



Directional Services

Job Number: 083217505092

Company: Petroleum Development Corporation

Lease/Well: Leonard & Sons, Well #1

Location: Weld County, CO

Rig Name: Raptor Wireline

RKB:

G.L. or M.S.L.:

State/Country: Colorado/USA

Declination: 11.00°

Grid: East To Grid

File name: F:\SURVEY\2008SU~1\PDCL\LEONARD1.SVY

Date/Time: 03-Mar-08 / 11:18

Curve Name: Surface - 7100' M.D. (gyroscopic)

WINSERVE SURVEY CALCULATIONS
 Minimum Curvature Method
 Vertical Section Plane .00
 Vertical Section Referenced to Wellhead
 Rectangular Coordinates Referenced to Wellhead

<i>Measured Depth FT</i>	<i>Incl Angle Deg</i>	<i>Drift Direction Deg</i>	<i>True Vertical Depth</i>	<i>N-S FT</i>	<i>E-W FT</i>	<i>Vertical Section FT</i>	<i>CLOSURE</i>		<i>Dogleg Severity Deg/100</i>
							<i>Distance FT</i>	<i>Direction Deg</i>	
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
100.00	.75	201.04	100.00	-.61	-.23	-.61	.65	201.04	.75
200.00	.75	193.97	199.99	-1.86	-.63	-1.86	1.96	198.68	.09
300.00	1.00	111.23	299.98	-2.81	.03	-2.81	2.81	179.44	1.17
400.00	1.25	110.51	399.96	-3.51	1.86	-3.51	3.97	152.02	.25
500.00	1.00	108.79	499.94	-4.17	3.71	-4.17	5.58	138.33	.25
600.00	.50	144.06	599.93	-4.80	4.79	-4.80	6.79	135.07	.66
700.00	1.25	149.34	699.92	-6.10	5.60	-6.10	8.28	137.40	.75
800.00	1.00	148.61	799.90	-7.78	6.62	-7.78	10.21	139.62	.25
900.00	.50	97.89	899.89	-8.58	7.50	-8.58	11.40	138.84	.79

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
1000.00	.75	140.99	999.89	-9.15	8.35	-9.15	12.39	137.64	.51
1100.00	.75	143.92	1099.88	-10.19	9.14	-10.19	13.69	138.10	.04
1200.00	.00	.00	1199.88	-10.72	9.53	-10.72	14.34	138.36	.75
1300.00	.25	58.77	1299.88	-10.61	9.72	-10.61	14.38	137.51	.25
1400.00	.50	157.69	1399.87	-10.90	10.07	-10.90	14.84	137.26	.59
1500.00	.25	229.62	1499.87	-11.44	10.07	-11.44	15.24	138.65	.48
1600.00	.00	.00	1599.87	-11.58	9.90	-11.58	15.24	139.47	.25
1700.00	1.00	216.47	1699.87	-12.28	9.38	-12.28	15.46	142.63	1.00
1800.00	.25	269.40	1799.86	-12.99	8.65	-12.99	15.60	146.35	.87
1900.00	.75	292.32	1899.86	-12.74	7.82	-12.74	14.95	148.45	.53
2000.00	.75	285.95	1999.85	-12.31	6.59	-12.31	13.96	151.85	.08
2100.00	.25	327.87	2099.84	-11.95	5.84	-11.95	13.30	153.94	.59
2200.00	.50	310.80	2199.84	-11.48	5.40	-11.48	12.68	154.82	.27
2300.00	1.25	307.72	2299.83	-10.53	4.20	-10.53	11.33	158.24	.75
2400.00	.25	314.65	2399.82	-9.71	3.18	-9.71	10.21	161.83	1.00
2500.00	1.00	293.57	2499.81	-9.20	2.23	-9.20	9.47	166.38	.77
2600.00	1.25	330.50	2599.80	-7.90	.89	-7.90	7.96	173.56	.75
2700.00	1.00	298.42	2699.78	-6.54	-.41	-6.54	6.55	183.60	.67
2800.00	.50	280.35	2799.77	-6.05	-1.61	-6.05	6.26	194.90	.55
2900.00	.75	301.28	2899.76	-5.63	-2.60	-5.63	6.20	204.77	.33
3000.00	1.00	331.40	2999.75	-4.52	-3.57	-4.52	5.76	218.32	.51
3100.00	.50	281.53	3099.74	-3.67	-4.42	-3.67	5.74	230.30	.78
3200.00	1.00	302.65	3199.73	-3.11	-5.58	-3.11	6.39	240.87	.56
3300.00	1.00	349.78	3299.72	-1.78	-6.47	-1.78	6.71	254.61	.80
3400.00	1.00	16.91	3399.71	-.09	-6.37	-.09	6.37	269.21	.47
3500.00	1.00	58.03	3499.69	1.21	-5.38	1.21	5.51	282.67	.70
3600.00	1.00	40.16	3599.68	2.34	-4.08	2.34	4.70	299.84	.31
3700.00	.75	81.28	3699.67	3.10	-2.87	3.10	4.22	317.29	.66
3800.00	.75	115.40	3799.66	2.92	-1.63	2.92	3.35	330.89	.44
3900.00	.75	89.53	3899.65	2.65	-.38	2.65	2.67	351.79	.34

