

Noble Energy

CO, Weld County (NAD 83 NZ)
Sec 4 Twn 9 N Rng 58 W
Rohn State LD03-64HN Original Hole
05-123-37457
H&P 277



A Schlumberger Company

Final Survey Report

23-Sep-2014

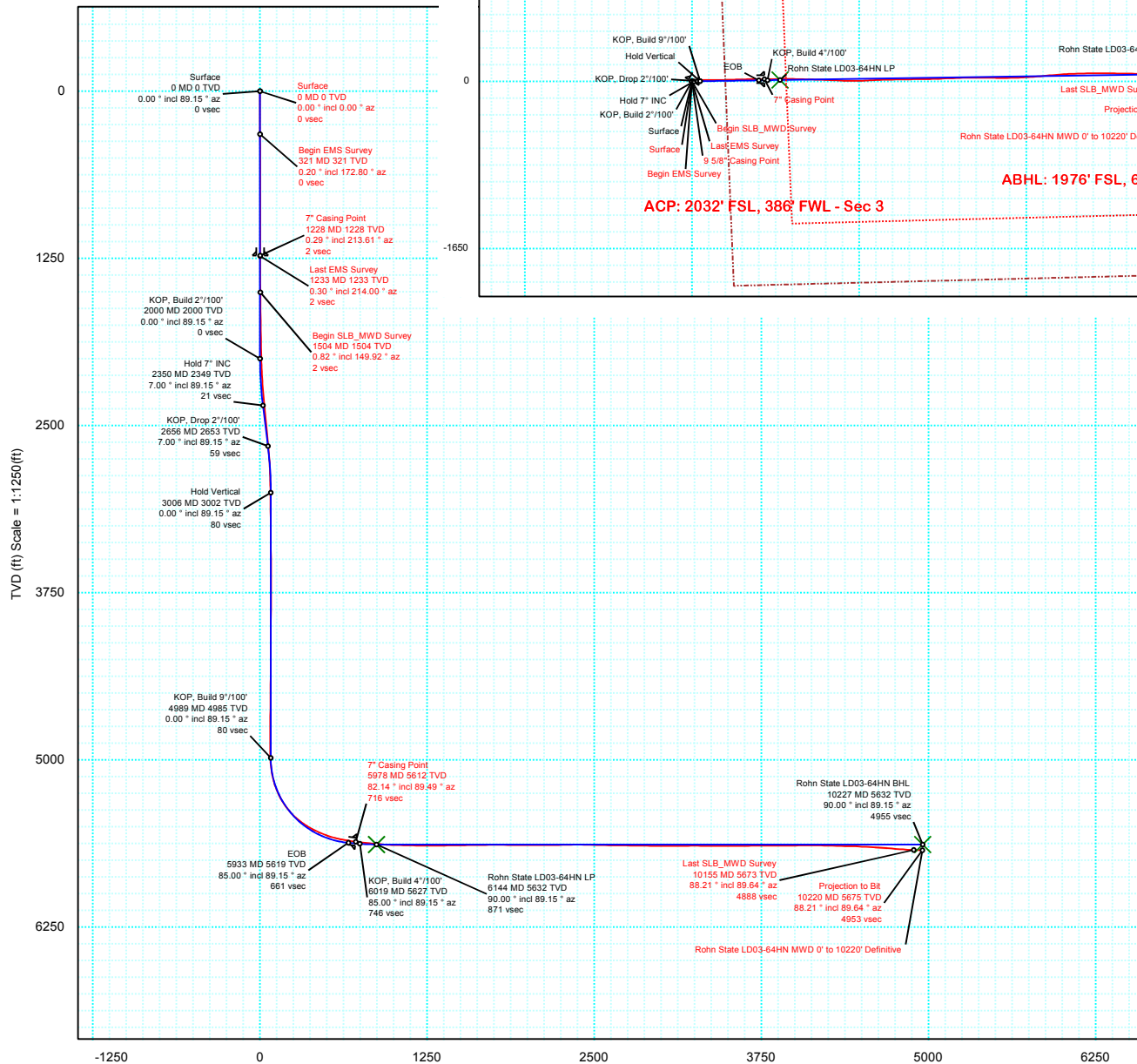
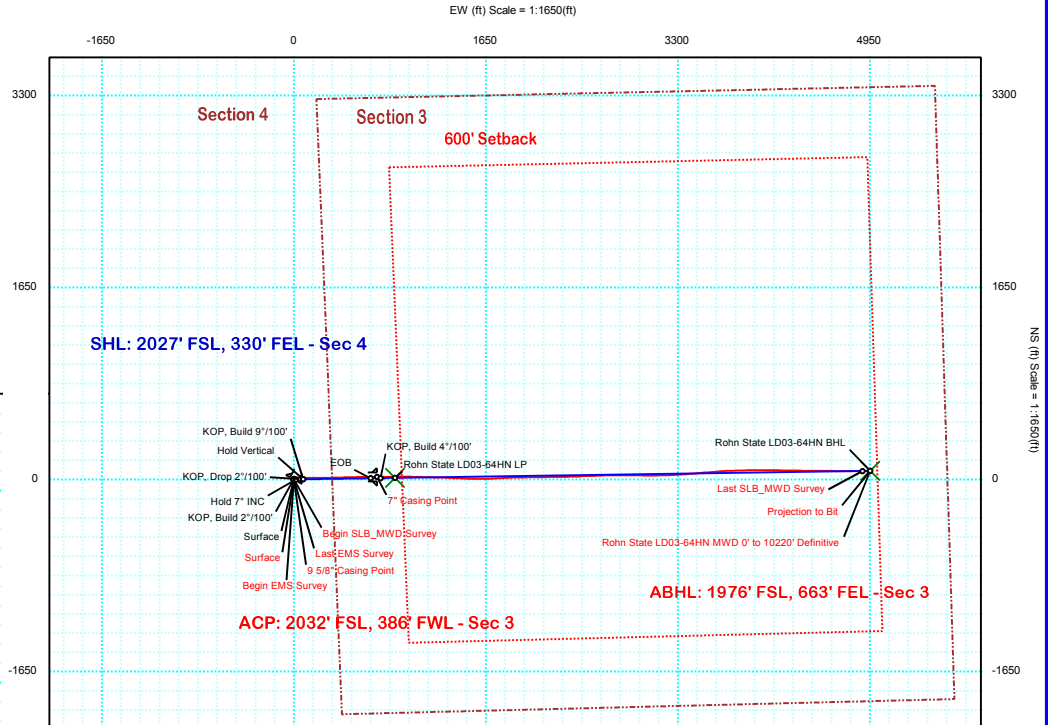
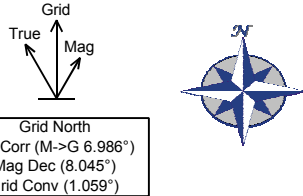
Well Coordinates:	NAD83 CO State Plane,N Zone, US Ft
	N 40° 46' 43.39200" W 103° 51' 40.86000"
	1530650.26 usFt 3453806.93 usFt
Ground Level:	4701.00 ft MSL
TVD Reference:	KB 24ft @ 4725.00 ft MSL
Local Coordinate Origin:	Rohn State LD03-64HN well head
Vertical Section Azimuth:	89.147 ° (Grid North)
North Reference:	Grid North

