

# **Chevron Canada Resources**

Static Gradient  
Chevron et al Ft. Liard K-29  
K-29

Apr 11, 99 to Apr 12, 99

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## **Service Company Contact Info**

Report Writer	Vio Tandara, 1-403-347-2524(309-7913)	Service Company	Lee Tool, Div. of Schlumberger
Operator	Doan Hunt, 1-780-778-2361	Job ID	k-29sg
		Test Date	Apr 11, 99 to Apr 12, 99

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

# Static Gradient

Chevron Canada Resources  
Alberta, Canada

Apr 11, 99 to Apr 12, 99

Chevron et al Ft. Liard K-29

K-29

Liard, Undefined

Well			
Client	Chevron Canada Resources		Province Alberta
			Country Canada
Well Name	Chevron et al Ft. Liard K-29		Deviated Well Yes
			Well Status Gas
Well No.	K-29		KB Elevation 417.40 m
			CF Elevation 409.60 m
Field	Liard	Pool Undefined	Pool Datum 2500.00 mSS

Test							
Test Type				Static Gradient		Atmospheric 101.30 KPa A	
Test Start (mm/dd/yy) 04/11/99		06:15 PM		Test Finish 04/12/99 12:11 AM		Casing ID 88.90 mm	
On Bottom 04/11/99		11:30 PM		Off Bottom 04/11/99 11:40 PM		C. Pres. Before 0.00 KPa G	
Shut In 04/11/99				ET0 04/11/99 06:15 PM		T. Pres. Before 22330.00 KPa G	
						T. Pres. After	
		Meas. Depth [mCF]		TVD [mCF]		Est. Pressure [KPa G]	
						Est. Gradient [KPa/m]	
						Est. Temperature [DegC]	
Well Datum				2909.60		28541.63	
Run Depth		2880.00		2817.80		28268.27	
Avg. MPP Depth		2842.20		2787.20		28183.38	
Operator				Service Company			
Doan Hunt, 1-780-778-2361				Lee Tool, Div. of Schlumberger			
Remarks							
9112q-16e bot. rec. & 9102q-16e top rec. One tool had a real time clock problem.							

Depth References		
Depth Reference	Offset [m]	Elevation [mMSL]
Casing Flange (CF)		409.60
Kelly Bushing (KB)	CF + 7.80	417.40

Perforations						
Perf Top MD, [mKB]	Perf Bottom MD, [mKB]	Perf Top MD, [mCF]	Perf Bottom MD, [mCF]	MPP TVD, [mCF]	Pressure [KPa G]	Gradient [KPa/m]
2700.00	3000.00	2692.20	2992.20	2787.20	28183.38	2.00

**Top Recorder**

Model	Serial	9102q-16e	Latest Calibration	01/01/70
Max. Rated Press.	Max. Rated Temp.			

**Gradient Stops**

Depth			Sample R/T [mmm dd, 24hr]	Pressure [KPa G]	Gradient [KPa/m]	Temperature [DegC]
Tool String MD, [mCF]	Recorder MD, [mCF]	Recorder TVD, [mCF]				
0.00	-1.50	-1.50	Apr 11, 99 18:49:10	22300.36		19.04
500.00	498.50	498.34	19:04:40	23590.01	2.58	33.00
1000.00	998.50	997.32	19:19:30	24720.66	2.27	59.42
1500.00	1498.50	1493.33	19:36:50	25734.10	2.04	86.22
2000.00	1998.50	1991.45	19:57:20	26699.79	1.94	112.02
2500.00	2498.50	2489.85	20:14:10	27573.55	1.75	136.22
2550.00	2548.50	2539.32	20:24:50	27713.72	2.83	141.10
2650.00	2648.50	2630.83	20:40:10	27886.02	1.88	144.42
2700.00	2698.50	2671.10	20:59:00	27969.75	2.08	146.92
2750.00	2748.50	2711.54	21:12:10	28039.16	1.72	148.68
2800.00	2798.50	2751.72	21:23:30	28111.54	1.80	150.19
2850.00	2848.50	2792.31	23:24:20	28195.72	2.07	151.80
2880.00	2878.50	2816.58	23:38:40	28257.30	2.54	152.73

**Bottom Recorder**

Model	Serial	9112q-16e	Latest Calibration	01/01/70
Max. Rated Press.	Max. Rated Temp.			

