

RESTAURACION DE PRESION Y GRADIENTE ESTATICA

CLIENTE : PETRO-TECH PERUANA S.A.

POZO : LO16 - 20

LOCACION : LOBITOS

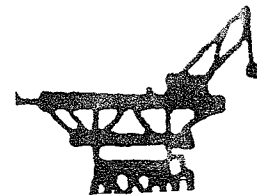
FECHA : del 13/06/95 al 15/06/95





FLOWPETROL S.A.

Avda. Mártires Petroleros Ex - Cementerio
Mz. B3 Lote C. Talara Telefax: 381690



Talara. 16 de Junio de 1.995.

Sres.
PETRO-TECH PERUANA S.A.
Presente.-

Estimado Ingeniero:

Sírvase encontrar adjunto el resultado de la prueba Build-Up realizada en el área de Lobitos Mar, Pozo L016 - 20 de la formación Basal Salina con intervalo de 8,188' - 7,584'.

Este pozo ha sido completado a fines de Mayo del presente año. Esta prueba se programó para 72 horas, pero por orden de Ingeniería se suspendió luego de 50 hrs.

En el gráfico LOG-LOG y la Derivada no es muy claro el comportamiento de flujo radial ; es por ello que el análisis se realizó empleando el método de las curvas tipo por Bourdet. De los cálculos se determinó que el factor Skin es negativo (-2.79), indicándonos que la formación está estimulada.

En el informe se adjuntan datos, cálculos, resultados y toda la secuencia de la prueba.

Esperando que esta información le sea de utilidad y agradeciendo vuestra comunicación para cualquier consulta adicional, me suscribo.

De usted, muy atentamente


ISMAEL HUGO PADILLA LAVERIANO

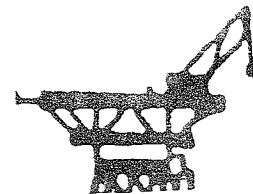
INGENIERO DE PETROLEO

Reg. del Colegio de Ingenieros No. 46574



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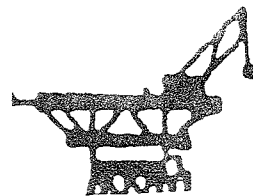


POZO: L016 - 20		ZONA: LOBITOS	
PRUEBA: RESTAURACION DE PRESION Y GRADIENTE ESTATICA			
RELOJ: 25477 - 72 HORAS		ELEMENTO 2,000 PSI SERIE: 45286	
TIPO DE INSTALACION: 5 1/2"		DESARROLLO DE LA PRUEBA	
ESQUEMA INSTALACION (SEGUN ARCHIVO) (*)N.FLUIDO @ 1,125' (*)AMERADA @ 7,615' (*)T.ARENA: 7,875' TAPON: 8,290' 8,712' 8,794'	FECHA	DATOS DEL POZO	
	13-06-95	ESTADO DEL POZO: FLOWING	
		GAS LIFT ☐ SI ☒ NO ☒ CICLO DE PROD: _____	
		PRESION SISTEMA G/L: _____ PSI	
		PRESION DE TBG: _____ PSI	
		FLOWING: _____ PSI WH CHOKE: /64	
		INSTALO BOP: ☐ SI ☒ NO ☒ CALIBRADOR: _____	
		RECUPERO STD VALVE: NO TIENE	
		TOPE DE ARENA: 7,875'	
		GRADIENTE FLUENTE	
HORA		FECHA:	
ELEMENTO ARMADO:		PSI	SERIE
			RELOJ
PROFUNDIDAD DE BOMBA:		FT. MEDIDOS	
RELOJ ENGROCHADO:			
EN EL FONDO:		FLUENTE:	
GAS DE INYECCION CERRADO:			
LEVANTO BOMBA		FECHA:	
OBSERVACIONES:			
GRADIENTE CON PARADAS			
HORA	ELEMENTO	PSI	SERIE
12:35	45286	2000	14138
			RELOJ
PARADAS CADA: 2000;1000;500;200;100		HASTA: 7,615 FT	
REGISTRO POR: 180		MIN.	
LEVANTO BOMBA A SUPERFICIE: 15:00			
INSTALO STANDING VALVE:		☐ SI ☒ NO ☒	FT.
PROFUNDIDAD:			
ESTADO DEL POZO DESPUES DE LA PRUEBA:			
EN PRODUCCION.			
OBSERVACIONES: SE HALLO EL TOPE DE ARENA A 7,875'.			
(*)VALORES MEDIDOS POR FLOWPETROL S.A.			
OPERADOR: R. MONTERO		ING: RUPERTO LEON ALEMAN	



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LECTURA DE MEDICION DE PRESIONES

DATOS BASICOS

CLIENTE PETRO-TECH PERUANA S.A.

DIRECCION NEGRITOS

TIPO DE PRUEBA RESTAURACION DE PRESION - GRADIENTE ESTÁTICA.

INTERVALO DE PRODUCCION 8,188' al 7,584' DE LA FORMACION BASAL SALINA.

ELEMENTO SERIAL No. 45286

ECUACION DE CALIBRACION $K = 1089.3285$ $a = -9.5361$

ELEVACION KB 33 Pies

NOMBRE DEL POZO L016 - 20

LOCACION LOBITOS

FECHA DE PRUEBA DESDE 13 06 95 HASTA 15 06 95

FECHA DE CALIBRACION DEL ELEMENTO 09-03-95

TUBERIA DE PRODUCCION CASING 5 1/2"

TIPO DE PRODUCCION FLOWING

PUNTO MEDIO DE PERFORACIONES: 7,886 Pies 7,173 Pies P.V.

PROFUNDIDAD DEL POZO 8,712 Pies TAPON: 8,290 Pies TOPE: 7,875 Pies

RELOJ # 25477 HORAS 72 # 14138 HORAS 6

PRESION DE SUPERFICIE - TUBING PSI CASING PSI

PROFUNDIDAD MAXIMA DE TRABAJO 7,615 Pies

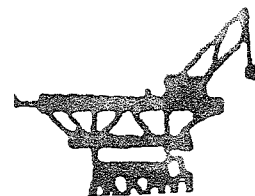
PRESION DE FONDO 1,625 PSI

GRADIENTE DEL POZO 0.235 PSI/FEET

FECHA DE CIERRE DEL POZO: 13 06 95 HORA 09 10

OPERADOR FLOWPETROL ALBERTO PALOMINO

SUPERVISOR ING. LUIS MONTORO N.



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DATOS Y RESULTADOS DE LA PRUEBA

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FORMACION	: BASAL SALINA
INTERVALO PERFORADO	: 8,188' - 7,584'
PRODUCCION ACUMULADA	: 1,129 STB
CAUDAL DE PETROLEO	: 88 STB/D
POROSIDAD	: 10.1 %
COMPRESIBILIDAD	: 9.39x1E-06
VISCOSIDAD DEL PETROLEO	: 0.848 cp.
FACTOR DE VOLUMEN DE FORMACION	: 1.136 bbl/STB
ARENA NETA	: 184 PIES
PRESION FLUYENTE	: 1358.7 PSI
PRESION ESTATICA	: 1625.0 PSI
GRADIENTE DEL POZO	: 0.235 PSI/PIE
GRADIENTE DEL GAS	: 0.005 PSI/PIE
GRADIENTE DEL PETROLEO	: 0.238 PSI/PIE
TRANSMISIBILIDAD	: 169.46 md-pies/cp.
PERMEABILIDAD	: 0.781 md
FACTOR SKIN (s)	: -2.79 (Estimulado)

SE USO METODO DE LA CURVA TIPO BOURDET (DERIVADA)
DEL MATCH

$$\Delta T = 10 \quad T(D)/C(D) = 1.84$$

$$\Delta P = 10 \quad P(D) = 0.12$$

$$C(D)e^2 = 100 \quad C(D) = 26,500.72$$

$$K = [u*Q*B/(0.00708*h)](P(D)/\Delta P) = 0.781 \quad \text{md.}$$

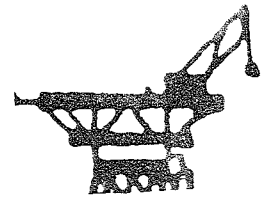
$$C(D) = 0.0002637*K\Delta T/[\phi*u*Ct*rw^2*(T(D)/C(D))] = 26,500.72$$

Handwritten notes:
 $k_i = 1832$
 $S = -0.668$
 $M = 5.50$



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CALCULO PARA EL ANALISIS DE LA RESTAURACION DE PRESION

DEFLECC	TIEMPO (MIN.)	ΔT (HRS.)	$(\Delta T + T_p)/\Delta T$	ΔT_e	Pws (PSI)	ΔP (PSI)
1.2560	0	0.00	--	0.00	1358.66	0.00
1.2600	10	0.17	1848.45	0.17	1363.02	4.36
1.2620	20	0.33	924.73	0.33	1365.20	6.54
1.2640	30	0.50	616.82	0.50	1367.38	8.71
1.2680	40	0.67	462.86	0.67	1371.73	13.07
1.2720	50	0.83	370.49	0.83	1376.09	17.43
1.2730	60	1.00	308.91	1.00	1377.18	18.52
1.2740	70	1.17	264.92	1.16	1378.27	19.61
1.2760	80	1.33	231.93	1.33	1380.45	21.79
1.2780	90	1.50	206.27	1.49	1382.63	23.97
1.2800	100	1.67	185.75	1.66	1384.80	26.14
1.2850	120	2.00	154.95	1.99	1390.25	31.59
1.2870	135	2.25	137.85	2.23	1392.43	33.77
1.2920	150	2.50	124.16	2.48	1397.88	39.22
1.2930	165	2.75	112.97	2.73	1398.97	40.31
1.2950	180	3.00	103.64	2.97	1401.14	42.48
1.2960	195	3.25	95.74	3.22	1402.23	43.57
1.2990	210	3.50	88.97	3.46	1405.50	46.84
1.3030	225	3.75	83.11	3.70	1409.86	51.20
1.3050	240	4.00	77.98	3.95	1412.04	53.38
1.3070	255	4.25	73.45	4.19	1414.22	55.56
1.3090	270	4.50	69.42	4.44	1416.39	57.73
1.3120	285	4.75	65.82	4.68	1419.66	61.00
1.3150	300	5.00	62.58	4.92	1422.93	64.27
1.3180	315	5.25	59.65	5.16	1426.20	67.54
1.3205	330	5.50	56.98	5.40	1428.92	70.26
1.3225	345	5.75	54.55	5.64	1431.10	72.44
1.3250	360	6.00	52.32	5.89	1433.82	75.16
1.3270	375	6.25	50.27	6.13	1436.00	77.34
1.3290	390	6.50	48.37	6.37	1438.18	79.52