DOX Version: 2.8

Borehole:	Well:	Field:	Structure:
Original Hole	Rohn State LD03-64HN	CO, Weld County (NAD 83 NZ)	04-09N-58W (Rohn State LD03 Pad) - H&P 277

Gravity & Magnetic Parameters	Surface Location	NAD83 Colorado State Plane, Northern Zone, US Feet	Miscellaneous
Model: BGGM 2014 Dip: 67.376° Date: 09-Sep-2014	Lat: N 40 46 43.39 Northing: 1530726.76ftU	Grid Conv: 1.0588°	Slot: Rohn State LD03-64HN
MagDec: 8.045° FS: 52973.276mT Gravity FS: 999.102mgn (9.80665 Based)	Lon: W 103 51 40.86 Easting: S 3453805.52ftU	Scale Fact: 0.99999925	TVD Ref: KB 24ft(4725ft above MSL)
			Plan: Rohn State LD03-64HN MWD 0' to 10220' Definitive

PvA



Vertical Section (ft) Azim = 89.15° Scale = 1:1250(ft) Origin = 0N/-S, 0E/-W



Rohn State LD03-64HN MWD 0' to 10220' Definitive Survey Geodetic Report (Def Survey)



Report Date: September 11, 2014 - 03:02 PM
Client: Noble Energy
Field: CO, Weld County (NAD 83 NZ)
Structure / Slot: Noble 04-09N-58W (Rohn State LD03 Pad) - H&P 277 / Rohn State LD03-64HN
Well: Rohn State LD03-64HN
Borehole: Original Hole
UWI / API#: Unknown / Unknown
Survey Name: Rohn State LD03-64HN MWD 0' to 10220' Definitive
Survey Date: September 09, 2014
Tort / AHD / DDI / ERD Ratio: 168.029 ° / 4990.025 ft / 6.179 / 0.879
Coordinate Reference System: NAD83 Colorado State Plane, Northern Zone, US Feet
Location Lat / Long: N 40° 46' 43.39200", W 103° 51' 40.86000"
Location Grid N/E Y/X: N 1530726.758 ftUS, E 3453805.515 ftUS
CRS Grid Convergence Angle: 1.0588 °
Grid Scale Factor: 0.99999925
Version / Patch: 2.8.551.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 89.147 ° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: KB 24ft
TVD Reference Elevation: 4725.000 ft above MSL
Seabed / Ground Elevation: 4701.000 ft above MSL
Magnetic Declination: 8.045 °
Total Gravity Field Strength: 999.1022mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 52973.276 nT
Magnetic Dip Angle: 67.376 °
Declination Date: September 09, 2014
Magnetic Declination Model: BGGM 2014
North Reference: Grid North
Grid Convergence Used: 1.0588 °
Total Corr Mag North->Grid North: 6.9863 °
Local Coord Referenced To: Well Head

