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Chevron Canada Resources

Static Gradient

Chevron Et Al Liard K-29

K-29

Jun 27, 01

Service Company Contact Info

Report Writer	Wade Nicks, 309-7940	Service Company	Lee Tool, Div. of Schlumberger
Operator	Cody Green, 347-2524	Job ID	K-29Chevsg
		Test Date	Jun 27, 01

Gauge: Lee Memory Recorder Model 3000s (Quartz)
Manufacturer: Lee Tool, Division of Schlumberger Canada Limited

Static Gradient

Chevron Canada Resources
North West Territories, Canada

Jun 27, 01

Chevron Et Al Liard K-29

K-29

Liard, Nahanni

Well			
Client	Chevron Canada Resources		Province
			North West Territories
Well Name	Chevron Et Al Liard K-29		Country
			Canada
Well No.	K-29		Deviated Well
			Yes
Field	Liard	Pool	Well Status
		Nahanni	Gas
			KB Elevation
			418.80 m
			CF Elevation
			409.60 m
			Pool Datum

Test			
Test Name	Static Gradient		Atmospheric
			101.30 KPa A
Test Start (mm/dd/yy)	06/27/01	Test Finish	06/27/01
	10:57 AM		01:58 PM
On Bottom	06/27/01	Off Bottom	06/27/01
	01:02 PM		01:17 PM
Shut In	06/27/01	ETO	06/27/01
	07:00 AM		10:57 AM
	Meas. Depth [mCF]	TVD [mCF]	Est. Pressure [KPa G]
			Est. Gradient [KPa/m]
			Est. Temperature [DegC]
			Grad. Threshold
			2.00 KPa/m
Well Datum			Grad. Recorder
			9808Q-16E
Run Depth	2691.00	2664.80	25874.63
			1.82
Avg. MPP Depth	2740.80	2705.07	25947.99
			1.82
Operator	Cody Green, 347-2524		Service Company
			Lee Tool, Div. of Schlumberger

Remarks
9809Q-16E Bot. Rec. & 9808Q-16E Top Rec.

Depth References		
Depth Reference	Offset [m]	Elevation [mMSL]
Casing Flange (CF)		409.60
Kelly Bushing (KB)	CF + 9.20	418.80

Perforations					
	Intvl. Top MD. [mCF]	Intvl. Bottom MD. [mCF]	MPP TVD. [mCF]	Pressure [KPa G]	Gradient [KPa/m]
Interval 1	2490.80	2990.80	2705.07	25947.99	1.82

Top Recorder

Model	Serial	Latest Calibration
LMR-3000S	9808Q-16E	11/14/00
Max. Rated Press.	Max. Rated Temp.	
110212.73 KPa G	174.88 DegC	

Gradient Stops

Depth

Tool String MD, [mCF]	Recorder MD, [mCF]	Recorder TVD, [mCF]	Sample R/T [mmm dd, 24hr]	Pressure [KPa G]	Gradient [KPa/m]	Temperature [DegC]
0.00	-2.00	-2.00	Jun 27, 01 11:33:00	21253.34		23.30
1000.00	998.00	996.82	11:53:00	23065.64	1.81	95.18
2000.00	1998.00	1990.95	12:12:00	24703.40	1.65	132.27
2500.00	2498.00	2489.35	12:27:00	25526.32	1.65	148.05
2600.00	2598.00	2586.50	12:40:00	25728.38	2.08	152.04
2650.00	2648.00	2630.29	12:54:00	25811.75	1.90	153.48
2691.00	2689.00	2663.20	13:12:00	25871.72	1.82	154.01

Bottom Hole Pressure

	Tool String MD, [mCF]	Sample R/T [mmm dd, yy 24 hr.]	Pressure [KPa G]
Sample 1	2691.00	Jun 27, 01 13:06:00	25869.98
Sample 2		13:16:00	25872.53
Difference:		00:10:00	2.55
			Build Up Rate 15.30 KPa/Hr.