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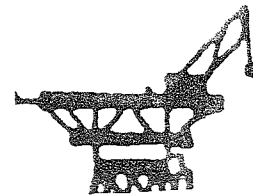
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DEFLECC	TIEMPO (MIN.)	ΔT (HRS.)	$(\Delta T + T_p)/\Delta T$	ΔT_e	Pws (PSI)	ΔP (PSI)
1.3320	405	6.75	46.62	6.61	1441.45	82.79
1.3348	420	7.00	44.99	6.84	1444.50	85.84
1.3370	435	7.25	43.47	7.08	1446.90	88.24
1.3392	450	7.50	42.05	7.32	1449.29	90.63
1.3405	465	7.75	40.73	7.56	1450.71	92.05
1.3435	480	8.00	39.49	7.80	1453.98	95.32
1.3450	495	8.25	38.32	8.03	1455.61	96.95
1.3470	510	8.50	37.22	8.27	1457.79	99.13
1.3495	525	8.75	36.19	8.51	1460.51	101.85
1.3510	540	9.00	35.21	8.74	1462.15	103.49
1.3530	555	9.25	34.29	8.98	1464.33	105.66
1.3565	570	9.50	33.41	9.22	1468.14	109.48
1.3580	585	9.75	32.58	9.45	1469.77	111.11
1.3590	600	10.00	31.79	9.69	1470.86	112.20
1.3600	615	10.25	31.04	9.92	1471.95	113.29
1.3630	630	10.50	30.32	10.15	1475.22	116.56
1.3650	645	10.75	29.64	10.39	1477.40	118.74
1.3660	660	11.00	28.99	10.62	1478.49	119.83
1.3675	675	11.25	28.37	10.85	1480.12	121.46
1.3700	690	11.50	27.77	11.09	1482.84	124.18
1.3710	705	11.75	27.21	11.32	1483.93	125.27
1.3730	720	12.00	26.66	11.55	1486.11	127.45
1.3740	735	12.25	26.14	11.78	1487.20	128.54
1.3760	750	12.50	25.63	12.01	1489.38	130.72
1.3790	765	12.75	25.15	12.24	1492.65	133.99
1.3800	780	13.00	24.69	12.47	1493.74	135.08
1.3810	795	13.25	24.24	12.70	1494.83	136.17
1.3820	810	13.50	23.81	12.93	1495.92	137.26
1.3830	825	13.75	23.39	13.16	1497.01	138.34
1.3840	840	14.00	22.99	13.39	1498.09	139.43
1.3860	855	14.25	22.61	13.62	1500.27	141.61
1.3880	870	14.50	22.24	13.85	1502.45	143.79
1.3890	885	14.75	21.88	14.08	1503.54	144.88
1.3900	900	15.00	21.53	14.30	1504.63	145.97

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DEFLECC	TIEMPO (MIN.)	ΔT (HRS.)	$(\Delta T + T_p)/\Delta T$	ΔT_e	Pws (PSI)	ΔP (PSI)
1.3920	915	15.25	21.19	14.53	1506.81	148.15
1.3940	930	15.50	20.87	14.76	1508.99	150.33
1.3950	945	15.75	20.55	14.98	1510.08	151.42
1.3970	960	16.00	20.24	15.21	1512.26	153.60
1.3980	975	16.25	19.95	15.44	1513.35	154.68
1.4000	990	16.50	19.66	15.66	1515.52	156.86
1.4020	1005	16.75	19.38	15.89	1517.70	159.04
1.4040	1020	17.00	19.11	16.11	1519.88	161.22
1.4050	1035	17.25	18.85	16.33	1520.97	162.31
1.4055	1050	17.50	18.59	16.56	1521.52	162.85
1.4070	1065	17.75	18.35	16.78	1523.15	164.49
1.4090	1080	18.00	18.11	17.01	1525.33	166.67
1.4105	1095	18.25	17.87	17.23	1526.96	168.30
1.4120	1110	18.50	17.64	17.45	1528.60	169.94
1.4130	1125	18.75	17.42	17.67	1529.69	171.02
1.4140	1140	19.00	17.21	17.90	1530.77	172.11
1.4150	1155	19.25	17.00	18.12	1531.86	173.20
1.4160	1170	19.50	16.79	18.34	1532.95	174.29
1.4170	1185	19.75	16.59	18.56	1534.04	175.38
1.4190	1200	20.00	16.40	18.78	1536.22	177.56
1.4200	1215	20.25	16.21	19.00	1537.31	178.65
1.4210	1230	20.50	16.02	19.22	1538.40	179.74
1.4220	1245	20.75	15.84	19.44	1539.49	180.83
1.4230	1260	21.00	15.66	19.66	1540.58	181.92
1.4240	1275	21.25	15.49	19.88	1541.67	183.01
1.4250	1290	21.50	15.32	20.10	1542.76	184.10
1.4270	1305	21.75	15.16	20.31	1544.94	186.28
1.4280	1320	22.00	15.00	20.53	1546.02	187.36
1.4295	1335	22.25	14.84	20.75	1547.66	189.00
1.4305	1350	22.50	14.68	20.97	1548.75	190.09
1.4310	1365	22.75	14.53	21.18	1549.29	190.63
1.4320	1380	23.00	14.39	21.40	1550.38	191.72
1.4325	1395	23.25	14.24	21.62	1550.93	192.27
1.4330	1410	23.50	14.10	21.83	1551.47	192.81
1.4340	1425	23.75	13.96	22.05	1552.56	193.90

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DEFLECC	TIEMPO (MIN.)	ΔT (HRS.)	$(\Delta T + T_p)/\Delta T$	ΔT_e	Pws (PSI)	ΔP (PSI)
1.4350	1440	24.00	13.83	22.26	1553.65	194.99
1.4365	1455	24.25	13.70	22.48	1555.28	196.62
1.4370	1470	24.50	13.57	22.69	1555.83	197.17
1.4375	1485	24.75	13.44	22.91	1556.37	197.71
1.4385	1500	25.00	13.32	23.12	1557.46	198.80
1.4390	1515	25.25	13.19	23.34	1558.01	199.35
1.4395	1530	25.50	13.07	23.55	1558.55	199.89
1.4410	1545	25.75	12.96	23.76	1560.19	201.53
1.4420	1560	26.00	12.84	23.98	1561.28	202.62
1.4430	1575	26.25	12.73	24.19	1562.36	203.70
1.4440	1590	26.50	12.62	24.40	1563.45	204.79
1.4450	1605	26.75	12.51	24.61	1564.54	205.88
1.4450	1620	27.00	12.40	24.82	1564.54	205.88
1.4460	1635	27.25	12.30	25.03	1565.63	206.97
1.4470	1650	27.50	12.20	25.25	1566.72	208.06
1.4480	1665	27.75	12.10	25.46	1567.81	209.15
1.4490	1680	28.00	12.00	25.67	1568.90	210.24
1.4495	1695	28.25	11.90	25.88	1569.45	210.79
1.4500	1710	28.50	11.80	26.09	1569.99	211.33
1.4505	1725	28.75	11.71	26.29	1570.53	211.87
1.4510	1740	29.00	11.62	26.50	1571.08	212.42
1.4520	1755	29.25	11.53	26.71	1572.17	213.51
1.4530	1770	29.50	11.44	26.92	1573.26	214.60
1.4540	1785	29.75	11.35	27.13	1574.35	215.69
1.4550	1800	30.00	11.26	27.34	1575.44	216.78
1.4560	1815	30.25	11.18	27.54	1576.53	217.87
1.4565	1830	30.50	11.10	27.75	1577.07	218.41
1.4570	1845	30.75	11.01	27.96	1577.62	218.96
1.4575	1860	31.00	10.93	28.16	1578.16	219.50
1.4580	1875	31.25	10.85	28.37	1578.70	220.04
1.4585	1890	31.50	10.77	28.58	1579.25	220.59
1.4590	1905	31.75	10.70	28.78	1579.79	221.13
1.4600	1920	32.00	10.62	28.99	1580.88	222.22
1.4605	1935	32.25	10.55	29.19	1581.43	222.77
1.4610	1950	32.50	10.47	29.40	1581.97	223.31

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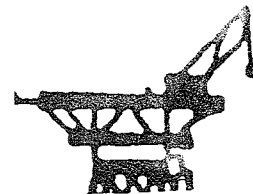


