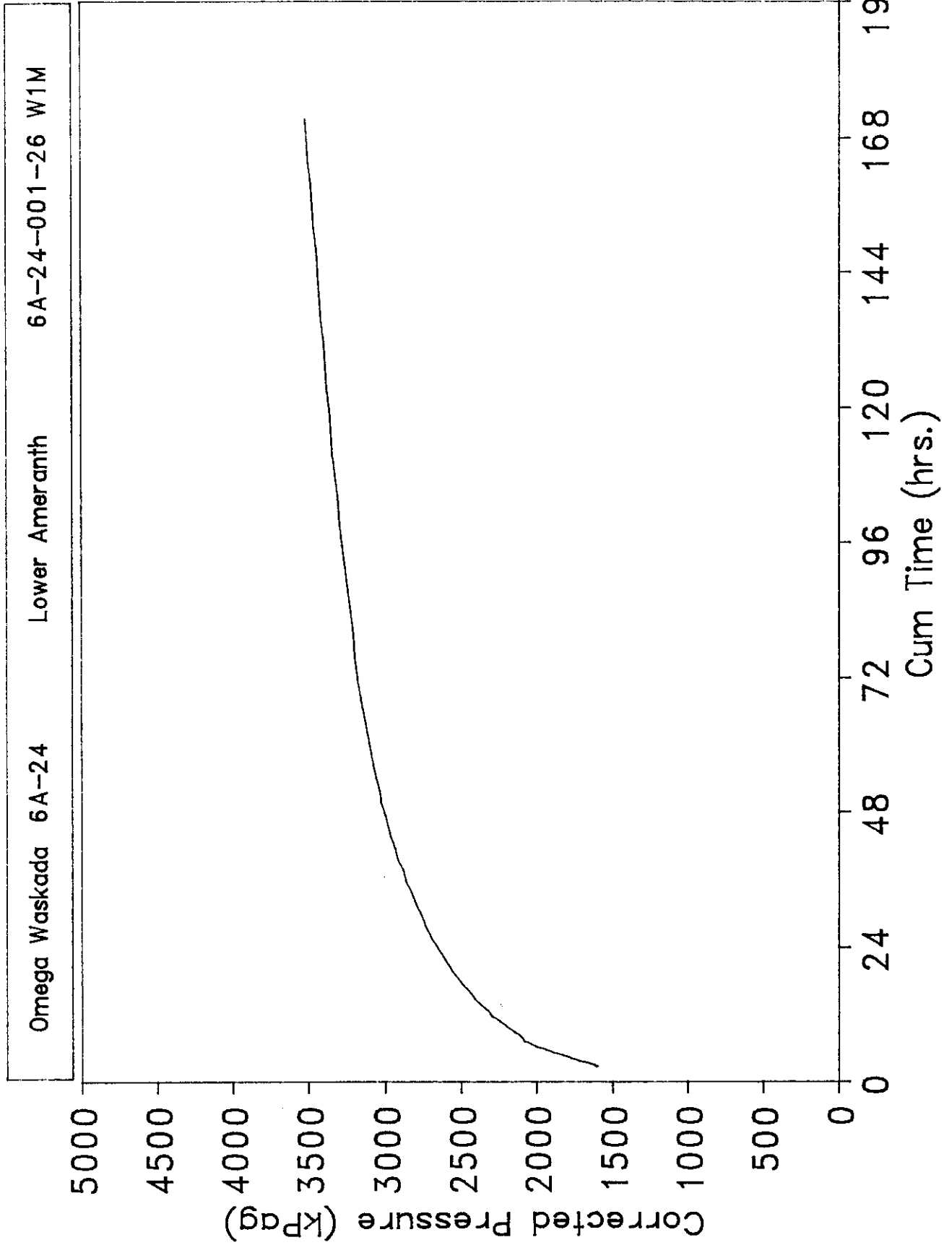
## CHART READINGS AND CALCULATIONS FOR STATIC TEST

SEE NEXT PAGE

## COMMENTS

SURVEYED BY: M.M	TESTED BY: S. Hourd	COMPUTED BY: R. Hale	CHECKED BY:
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OPSCO BUILD-UP GAUGE # 045299 May 02 - 09, 1991



Reporting Date: May 13, 1991

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Well Name: Omega Waskada 6A-24  
Pool: Lower AmeranthLocation: 6A-24-001-26 WIM  
Test Date: May 02 - 09/91