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
4000.00	.75	110.28	3999.64	2.43	.89	2.43	2.58	20.08	.27
4100.00	.75	160.41	4099.63	1.58	1.72	1.58	2.34	47.38	.64
4200.00	.50	37.54	4199.63	1.31	2.21	1.31	2.57	59.25	1.10
4300.00	.50	129.66	4299.63	1.38	2.81	1.38	3.13	63.83	.72
4400.00	.75	98.79	4399.62	1.00	3.79	1.00	3.92	75.21	.41
4500.00	.75	155.91	4499.62	.30	4.70	.30	4.71	86.31	.72
4600.00	1.25	117.03	4599.60	-.79	5.94	-.79	5.99	97.57	.82
4700.00	.75	111.16	4699.59	-1.52	7.52	-1.52	7.68	101.43	.51
4800.00	.75	84.29	4799.58	-1.69	8.79	-1.69	8.95	100.91	.35
4900.00	.00	.00	4899.57	-1.63	9.44	-1.63	9.58	99.79	.75
5000.00	.25	143.64	4999.57	-1.80	9.57	-1.80	9.74	100.68	.25
5100.00	.50	.87	5099.57	-1.54	9.70	-1.54	9.82	99.04	.72
5200.00	1.25	.09	5199.56	-.02	9.71	-.02	9.71	90.09	.75
5300.00	1.50	355.32	5299.53	2.38	9.61	2.38	9.90	76.09	.27
5400.00	1.25	353.54	5399.50	4.77	9.38	4.77	10.52	63.05	.25
5500.00	1.25	352.77	5499.48	6.93	9.12	6.93	11.45	52.74	.02
5600.00	1.50	347.99	5599.45	9.30	8.71	9.30	12.74	43.13	.27
5700.00	1.50	358.22	5699.42	11.88	8.39	11.88	14.55	35.23	.27
5800.00	2.00	1.45	5799.37	14.94	8.40	14.94	17.14	29.34	.51
5900.00	1.25	11.68	5899.33	17.75	8.66	17.75	19.75	26.01	.80
6000.00	1.75	6.03	5999.29	20.34	9.04	20.34	22.26	23.97	.52
6100.00	1.50	13.26	6099.25	23.13	9.50	23.13	25.01	22.34	.32
6200.00	1.50	37.48	6199.22	25.44	10.60	25.44	27.56	22.62	.63
6300.00	1.50	10.71	6299.19	27.77	11.64	27.77	30.11	22.74	.69
6400.00	2.00	19.94	6399.14	30.69	12.48	30.69	33.13	22.13	.57
6500.00	1.75	4.16	6499.09	33.86	13.18	33.86	36.33	21.28	.57
6600.00	2.25	20.40	6599.03	37.22	13.98	37.22	39.76	20.59	.75
6700.00	1.50	7.61	6698.97	40.36	14.84	40.36	43.00	20.19	.85
6800.00	2.25	10.84	6798.92	43.58	15.38	43.58	46.22	19.44	.76
6900.00	2.00	18.07	6898.85	47.17	16.29	47.17	49.90	19.05	.37

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
7000.00	2.50	22.80	6998.77	50.84	17.68	50.84	53.82	19.17	.53
Last Survey Depth Recorded									
7100.00	2.00	27.52	7098.70	54.40	19.33	54.40	57.73	19.56	.53