

Noble Energy

CO, Weld County (NAD 83 NZ)
Sec 25 Twn 4 N Rng 65 W
Heartland G25-73-1HN Original Hole
05-123-39551
PD 829



A Schlumberger Company

Final Survey Report

2-Oct-2014

Well Coordinates: NAD83 Colorado State Plane, N Zone, US Ft

N 40° 16' 36.22790"	W 104° 36' 18.82800"
1344913.63 usFt	3249651.6 usFt

Ground Level:	4835.00 ft MSL
TVD Reference:	KB 16ft @ 4851.00 ft MSL
Local Coordinate Origin:	Heartland G25-73-1HN well head
Vertical Section Azimuth:	358.348 ° (Grid North)
North Reference:	Grid North

DOX Version: 2.8

Borehole: Original Hole	Well: Heartland G25-73-1HN	Field: CO, Weld County (NAD 83 NZ)	Structure: 25-04N-65W (Heartland State G36-75-1HN Pad) - PD 829
Gravity & Magnetic Parameters Model: BGGM 2014 Dip: 66.856° Date: 02-Oct-2014 MagDec: 8.416° FS: 52629.206nT Gravity FS: 999.019mgm (9.80665 Based)		Surface Location NAD83 Colorado State Plane, Northern Zone, US Feet Lat: N 40 16 36.23 Northing: 1344914.31ftU Grid Conv: 0.5783° Lon: W 104 36 17.96 Easting: S 3249718.56ftU Scale Fact: 0.99995695	
		Miscellaneous Slot: Heartland G25-73-1HN TVD Ref: KB 16ft(4851ft above MSL) Plan: Heartland G25-73-1HN MWD+IFR 0' to 16867' Definitive	