--- Lower Gauge ---  
Ser # 045299  
Range 13790  
Depth 910.3

--- Upper Gauge ---  
Ser # 045301  
Range 13790  
Depth 908.3

Date	Time	Period (hrs.)	Deflect (mm)	Corrected Pressure (kPag)	Deflect (mm)	Corrected Pressure (kPag)
02-May-91	08:15	0.00	<Shut-in well for build-up >			
	11:07	2.87	<Set recorders at 910.3 m, CF >			
	11:07	2.87	5.857	1597.8	5.813	1636.1
	11:10	2.92	5.880	1604.0		
	11:15	3.00	5.910	1612.2		
	11:30	3.25	6.024	1643.3		
	12:00	3.75	6.290	1715.9		
	12:30	4.25	6.507	1775.1		
	13:00	4.75	6.717	1832.4		
	13:30	5.25	6.920	1887.7		
	14:00	5.75	7.096	1935.7	7.058	1985.8
	14:30	6.25	7.332	2000.1		
	15:00	6.75	7.493	2044.0		
	15:30	7.25	7.644	2085.2		
	16:00	7.75	7.671	2092.6		
	16:30	8.25	7.759	2116.6		
	17:00	8.75	7.863	2145.0		
	18:00	9.75	8.045	2194.6	8.007	2252.3
	19:00	10.75	8.223	2243.2		
	20:00	11.75	8.407	2293.4		
	21:00	12.75	8.538	2329.1		
	22:00	13.75	8.691	2370.8		
	23:00	14.75	8.826	2407.7		
	24:00	15.75	8.936	2437.7	8.840	2486.2
03-May-91	02:00	17.75	9.159	2498.5		
	04:00	19.75	9.360	2553.3		
	06:00	21.75	9.551	2605.4		
	08:00	23.75	9.703	2646.9		
	10:00	25.75	9.862	2690.3		
	12:00	27.75	10.003	2728.8	9.896	2782.8
	14:00	29.75	10.116	2759.7		
	16:00	31.75	10.234	2792.1		
	18:00	33.75	10.349	2823.6		
	20:00	35.75	10.464	2855.1		
	22:00	37.75	10.559	2881.1		
	24:00	39.75	10.664	2909.8	10.533	2961.6
04-May-91	02:00	41.75	10.745	2932.0		
	04:00	43.75	10.834	2956.4		
	06:00	45.75	10.908	2976.7		
	08:00	47.75	10.985	2998.0		
	10:00	49.75	11.074	3022.1		

Reporting Date: May 13, 1991

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Well Name: Omega Waskada 6A-24

Location: 6A-24-001-26 W1M

Pool: Lower Ameranth

Test Date: May 02 - 09/91

--- Lower Gauge ---  
 Ser # 045299  
 Range 13790  
 Depth 910.3

--- Upper Gauge ---  
 Ser # 045301  
 Range 13790  
 Depth 908.3

Date	Time	Period (hrs.)	Deflect (mm)	Corrected Pressure (kPag)	Deflect (mm)	Corrected Pressure (kPag)
04-May-91	12:00	51.75	11.129	3037.2	10.996	3091.7
	14:00	53.75	11.187	3053.1		
	16:00	55.75	11.237	3066.8		
	20:00	59.75	11.352	3098.3		
	24:00	63.75	11.447	3124.3		
05-May-91	04:00	67.75	11.560	3155.3	11.282	3172.0
	08:00	71.75	11.643	3178.0		
	12:00	75.75	11.712	3196.9		
	16:00	79.75	11.771	3213.1		
	20:00	83.75	11.840	3232.0		
06-May-91	24:00	87.75	11.893	3246.5	11.748	3302.8
	04:00	91.75	11.959	3264.5		
	08:00	95.75	12.021	3281.5		
	12:00	99.75	12.089	3300.2		
	16:00	103.75	12.138	3313.6		
07-May-91	20:00	107.75	12.197	3329.7	12.054	3388.8
	24:00	111.75	12.250	3344.3		
	04:00	115.75	12.302	3358.5		
	08:00	119.75	12.342	3369.5		
	12:00	123.75	12.389	3382.3		
08-May-91	16:00	127.75	12.433	3394.4	12.333	3467.1
	20:00	131.75	12.465	3403.1		
	24:00	135.75	12.524	3419.3		
	04:00	139.75	12.550	3426.4		
	08:00	143.75	12.608	3442.3		
09-May-91	12:00	147.75	12.640	3451.1	12.566	3532.6
	16:00	151.75	12.685	3463.4		
	20:00	155.75	12.721	3473.3		
	24:00	159.75	12.770	3486.7		
	04:00	163.75	12.835	3504.5		
09-May-91	08:00	167.75	12.878	3516.3	12.679	3564.3
	11:30	171.25	12.888	3519.0		
	11:30	171.25	<Recovered recorders from well >			