Bottom Recorder

Model	Serial	Latest Calibration
LMR-3000S	9809Q-16E	11/14/00
Max. Rated Press.	Max. Rated Temp.	
110212.73 KPa G	174.88 DegC	

Gradient Stops

Depth

Tool String MD, [mCF]	Recorder MD, [mCF]	Recorder TVD, [mCF]	Sample R/T [mmm dd, 24hr]	Pressure [KPa G]	Gradient [KPa/m]	Temperature [DegC]
0.00	0.00	-0.00	Jun 27, 01 11:33:00	21264.12		19.83
1000.00	1000.00	998.81	11:53:00	23071.73	1.81	91.31
2000.00	2000.00	1992.94	12:12:00	24710.12	1.65	130.21
2500.00	2500.00	2491.34	12:27:00	25532.97	1.65	146.93
2600.00	2600.00	2588.34	12:40:00	25730.76	2.04	151.73
2650.00	2650.00	2631.93	12:54:00	25814.81	1.93	153.39
2691.00	2691.00	2664.80	13:12:00	25874.03	1.80	153.88

Bottom Hole Pressure

	Tool String MD, [mCF]	Sample R/T [mmm dd, yy 24 hr.]	Pressure [KPa G]
Sample 1	2691.00	Jun 27, 01 13:05:00	25872.56
Sample 2		13:15:00	25874.33
Difference:		00:10:00	1.77
			Build Up Rate 10.61 KPa/Hr.

Deviated Well Survey

Meas. Depth [mKB]	Inclination [Degrees]	TVD [mKB]	Meas. Depth [mCF]	TVD [mCF]
0.00	0.00	0.00	-9.20	-9.20
221.00	0.25	221.00	211.80	211.80
960.00	3.88	958.93	950.80	949.73

Deviated Well Survey				
Meas. Depth [mKB]	Inclination [Degrees]	TVD [mKB]	Meas. Depth [mCF]	TVD [mCF]
1027.00	4.00	1025.77	1017.80	1016.57
1972.50	3.80	1965.52	1963.30	1956.32
2030.00	3.40	2022.91	2020.80	2013.71
2484.00	4.40	2475.42	2474.80	2466.22
2510.00	4.60	2501.34	2500.80	2492.14
2598.40	20.30	2587.50	2589.20	2578.30
2608.00	22.60	2596.43	2598.80	2587.23
2617.50	25.30	2605.12	2608.30	2595.92
2646.00	31.90	2630.10	2636.80	2620.90
2655.60	33.90	2638.16	2646.40	2628.96
2665.20	36.00	2646.03	2656.00	2636.83
2684.50	37.10	2661.50	2675.30	2652.30
2694.20	37.40	2669.22	2685.00	2660.02
2703.90	36.70	2676.96	2694.70	2667.76
2742.60	36.20	2708.31	2733.40	2699.11
2752.20	36.60	2716.04	2743.00	2706.84
2761.90	36.20	2723.84	2752.70	2714.64
2983.00	36.10	2902.45	2973.80	2893.25
3000.00	36.10	2916.19	2990.80	2906.99

Tool Summary

Chevron Canada Resources
North West Territories, Canada

Jun 27, 01

Chevron Et Al Liard K-29

K-29

Liard, Nahanni

Top Recorder

Tool	LMR-3000S	Serial	9808Q-16E	Latest Calibration	11/14/00	Battery Serial	165
Landed Depth	2689.00 mCF MD (2663.20 mCF TVD)			Depth Offset	-2.00 m	Min. Battery	18.05 V

Program: Static Gradient -- 512 kByte

Mode	Intervals				Expected Samples			Actual Samples				Duration [d hh:mm:ss]
	Interval [d hh:mm:ss]	Rate [hh:mm:ss]	Delta [KPa]	Periodic [hh:mm:ss]	Regular Samples	Percent Storage	Energy [Ahr]	Regular Samples	Delta Samples	Percent Storage	Energy [Ahr]	
HB	10:00	1			600	0.2%	0.0022	600		0.2%	0.0022	10:00
HB	10	10			86400	24.7%	1.8249	1033		0.3%	0.0218	2:52:10
Totals:	10	10:00			87000	24.9%	1.8271	1633		0.5%	0.0240	3:02:10

Bottom Recorder

Tool	LMR-3000S	Serial	9809Q-16E	Latest Calibration	11/14/00	Battery Serial	165
Landed Depth	2691.00 mCF MD (2664.80 mCF TVD)			Depth Offset	0.00 m	Min. Battery	17.96 V

Program: Static Gradient -- 512 kByte

Mode	Intervals				Expected Samples			Actual Samples				Duration [d hh:mm:ss]
	Interval [d hh:mm:ss]	Rate [hh:mm:ss]	Delta [KPa]	Periodic [hh:mm:ss]	Regular Samples	Percent Storage	Energy [Ahr]	Regular Samples	Delta Samples	Percent Storage	Energy [Ahr]	
HB	10:00	1			600	0.2%	0.0022	600		0.2%	0.0022	10:00
HB	10	10			86400	24.7%	1.8249	1032		0.3%	0.0218	2:52:00
Totals:	10	10:00			87000	24.9%	1.8271	1632		0.5%	0.0240	3:02:00