DEFLECC	TIEMPO (MIN.)	ΔT (HRS.)	$(\Delta T + T_p)/\Delta T$	ΔT_e	Pws (PSI)	ΔP (PSI)
1.4610	1965	32.75	10.40	29.60	1581.97	223.31
1.4615	1980	33.00	10.33	29.81	1582.52	223.86
1.4620	1995	33.25	10.26	30.01	1583.06	224.40
1.4625	2010	33.50	10.19	30.21	1583.61	224.95
1.4635	2025	33.75	10.12	30.42	1584.70	226.04
1.4645	2040	34.00	10.06	30.62	1585.79	227.12
1.4650	2055	34.25	9.99	30.82	1586.33	227.67
1.4660	2070	34.50	9.92	31.02	1587.42	228.76
1.4665	2085	34.75	9.86	31.23	1587.96	229.30
1.4670	2100	35.00	9.80	31.43	1588.51	229.85
1.4670	2115	35.25	9.74	31.63	1588.51	229.85
1.4675	2130	35.50	9.67	31.83	1589.05	230.39
1.4675	2145	35.75	9.61	32.03	1589.05	230.39
1.4680	2160	36.00	9.55	32.23	1589.60	230.94
1.4690	2175	36.25	9.49	32.43	1590.69	232.03
1.4695	2190	36.50	9.44	32.63	1591.23	232.57
1.4700	2205	36.75	9.38	32.83	1591.78	233.12
1.4705	2220	37.00	9.32	33.03	1592.32	233.66
1.4715	2235	37.25	9.27	33.23	1593.41	234.75
1.4720	2250	37.50	9.21	33.43	1593.96	235.29
1.4725	2265	37.75	9.16	33.63	1594.50	235.84
1.4730	2280	38.00	9.10	33.83	1595.04	236.38
1.4735	2295	38.25	9.05	34.02	1595.59	236.93
1.4740	2310	38.50	9.00	34.22	1596.13	237.47
1.4745	2325	38.75	8.95	34.42	1596.68	238.02
1.4750	2340	39.00	8.90	34.62	1597.22	238.56
1.4755	2355	39.25	8.84	34.81	1597.77	239.11
1.4765	2370	39.50	8.80	35.01	1598.86	240.20
1.4770	2385	39.75	8.75	35.21	1599.40	240.74
1.4770	2400	40.00	8.70	35.40	1599.40	240.74
1.4775	2415	40.25	8.65	35.60	1599.95	241.29
1.4780	2430	40.50	8.60	35.79	1600.49	241.83
1.4785	2445	40.75	8.56	35.99	1601.04	242.38
1.4790	2460	41.00	8.51	36.18	1601.58	242.92
1.4800	2475	41.25	8.46	36.38	1602.67	244.01

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DEFLECC	TIEMPO (MIN.)	ΔT (HRS.)	$(\Delta T + T_p)/\Delta T$	ΔT_e	Pws (PSI)	ΔP (PSI)
1.4810	2490	41.50	8.42	36.57	1603.76	245.10
1.4815	2505	41.75	8.38	36.76	1604.30	245.64
1.4820	2520	42.00	8.33	36.96	1604.85	246.19
1.4830	2535	42.25	8.29	37.15	1605.94	247.28
1.4835	2550	42.50	8.24	37.35	1606.48	247.82
1.4840	2565	42.75	8.20	37.54	1607.03	248.37
1.4845	2580	43.00	8.16	37.73	1607.57	248.91
1.4850	2595	43.25	8.12	37.92	1608.12	249.46
1.4850	2610	43.50	8.08	38.12	1608.12	249.46
1.4855	2625	43.75	8.04	38.31	1608.66	250.00
1.4860	2640	44.00	8.00	38.50	1609.21	250.55
1.4870	2655	44.25	7.96	38.69	1610.30	251.63
1.4880	2670	44.50	7.92	38.88	1611.38	252.72
1.4880	2685	44.75	7.88	39.07	1611.38	252.72
1.4890	2700	45.00	7.84	39.26	1612.47	253.81
1.4900	2715	45.25	7.80	39.45	1613.56	254.90
1.4905	2730	45.50	7.77	39.64	1614.11	255.45
1.4915	2745	45.75	7.73	39.83	1615.20	256.54
1.4920	2760	46.00	7.69	40.02	1615.74	257.08
1.4920	2775	46.25	7.66	40.21	1615.74	257.08
1.4930	2790	46.50	7.62	40.40	1616.83	258.17
1.4930	2805	46.75	7.59	40.59	1616.83	258.17
1.4940	2820	47.00	7.55	40.78	1617.92	259.26
1.4940	2835	47.25	7.52	40.96	1617.92	259.26
1.4945	2850	47.50	7.48	41.15	1618.47	259.80
1.4950	2865	47.75	7.45	41.34	1619.01	260.35
1.4950	2880	48.00	7.41	41.53	1619.01	260.35
1.4955	2895	48.25	7.38	41.71	1619.55	260.89
1.4960	2910	48.50	7.35	41.90	1620.10	261.44
1.4970	2915	48.58	7.34	41.96	1621.19	262.53
1.4975	2940	49.00	7.28	42.27	1621.73	263.07
1.4980	2955	49.25	7.25	42.46	1622.28	263.62

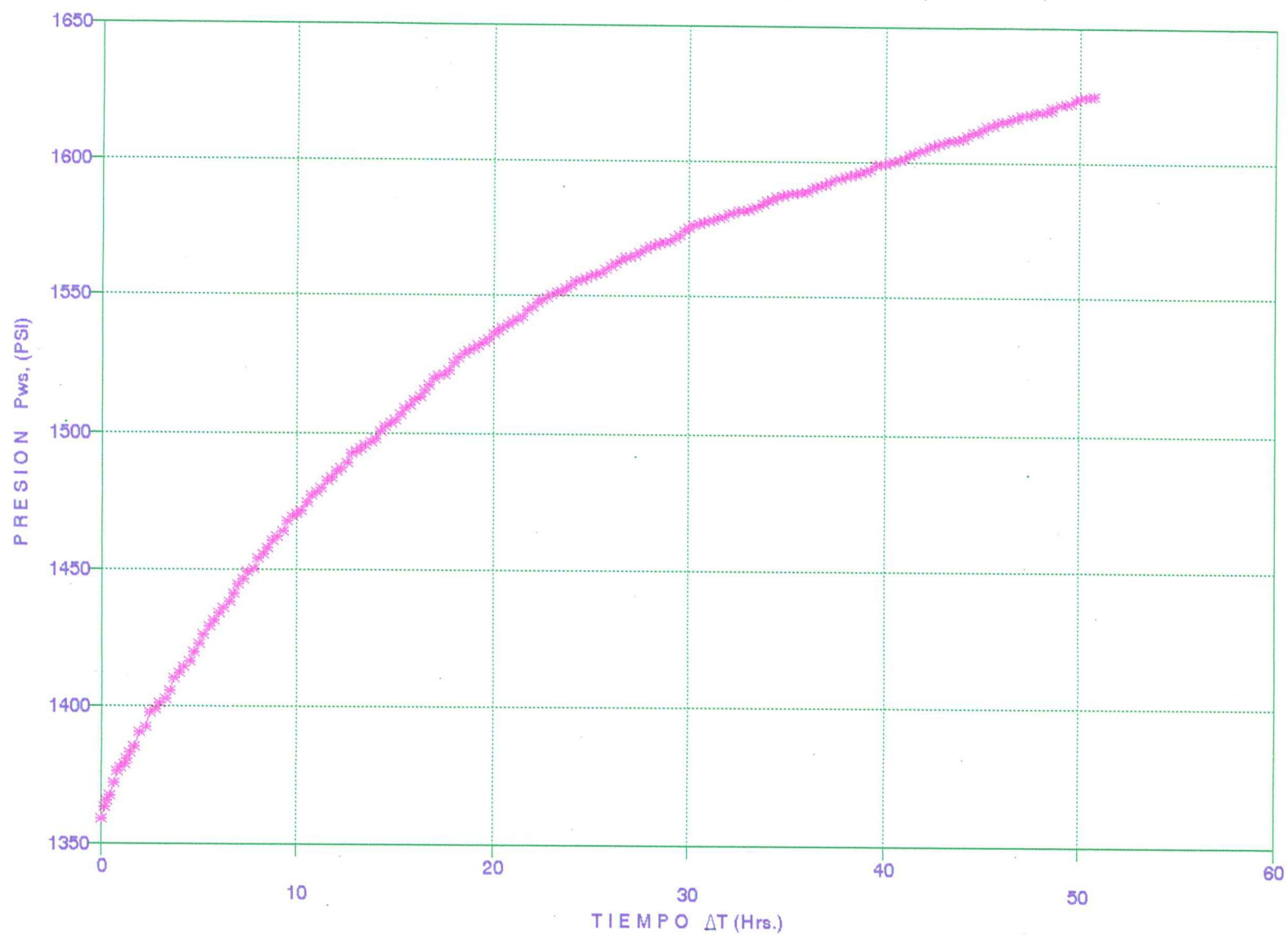
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DEFLECC	TIEMPO (MIN.)	ΔT (HRS.)	$(\Delta T + T_p) / \Delta T$	ΔT_e	Pws (PSI)	ΔP (PSI)
1.4985	2970	49.50	7.22	42.64	1622.82	264.16
1.4990	2985	49.75	7.19	42.83	1623.37	264.71
1.4995	3000	50.00	7.16	43.01	1623.91	265.25
1.5000	3015	50.25	7.13	43.20	1624.46	265.80
1.5000	3030	50.50	7.10	43.38	1624.46	265.80
1.5005	3038	50.63	7.08	43.48	1625.00	266.34