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')
Surface	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	1530726.76	3453805.52	N 40 46 43.39	W 103 51 40.86
Begin EMS	321.00	0.20	172.80	321.00	0.06	-0.56	0.07	0.06	1530726.20	3453805.59	N 40 46 43.39	W 103 51 40.86
Survey	602.00	0.10	149.00	602.00	0.24	-1.25	0.26	0.04	1530725.51	3453805.77	N 40 46 43.38	W 103 51 40.86
	885.00	0.40	54.00	885.00	1.17	-0.88	1.18	0.15	1530725.87	3453806.70	N 40 46 43.38	W 103 51 40.84
9 5/8" Casing	1228.00	0.29	213.61	1227.99	1.66	-0.90	1.67	0.20	1530725.85	3453807.19	N 40 46 43.38	W 103 51 40.84
Point												
Last EMS	1233.00	0.30	214.00	1232.99	1.64	-0.92	1.66	0.20	1530725.83	3453807.17	N 40 46 43.38	W 103 51 40.84
Survey												
Begin	1504.00	0.82	149.92	1503.98	2.18	-3.18	2.23	0.27	1530723.57	3453807.74	N 40 46 43.36	W 103 51 40.83
SLB_MWD												
Survey	1788.00	1.57	142.81	1787.92	5.47	-8.03	5.59	0.27	1530718.72	3453811.11	N 40 46 43.31	W 103 51 40.79
	1977.00	1.41	132.50	1976.85	8.70	-11.67	8.88	0.16	1530715.09	3453814.39	N 40 46 43.28	W 103 51 40.75
	2071.00	2.92	105.04	2070.79	11.85	-13.08	12.05	1.91	1530713.68	3453817.56	N 40 46 43.26	W 103 51 40.71
	2166.00	3.44	82.49	2165.64	17.01	-13.33	17.21	1.41	1530713.43	3453822.73	N 40 46 43.26	W 103 51 40.64
	2260.00	5.41	80.84	2259.36	24.20	-12.26	24.38	2.09	1530714.50	3453829.90	N 40 46 43.27	W 103 51 40.55
	2355.00	5.34	83.75	2353.94	33.03	-11.07	33.20	0.30	1530715.69	3453838.71	N 40 46 43.28	W 103 51 40.43
	2545.00	5.56	79.31	2543.08	50.90	-8.40	51.03	0.25	1530718.36	3453856.54	N 40 46 43.30	W 103 51 40.20
	2639.00	5.79	79.59	2636.62	60.07	-6.70	60.17	0.25	1530720.06	3453865.69	N 40 46 43.31	W 103 51 40.08
	2734.00	4.29	72.89	2731.25	68.21	-4.78	68.29	1.70	1530721.97	3453873.80	N 40 46 43.33	W 103 51 39.97
	2829.00	2.07	74.42	2826.10	73.28	-3.28	73.34	2.34	1530723.48	3453878.85	N 40 46 43.35	W 103 51 39.91
	2924.00	1.65	71.22	2921.05	76.24	-2.38	76.29	0.46	1530724.38	3453881.80	N 40 46 43.35	W 103 51 39.87
	3018.00	0.70	124.51	3015.03	78.00	-2.27	78.04	1.44	1530724.49	3453883.55	N 40 46 43.36	W 103 51 39.85
	3208.00	0.55	136.46	3205.02	79.57	-3.59	79.63	0.10	1530723.17	3453885.15	N 40 46 43.34	W 103 51 39.83
	3303.00	0.58	129.71	3300.02	80.25	-4.23	80.32	0.08	1530722.52	3453885.84	N 40 46 43.34	W 103 51 39.82
	3492.00	0.69	154.26	3489.00	81.46	-5.88	81.56	0.15	1530720.88	3453887.07	N 40 46 43.32	W 103 51 39.80
	3587.00	0.49	156.28	3584.00	81.86	-6.77	81.97	0.21	1530719.99	3453887.49	N 40 46 43.31	W 103 51 39.80