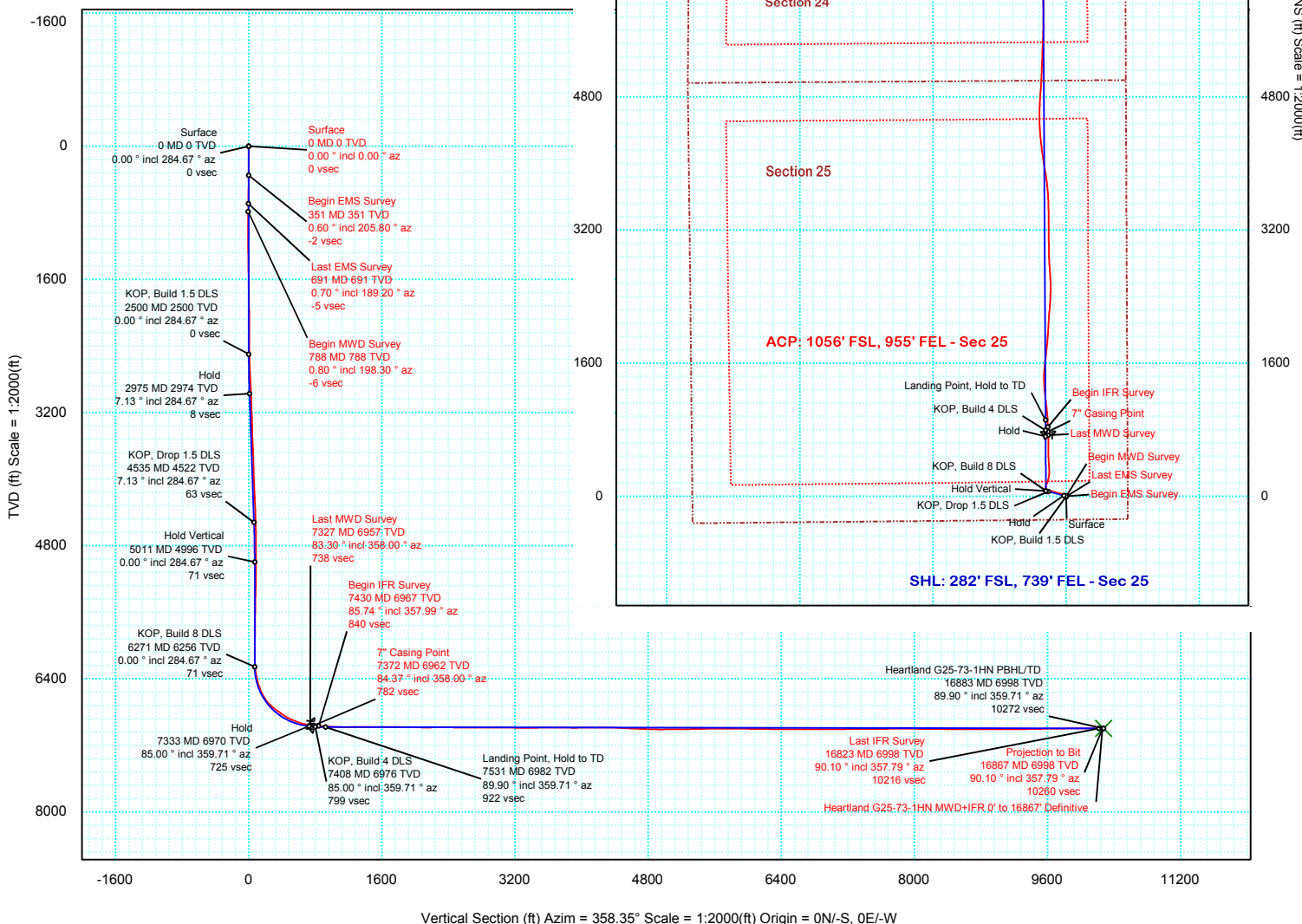
PvA

EW (ft) Scale = 1:2000(ft)



Grid
True
Mag

Grid North
Tot Corr (M->G 7.838°)
Mag Dec (8.416°)
Grid Conv (0.578°)





Heartland G25-73-1HN MWD+IFR 0' to 16867' Definitive Survey Geodetic Report (Def Survey)