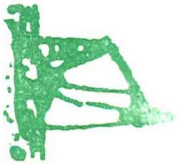
RESTAURACION PRESION VS. TIEMPO
POZO: LO16 - 20 LOBITOS (13-15/06/95)



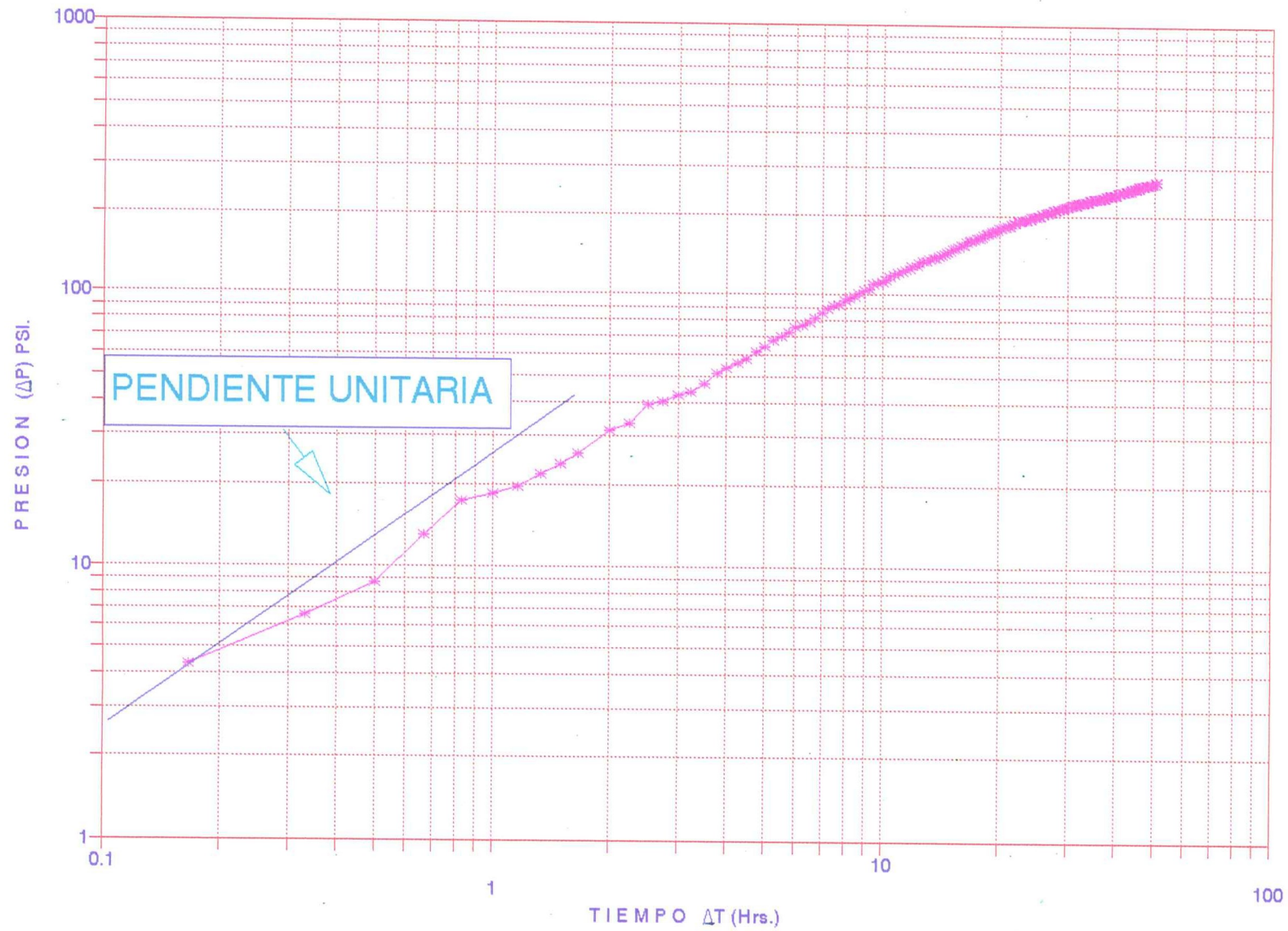
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ANALISIS LOG-LOG
POZO: LO16 - 20 LOBITOS (13-15/06/95)



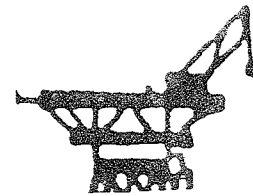
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FLOWPETROL S.A.

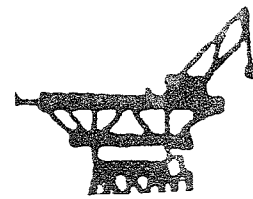


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TABLA PARA EL ANALISIS DE LA DERIVADA

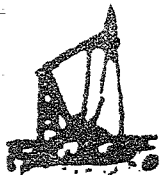
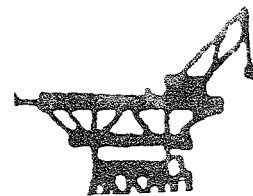
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ΔT (HRS.)	ΔP (PSI)	DERIVADA
0.00	0.00	--
0.17	4.36	4.36
0.33	6.54	4.36
0.50	8.71	6.54
0.67	13.07	17.43
0.83	17.43	21.79
1.00	18.52	6.54
1.17	19.61	7.63
1.33	21.79	17.43
1.50	23.97	19.61
1.67	26.14	21.79
2.00	31.59	32.68
2.25	33.77	19.61
2.50	39.22	54.47
2.75	40.31	11.98
3.00	42.48	26.14
3.25	43.57	14.16
3.50	46.84	45.75
3.75	51.20	65.36
4.00	53.38	34.86
4.25	55.56	37.04
4.50	57.73	39.22
4.75	61.00	62.09
5.00	64.27	65.36
5.25	67.54	68.63
5.50	70.26	59.91
5.75	72.44	50.11
6.00	75.16	65.36
6.25	77.34	54.47
6.50	79.52	56.65
6.75	82.79	88.24

**FLOWPETROL S.A.**

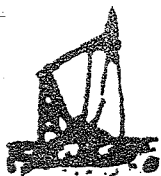
Avda. Mártires Petroleros Ex - Cementerio
Mz. B3 Lote C. Talara Telefax: 381690

ΔT (HRS.)	ΔP (PSI)	DERIVADA
7.00	85.84	85.40
7.25	88.24	69.50
7.50	90.63	71.90
7.75	92.05	43.90
8.00	95.32	104.58
8.25	96.95	53.92
8.50	99.13	74.07
8.75	101.85	95.32
9.00	103.49	58.82
9.25	105.66	80.61
9.50	109.48	144.88
9.75	111.11	63.73
10.00	112.20	43.57
10.25	113.29	44.66
10.50	116.56	137.26
10.75	118.74	93.68
11.00	119.83	47.93
11.25	121.46	73.53
11.50	124.18	125.27
11.75	125.27	51.20
12.00	127.45	104.58
12.25	128.54	53.38
12.50	130.72	108.93
12.75	133.99	166.67
13.00	135.08	56.65
13.25	136.17	57.73
13.50	137.26	58.82
13.75	138.34	59.91
14.00	139.43	61.00
14.25	141.61	124.18
14.50	143.79	126.36
14.75	144.88	64.27
15.00	145.97	65.36
15.25	148.15	132.90

**FLOWPETROL S.A.**

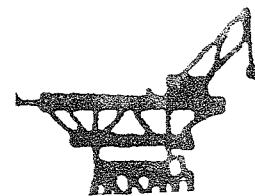
Avda. Mártires Petroleros Ex - Cementerio
Mz. B3 Lote C. Talara Telefax: 381690

ΔT (HRS.)	ΔP (PSI)	DERIVADA
15.50	150.33	135.08
15.75	151.42	68.63
16.00	153.60	139.43
16.25	154.68	70.81
16.50	156.86	143.79
16.75	159.04	145.97
17.00	161.22	148.15
17.25	162.31	75.16
17.50	162.85	38.13
17.75	164.49	116.01
18.00	166.67	156.86
18.25	168.30	119.28
18.50	169.94	120.92
18.75	171.02	81.70
19.00	172.11	82.79
19.25	173.20	83.88
19.50	174.29	84.97
19.75	175.38	86.06
20.00	177.56	174.29
20.25	178.65	88.24
20.50	179.74	89.32
20.75	180.83	90.41
21.00	181.92	91.50
21.25	183.01	92.59
21.50	184.10	93.68
21.75	186.28	189.54
22.00	187.36	95.86
22.25	189.00	145.43
22.50	190.09	98.04
22.75	190.63	49.56
23.00	191.72	100.22
23.25	192.27	50.65
23.50	192.81	51.20
23.75	193.90	103.49

**FLOWPETROL S.A.**

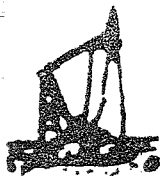
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ΔT (HRS.)	ΔP (PSI)	DERIVADA
24.00	194.99	104.58
24.25	196.62	158.50
24.50	197.17	53.38
24.75	197.71	53.92
25.00	198.80	108.93
25.25	199.35	55.01
25.50	199.89	55.56
25.75	201.53	168.30
26.00	202.62	113.29
26.25	203.70	114.38
26.50	204.79	115.47
26.75	205.88	116.56
27.25	206.97	59.37
27.50	208.06	119.83
27.75	209.15	120.92
28.00	210.24	122.00
28.25	210.79	61.55
28.50	211.33	62.09
28.75	211.87	62.64
29.00	212.42	63.18
29.25	213.51	127.45
29.50	214.60	128.54
29.75	215.69	129.63
30.00	216.78	130.72
30.25	217.87	131.81
30.50	218.41	66.45
30.75	218.96	66.99
31.00	219.50	67.54
31.25	220.04	68.08
31.50	220.59	68.63
31.75	221.13	69.17
32.00	222.22	139.43
32.25	222.77	70.26
32.50	223.31	70.81
33.00	223.86	35.95