	3682.00	0.36	134.63	3679.00	82.23	-7.35	82.35	0.22	1530719.41	3453887.86	N 40 46 43.30	W 103 51 39.79
	3776.00	0.74	333.89	3772.99	82.17	-7.01	82.29	1.16	1530719.75	3453887.80	N 40 46 43.31	W 103 51 39.79
	4060.00	0.58	345.80	4056.98	81.05	-3.95	81.12	0.07	1530722.81	3453886.64	N 40 46 43.34	W 103 51 39.81
	4250.00	0.54	321.11	4246.97	80.28	-2.31	80.32	0.13	1530724.45	3453885.83	N 40 46 43.35	W 103 51 39.82
	4439.00	1.09	336.37	4435.95	79.03	0.03	79.03	0.31	1530726.79	3453884.55	N 40 46 43.38	W 103 51 39.83
	4533.00	1.35	332.57	4529.93	78.18	1.84	78.16	0.29	1530728.60	3453883.68	N 40 46 43.40	W 103 51 39.84
	4723.00	0.74	348.70	4719.89	76.96	5.03	76.89	0.36	1530731.79	3453882.41	N 40 46 43.43	W 103 51 39.86
	4937.00	0.80	357.62	4933.87	76.67	7.86	76.56	0.06	1530734.62	3453882.07	N 40 46 43.46	W 103 51 39.86
	5007.00	2.72	64.05	5003.84	78.16	9.08	78.03	3.59	1530735.83	3453883.55	N 40 46 43.47	W 103 51 39.84
	5102.00	10.26	83.60	5098.17	88.63	11.01	88.48	8.15	1530737.77	3453893.99	N 40 46 43.48	W 103 51 39.71
	5197.00	18.37	86.95	5190.15	112.05	12.75	111.87	8.58	1530739.51	3453917.38	N 40 46 43.50	W 103 51 39.40
	5292.00	27.37	89.44	5277.60	148.91	13.76	148.72	9.53	1530740.52	3453954.24	N 40 46 43.50	W 103 51 38.92
	5387.00	37.45	90.69	5357.70	199.75	13.63	199.57	10.64	1530740.39	3454005.08	N 40 46 43.49	W 103 51 38.26
	5482.00	47.26	89.56	5427.82	263.66	13.55	263.49	10.36	1530740.31	3454069.01	N 40 46 43.48	W 103 51 37.43
	5576.00	56.78	88.82	5485.60	337.67	14.62	337.49	10.14	1530741.38	3454143.00	N 40 46 43.47	W 103 51 36.47
	5671.00	64.98	87.95	5531.80	420.58	16.98	420.37	8.67	1530743.74	3454225.89	N 40 46 43.48	W 103 51 35.39
	5765.00	70.59	88.68	5567.33	507.56	19.52	507.32	6.01	1530746.28	3454312.84	N 40 46 43.49	W 103 51 34.26
	5860.00	78.93	89.68	5592.28	599.13	20.81	598.89	8.84	1530747.57	3454404.40	N 40 46 43.49	W 103 51 33.07
	5932.00	80.92	89.43	5604.88	670.02	21.36	669.77	2.78	1530748.12	3454475.29	N 40 46 43.48	W 103 51 32.15
	5978.00	82.14	89.49	5611.65	715.51	21.79	715.27	2.66	1530748.55	3454520.78	N 40 46 43.48	W 103 51 31.56
	6078.00	84.80	89.62	5623.01	814.85	22.57	814.61	2.66	1530749.32	3454620.12	N 40 46 43.47	W 103 51 30.27
	6173.00	85.11	89.41	5631.36	909.48	23.37	909.24	0.39	1530750.13	3454714.75	N 40 46 43.46	W 103 51 29.04
	6266.00	88.49	90.84	5636.56	1002.31	23.16	1002.08	3.94	1530749.92	3454807.59	N 40 46 43.44	W 103 51 27.83
	6360.00	88.83	92.44	5638.75	1096.19	20.47	1096.01	1.74	1530747.23	3454901.52	N 40 46 43.39	W 103 51 26.61
