



Job Number: SVGJ-110921

Company: Petroleum Development Corporation

Lease/Well: Rotharmel 21-32

Location: Weld County, CO

Rig Name: MS Wireline

RKB: 0'

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

State/Country: Colorado/USA

Declination: 8.90°

Grid: East To True

File name: F:\SURVEY\2011SU~1\PDC\ROTH2132.SVY

Date/Time: 06-Oct-11 / 13:50

Curve Name: Surface - 7300' M.D. (Rate Gyro)

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

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	
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
100.00	.76	31.99	100.00	.56	.35	.56	.66	31.99	.76
200.00	.36	57.81	199.99	1.29	.97	1.29	1.62	36.85	.46
300.00	.24	306.89	299.99	1.59	1.07	1.59	1.91	33.94	.50
400.00	.29	60.45	399.99	1.84	1.12	1.84	2.15	31.37	.44
500.00	.23	77.80	499.99	2.00	1.54	2.00	2.52	37.48	.10
600.00	.27	68.87	599.99	2.13	1.95	2.13	2.89	42.49	.06
700.00	.28	65.04	699.99	2.32	2.39	2.32	3.33	45.91	.02
800.00	.42	93.80	799.99	2.40	2.98	2.40	3.82	51.19	.22
900.00	.49	96.93	899.98	2.32	3.77	2.32	4.43	58.38	.07

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	.61	130.61	999.98	1.92	4.60	1.92	4.99	67.30	.34
1100.00	.73	157.94	1099.97	.99	5.24	.99	5.33	79.34	.34
1200.00	1.11	159.89	1199.96	-.51	5.81	-.51	5.84	95.05	.38
1300.00	1.20	152.00	1299.94	-2.35	6.64	-2.35	7.04	109.47	.18
1400.00	1.17	144.36	1399.92	-4.10	7.73	-4.10	8.75	117.96	.16
1500.00	1.03	152.42	1499.90	-5.73	8.74	-5.73	10.45	123.25	.21
1600.00	1.04	169.70	1599.88	-7.42	9.32	-7.42	11.91	128.53	.31
1700.00	1.29	151.30	1699.86	-9.30	10.02	-9.30	13.67	132.86	.45
1800.00	1.21	139.21	1799.84	-11.08	11.25	-11.08	15.79	134.58	.28
1900.00	.98	170.65	1899.82	-12.73	12.08	-12.73	17.55	136.50	.63
2000.00	.73	148.13	1999.81	-14.11	12.55	-14.11	18.89	138.35	.41
2100.00	.24	69.54	2099.81	-14.58	13.09	-14.58	19.59	138.09	.72
2200.00	.27	324.46	2199.81	-14.32	13.14	-14.32	19.43	137.44	.41
2300.00	.59	15.83	2299.80	-13.63	13.15	-13.63	18.94	136.03	.47
2400.00	.84	344.80	2399.80	-12.43	13.10	-12.43	18.05	133.50	.45
2500.00	1.11	310.39	2499.78	-11.09	12.17	-11.09	16.46	132.35	.63
2600.00	1.06	293.17	2599.76	-10.10	10.58	-10.10	14.62	133.67	.33
2700.00	.84	297.20	2699.75	-9.40	9.08	-9.40	13.07	136.01	.23
2800.00	.96	320.64	2799.74	-8.42	7.89	-8.42	11.54	136.84	.38
2900.00	1.09	292.60	2899.72	-7.40	6.48	-7.40	9.84	138.79	.51
3000.00	.86	310.22	2999.71	-6.55	5.03	-6.55	8.26	142.48	.38
3100.00	1.26	309.39	3099.69	-5.37	3.61	-5.37	6.47	146.10	.40
3200.00	1.07	317.31	3199.67	-3.99	2.13	-3.99	4.52	151.93	.25
3300.00	1.88	282.43	3299.64	-2.95	-.11	-2.95	2.95	182.11	1.17
3400.00	1.82	289.75	3399.59	-2.06	-3.21	-2.06	3.81	237.29	.24
3500.00	1.85	279.89	3499.54	-1.24	-6.29	-1.24	6.41	258.81	.32
3600.00	1.46	286.95	3599.49	-.60	-9.10	-.60	9.12	266.25	.44
3700.00	1.24	305.65	3699.47	.41	-11.20	.41	11.20	272.08	.49
3800.00	1.21	282.80	3799.44	1.27	-13.11	1.27	13.17	275.54	.49