**Gradient Stops**

Depth			Sample R/T [mmm dd, 24hr]	Pressure [KPa G]	Gradient [KPa/m]	Temperature [DegC]
Tool String MD, [mCF]	Recorder MD, [mCF]	Recorder TVD, [mCF]				
0.00	0.00	-0.00	Apr 11, 99 18:50:00	22300.51		19.69
500.00	500.00	499.84	19:07:20	23591.23	2.58	35.21
1000.00	1000.00	998.82	19:21:30	24726.48	2.28	61.97
1500.00	1500.00	1494.82	19:39:30	25746.38	2.06	88.18
2000.00	2000.00	1992.95	19:58:10	26710.74	1.94	112.61
2500.00	2500.00	2491.35	20:18:10	27611.20	1.81	138.57
2550.00	2550.00	2540.78	20:23:00	27710.60	2.01	140.58
2650.00	2650.00	2632.04	20:40:30	27888.91	1.95	144.54
2700.00	2700.00	2672.30	20:57:53	27973.76	2.11	147.09
2750.00	2750.00	2712.74	21:08:44	28042.76	1.71	148.73
2800.00	2800.00	2752.92	21:18:55	28114.95	1.80	150.24
2850.00	2850.00	2793.53	23:18:16	28196.01	2.00	151.78
2880.00	2880.00	2817.80	23:28:50	28268.27	2.98	152.87

**Deviated Well Survey**

Meas. Depth [mKB]	Inclination [Degrees]	TVD [mKB]	Meas. Depth [mCF]	TVD [mCF]
0.00		0.00	-7.80	-7.80
425.00	2.00	424.94	417.20	417.14
513.00	3.75	512.83	505.20	505.03



**Deviated Well Survey**

Meas. Depth [mKB]	Inclination [Degrees]	TVD [mKB]	Meas. Depth [mCF]	TVD [mCF]
960.00	3.88	958.93	952.20	951.13
1027.00	4.00	1025.77	1019.20	1017.97
1502.00	9.00	1496.88	1494.20	1489.08
1512.70	7.30	1507.47	1504.90	1499.67
2001.20	3.70	1994.16	1993.40	1986.36
2030.00	3.40	2022.90	2022.20	2015.10
2484.00	4.40	2475.42	2476.20	2467.62
2510.00	4.60	2501.34	2502.20	2493.54
2519.60	5.70	2510.90	2511.80	2503.10
2548.60	11.00	2539.59	2540.80	2531.79
2558.30	13.50	2549.07	2550.50	2541.27
2598.40	20.30	2587.41	2590.60	2579.61
2608.00	22.60	2596.35	2600.20	2588.55
2646.00	31.90	2630.10	2638.20	2622.30
2655.60	36.00	2638.06	2647.80	2630.26
2665.20	36.00	2645.83	2657.40	2638.03
2703.90	36.70	2676.97	2696.10	2669.17
2713.50	35.90	2684.71	2705.70	2676.91
2752.20	36.60	2716.04	2744.40	2708.24
2761.90	36.20	2723.85	2754.10	2716.05
2800.60	36.60	2754.94	2792.80	2747.14
2810.20	36.60	2762.65	2802.40	2754.85
2848.90	35.60	2794.11	2841.10	2786.31
2850.00	35.60	2795.00	2842.20	2787.20
2858.60	36.00	2801.98	2850.80	2794.18
2868.30	36.30	2809.81	2860.50	2802.01
2877.80	35.80	2817.49	2870.00	2809.69
2887.30	35.80	2825.19	2879.50	2817.39
2896.80	36.30	2832.87	2889.00	2825.07
2915.90	36.50	2848.24	2908.10	2840.44
2925.50	35.80	2856.00	2917.70	2848.20
2983.00	36.10	2902.45	2975.20	2894.65
3000.00	36.10	2916.19	2992.20	2908.39
3002.00	36.10	2917.80	2994.20	2910.00

# Tool Summary

Alberta, Canada

Top Recorder				
Tool	LMR-3000S	Serial	9102Q-16E	Latest Calibration 03/10/99
Landed Depth		Depth Offset	-1.50 m	Min. Battery 17.86 V

Program: Program for s.g. with 2 meg. memory												
Intervals					Expected Samples			Actual Samples				
Mode	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]	Duration [d hh:mm:ss]
HB	10:00	1			600	0.2%	0.0022	600		0.2%	0.0022	10:00
HB	30	10			259200	74.2%	5.4747	2067		0.6%	0.0437	5:44:30
Totals:	30 10:00				259800	74.3%	5.4769	2667		0.8%	0.0458	5:54:30