Report Date: October 02, 2014 - 04:02 PM
Client: Noble Energy
Field: CO, Weld County (NAD 83 NZ)
Structure / Slot: Noble 25-04N-65W (Heartland State G36-75-1HN Pad) - PD 829 / Heartland G25-73-1HN
Well: Heartland G25-73-1HN
Borehole: Original Hole
UWI / API#: Unknown / Unknown
Survey Name: Heartland G25-73-1HN MWD+IFR 0' to 16867' Definitive
Survey Date: October 02, 2014
Tort / AHD / DDI / ERD Ratio: 260.861 ° / 10552.961 ft / 6.821 / 1.506
Coordinate Reference System: NAD83 Colorado State Plane, Northern Zone, US Feet
Location Lat / Long: N 40° 16' 36.22790", W 104° 36' 17.96401"
Location Grid N/E Y/X: N 1344914.310 ftUS, E 3249718.560 ftUS
CRS Grid Convergence Angle: 0.5783 °
Grid Scale Factor: 0.99995695
Version / Patch: 2.8.551.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 358.348 ° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: KB 16ft
TVD Reference Elevation: 4851.000 ft above MSL
Seabed / Ground Elevation: 4835.000 ft above MSL
Magnetic Declination: 8.416 °
Total Gravity Field Strength: 999.0189mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 52629.206 nT
Magnetic Dip Angle: 66.856 °
Declination Date: October 02, 2014
Magnetic Declination Model: BGGM 2014
North Reference: Grid North
Grid Convergence Used: 0.5783 °
Total Corr Mag North->Grid North: 7.8374 °
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	1344914.31	3249718.56	N 40 16 36.23	W 104 36 17.96
Begin EMS	351.00	0.60	205.80	350.99	-1.63	-1.65	-0.80	0.17	1344912.66	3249717.76	N 40 16 36.21	W 104 36 17.97
Survey												
Last EMS	691.00	0.70	189.20	690.97	-5.25	-5.31	-1.91	0.06	1344909.00	3249716.65	N 40 16 36.18	W 104 36 17.99
Begin MWD												
Survey	788.00	0.80	198.30	787.96	-6.47	-6.54	-2.21	0.16	1344907.77	3249716.35	N 40 16 36.16	W 104 36 17.99
	877.00	1.10	154.30	876.95	-7.83	-7.90	-2.04	0.86	1344906.42	3249716.52	N 40 16 36.15	W 104 36 17.99
	967.00	0.70	87.50	966.94	-8.61	-8.65	-1.11	1.16	1344905.66	3249717.45	N 40 16 36.14	W 104 36 17.98
	1056.00	0.70	63.00	1055.94	-8.37	-8.38	-0.09	0.33	1344905.93	3249718.47	N 40 16 36.15	W 104 36 17.97
	1164.00	1.00	57.60	1163.92	-7.61	-7.57	1.30	0.29	1344906.74	3249719.86	N 40 16 36.15	W 104 36 17.95
	1259.00	1.00	48.00	1258.91	-6.65	-6.58	2.61	0.18	1344907.73	3249721.17	N 40 16 36.16	W 104 36 17.93
	1358.00	1.00	36.70	1357.90	-5.41	-5.30	3.77	0.20	1344909.01	3249722.33	N 40 16 36.18	W 104 36 17.92
	1450.00	1.10	13.20	1449.88	-3.93	-3.80	4.45	0.48	1344910.51	3249723.01	N 40 16 36.19	W 104 36 17.91
	1545.00	1.30	22.40	1544.86	-2.06	-1.92	5.07	0.29	1344912.39	3249723.63	N 40 16 36.21	W 104 36 17.90
	1637.00	1.10	45.10	1636.84	-0.50	-0.33	6.09	0.56	1344913.98	3249724.65	N 40 16 36.22	W 104 36 17.89
	1731.00	1.30	298.20	1730.83	0.64	0.81	5.79	2.05	1344915.12	3249724.35	N 40 16 36.24	W 104 36 17.89
	1823.00	1.50	296.00	1822.80	1.72	1.83	3.79	0.23	1344916.14	3249722.35	N 40 16 36.25	W 104 36 17.91