**FLOWPETROL S.A.**

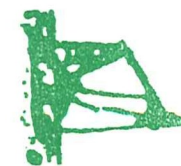
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ΔT (HRS.)	ΔP (PSI)	DERIVADA
33.25	224.40	72.44
33.50	224.95	72.99
33.75	226.04	147.06
34.00	227.12	148.15
34.25	227.67	74.62
34.50	228.76	150.33
34.75	229.30	75.71
35.00	229.85	76.25
35.50	230.39	38.67
36.00	230.94	39.22
36.25	232.03	157.95
36.50	232.57	79.52
36.75	233.12	80.07
37.00	233.66	80.61
37.25	234.75	162.31
37.50	235.29	81.70
37.75	235.84	82.24
38.00	236.38	82.79
38.25	236.93	83.33
38.50	237.47	83.88
38.75	238.02	84.42
39.00	238.56	84.97
39.25	239.11	85.51
39.50	240.20	172.11
39.75	240.74	86.60
40.25	241.29	43.85
40.50	241.83	88.24
40.75	242.38	88.78
41.00	242.92	89.32
41.25	244.01	179.74
41.50	245.10	180.83
41.75	245.64	90.96
42.00	246.19	91.50
42.25	247.28	184.10
42.50	247.82	92.59

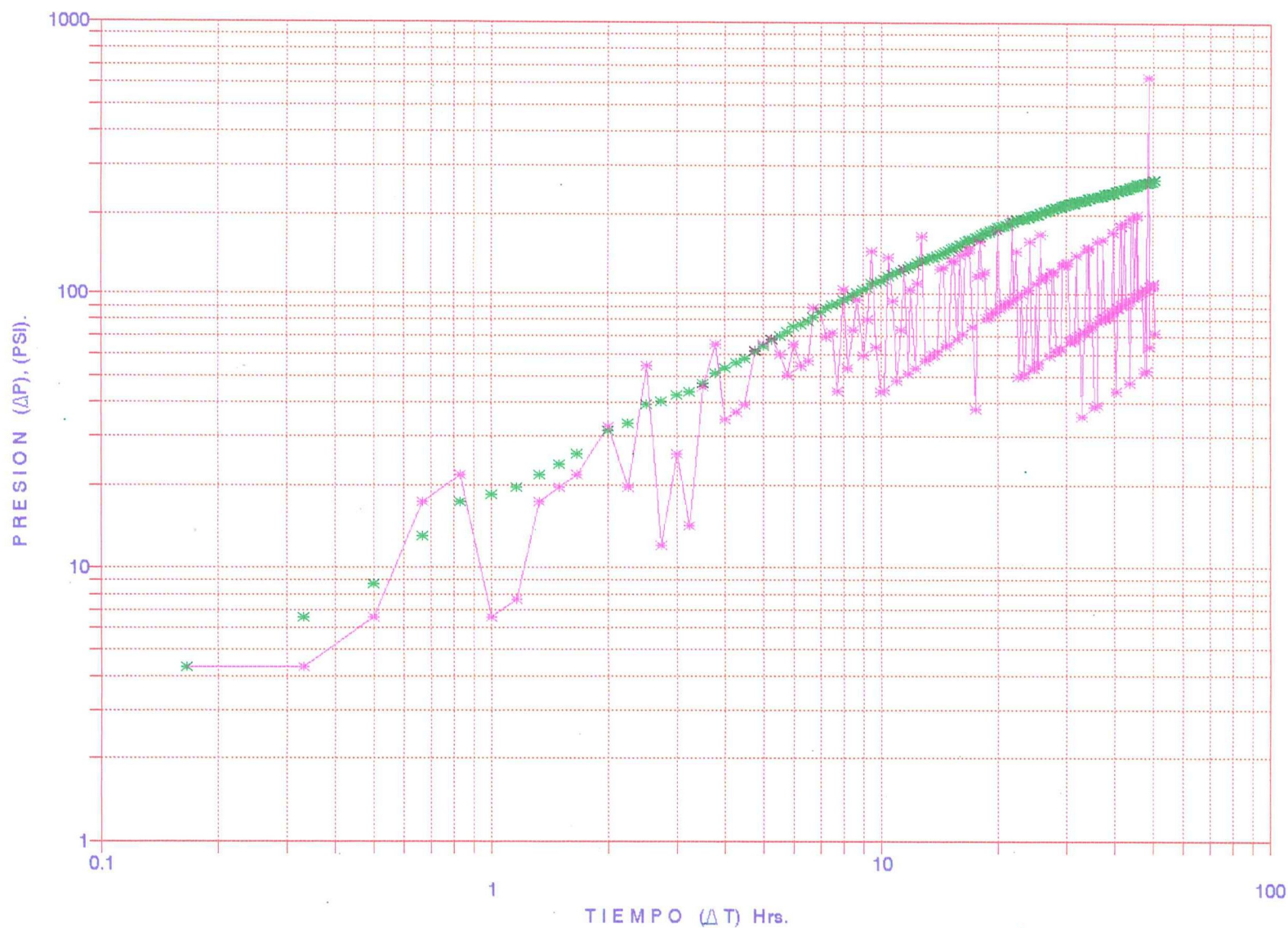
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ΔT (HRS.)	ΔP (PSI)	DERIVADA
42.75	248.37	93.14
43.00	248.91	93.68
43.25	249.46	94.23
43.75	250.00	47.66
44.00	250.55	95.86
44.25	251.63	192.81
44.50	252.72	193.90
45.00	253.81	98.04
45.25	254.90	197.17
45.50	255.45	99.13
45.75	256.54	199.35
46.00	257.08	100.22
46.50	258.17	101.31
47.00	259.26	102.40
47.50	259.80	51.74
47.75	260.35	104.03
48.25	260.89	52.56
48.50	261.44	105.66
48.58	262.53	635.08
49.00	263.07	64.05
49.25	263.62	107.30
49.50	264.16	107.84
49.75	264.71	108.39
50.00	265.25	108.93
50.25	265.80	109.48
50.63	266.34	71.94

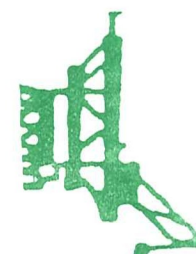


ANALISIS LOG-DERIVADA
POZO: LO16 - 20 LOBITOS (13-15/06/95)



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WELL WITH WELLBORE STORAGE AND SKIN INFINITE ACTING RESERVOIR WITH HOMOGENEOUS BEHAVIOR

The use of this type-curve is described in World Oil - May 1983 : A NEW SET OF TYPE CURVES SIMPLIFIES WELL TEST ANALYSIS by D. BOURDET, T.M. WHITTLE, A.A. DOUGLAS, Y.M. PIRARD.

FLOPETROL JOHNSTON

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B.P. 557 - 77006 Meaux Cedex
FRANCE

100 Macco Boulevard
Sugarland, Texas 77478
Poste adress
P.O. Box 36363
Houston, Texas 77036

$$C_D = \frac{0.8936 C}{\phi c_i h r_w^2}$$

FOR OIL — $p_D = \frac{kh}{141.2 q B \mu} \Delta p$

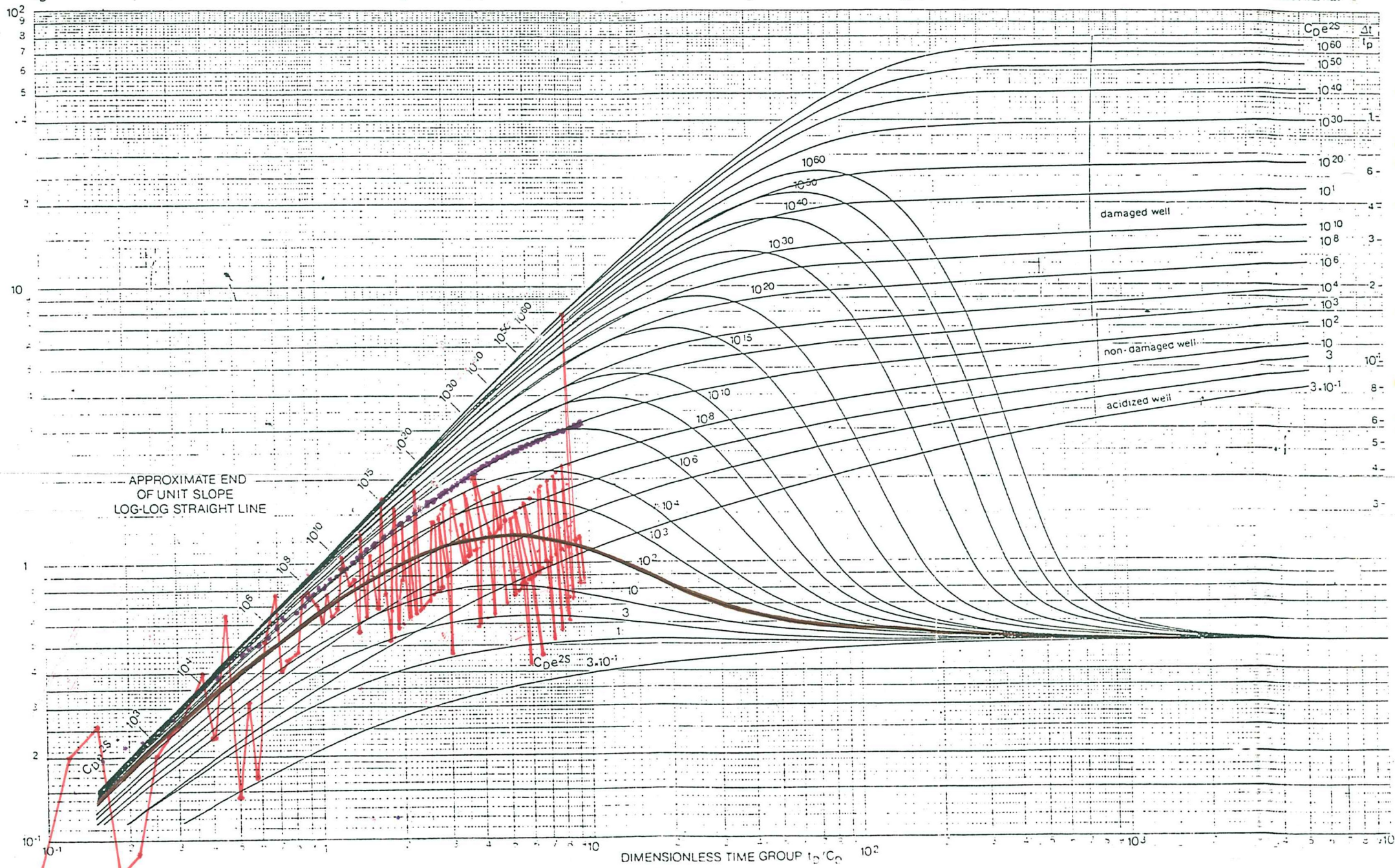
FOR GAS — $p_D = \frac{kh}{5.030 \cdot 10^4 q} \frac{T_{sc}}{T} \frac{2}{p_{sc}} \int_{p_0}^{p_0 + \Delta p} \frac{p}{\mu(p) Z(p)} dp$