Bottom Recorder				
Tool	LMR-3000S	Serial	9112Q-16E	Latest Calibration 03/10/99
Landed Depth		Depth Offset	0.00 m	Min. Battery 14.75 V

Program: Program for s.g. with 2 meg. memory												
Intervals					Expected Samples			Actual Samples				
Mode	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]	Duration [d hh:mm:ss]
HB	10:00	1			600	0.2%	0.0022	600		0.2%	0.0022	10:00
HB	30	10			259200	74.2%	5.4747	2000		0.6%	0.0422	5:33:20
Totals:	30 10:00				259800	74.3%	5.4769	2600		0.7%	0.0444	5:43:20

# Calibration Summary

Alberta, Canada

Top Recorder			
Tool	Serial	Latest Calibration	Battery Serial
LMR-3000S	9102Q-16E	03/10/99	165 c
Landed Depth	Depth Offset	Min. Battery	
	-1.50 m	17.86 V	

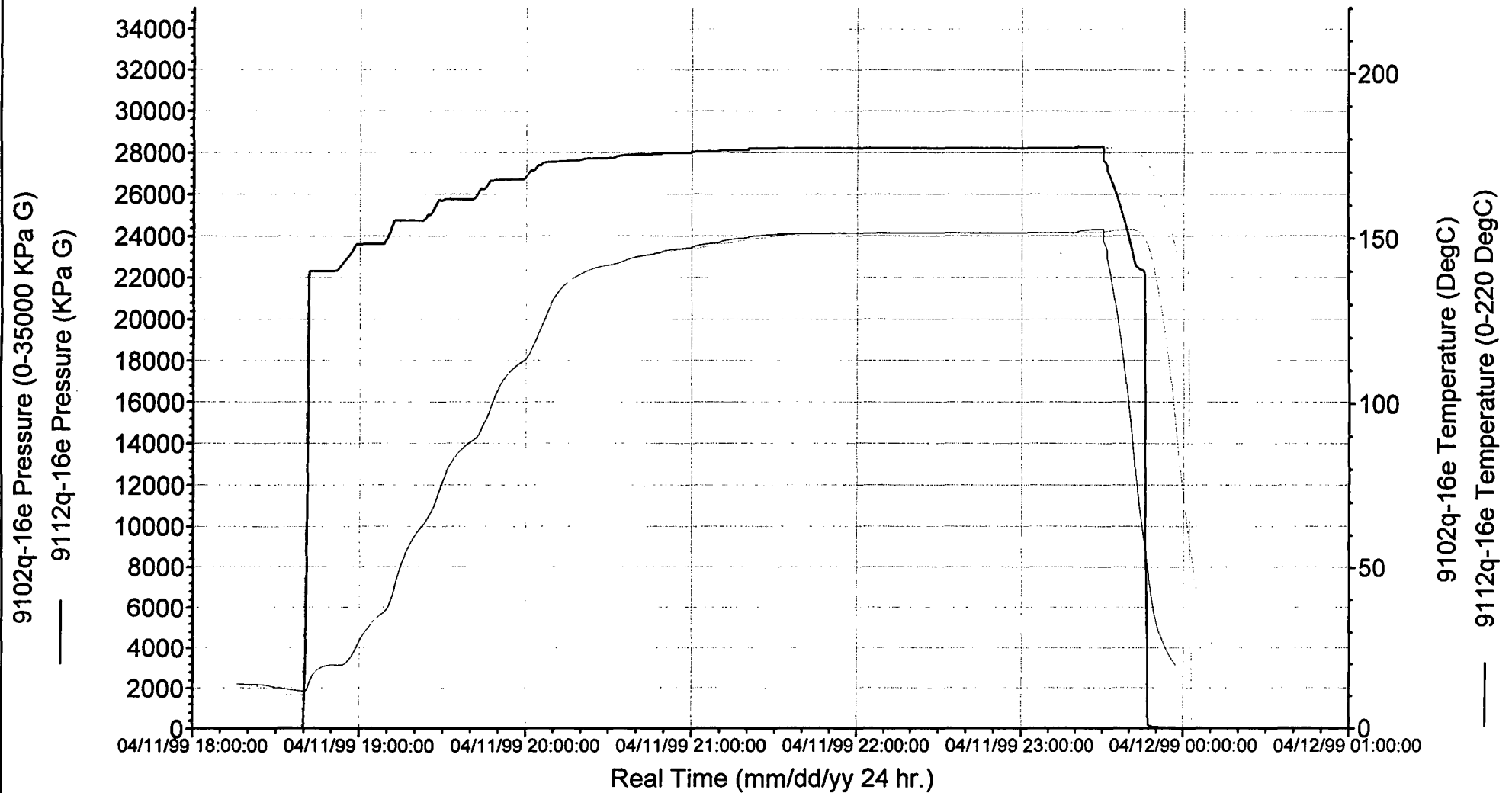
Equations
FP = Pres Freq (Hz) FT = Temp Freq (Hz)  XP = 2.208100e+004 + (1.000000e-002) FP XT = 5.176900e+004 + (1.000000e-002) FT  $P_0 = 1.990071e+001 + (-1.555979e+000) XT + (-2.287482e-002) XT^2 + (1.677079e-007) XT^3 + (-1.476436e-008) XT^4$ $P_1 = 4.457698e+001 + (-2.151670e-002) XT + (3.862171e-005) XT^2 + (3.738375e-008) XT^3 + (1.886815e-010) XT^4$ $P_2 = -1.755544e-003 + (5.948385e-006) XT + (-1.661327e-007) XT^2 + (-8.524640e-010) XT^3 + (-1.742323e-012) XT^4$ $P_3 = 4.985877e-007 + (2.455509e-008) XT + (6.352675e-010) XT^2 + (3.710346e-012) XT^3 + (6.732222e-015) XT^4$ $P_4 = 1.150052e-010 + (-4.275052e-011) XT + (-8.475401e-013) XT^2 + (-4.956157e-015) XT^3 + (-8.706455e-018) XT^4$ Pressure (psiA) = $P_0 + P_1 XP + P_2 XP^2 + P_3 XP^3 + P_4 XP^4$ $T_0 = 2.575670e+001$ $T_1 = -7.315464e-001$ $T_2 = -8.249659e-004$ $T_3 = -5.865845e-007$ Temperature (degC) = $T_0 + T_1 XT + T_2 XT^2 + T_3 XT^3$