	1917.00	1.70	308.60	1916.76	3.19	3.24	1.60	0.43	1344917.55	3249720.16	N 40 16 36.26	W 104 36 17.94
	2009.00	1.60	296.00	2008.73	4.67	4.66	-0.62	0.41	1344918.97	3249717.94	N 40 16 36.27	W 104 36 17.97
	2103.00	1.20	283.60	2102.70	5.54	5.46	-2.76	0.53	1344919.77	3249715.80	N 40 16 36.28	W 104 36 18.00
	2196.00	0.50	233.60	2195.69	5.57	5.45	-4.03	1.03	1344919.76	3249714.53	N 40 16 36.28	W 104 36 18.02
	2289.00	0.20	267.70	2288.69	5.33	5.20	-4.52	0.38	1344919.51	3249714.04	N 40 16 36.28	W 104 36 18.02
	2380.00	0.40	327.20	2379.69	5.60	5.46	-4.85	0.38	1344919.77	3249713.71	N 40 16 36.28	W 104 36 18.03
	2474.00	1.90	305.30	2473.66	6.82	6.64	-6.30	1.63	1344920.95	3249712.26	N 40 16 36.29	W 104 36 18.04
	2580.00	3.00	303.00	2579.57	9.45	9.17	-10.06	1.04	1344923.48	3249708.50	N 40 16 36.32	W 104 36 18.09
	2670.00	3.90	301.90	2669.40	12.48	12.07	-14.64	1.00	1344926.38	3249703.92	N 40 16 36.35	W 104 36 18.15
	2759.00	5.30	303.20	2758.11	16.51	15.92	-20.65	1.58	1344930.23	3249697.91	N 40 16 36.39	W 104 36 18.23
	2849.00	6.20	296.00	2847.66	21.14	20.32	-28.49	1.28	1344934.63	3249690.07	N 40 16 36.43	W 104 36 18.33
	2938.00	6.60	289.60	2936.11	25.22	24.15	-37.63	0.92	1344938.46	3249680.93	N 40 16 36.47	W 104 36 18.45
	3028.00	7.20	280.80	3025.46	28.31	26.94	-48.04	1.35	1344941.25	3249670.52	N 40 16 36.50	W 104 36 18.58
	3118.00	7.30	283.10	3114.74	30.98	29.29	-59.15	0.34	1344943.60	3249659.41	N 40 16 36.52	W 104 36 18.72
	3207.00	8.90	287.20	3202.85	34.65	32.61	-71.24	1.91	1344946.92	3249647.32	N 40 16 36.56	W 104 36 18.88
	3297.00	8.50	282.80	3291.81	38.56	36.14	-84.38	0.86	1344950.45	3249634.19	N 40 16 36.59	W 104 36 19.05
	3386.00	6.60	277.00	3380.04	40.97	38.22	-95.87	2.30	1344952.53	3249622.70	N 40 16 36.62	W 104 36 19.20
	3476.00	5.80	284.40	3469.51	43.01	39.98	-105.41	1.25	1344954.29	3249613.16	N 40 16 36.63	W 104 36 19.32
	3566.00	7.10	289.00	3558.94	46.23	42.93	-115.07	1.55	1344957.23	3249603.49	N 40 16 36.66	W 104 36 19.44
	3656.00	7.80	291.20	3648.18	50.56	46.95	-126.02	0.84	1344961.25	3249592.54	N 40 16 36.70	W 104 36 19.58
	3745.00	7.00	284.80	3736.44	54.44	50.51	-136.90	1.29	1344964.82	3249581.67	N 40 16 36.74	W 104 36 19.72
	3835.00	6.40	280.00	3825.83	57.01	52.79	-147.14	0.91	1344967.09	3249571.43	N 40 16 36.76	W 104 36 19.86
	3924.00	6.20	279.30	3914.29	58.92	54.42	-156.77	0.24	1344968.73	3249561.80	N 40 16 36.78	W 104 36 19.98
	4014.00	6.00	290.40	4003.78	61.61	56.85	-165.97	1.33	1344971.16	3249552.59	N 40 16 36.81	W 104 36 20.10
	4104.00	7.00	290.00	4093.20	65.40	60.37	-175.54	1.11	1344974.67	3249543.03	N 40 16 36.84	W 104 36 20.22
	4194.00	7.40	291.20	4182.49	69.67	64.34	-186.09	0.47	1344978.64	3249532.48	N 40 16 36.88	W 104 36 20.36
	4283.00	7.00	289.20	4270.79	73.83	68.19	-196.56	0.53	1344982.50	3249522.01	N 40 16 36.92	W 104 36 20.49
	4373.00	6.30	287.80	4360.19	77.43	71.51	-206.44	0.80	1344985.81	3249512.13	N 40 16 36.96	W 104 36 20.62