$$\frac{t_D}{C_D} = 0.000295 \frac{kh}{\mu} \frac{\Delta t}{C}$$

— $\frac{t_D}{C_D} p_D = \frac{kh}{141.2 q B \mu} \Delta t \cdot \Delta p'$

— $\frac{t_D}{C_D} p_D = \frac{kh}{5.030 \cdot 10^4 q} \frac{T_{sc}}{T} \frac{2}{p_{sc}} \int_{p_0}^{p_0 + \Delta p} \frac{p}{\mu(p) Z(p)} \Delta t \cdot \Delta p'$

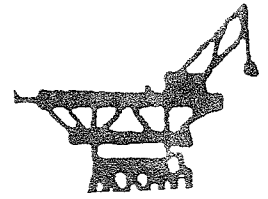
AND PRESSURE DERIVATIVE GROUP $(t_D/C_D) p_D'$
DIMENSIONLESS PRESSURE p_D





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ANALISIS DE LA CARTA

=====

GRADIENTE ESTATICA

=====

PROF. MEDIDO (PIES)	DEFLECC.	PROF. VERTICAL (PIES)	ΔPROF (PIES)	PRESION (PSI)	ΔP	ΔP/ΔPROF (PSI/PIE)
0	0.2310	0.00	0.00	242.10	0	0.002
2000	0.4020	1904.91	1904.91	428.37	186.28	0.0978
3000	0.5940	2783.49	878.58	637.53	209.15	0.2381
4000	0.7900	3678.50	895.01	851.03	213.51	0.2386
5000	0.9920	4595.60	917.10	1071.08	220.04	0.2399
5500	1.0880	5037.26	441.67	1175.65	104.58	0.2368
6000	1.1840	5476.94	439.68	1280.23	104.58	0.2378
6500	1.2800	5917.25	440.30	1384.80	104.58	0.2375
6700	1.3190	6094.71	177.46	1427.29	42.48	0.2394
6900	1.3590	6274.86	180.15	1470.86	43.57	0.2419
7100	1.3980	6455.95	181.10	1513.35	42.48	0.2346
7300	1.4380	6638.35	182.40	1556.92	43.57	0.2389
7400	1.4575	6730.47	92.12	1578.16	21.24	0.2306
7500	1.4770	6821.46	90.99	1599.40	21.24	0.2335
7615	1.5005	6927.22	105.76	1625.00	25.60	0.2420

$\frac{\Delta P}{\Delta D} = 0.002$

$\frac{100}{500}$

$\frac{100}{500}$

TOTAL DE GRADIENTE ESTATICA DEL POZO = 0.235 PSI/PIE

GRADIENTE DEL GAS = 0.005 PSI/PIE

NIVEL DE FLUIDO = 1,115' VERTICAL
= 1,125' MEDIDO

GRADIENTE DEL PETROLEO = 0.238 PSI/PIE

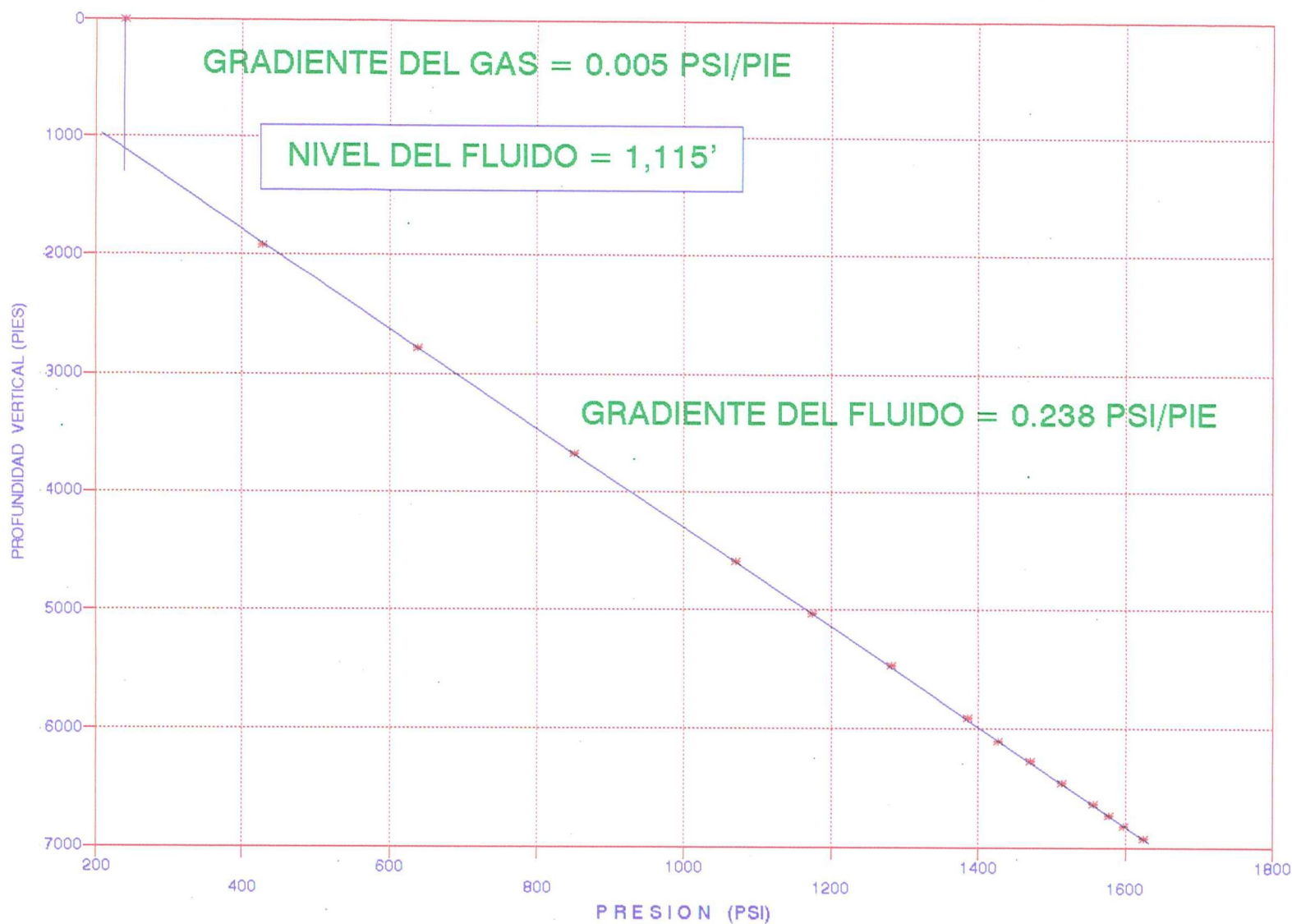
*NOTA. SE HICIERON PARADAS DE 8 MINUTOS CADA UNA.

0.238

Oil Level / 1155 MD - 1155 VD
Boman 7615 MD (6922' VD) 1625
MWD WS 7619 MD (6930' VD)
7
MWD Up BS 8077 MD (7311' VD)

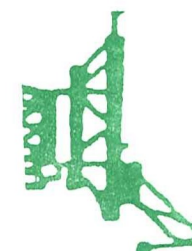


ANALISIS DE LA GRADIENTE ESTATICA
POZO: LO16 - 20 LOBITOS (13-15/06/95)



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REPORTE DIARIO DE CORTE PARAFINA Y SLICK LINE

DSR. No.	:		CARGO	:	BUILD UP x 72 HRS.
FECHA	:	13-06-95	SUPERVISOR	:	ING. R. LEON
OPERADOR	:	M. BENITES	AYUDANTE	:	OVIEDO
AREA	:	LOBITOS	POZO No.	:	20
HORA LLEGADA	:	07:40	TUBING	:	5 1/2"

HORA : SE ARMO EQUIPO EN EL POZO.