Calibration Summary

Chevron Canada Resources
North West Territories, Canada

Jun 27, 01

Chevron Et Al Liard K-29

K-29

Liard, Nahanni

Top Recorder

Tool	LMR-3000S	Serial	9808Q-16E	Latest Calibration	11/14/00	Battery Serial	165
Landed Depth	2689.00 mCF MD (2663.20 mCF TVD)			Depth Offset	-2.00 m	Min. Battery	18.05 V

Equations

FP = Pres Freq (Hz)

FT = Temp Freq (Hz)

$XP = 2.497500e+004 + (1.000000e-002) FP$

$XT = 4.359200e+004 + (1.000000e-002) FT$

$P_0 = 2.966512e+001 + (-1.498518e+000) XT + (-2.326955e-002) XT^2 + (-9.144850e-007) XT^3 + (-1.528643e-008) XT^4$

$P_1 = 4.435802e+001 + (-2.067937e-002) XT + (3.914277e-005) XT^2 + (4.720518e-009) XT^3 + (8.804357e-011) XT^4$

$P_2 = -1.778392e-003 + (2.536479e-006) XT + (-1.621820e-007) XT^2 + (-6.144548e-010) XT^3 + (-1.077388e-012) XT^4$

$P_3 = 6.277240e-007 + (1.220940e-008) XT + (3.022462e-010) XT^2 + (1.475717e-012) XT^3 + (2.479974e-015) XT^4$

Pressure (psiA) = $P_0 + P_1 XP + P_2 XP^2 + P_3 XP^3$

$T_0 = 2.511688e+001$

$T_1 = -7.411773e-001$

$T_2 = -8.770965e-004$

$T_3 = -6.801326e-007$

Temperature (degC) = $T_0 + T_1 XT + T_2 XT^2 + T_3 XT^3$

Bottom Recorder

Tool	LMR-3000S	Serial	9809Q-16E	Latest Calibration	11/14/00	Battery Serial	165
Landed Depth	2691.00 mCF MD (2664.80 mCF TVD)			Depth Offset	0.00 m	Min. Battery	17.96 V

Equations

FP = Pres Freq (Hz)

FT = Temp Freq (Hz)

$XP = 2.548100e+004 + (1.000000e-002) FP$

$XT = 4.683100e+004 + (1.000000e-002) FT$

$P_0 = 3.014293e+001 + (-1.060479e+000) XT + (-2.253019e-002) XT^2 + (1.079977e-007) XT^3 + (-1.510453e-008) XT^4$

$P_1 = 4.371725e+001 + (-2.166634e-002) XT + (2.681023e-005) XT^2 + (-4.451122e-008) XT^3 + (2.871370e-011) XT^4$

$P_2 = -1.846576e-003 + (8.994742e-006) XT + (-5.644304e-008) XT^2 + (-1.049700e-010) XT^3 + (-3.236695e-013) XT^4$

$P_3 = 6.807911e-007 + (7.733984e-010) XT + (9.123245e-011) XT^2 + (3.825502e-013) XT^3 + (7.591878e-016) XT^4$