Bottom Recorder			
Tool	Serial	Latest Calibration	Battery Serial
LMR-3000S	9112Q-16E	03/10/99	165
Landed Depth	Depth Offset	Min. Battery	
	0.00 m	14.75 V	

Equations
FP = Pres Freq (Hz) FT = Temp Freq (Hz)  XP = 2.524500e+004 + (1.000000e-002) FP XT = 4.404400e+004 + (1.000000e-002) FT  $P_0 = 2.059346e+001 + (-1.248274e+000) XT + (-2.033423e-002) XT^2 + (1.170075e-006) XT^3 + (-1.235264e-008) XT^4$ $P_1 = 3.963056e+001 + (-1.891355e-002) XT + (4.895316e-005) XT^2 + (9.463500e-008) XT^3 + (2.698000e-010) XT^4$ $P_2 = -1.975134e-003 + (-3.969299e-006) XT + (-2.592481e-007) XT^2 + (-1.271178e-009) XT^3 + (-2.368644e-012) XT^4$ $P_3 = 1.340248e-006 + (5.199956e-008) XT + (9.074406e-010) XT^2 + (4.902146e-012) XT^3 + (8.577975e-015) XT^4$ $P_4 = -9.123857e-010 + (-6.740327e-011) XT + (-1.081794e-012) XT^2 + (-5.924722e-015) XT^3 + (-1.024025e-017) XT^4$ Pressure (psiA) = $P_0 + P_1 XP + P_2 XP^2 + P_3 XP^3 + P_4 XP^4$ $T_0 = 2.575680e+001$ $T_1 = -7.340471e-001$ $T_2 = -8.306071e-004$ $T_3 = -5.911701e-007$ Temperature (degC) = $T_0 + T_1 XT + T_2 XT^2 + T_3 XT^3$

## Pressure & Temperature vs. Real Time(Static gradient)

Company:	Lee Tool, Div. of Schlumberger	Field:	Liard
Client:	Chevron Canada Resources	Well Name:	Chevron et al Ft. Liard K-29
Remarks:	9112q-16e bot. rec. & 9102q-16e top rec.	Well Number:	K-29



## Pressure vs. Depth

Company: Lee Tool, Div. of Schlumberger  
Client: Chevron Canada Resources  
Remarks: 9112q-16e bot. rec. & 9102q-16e top rec.

Field: Liard  
Well Name: Chevron et al Ft. Liard K-29  
Well Number: K-29