## BASIC DATA

COMPANY: Omega Hydrocarbons Ltd.		WELL NAME: Omega Waskada 6A-24	
ADDRESS: Calgary, Alberta		UNIQUE WELL IDENTIFIER: 6A-24-001-26 WIM	
FIELD AND POOL: Waskada / Lower Ameranth		STATUS:	
TYPE OF TEST: Static Gradient Test		DATE OF TEST: Y 91 M 05 D 09 TO Y M D	
PRODUCING INTERVAL (m,CF): 905.8-914.8	PERF	PRODUCING THROUGH: 60.3 mm TUBING	
ELEVATION: (CF) 467.9 m (KB) 472.1 m		114.3 mm CASING	
POOL DATUM (SUBSEA): -440.0		MID POINT OF PRODUCING (MPP) INTERVAL (m,CF): 910.3	
ELEMENT SERIAL NO:	RANGE(GAUGE) kPa	DATUM DEPTH OF WELL FROM (m,CF): 907.9	
CALIBRATION EQUATION: See calibration report		CLOCK RANGE: 3 hrs LAST CALIBRATION: See Cal. Report	

## STATIC TEST

TUBING PRESSURE: 0	kPag	SHUT-IN DATE: 0815 May 02/91	DURATION: 172.73	hrs
CASING PRESSURE: 3350	kPag	DATE ON BOTTOM: May 09/91	@ 1254	hrs
RUN DEPTH (m,CF): 910.3		DATE OFF BOTTOM: May 09/91	@ 1259	hrs
B.H. TEMP: 44 °C	R.D. PRESSURE 3538 kPag	MPP PRESSURE: 3538 kPag		
SURFACE TEMP: °C	GRADIENT 11.701 kPa/m	DATUM DEPTH PRESSURE (GAUGE): 3510. kPag		

## ACOUSTIC WELL SOUNDER TEST

NOT APPLICABLE
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## BUILD-UP OR DRAWDOWN TEST

NOT APPLICABLE
----------------

## CHART READINGS AND CALCULATIONS FOR STATIC TEST

SEE NEXT PAGE
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## COMMENTS

Estimated oil level at 497 m,CF Estimated water level at 857 m,CF
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SURVEYED BY: M.M	TESTED BY: S. Hourd	COMPUTED Y: R. Hale	CHECKED BY:
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## STATIC GRADIENT