Pressure (psiA) = $P_0 + P_1 XP + P_2 XP^2 + P_3 XP^3$

$T_0 = 2.511614e+001$

$T_1 = -7.354140e-001$

$T_2 = -8.599623e-004$

$T_3 = -6.579934e-007$

Temperature (degC) = $T_0 + T_1 XT + T_2 XT^2 + T_3 XT^3$

Recorded Data

Chevron Canada Resources
North West Territories, Canada

Jun 27, 01

Chevron Et Al Liard K-29

K-29

Liard, Nahanni

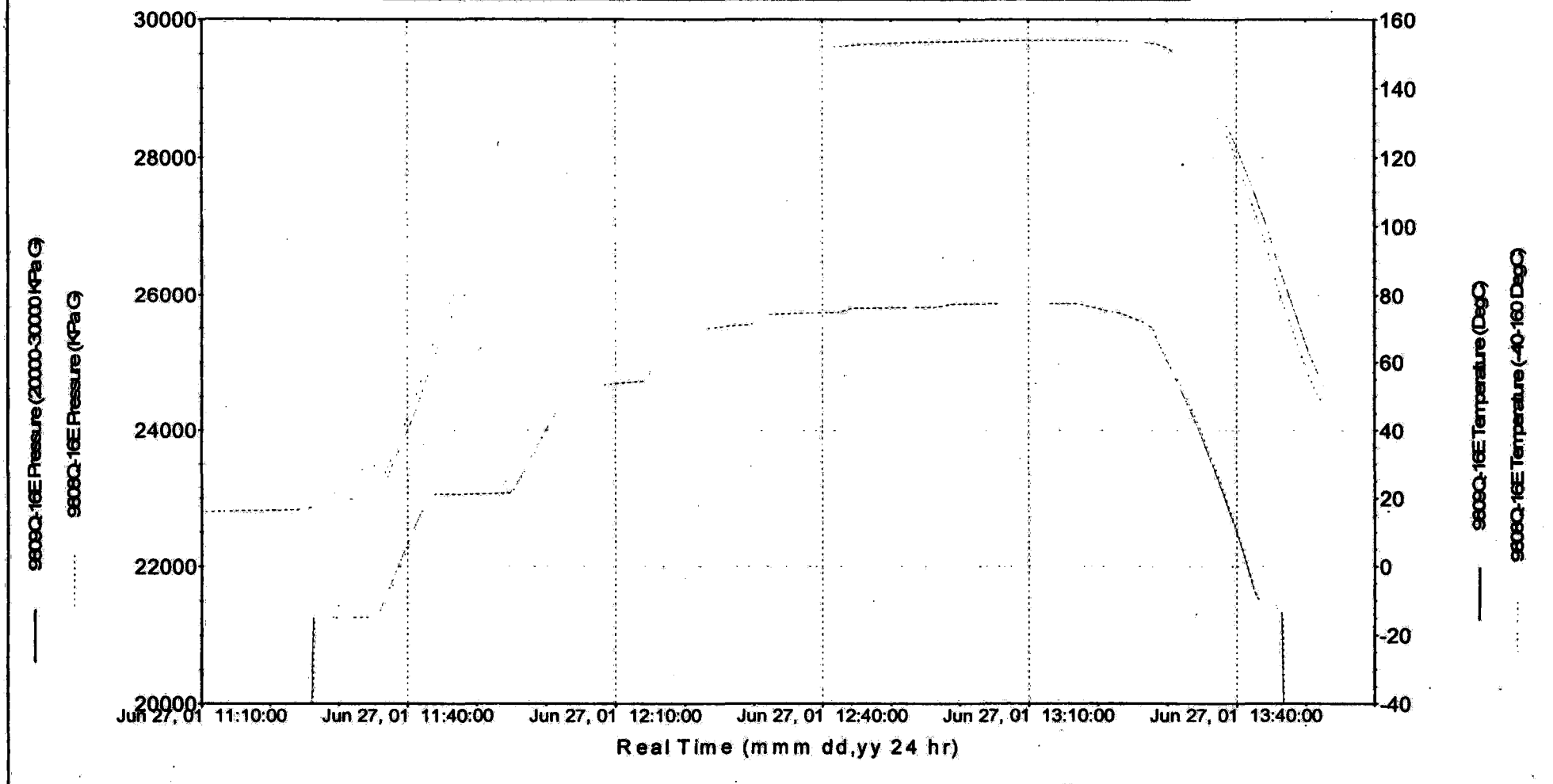
Data							
9809Q-16E		9809Q-16E	9808Q-16E	9809Q-16E vs 9808Q-16E	9809Q-16E	9808Q-16E	
Real Time (mmm dd,yy 24 hr)	Elapsed Time (DDD:HH:MM:SS)	Pressure (KPa G)	Pressure (KPa G)	Press. Diff. (KPa)	Temperature (DegC)	Temperature (DegC)	Comments
Jun 27, 01 10:57:00	0:00:00:00	-9.607			21.72		
10:59:00	0:00:02:00	-13.341	-19.341	6.000	15.05	14.88	
11:00:00	0:00:03:00	-13.544	-21.217	7.673	15.09	14.84	9809Q-16E Bottom Recorder
11:01:00	0:00:04:00	-13.944	-21.818	7.874	15.16	14.91	9808Q-16E Top Recorder
11:03:00	0:00:06:00	-14.719	-20.998	6.279	15.35	15.11	
11:05:00	0:00:08:00	-15.289	-21.720	6.430	15.59	15.34	
11:07:00	0:00:10:00	-14.932	-21.505	6.573	15.77	15.54	
11:09:00	0:00:12:00	-14.445	-20.823	6.379	15.88	15.69	
11:11:00	0:00:14:00	-14.320	-20.642	6.322	16.00	15.81	
11:13:00	0:00:16:00	-14.128	-20.352	6.223	16.11	15.94	
11:15:00	0:00:18:00	-13.858	-20.106	6.248	16.22	16.07	
11:17:00	0:00:20:00	-13.781	-16.859	3.078	16.30	16.17	
11:19:00	0:00:22:00	-2.356	-13.094	10.737	16.36	16.26	
11:21:00	0:00:24:00	11.042	-7.896	18.939	16.42	16.30	
11:23:00	0:00:26:00	73.029	58.443	14.587	16.50	16.31	
11:25:00	0:00:28:00	6449.670	5401.091	1048.579	16.88	16.58	
11:27:00	0:00:30:00	21256.593	21233.497	23.096	17.90	18.74	
11:29:00	0:00:32:00	21261.325	21242.977	18.348	19.09	21.20	
11:31:00	0:00:34:00	21263.542	21250.221	13.321	19.58	22.52	
11:33:00	0:00:36:00	21264.122	21253.336	10.786	19.83	23.30	Static Gradient Stop # 1 @ 0.00 mCF
11:35:00	0:00:38:00	21288.459	21271.523	16.935	20.00	23.76	
11:37:00	0:00:40:00	21601.968	21525.494	76.474	25.57	28.20	
11:39:00	0:00:42:00	22086.291	22014.854	71.437	35.09	38.53	
11:41:00	0:00:44:00	22567.236	22505.578	61.659	44.98	49.00	
11:43:00	0:00:46:00	22988.582	22941.986	46.596	56.38	60.91	
11:45:00	0:00:48:00	23063.129	23052.417	10.712	67.39	72.58	
11:47:00	0:00:50:00	23060.056	23049.717	10.339	75.78	80.94	
11:49:00	0:00:52:00	23060.371	23051.155	9.216	82.27	87.11	
11:51:00	0:00:54:00	23065.022	23057.372	7.650	87.34	91.72	
11:53:00	0:00:56:00	23071.726	23065.644	6.082	91.31	95.18	Static Gradient Stop # 2 @ 1000.00 mCF
11:55:00	0:00:58:00	23107.612	23077.377	30.236	94.43	97.79	
11:57:00	0:01:00:00	23446.488	23408.152	38.336	97.83	100.65	