SE BAJO ESTAMPA DE 2 5/16" Y SE CHEQUEO TOPE DE ARENA A 7.875'.

HORA : 08:00 SE ARMARON AMERADAS: 2,000 PSI N. 45286 RELOJ DE 72 HRS N. 25477.
3,000 PSI N. 45397 RELOJ DE 72 HRS N. 3619.

HORA : 08:15 SE ENGROCHA ESTILETES.

08:27 EN EL LUBRICADOR.

HORA : 08:31 SE EMPIEZAN A BAJAR AMERADAS. LINEA DE PRODUCCION ABIERTA AL TANQUE.

08:40 LLEGADA AL FONDO A 7.615'.

09:10 SE CERRO EL POZO PARA REGISTRO DE BUILD UP
DE 72 HRS.

HORA :

HORA :

OBSERVACIONES : - EL POZO QUEDA CERRADO A LAS 09:10 TOMANDO REGISTRO
BUILD UP POR 72 HRS.

FIRMA DEL CLIENTE

OPERADOR FLOWPETROL S.A.



FLOWPETROL S.A.

Avda. Mártires Petroleros Ex - Cementerio
Mz. B3 Lote C. Talara Telefax: 381690



REPORTE DIARIO DE CORTE PARAFINA Y SLICK LINE

DSR. No. :		EQUIPO :	1	CARGO :	BUILD UP x 48 HRS.
FECHA :	13 AL 15-06-95	AYUDANTE :		SUPERVISOR:	
OPERADOR :		PLATAFORMA :	L016	AYUDANTE :	
AREA :	LOBITOS	HORA SALIDA:		POZO No. :	20
HORA LLEGADA:				TUBING :	5 1/2"

HORA : 18:00 PRESION EN CABEZA 180 PSI. (13-06-95).

HORA : 06:00 PRESION EN CABEZA 230 PSI. (14-06-95).

HORA : 18:00 PRESION EN CABEZA 240 PSI. (14-06-95).

HORA : 05:00 PRESION EN CABEZA 240 PSI. (15-06-95).

HORA : 11:30 PRESION EN CABEZA 240 PSI. (15-06-95).

OBSERVACIONES:

FIRMA DEL CLIENTE

OPERADOR FLOWPETROL S.A.



FLOWPETROL S.A.



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Mz. B3 Lote C. Talara Telefax: 381690

REPORTE DIARIO DE CORTE PARAFINA Y SLICK LINE

DSR. No.	:		CARGO	:	BUILDUP / GRAD. ESTAT.
FECHA	:	15 - 06 - 95	SUPERVISOR	:	ING. R. LEON A.
OPERADOR	:	R. MONTERO	AYUDANTE	:	OVIEDO
AREA	:	LOBITOS	POZO No.	:	20
HORA LLEGADA	:	11:40	TUBING	:	5 1/2"

HORA : 11:40 SE EMPIEZA A SUBIR AMERADAS.

12:00 EN EL LUBRICADOR.

12:04 EN SUPERFICIE.

HORA : 12:35 SE ARMAN AMERADAS. ELEMENTO DE 2,000 PSI #. 45206 Y RELOJ DE 6 HRS. #. 14138.
3,000 PSI #. 45397 Y RELOJ DE 6 HRS. #. 14139.

HORA : 12:40 SE ENGROCHA ESTILETE.

12:49 EN EL LUBRICADOR.

HORA : 12:51 SE EMPIEZA A BAJAR AMERADAS TOMANDO GRADIENTE ESTATICA. HACIENDO PARADAS DE 8 MINUTOS
EN 0' , 2,000' , 3,000' , 4,000' , 5,000' , 5,500' , 6,000' , 6,500' , 6,700' ,
6,900' , 7,100' , 7,300' , 7,400' , 7,500' Y 7,615'.

HORA : 14:51 EN EL FONDO A 7,615'.

15:00 SE SUBEN AMERADAS.

HORA : 15:14 EN EL LUBRICADOR.

15:16 EN SUPERFICIE.

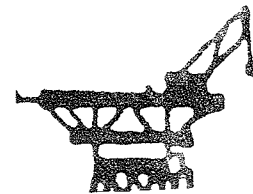
HORA : 16:00 POZO QUEDO EN PRODUCCION.

TRABAJO TERMINADO.

OBSERVACIONES :

FIRMA DEL CLIENTE

OPERADOR FLOWPETROL S.A.



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DATOS PARA CALCULO

=====

PROFUNDIDAD VERTICAL

=====

"SURVEY DIRECTIONAL DRILLING"		
MEASURED DEPTH	AVERAGE ANGLE	TOTAL VERTICAL
1831	27.800	1755.42
2885	27.200	2681.21
3695	25.500	3403.21
4839	25.300	4450.04
5393	28.600	4943.32
5949	30.100	5432.82
6350	26.700	5783.24
6690	25.600	6085.69
6875	24.900	6252.18
7061	24.300	6420.41
7247	22.900	6589.53
7247	22.900	6589.53
7433	23.400	6759.97
7607	24.800	6919.96



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- BOTTOM HOLE PRESSURE GAUGE CALIBRATION SHEET -

DATE: 03/09/95

CALIBRATION No.:

15

- EQUIPMENT DATA -

Calibration cell No.: 2318 Manufacturer : CHANDLER
Dead weight tester No.: 13864 Manufacturer : CHANDLER Range 0 -10000 PSI
Recording element No.: 15233 Manufacturer : GRC
Pressure element No.: 45286 Manufacturer : GRC Range 0 - 2,084 PSI

- MISCELLANEOUS INFORMATION -

Base line drawing temperature : AMBT
Reference line data-temperature: AMBT -pressure Pr: reading Yr:
Calibration data -temperature: AMBT -step drawing: with crank with clock
Equivalent pressure P of level difference between Dwt and bellows

Level difference : +in case of Dwt above
Oil specific gravity : P= -in case of Dwt beneath
bellows

-CALIBRATION READING AND CALCULATIONS-

NUM. DE LECTURAS= 4

P(Dwt)	Y	ΔY	Y^2	YP	$P_c = KY + a$	$C = P - P_c$
PSI	DEFLEC		-Units on this line-			
500	0.4580	-----	0.2098	229.00	489.376	10.6236
1000	0.9330	0.4750	0.8705	933.00	1006.807	-6.8074
1500	1.4040	0.4710	1.9712	2106.00	1519.881	-19.8811
2000	1.8300	0.4260	3.3489	3660.00	1983.935	16.0649
5000	4.6250		6.4004	6928.00	ERROR =	-0.0000

$$A = \text{SUM}(P)/n = 1250$$

$$K = (A-D)/(B-C) = 1089.3285$$

$$B = \frac{\text{SUM}(Y)}{n} = 1.15625$$

$$a' = A - BK = -9.5361$$

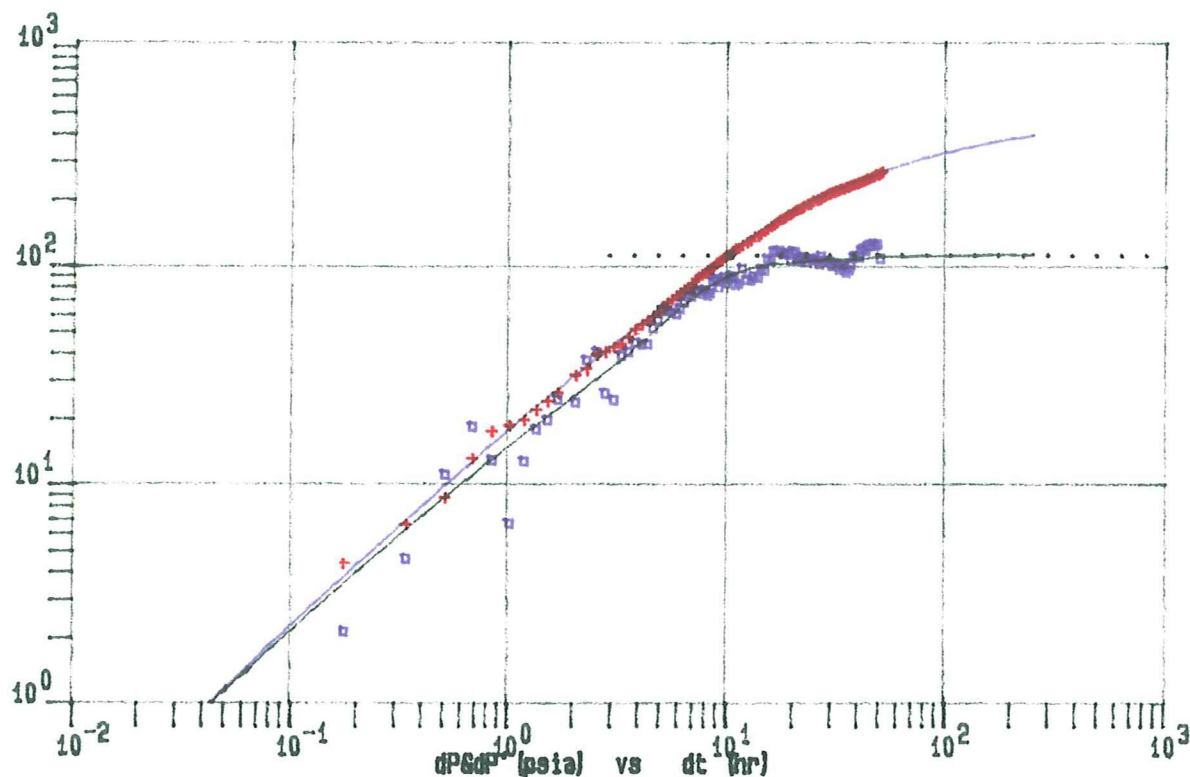
$$C = \frac{\text{SUM}(Y^2)}{\text{SUM}(Y)} = 1.3838636$$

$$a' = D - CK = -9.5361$$

$$D = \frac{\text{SUM}(YP)}{\text{SUM}(Y)} = 1497.9459$$

$$a = a' + P = -9.5361$$

PetroTech	Log-Log	L016-20
Company	PETRO-TECH	Test
Field	LOBITOS	Date
Well	L016-20	Gauge
		PBU
		JUNE/13-15/95