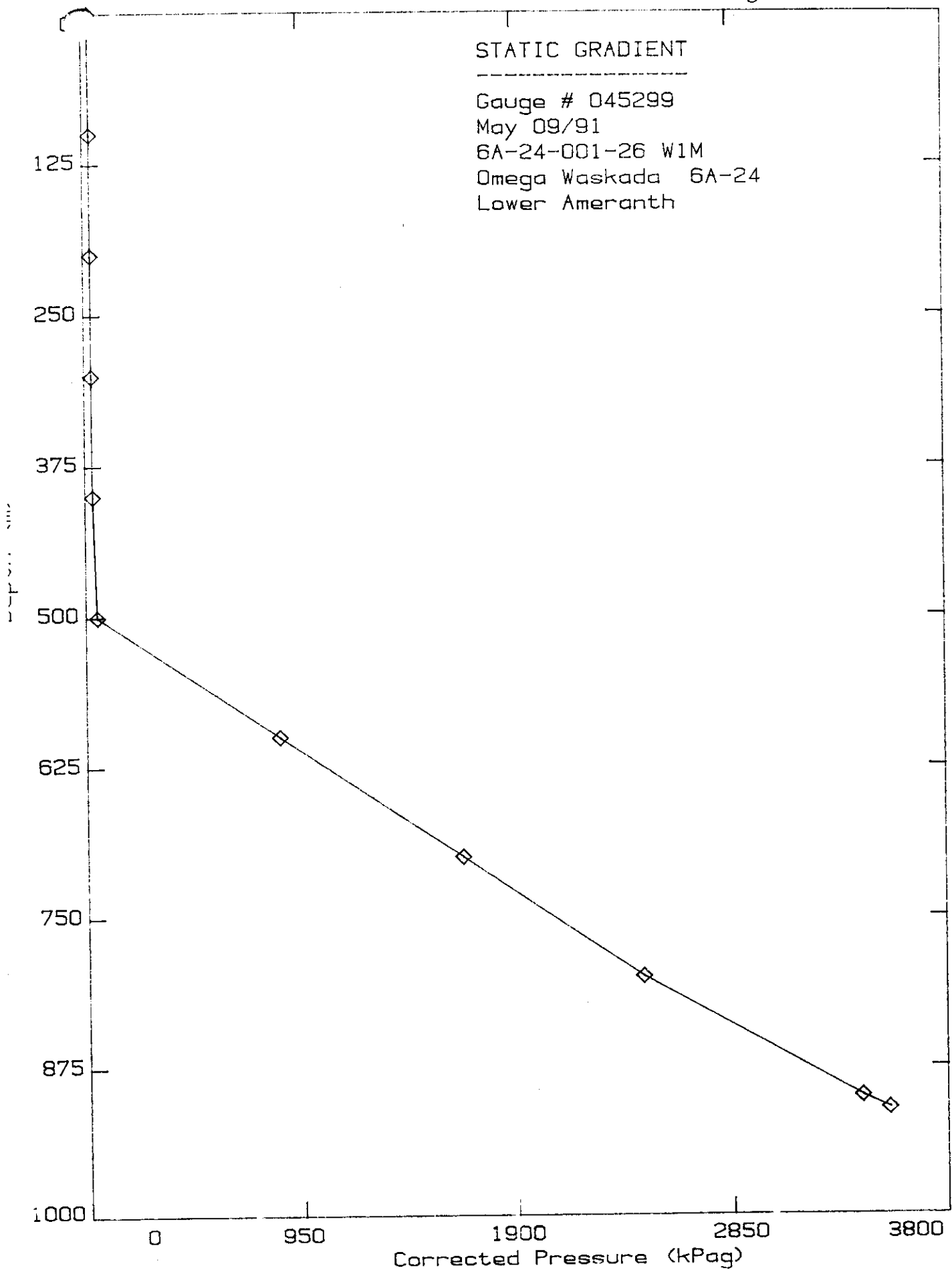
Gauge # 045299

May 09/91

6A-24-001-26 W1M

Omega Waskada 6A-24

Lower Ameranth



Reporting Date: May 13, 1991,

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WellName: Omega Waskada 6A-24

Location : 6A-24-001-26 W1M

Pool : Lower Ameranth

Date Of test: May 09/91

----- Upper Gauge -----						----- Lower Gauge -----				
Serial # 045301 Range 13790						Serial # 045299 Range 13790				
Start Time	End Time	Corrected				Corrected				
hh:mm	hh:mm	Depth	Deflect	Pressure	Grad.	Depth	Deflect	Pressure	Grad.	
		CF(m)	(mm)	(kPag)	(kPa/m)	CF(m)	(mm)	(kPag)	(kPa/m)	
12:12	12:15	Surf	0.110	30.4		Surf	0.102	27.8		
12:16	12:19	98.0	0.114	31.5	0.011	100.0	0.114	31.1	0.033	
12:20	12:23	198.0	0.117	32.4	0.008	200.0	0.116	31.7	0.005	
12:24	12:27	298.0	0.119	32.9	0.006	300.0	0.119	32.5	0.008	
12:28	12:31	398.0	0.123	34.0	0.011	400.0	0.124	33.8	0.014	
12:33	12:36	498.0	0.129	35.7	0.017	500.0	0.187	51.0	0.172	
12:37	12:40	598.0	3.025	838.0	8.023	600.0	3.141	856.9	8.058	
12:41	12:44	698.0	6.009	1664.8	8.267	700.0	6.108	1666.2	8.094	
12:46	12:49	798.0	8.817	2442.7	7.780	800.0	9.020	2460.6	7.944	
12:50	12:53	898.0	12.238	3393.4	9.507	900.0	12.518	3417.7	9.571	
12:54	12:59	908.3	12.678	3515.9	11.887	910.3	12.958	3538.2	11.701	

## Comments:

TBG pressure by DWG = 0 kPag  
 CSG pressure by DWG = 3350 kPag  
 Temperature at run depth = 44 C  
 Estimated oil level at 497 m,CF  
 Estimated water level at 857 m,CF

OPSCO Industries Ltd.