Data							
9809Q-16E		9809Q-16E	9808Q-16E	9809Q-16E vs 9808Q-16E	9809Q-16E	9808Q-16E	
Real Time (mmm dd,yy 24 hr)	Elapsed Time (DDD:HH:MM:SS)	Pressure (KPa G)	Pressure (KPa G)	Press. Diff. (KPa)	Temperature (DegC)	Temperature (DegC)	Comments
11:59:00	0:01:02:00	23821.191	23780.452	40.739	102.14	104.82	
12:01:00	0:01:04:00	24189.444	24147.289	42.155	106.83	109.48	
12:03:00	0:01:06:00	24538.775	24492.411	46.364	112.43	115.15	
12:05:00	0:01:08:00	24654.545	24634.563	19.982	118.31	121.28	
12:07:00	0:01:10:00	24665.950	24649.145	16.805	122.87	125.73	
12:09:00	0:01:12:00	24683.244	24671.633	11.612	126.38	128.93	
12:11:00	0:01:14:00	24701.663	24693.327	8.335	129.09	131.31	
12:12:00	0:01:15:00	24710.116	24703.403	6.713	130.21	132.27	Static Gradient Stop # 3 @ 2000.00 mCF
12:14:00	0:01:17:00	24725.818	24720.749	5.069	132.06	133.81	
12:16:00	0:01:19:00	25049.913	25012.038	37.874	134.05	135.44	
12:18:00	0:01:21:00	25385.769	25348.895	36.874	137.21	138.62	
12:20:00	0:01:23:00	25469.737	25447.639	22.097	140.51	142.09	
12:22:00	0:01:25:00	25487.874	25470.244	17.630	143.01	144.56	
12:24:00	0:01:27:00	25507.874	25495.864	12.009	144.88	146.27	
12:26:00	0:01:29:00	25525.407	25517.182	8.225	146.33	147.54	
12:27:00	0:01:30:00	25532.974	25526.319	6.655	146.93	148.05	Static Gradient Stop # 4 @ 2500.00 mCF
12:29:00	0:01:32:00	25545.829	25541.473	4.356	147.93	148.86	
12:31:00	0:01:34:00	25646.591	25631.784	14.807	148.89	149.63	
12:33:00	0:01:36:00	25706.018	25701.345	4.672	149.87	150.53	
12:35:00	0:01:38:00	25714.664	25710.987	3.677	150.59	151.14	
12:37:00	0:01:40:00	25722.193	25719.260	2.934	151.13	151.58	
12:39:00	0:01:42:00	25728.316	25725.784	2.531	151.55	151.91	
12:40:00	0:01:43:00	25730.759	25728.382	2.377	151.73	152.04	Static Gradient Stop # 5 @ 2600.00 mCF
12:42:00	0:01:45:00	25734.928	25732.690	2.238	152.02	152.27	
12:44:00	0:01:47:00	25793.918	25786.478	7.439	152.33	152.51	
12:46:00	0:01:49:00	25804.486	25800.192	4.294	152.68	152.86	
12:48:00	0:01:51:00	25807.840	25803.932	3.908	152.93	153.09	
12:50:00	0:01:53:00	25810.638	25807.305	3.333	153.12	153.25	
12:52:00	0:01:55:00	25812.950	25809.840	3.110	153.27	153.38	
12:54:00	0:01:57:00	25814.812	25811.753	3.059	153.39	153.48	Static Gradient Stop # 6 @ 2650.00 mCF
12:56:00	0:01:59:00	25816.197	25813.319	2.878	153.48	153.57	
12:58:00	0:02:01:00	25852.798	25846.935	5.862	153.54	153.62	
13:00:00	0:02:03:00	25871.388	25865.125	6.262	153.63	153.69	
13:02:00	0:02:05:00	25871.445	25867.967	3.478	153.70	153.79	On Bottom
13:04:00	0:02:07:00	25872.158	25869.056	3.102	153.75	153.86	
13:06:00	0:02:09:00	25872.800	25869.984	2.816	153.79	153.91	
13:08:00	0:02:11:00	25873.271	25870.798	2.472	153.83	153.95	
13:10:00	0:02:13:00	25873.626	25871.358	2.268	153.86	153.98	
13:12:00	0:02:15:00	25874.027	25871.724	2.304	153.88	154.01	Static Gradient Stop # 7 @ 2691.00 mCF