	4463.00	6.10	282.60	4449.66	80.25	74.06	-215.81	0.66	1344988.37	3249502.76	N 40 16 36.98	W 104 36 20.74
	4552.00	5.80	282.50	4538.18	82.51	76.06	-224.81	0.34	1344990.37	3249493.76	N 40 16 37.00	W 104 36 20.85
	4642.00	5.70	281.40	4627.73	84.63	77.93	-233.63	0.17	1344992.24	3249484.94	N 40 16 37.02	W 104 36 20.97
	4732.00	5.30	275.40	4717.31	86.15	79.21	-242.15	0.78	1344993.51	3249476.42	N 40 16 37.03	W 104 36 21.08
	4821.00	4.60	265.30	4805.98	86.47	79.30	-249.80	1.25	1344993.61	3249468.77	N 40 16 37.04	W 104 36 21.18
	4911.00	4.60	259.50	4895.69	85.72	78.35	-256.95	0.52	1344992.65	3249461.62	N 40 16 37.03	W 104 36 21.27
	5001.00	4.00	264.00	4985.44	84.93	77.36	-263.62	0.76	1344991.67	3249454.95	N 40 16 37.02	W 104 36 21.35
	5090.00	3.00	263.90	5074.27	84.51	76.79	-269.02	1.12	1344991.10	3249449.55	N 40 16 37.01	W 104 36 21.42
	5180.00	2.30	284.70	5164.18	84.84	77.00	-273.11	1.31	1344991.30	3249445.46	N 40 16 37.02	W 104 36 21.48
	5270.00	1.10	227.60	5254.14	84.78	76.87	-275.49	2.15	1344991.18	3249443.08	N 40 16 37.01	W 104 36 21.51
	5359.00	1.50	162.40	5343.12	83.11	75.19	-275.77	1.62	1344989.49	3249442.80	N 40 16 37.00	W 104 36 21.51
	5449.00	2.10	153.90	5433.08	80.47	72.58	-274.69	0.73	1344986.89	3249443.88	N 40 16 36.97	W 104 36 21.50
	5538.00	1.50	106.10	5522.04	78.63	70.80	-272.85	1.75	1344985.10	3249445.72	N 40 16 36.95	W 104 36 21.47
	5628.00	1.80	118.70	5612.00	77.56	69.79	-270.48	0.52	1344984.10	3249448.09	N 40 16 36.94	W 104 36 21.44
	5718.00	1.10	136.60	5701.97	76.20	68.48	-268.65	0.92	1344982.79	3249449.92	N 40 16 36.93	W 104 36 21.42
	5807.00	0.50	140.60	5790.96	75.26	67.56	-267.82	0.68	1344981.87	3249450.76	N 40 16 36.92	W 104 36 21.41
	5897.00	0.90	172.30	5880.96	74.24	66.56	-267.47	0.60	1344980.87	3249451.10	N 40 16 36.91	W 104 36 21.41
	5987.00	1.50	121.90	5970.94	72.89	65.24	-266.38	1.29	1344979.54	3249452.19	N 40 16 36.90	W 104 36 21.39
	6076.00	0.90	125.00	6059.92	71.83	64.22	-264.82	0.68	1344978.53	3249453.76	N 40 16 36.89	W 104 36 21.37
	6166.00	0.30	57.00	6149.91	71.53	63.94	-264.04	0.93	1344978.25	3249454.53	N 40 16 36.89	W 104 36 21.36
	6211.00	0.50	19.90	6194.91	71.77	64.19	-263.87	0.71	1344978.50	3249454.70	N 40 16 36.89	W 104 36 21.36
	6256.00	5.00	23.70	6239.85	73.73	66.17	-263.02	10.00	1344980.48	3249455.55	N 40 16 36.91	W 104 36 21.35
	6301.00	7.90	19.80	6284.56	78.38	70.88	-261.18	6.51	1344985.19	3249457.39	N 40 16 36.95	W 104 36 21.32
	6346.00	10.00	24.20	6329.01	84.77	77.35	-258.53	4.90	1344991.66	3249460.04	N 40 16 37.02	W 104 36 21.29
	6390.00	11.50	21.10	6372.24	92.26	84.93	-255.39	3.65	1344999.24	3249463.18	N 40 16 37.09	W 104 36 21.25
	6435.00	14.80	15.00	6416.05	101.90	94.67	-252.28	7.95	1345008.98	3249466.29	N 40 16 37.19	W 104 36 21.21
	6480.00	18.20	17.00	6459.20	114.07	106.95	-248.74	7.66	1345021.25	3249469.83	N 40 16 37.31	W 104 36 21.16
	6525.00	20.40	19.80	6501.66	128.03	121.05	-244.03	5.30	1345035.35	3249474.54	N 40 16 37.45	W 104 36 21.