	6455.00	89.35	90.94	5640.26	1191.08	17.67	1190.95	1.67	1530744.42	3454996.46	N 40 46 43.35	W 103 51 25.38
	6549.00	90.58	92.44	5640.32	1284.99	14.89	1284.91	2.07	1530741.65	3455090.42	N 40 46 43.30	W 103 51 24.16
	6644.00	89.97	91.50	5639.86	1379.87	11.63	1379.85	1.18	1530738.39	3455185.36	N 40 46 43.25	W 103 51 22.92
	6739.00	91.24	93.67	5638.87	1474.68	7.35	1474.74	2.65	1530734.11	3455280.25	N 40 46 43.19	W 103 51 21.69
	6834.00	90.27	90.48	5637.61	1569.54	3.91	1569.65	3.51	1530730.67	3455375.17	N 40 46 43.14	W 103 51 20.46
	6928.00	91.44	88.27	5636.20	1663.52	4.94	1663.63	2.66	1530731.70	3455469.14	N 40 46 43.14	W 103 51 19.24
	7023.00	89.79	86.70	5635.18	1758.47	9.11	1758.53	2.40	1530735.87	3455564.04	N 40 46 43.16	W 103 51 18.00
	7118.00	89.55	87.79	5635.72	1853.41	13.68	1853.41	1.18	1530740.44	3455658.92	N 40 46 43.19	W 103 51 16.77
	7212.00	90.31	88.66	5635.83	1947.40	16.59	1947.37	1.23	1530743.34	3455752.88	N 40 46 43.20	W 103 51 15.55
	7307.00	89.45	89.11	5636.03	2042.40	18.44	2042.35	1.02	1530745.19	3455847.86	N 40 46 43.20	W 103 51 14.31
	7402.00	89.86	89.34	5636.60	2137.39	19.73	2137.34	0.50	1530746.48	3455942.85	N 40 46 43.20	W 103 51 13.08
	7496.00	91.13	89.78	5635.78	2231.39	20.45	2231.33	1.43	1530747.21	3456036.84	N 40 46 43.19	W 103 51 11.86
	7591.00	91.34	88.63	5633.73	2326.36	21.77	2326.30	1.24	1530748.53	3456131.80	N 40 46 43.18	W 103 51 10.62
	7686.00	88.73	87.59	5633.68	2421.34	24.91	2421.23	2.96	1530751.67	3456226.74	N 40 46 43.19	W 103 51 9.39
	7780.00	88.66	87.75	5635.82	2515.28	28.74	2515.13	0.19	1530755.49	3456320.64	N 40 46 43.22	W 103 51 8.17
	7875.00	88.90	88.26	5637.84	2610.24	32.04	2610.05	0.60	1530758.80	3456415.56	N 40 46 43.23	W 103 51 6.93
	7969.00	89.17	88.53	5639.42	2704.22	34.67	2704.00	0.41	1530761.43	3456509.51	N 40 46 43.24	W 103 51 5.71
	8064.00	89.42	89.72	5640.59	2799.21	36.12	2798.98	1.28	1530762.87	3456604.49	N 40 46 43.24	W 103 51 4.48
	8158.00	89.24	90.54	5641.69	2893.19	35.90	2892.97	0.89	1530762.66	3456698.48	N 40 46 43.22	W 103 51 3.25
	8253.00	88.93	91.78	5643.20	2988.12	33.98	2987.94	1.34	1530760.73	3456793.45	N 40 46 43.18	W 103 51 2.02
	8348.00	90.34	89.26	5643.80	3083.08	33.12	3082.93	3.04	1530759.88	3456888.43	N 40 46 43.15	W 103 51 0.79
	8442.00	91.13	88.70	5642.58	3177.07	34.79	3176.90	1.03	1530761.55	3456982.41	N 40 46 43.15	W 103 50 59.56
	8537.00	89.76	87.16	5641.84	3272.04	38.22	3271.83	2.17	1530764.98	3457077.34	N 40 46 43.17	W 103 50 58.