Data							
9809Q-16E		9809Q-16E	9808Q-16E	9809Q-16E vs 9808Q-16E	9809Q-16E	9808Q-16E	
Real Time (mmm dd,yy 24 hr)	Elapsed Time (DDD:HH:MM:SS)	Pressure (KPa G)	Pressure (KPa G)	Press. Diff. (KPa)	Temperature (DegC)	Temperature (DegC)	Comments
13:14:00	0:02:17:00	25874.159	25872.219	1.940	153.90	154.03	
13:15:00	0:02:18:00	25874.328	25872.376	1.952	153.91	154.04	Build-Up Rate Sample
13:17:00	0:02:20:00	25874.506	25872.738	1.767	153.92	154.05	Off Bottom
13:19:00	0:02:22:00	25826.784	25830.356	-3.572	153.95	154.07	
13:21:00	0:02:24:00	25770.706	25774.956	-4.251	153.93	154.01	
13:23:00	0:02:26:00	25733.491	25737.851	-4.360	153.84	153.89	
13:25:00	0:02:28:00	25648.250	25655.538	-7.288	153.69	153.70	
13:27:00	0:02:30:00	25553.440	25565.842	-12.402	153.40	153.38	
13:29:00	0:02:32:00	25224.396	25264.006	-39.610	152.65	152.59	
13:31:00	0:02:34:00	24800.792	24849.268	-48.477	150.56	150.30	
13:33:00	0:02:36:00	24366.158	24425.601	-59.443	146.64	145.85	
13:35:00	0:02:38:00	23887.468	23954.495	-67.027	141.14	139.58	
13:37:00	0:02:40:00	23350.457	23408.887	-58.431	134.98	132.70	
13:39:00	0:02:42:00	22782.732	22831.595	-48.863	127.55	124.52	
13:41:00	0:02:44:00	22169.157	22209.021	-39.865	117.92	113.76	
13:43:00	0:02:46:00	21542.859	21536.472	6.387	107.41	102.06	
13:45:00	0:02:48:00	21458.230	21420.921	37.309	95.65	89.15	
13:47:00	0:02:50:00	18735.445	19220.784	-485.339	83.16	75.61	
13:49:00	0:02:52:00	6096.189	6717.609	-621.420	71.15	63.88	
13:51:00	0:02:54:00	1385.665	1565.217	-179.551	60.11	53.48	
13:53:00	0:02:56:00	228.697	252.589	-23.892	52.20	46.24	
13:55:00	0:02:58:00	58.664	52.490	6.174	46.82	41.44	
13:57:00	0:03:00:00	38.872	35.568	3.304	43.03	38.26	
13:59:00	0:03:02:00		25.362			36.03	