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 ° ' ")
	6749.00	41.70	9.20	6692.74	236.01	230.05	-209.96	12.41	1345144.35	3249508.61	N 40 16 38.52	W 104 36 20.64
	6794.00	47.10	5.40	6724.88	267.09	261.26	-206.01	13.37	1345175.56	3249512.56	N 40 16 38.83	W 104 36 20.59
	6839.00	52.00	359.80	6754.08	301.21	295.44	-204.52	14.42	1345209.74	3249514.05	N 40 16 39.17	W 104 36 20.56
	6883.00	54.30	356.80	6780.47	336.41	330.62	-205.58	7.56	1345244.92	3249512.96	N 40 16 39.52	W 104 36 20.57
	6928.00	53.80	356.80	6806.89	372.83	367.00	-207.61	1.11	1345281.29	3249510.99	N 40 16 39.88	W 104 36 20.59
	6973.00	55.40	356.50	6832.96	409.49	403.61	-209.75	3.60	1345317.90	3249508.81	N 40 16 40.24	W 104 36 20.62
	7017.00	58.30	357.10	6857.02	446.31	440.39	-211.81	6.69	1345354.68	3249506.76	N 40 16 40.60	W 104 36 20.64
	7062.00	64.60	359.00	6878.51	485.82	479.87	-213.13	14.48	1345394.16	3249505.44	N 40 16 40.99	W 104 36 20.65
	7107.00	68.10	0.20	6896.56	527.02	521.09	-213.41	8.15	1345435.37	3249505.16	N 40 16 41.40	W 104 36 20.65
	7152.00	68.70	0.60	6913.13	568.83	562.92	-213.12	1.57	1345477.21	3249505.45	N 40 16 41.81	W 104 36 20.64
	7197.00	70.70	359.70	6928.74	611.02	605.13	-213.01	4.82	1345519.41	3249505.56	N 40 16 42.23	W 104 36 20.63
	7242.00	75.10	358.30	6941.97	654.01	648.12	-213.77	10.22	1345562.40	3249504.80	N 40 16 42.65	W 104 36 20.64
	7286.00	80.40	357.90	6951.30	696.99	691.08	-215.20	12.08	1345605.36	3249503.37	N 40 16 43.08	W 104 36 20.65
Last MWD Survey	7327.00	83.30	358.00	6957.11	737.57	731.63	-216.65	7.08	1345645.91	3249501.92	N 40 16 43.48	W 104 36 20.66
7" Casing Point	7372.00	84.37	358.00	6961.95	782.31	776.34	-218.21	2.37	1345690.62	3249500.36	N 40 16 43.92	W 104 36 20.68
Begin IFR Survey	7430.00	85.74	357.99	6966.95	840.09	834.09	-220.24	2.37	1345748.36	3249498.33	N 40 16 44.49	W 104 36 20.70
	7520.00	86.15	356.72	6973.31	929.85	923.77	-224.38	1.48	1345838.04	3249494.19	N 40 16 45.38	W 104 36 20.74
	7609.00	87.28	354.73	6978.41	1018.61	1012.37	-231.00	2.57	1345926.63	3249487.57	N 40 16 46.25	W 104 36 20.81
	7699.00	88.21	352.66	6981.96	1108.24	1101.75	-240.88	2.52	1346016.01	3249477.69	N 40 16 47.14	W 104 36 20.93
	7789.00	91.10	354.01	6982.50	1197.88	1191.13	-251.32	3.54	1346105.38	3249467.25	N 40 16 48.02	W 104 36 21.05
	7878.00	91.03	355.00	6980.84	1286.66	1279.70	-259.84	1.11	1346193.96	3249458.73	N 40 16 48.90	W 104 36 21.15
	7968.00	90.10	357.66	6979.96	1376.59	1369.50	-265.60	3.13	1346283.75	3249452.97	N 40 16 49.79	W 104 36 21.21
	8058.00	89.73	1.65	6980.09	1466.55	1459.48	-266.14	4.45	1346373.73	3249452.43	N 40 16 50.68	W 104 36 21.21
	8147.00	90.21	5.18	6980.14	1555.19	1548.31	-260.84	4.00	1346462.55	3249457.73	N 40 16 51.55	W 104 36 21.13
	8237.00	89.86	7.15	6980.08	1644.35	1637.79	-251.18	2.22	1346552.02	3249467.39	N 40 16 52.44	W 104 36 20.99
	8327.00	89.21	6.63	6980.81	1733.35	1727.13	-240.38	0.92	1346641.37	3249478.19	N 40 16 53.32	W 104 36 20.84
	8416.00	88.83	5.62	6982.33	1821.51	1815.61	-230.89	1.21	1346729.84	3249487.68	N 40 16 54.19	W 104 36 20.71
	8506.00	89.35	4.19	6983.76	1910.91	1905.27	-223.19	1.69	1346819.49	3249495.38	N 40 16 55.08	W 104 36 20.60
	8596.00	89.28	3.67	6984.84	2000.48	1995.05	-217.03	0.58	1346909.27	3249501.54	N 40 16 55.96	W 104 36 20.50
	8685.00	89.52	2.93	6985.77	2089.14	2083.90	-211.90	0.87	1346998.11	3249506.67	N 40 16 56.84	W 104 36 20.43
	8775.00	90.41	4.14	6985.83	2178.77	2173.72	-206.35	1.67	1347087.93	3249512.31	N 40 16 57.73	W 104 36 20.34
	8865.00	90.07	4.91	6985.45	2268.24	2263.44	-199.25	0.94	1347177.65	3249519.21	N 40 16 58.61	W 104 36 20.24
	8954.00	89.97	3.56	6985.42	2356.77	2352.20	-192.68	1.52	1347266.40	3249525.89	N 40 16 59.49	W 104 36 20.14
	9044.00	89.76	1.47	6985.63	2446.53	2442.10	-188.73	2.33	1347356.30	3249529.84	N 40 17 0 38	W 104 36 20.08
	9134.00	89.76	359.35	6986.01	2536.46	2532.09	-188.09	2.36	1347446.29	3249530.48	N 40 17 1 27	W 104 36 20.06
	9223.00	89.69	357.46	6986.43	2625.46	2621.06	-190.57	2.13	1347535.25	3249528.00	N 40 17 2 15	W 104 36 20.08
	9313.00	89.66	355.25	6986.94	2715.40	2710.87	-196.29	2.46	1347625.05	3249522.28	N 40 17 3 03	W 104 36 20.14