- Sub-Surface Pressure Instrument  
Calibration Report

Reporting Date: May 13, 1991

Page 8 of 9

Serial No: 045299  
Range: 13790  
Cal Temp (air): 20  
Cal Temp (bath):  
Bath Cal Date: 12-03-90  
Last Air Cal Date: 12-03-90  
Curr Air Cal Date: 03-25-91  
Recorder Section No:  
Comment:  
Owner: MOOSE MOUNTAIN

Press (kPag)	First (mm)	Second (mm)	Average (mm)	P - Pc (kPa)	Bath (mm)
0	0.000	0.000	0.000	1.30	0.000
2758	10.108	10.108	10.108	-40.34	10.108
5516	20.176	20.176	20.176	-70.91	20.176
8574	30.166	30.166	30.166	220.13	30.166
11032	40.092	40.092	40.092	-71.11	40.092
13790	49.934	49.934	49.934	-39.08	49.934

Sum: -0.01

Previous m = 276.973  
Previous A = -1.302

Present m = 276.973  
Present A = -1.302

Present Press = 14068.93  
Previous Press = 14068.93

Deviation = 0.01  
Acc. Deviation = 34.47

OPSCO Industries Ltd.

Sub-Surface Pressure Instrument  
Calibration Report

Reporting Date: May 13, 1991

Page 9 of 9

Serial No: 045301  
Range: 13790  
Cal Temp (air): 20  
Cal Temp (bath):  
Bath Cal Date: 12-03-90  
Last Air Cal Date: 12-03-90  
Curr Air Cal Date: 03-25-91  
Recorder Section No:  
Comment:  
Owner: MOOSE MOUNTAIN

Press (kPag)	First (mm)	Second (mm)	Average (mm)	P - Pc (kPa)	Bath (mm)
0	0.000	0.000	0.000	-3.68	0.000
2758	9.953	9.953	9.953	-40.76	9.953
5516	19.864	19.864	19.864	-66.05	19.864
8574	29.716	29.716	29.716	225.23	29.716
11032	39.518	39.518	39.518	-69.44	39.518
13790	49.253	49.253	49.253	-45.30	49.253

Sum: -0.00

Previous m = 280.828  
Previous A = 3.681

Present m = 280.828  
Present A = 3.681

Present Press = 14269.74  
Previous Press = 14269.74

Deviation = 0.00  
Acc. Deviation = 34.47



1300 SUN LIFE PLAZA III  
112 - 4th AVENUE S.W.  
CALGARY, ALBERTA, CANADA T2P 0H3  
TELEPHONE (403) 261-0743  
FAX (403) 264-5691

file: Waskada  
unit No. 4  
Pressure  
surveys

January 16, 1991

Manitoba Energy & Mines  
Petroleum Branch  
555 - 330 Graham Avenue  
Winnipeg, Manitoba  
R3C 4E3

Attention: Mr. John Fox  
Chief Petroleum Engineer

Dear Sir:

RE: 1991 Annual Pressure Survey  
Omega Waskada 15-20-1-25 WPM  
Omega Waskada 5-26-1-26 WPM  
Omega Waskada 13-33-1-26 WPM  
Omega Waskada 13-8-2-25 WPM

In accordance with the Pressure Maintenance rules contained in Board Order No. PM4 please find attached a copy of a recently conducted pressure test for each of the aforementioned wells. Attachment 1 contains a summary of the results obtained from the static gradient test.

Should there be any questions or comments, please contact the undersigned at (403) 261-0743.

Yours truly,

OMEGA HYDROCARBONS LTD.

K. Thomas  
Production Technologist

KT/ns  
c.c.: Waskada Pressure Data Binders  
Wellfiles

**1991 Annual Pressure Survey**  
**Waskada Lower Amaranth Injection Wells**

Well	Pool	Test Date	Shut In Time (hrs.)	Pressure @ MPP (kPag)	Pressure @ Datum (kPag)
15-20-1-25 WPM	LAm	91/01/18	432	10132	10186
5-26-1-26 WPM	LAm	91/01/18	432	9126	9073
13-33-1-26 WPM	LAm	91/01/08	960	9214	9089
13-8-2-25 WPM	LAm	91/01/18	480	8859	9170

Lower Amaranth Datum Depth = 440 m subsea