Well							
Client	Chevron Canada Resources	Well Name	Chevron Et Al Liard K-29	Well No.	K-29	Province	North West Territories
Test Name	Static Gradient	Test Date	Jun 27, 01	Field	Liard	Pool	Nahanni

Pressure & Temperature vs. Real Time (Static Gradient)

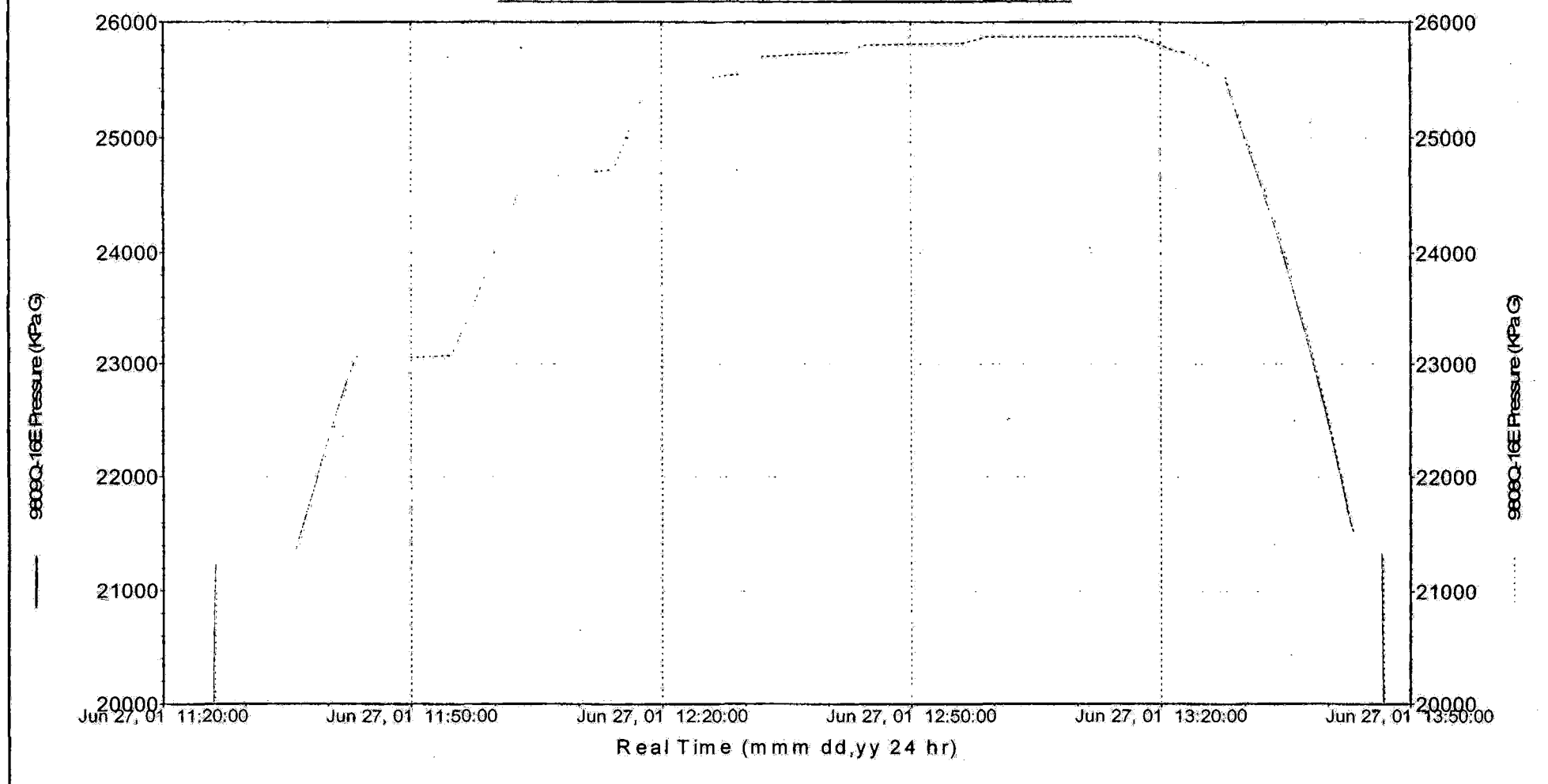


Remarks

9809Q-16E Bot. Rec. & 9808Q-16E Top Rec.