	9403.00	89.66	356.38	6987.48	2805.31	2800.62	-202.85	1.26	1347714.81	3249515.71	N 40 17 3 92	W 104 36 20.22
	9493.00	89.86	358.04	6987.86	2895.29	2890.51	-207.24	1.86	1347804.69	3249511.33	N 40 17 4 81	W 104 36 20.26
	9582.00	89.90	359.58	6988.04	2984.28	2979.49	-209.08	1.73	1347893.67	3249509.49	N 40 17 5 69	W 104 36 20.27
	9672.00	89.90	359.77	6988.20	3074.26	3069.49	-209.59	0.21	1347983.66	3249508.98	N 40 17 6 58	W 104 36 20.27
	9761.00	89.38	359.50	6988.76	3163.23	3158.49	-210.16	0.66	1348072.65	3249508.41	N 40 17 7 46	W 104 36 20.26
	9851.00	89.59	359.53	6989.57	3253.21	3248.48	-210.92	0.24	1348162.64	3249507.65	N 40 17 8 35	W 104 36 20.26
	9941.00	89.86	359.57	6990.00	3343.19	3338.47	-211.63	0.30	1348252.63	3249506.94	N 40 17 9 24	W 104 36 20.26
	10030.00	90.65	359.23	6989.60	3432.17	3427.47	-212.56	0.97	1348341.62	3249506.01	N 40 17 10 12	W 104 36 20.26
	10120.00	90.96	358.27	6988.34	3522.16	3517.44	-214.52	1.12	1348431.59	3249504.04	N 40 17 11 01	W 104 36 20.27
	10210.00	90.93	357.14	6986.85	3612.14	3607.35	-218.13	1.26	1348521.50	3249500.44	N 40 17 11 90	W 104 36 20.31
	10299.00	88.56	354.09	6987.25	3701.02	3696.07	-224.93	4.34	1348610.22	3249493.64	N 40 17 12 77	W 104 36 20.38
	10389.00	89.59	352.50	6988.70	3790.65	3785.44	-235.44	2.10	1348699.58	3249483.13	N 40 17 13 66	W 104 36 20.51
	10479.00	89.97	351.19	6989.05	3880.07	3874.53	-248.20	1.52	1348788.66	3249470.37	N 40 17 14 54	W 104 36 20.66
	10568.00	90.07	350.22	6989.02	3968.28	3962.36	-262.58	1.10	1348876.49	3249455.99	N 40 17 15 41	W 104 36 20.84
	10658.00	90.31	351.07	6988.72	4057.47	4051.16	-277.21	0.98	1348965.29	3249441.36	N 40 17 16 29	W 104 36 21.01
	10748.00	90.03	352.30	6988.45	4146.86	4140.21	-290.22	1.40	1349054.34	3249428.35	N 40 17 17 17	W 104 36 21.17
	10838.00	90.89	353.96	6987.73	4236.48	4229.56	-300.99	2.08	1349143.68	3249417.59	N 40 17 18 05	W 104 36 21.30
	10927.00	89.45	355.05	6987.47	4325.27	4318.15	-309.51	2.03	1349232.26	3249409.06	N 40 17 18 93	W 104 36 21.40
	11019.00	87.97	356.08	6989.54	4417.14	4409.84	-316.62	1.96	1349323.95	3249401.95	N 40 17 19 83	W 104 36 21.48
	11113.00	86.43	358.56	6994.13	4511.00	4503.62	-321.01	3.10	1349417.73	3249397.56	N 40 17 20 76	W 104 36 21.52
	11206.00	87.46	0.80	6999.09	4603.94	4596.48	-321.53	2.65	1349510.58	3249397.04	N 40 17 21 68	W 104 36 21.51
	11298.00	88.08	2.31	7002.67	4695.62	4688.37	-319.04	1.77	1349602.47	3249399.54	N 40 17 22 59	W 104 36 21.47
	11391.00	87.87	3.97	7005.95	4788.23	4781.17	-313.95	1.80	1349695.26	3249404.63	N 40 17 23 50	W 104 36 21.39
	11485.00	88.90	4.27	7008.60	4881.72	4874.89	-307.20	1.14	1349788.98	3249411.38	N 40 17 24 43	W 104 36 21.29
	11577.00	90.48	3.20	7009.10	4973.31	4966.69	-301.20	2.07	1349880.77	3249417.37	N 40 17 25 34	W 104 36 21.20
	11670.00	90.82	2.00	7008.05	5066.04	5059.58	-296.98	1.34	1349973.67	3249421.59	N 40 17 26 25	W 104 36 21.14
	11762.00	90.27	2.27	7007.17	5157.84	5151.51	-293.56	0.67	1350065.59	3249425.02	N 40 17 27 16	W 104 36 21.08
	11855.00	90.41	1.91	7006.62	5250.64	5244.45	-290.17	0.42	1350158.53	3249428.41	N 40 17 28 08	W 104 36 21.03
	11949.00	91.44	2.89	7005.10	5344.39	5338.35	-286.23	1.51	1350252.42	3249432.34	N 40 17 29 01	W 104 36 20.96
	12042.00	90.76	2.06	7003.32	5437.13	5431.25	-282.21	1.15	1350345.31	3249436.36	N 40 17 29 92	W 104 36 20.90
	12134.00	91.55	2.14	7001.46	5528.91	5523.17	-278.84	0.86	1350437.23	3249439.73	N 40 17 30 83	W 104 36 20.84
	12227.00	90.10	2.04	7000.12	5621.70	5616.09	-275.45	1.56	1350530.15	3249443.12	N 40 17 31 75	W 104 36 20.79
	12321.00	89.27	0.14	6999.82	5715.59	5710.07	-273.66	2.03	1350624.12	3249444.91	N 40 17 32 68	W 104 36 20.75
	12415.00	89.59	358.97	6999.93	5809.56	5804.07	-274.39	1.44	1350718.12	3249444.18	N 40 17 33 61	W 104 36 20.75
	12510.00	89.04	359.31	7001.07	5904.55	5899.05	-275.82	0.68	1350813.09	3249442.75	N 40 17 34 55	W 104 36 20.75
	12604.00	89.52	0.94	7002.25	5998.49	5993.04	-275.62	1.81	1350907.08	3249442.96	N 40 17 35 47	W 104 36 20.74
	12698.00	89.04	359.64	7003.43	6092.43	6087.03	-275.14	1.47	1351001.06	3249443.43	N 40 17 36 40	W 104 36 20.72
	12792.00	89.42	359.99	7004.69	6186.39	6181.02	-275.44	0.55	1351095.05	3249443.13		