Flow Period # 2
 Rate 0 STB/day
 Rate Change 88 STB/day
 P @ dt=0 1358.7 psia
 Pi 1832.7 psia
 Smoothing 0.1

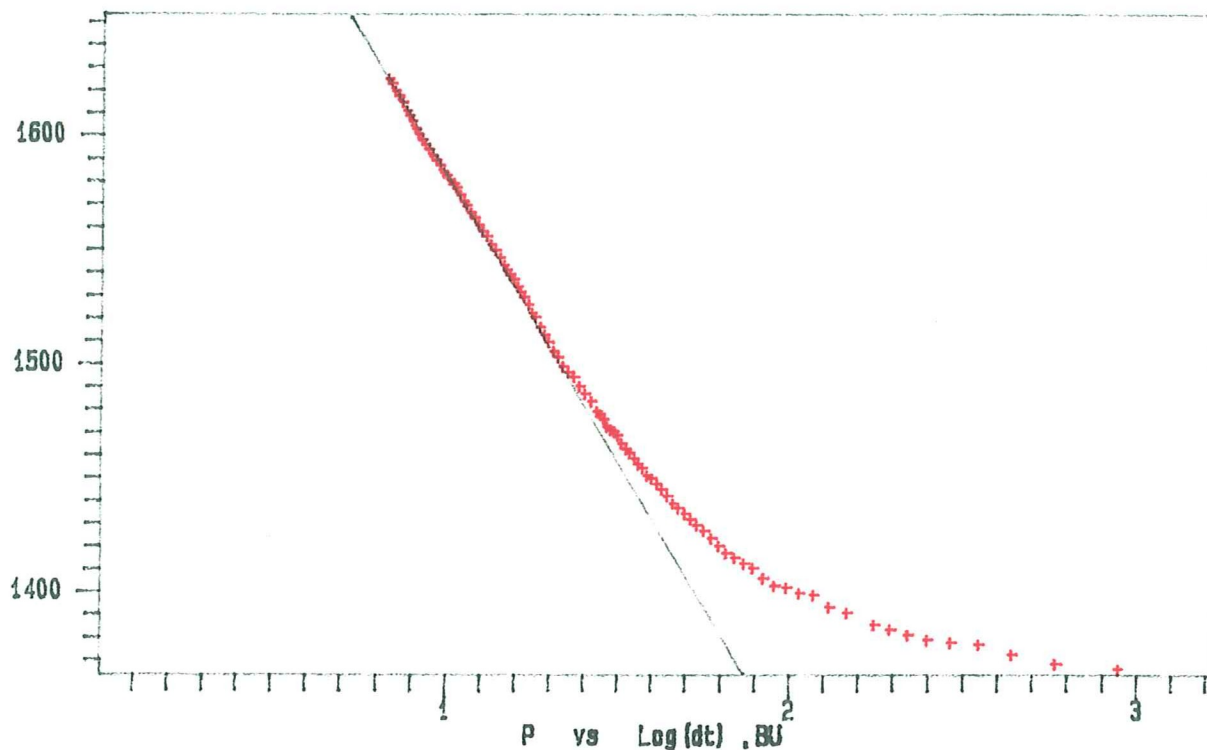
Time match 0.17301 (hr)⁻¹
 Pressure Match 0.004595 (psia)⁻¹

RESERVOIR Homogeneous
 WELL Changing storage
 BOUNDARY Infinite

Storage C 0.12014 STB/psi
 CD 8055.2
 C factor 1.3977
 Alpha 9140.3
 Skin factor -4.6688

kh 77.08 md.ft
 K 5.5057 md
 Mobility k/mu 5.0326
 Investig. R 167.74 ft

PetroTech	Flexible		L016-20	
Company	PETRO-TECH		Test	PBU
Field	LOBITOS		Date	JUNE/13-15/95
Well	L016-20		Gauge	



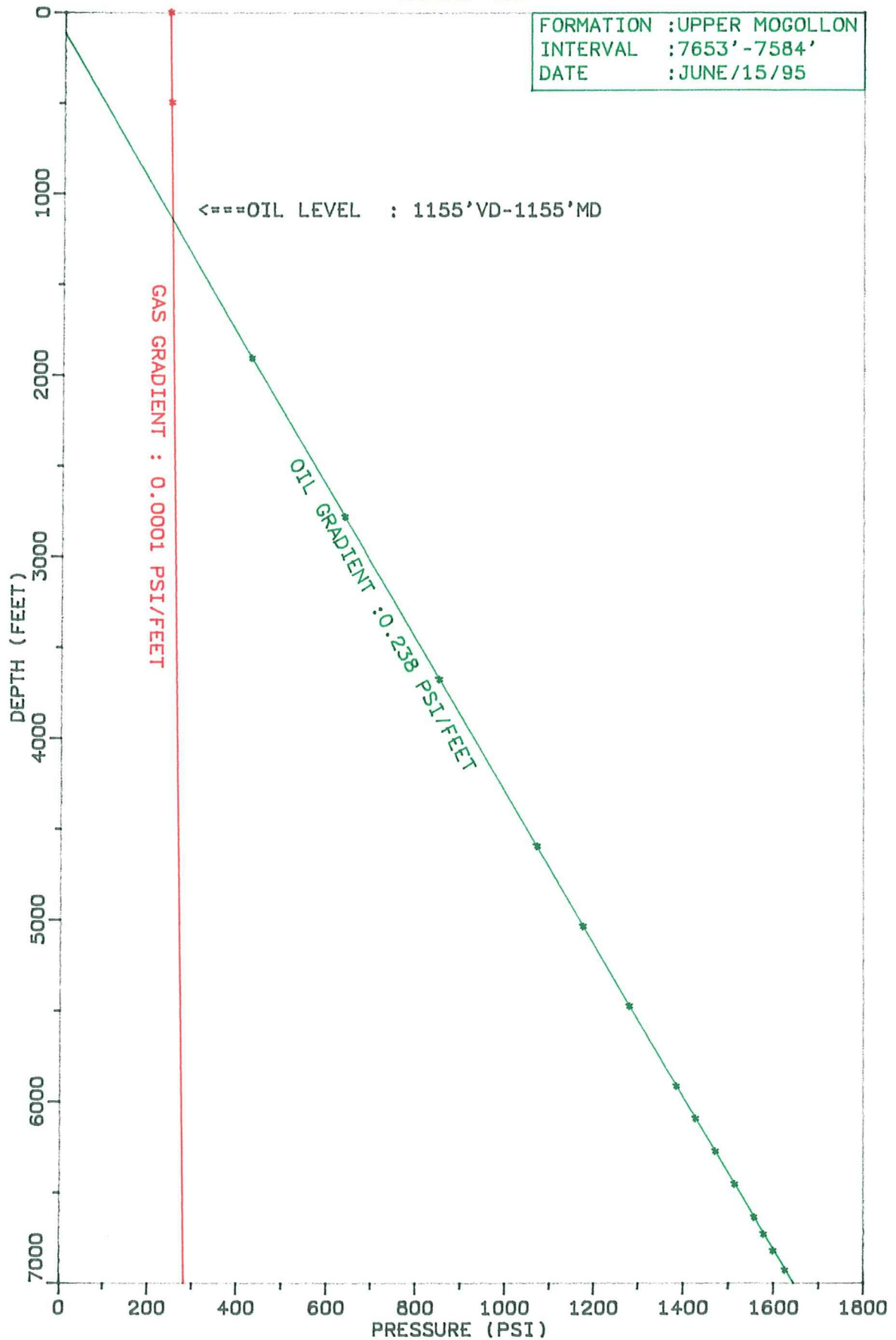
Flow Period # 2
 Rate 0 STB/day
 Rate Change 88 STB/day
 P @ dt=0 1358.7 psia
 P1 1832.7 psia

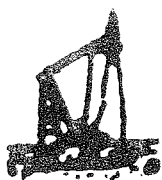
Flexible line # 1
 P vs Log(dt) , BU

Slope -251.68
 Intercept 1832.4
 kh 76.714 md.ft
 K 5.4796 md
 Skin factor -3.3551

STATIC GRADIENT L016-20

FORMATION	: UPPER MOGOLLON
INTERVAL	: 7653' - 7584'
DATE	: JUNE/15/95





FLOWPETROL S.A.

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CARTA DE RESTAURACION DE PRESION

CLIENTE : PETRO-TECH PERUANA S.A. OBSERVACION:

LOCACIO : LOBITOS

POZO : LO16 - 20

PRESION: 2000 PSI - 45286

FECHA : del 13/06 al 15/06/95

RELOJ : 72 HRS. SERIE 25477



FLOWPETROL S.A.

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CARTA DE GRADIENTE ESTATICA

CLIENTE : PETRO-TECH PERUANA S.A. OBSERVACION:

LOCACIO : LOBITOS

POZO : LO16 - 20

PRESION: 2000 PSI - 45286

FECHA : 15/06/95

RELOJ : 6 HRS. SERIE 14138