Well			
Client	Chevron Canada Resources	Well Name	Chevron Et Al Liard K-29
Test Name	Static Gradient	Well No.	K-29
		Province	North West Territories
		Field	Liard
		Pool	Nahanni
		Test Date	Jun 27, 01

Pressure vs. Real Time (Static Gradient)

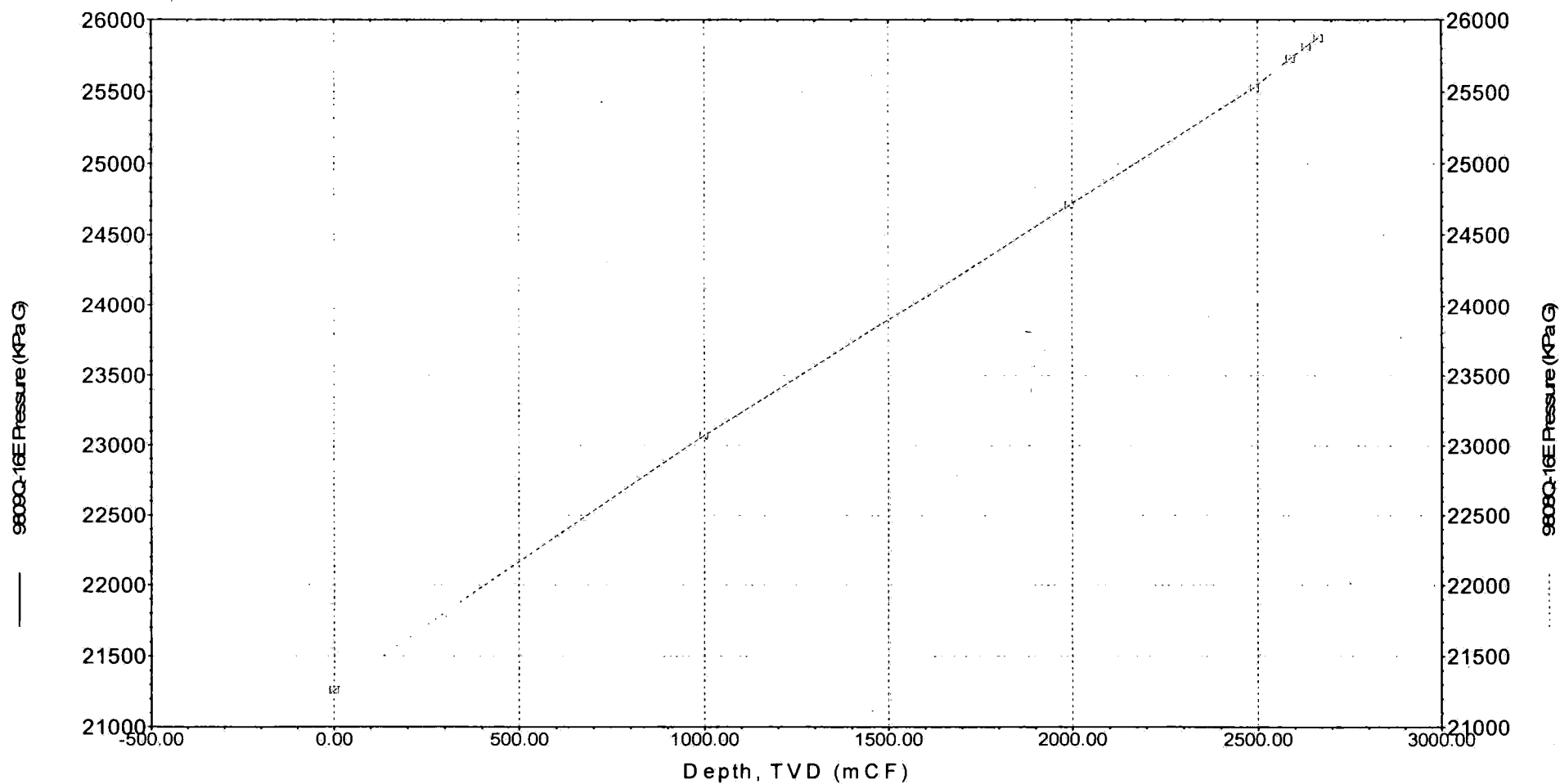


Remarks

9809Q-16E Bot. Rec. & 9808Q-16E Top Rec.

Well

Client	Chevron Canada Resources	Well Name	Chevron Et Al Liard K-29	Well No.	K-29	Province	North West Territories
Test Name	Static Gradient	Test Date	Jun 27, 01	Field	Liard	Pool	Nahanni

Pressure vs. Depth (Static Gradient)**Remarks**

9809Q-16E Bot. Rec. & 9808Q-16E Top Rec.