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 ° ' ")
	15749.00	90.31	359.35	7007.41	9142.44	9137.75	-294.44	0.31	1354051.64	3249424.13	N 40 18 6.55	W 104 36 20.57
	15838.00	90.34	359.20	7006.91	9231.42	9226.74	-295.57	0.17	1354140.63	3249423.01	N 40 18 7.43	W 104 36 20.58
	15928.00	90.79	359.14	7006.02	9321.41	9316.72	-296.87	0.50	1354230.61	3249421.70	N 40 18 8.32	W 104 36 20.58
	16017.00	90.48	359.32	7005.03	9410.39	9405.71	-298.07	0.40	1354319.60	3249420.51	N 40 18 9.20	W 104 36 20.59
	16107.00	91.79	359.27	7003.25	9500.36	9495.68	-299.17	1.46	1354409.57	3249419.40	N 40 18 10.09	W 104 36 20.59
	16196.00	90.82	359.69	7001.22	9589.32	9584.66	-299.98	1.19	1354498.53	3249418.59	N 40 18 10.97	W 104 36 20.59
	16286.00	90.55	358.54	7000.15	9679.30	9674.64	-301.37	1.31	1354588.51	3249417.20	N 40 18 11.86	W 104 36 20.59
	16375.00	90.41	358.56	6999.40	9768.30	9763.60	-303.62	0.16	1354677.47	3249414.95	N 40 18 12.74	W 104 36 20.61
	16465.00	90.27	358.07	6998.87	9858.30	9853.56	-306.27	0.57	1354767.43	3249412.30	N 40 18 13.62	W 104 36 20.63
	16555.00	90.10	357.41	6998.58	9948.29	9943.49	-309.82	0.76	1354857.36	3249408.76	N 40 18 14.51	W 104 36 20.67
	16644.00	90.27	356.98	6998.29	10037.27	10032.39	-314.17	0.52	1354946.24	3249404.40	N 40 18 15.39	W 104 36 20.71
	16734.00	90.10	357.81	6998.00	10127.26	10122.29	-318.26	0.94	1355036.15	3249400.31	N 40 18 16.28	W 104 36 20.75
Last IFR Survey	16823.00	90.10	357.79	6997.84	10216.26	10211.23	-321.68	0.02	1355125.08	3249396.89	N 40 18 17.16	W 104 36 20.79
Projection to Bit	16867.00	90.10	357.79	6997.77	10260.25	10255.19	-323.38	0.00	1355169.04	3249395.20	N 40 18 17.59	W 104 36 20.80

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	16.000	Act Stns	13.750	9.625	SLB_EMS-STD-Depth Only	Original Hole / Heartland G25-73-1HN MWD+IFR 0' to 16867'
Surface	1	16.000	691.000	1/98.425	13.750	9.625	SLB_EMS-STD	Original Hole / Heartland G25-73-1HN MWD+IFR 0' to 16867'
Intermediate	1	691.000	7327.000	Act Stns	8.750	7.000	SLB_MWD-STD	Original Hole / Heartland G25-73-1HN MWD+IFR 0' to 16867'
* Lateral	1	7327.000	16823.000	Act Stns	6.125	4.500	SLB_MWD+IFR1+MS	Original Hole / Heartland G25-73-1HN MWD+IFR 0' to 16867'
Bit Projection	1	16823.000	16867.000	Act Stns	6.125	4.500	SLB_BLIND+TREND	Original Hole / Heartland G25-73-1HN MWD+IFR 0' to 16867'

* SLB_MWD+IFR_MS =
MWD+IFR1+MS_WY