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	
3900.00	1.20	290.18	3899.42	1.87	-15.12	1.87	15.23	277.04	.16
4000.00	1.38	287.21	3999.40	2.58	-17.25	2.58	17.44	278.52	.19
4100.00	1.18	285.75	4099.37	3.22	-19.39	3.22	19.66	279.42	.20
4200.00	1.09	297.10	4199.35	3.93	-21.23	3.93	21.59	280.49	.24
4300.00	.75	325.13	4299.34	4.90	-22.45	4.90	22.98	282.32	.55
4400.00	.63	346.11	4399.33	5.97	-22.96	5.97	23.72	284.58	.28
4500.00	.55	5.82	4499.33	6.98	-23.04	6.98	24.08	286.86	.22
4600.00	.55	347.11	4599.32	7.93	-23.10	7.93	24.42	288.95	.18
4700.00	.40	326.37	4699.32	8.69	-23.40	8.69	24.96	290.37	.23
4800.00	.11	327.16	4799.32	9.06	-23.64	9.06	25.32	290.96	.29
4900.00	.35	241.28	4899.32	8.99	-23.96	8.99	25.60	290.57	.36
5000.00	.46	176.42	4999.32	8.45	-24.21	8.45	25.64	289.23	.44
5100.00	.42	173.95	5099.31	7.68	-24.14	7.68	25.34	287.65	.04
5200.00	.44	200.56	5199.31	6.96	-24.24	6.96	25.22	286.01	.20
5300.00	.74	204.18	5299.31	6.01	-24.64	6.01	25.36	283.70	.30
5400.00	.51	192.64	5399.30	4.98	-25.00	4.98	25.49	281.28	.26
5500.00	.50	230.21	5499.30	4.27	-25.43	4.27	25.79	279.53	.33
5600.00	.72	187.51	5599.29	3.37	-25.85	3.37	26.07	277.42	.49
5700.00	.09	6.69	5699.29	2.82	-25.92	2.82	26.08	276.22	.81
5800.00	.15	18.42	5799.29	3.03	-25.87	3.03	26.05	276.67	.06
5900.00	.18	290.67	5899.29	3.21	-25.98	3.21	26.18	277.03	.23
6000.00	.31	230.18	5999.29	3.09	-26.33	3.09	26.51	276.69	.27
6100.00	.41	199.29	6099.28	2.58	-26.66	2.58	26.78	275.52	.21
6200.00	.63	194.87	6199.28	1.71	-26.92	1.71	26.97	273.63	.22
6300.00	.45	235.88	6299.28	.96	-27.39	.96	27.40	272.00	.41
6400.00	.65	180.27	6399.27	.17	-27.71	.17	27.71	270.35	.54
6500.00	.73	218.17	6499.27	-.90	-28.11	-.90	28.12	268.17	.45
6600.00	.76	203.94	6599.26	-2.01	-28.77	-2.01	28.84	266.01	.19
6700.00	.75	187.62	6699.25	-3.26	-29.13	-3.26	29.31	263.61	.21

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	
6800.00	.77	197.51	6799.24	-4.55	-29.42	-4.55	29.77	261.21	.13
6900.00	.60	229.06	6899.23	-5.53	-30.01	-5.53	30.52	259.55	.41
7000.00	.46	250.16	6999.23	-6.01	-30.79	-6.01	31.37	258.95	.24
7100.00	.64	121.34	7099.23	-6.44	-30.69	-6.44	31.36	258.15	1.00
7200.00	.49	85.21	7199.22	-6.70	-29.79	-6.70	30.53	257.33	.38

Last Survey Depth Recorded									
7300.00	.44	126.07	7299.22	-6.89	-29.05	-6.89	29.85	256.66	.33