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	8916.00	90.69	85.34	5642.10	3650.24	67.89	3649.63	1.14	1530794.64	3457455.14	N 40 46 43.39	W 103 50 53.41
	9011.00	89.79	87.74	5641.70	3745.13	73.62	3744.45	2.70	1530800.38	3457549.96	N 40 46 43.43	W 103 50 52.18
	9105.00	89.97	88.68	5641.90	3839.12	76.56	3838.40	1.01	1530803.32	3457643.91	N 40 46 43.44	W 103 50 50.96
	9200.00	91.17	88.76	5640.96	3934.11	78.69	3933.37	1.27	1530805.45	3457738.88	N 40 46 43.45	W 103 50 49.72
	9295.00	90.24	90.05	5639.79	4029.10	79.67	4028.36	1.68	1530806.43	3457833.86	N 40 46 43.44	W 103 50 48.49
	9389.00	90.38	91.03	5639.28	4123.07	78.78	4122.35	1.05	1530805.54	3457927.86	N 40 46 43.41	W 103 50 47.27
	9484.00	88.45	90.66	5640.25	4218.02	77.38	4217.33	2.06	1530804.14	3458022.84	N 40 46 43.38	W 103 50 46.03
	9579.00	88.63	91.18	5642.67	4312.94	75.86	4312.29	0.59	1530802.62	3458117.79	N 40 46 43.35	W 103 50 44.80
	9673.00	88.87	91.42	5644.73	4406.85	73.72	4406.24	0.36	1530800.48	3458211.74	N 40 46 43.31	W 103 50 43.58
	9768.00	86.84	89.94	5648.29	4501.74	72.59	4501.16	2.64	1530799.34	3458306.66	N 40 46 43.28	W 103 50 42.34
	9863.00	86.28	90.17	5653.99	4596.56	72.50	4595.99	0.63	1530799.26	3458401.49	N 40 46 43.26	W 103 50 41.11
	9958.00	86.01	90.52	5660.37	4691.32	71.93	4690.77	0.47	1530798.69	3458496.27	N 40 46 43.24	W 103 50 39.88
	10053.00	85.42	90.57	5667.46	4786.03	71.03	4785.50	0.62	1530797.79	3458591.00	N 40 46 43.22	W 103 50 38.65
Last SLB_MWD Survey	10155.00	88.21	89.64	5673.12	4887.85	70.85	4887.33	2.88	1530797.60	3458692.84	N 40 46 43.19	W 103 50 37.33
Projection to Bit	10220.00	88.21	89.64	5675.15	4952.81	71.26	4952.30	0.00	1530798.01	3458757.80	N 40 46 43.19	W 103 50 36.48

Survey Type: Def Survey

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
Surface	1	0.000	24.000	Act Stns	13.750	9.625	SLB_EMS-STD-Depth Only	Original Hole / Rohn State LD03-64HN MWD 0' to 10220' Definitive
Surface	1	321.000	1233.000	Act Stns	13.750	9.625	SLB_EMS-STD	Original Hole / Rohn State LD03-64HN MWD 0' to 10220' Definitive
Intermediate	1	1233.000	5932.000	Act Stns	8.750	7.000	SLB_MWD-STD	Original Hole / Rohn State LD03-64HN MWD 0' to 10220' Definitive
Lateral	1	5932.000	10155.000	Act Stns	6.125	4.500	SLB_MWD-STD	Original Hole / Rohn State LD03-64HN MWD 0' to 10220' Definitive
Bit Projection	1	10155.000	10220.000	Act Stns	6.125	4.500	SLB_BLIND+TREND	Original Hole / Rohn State LD03-64HN MWD 0' to 10220' Definitive