Project: Weld County, CO (NAD 83)
Site: Sec. 11-T5N-R64W
Well: Jenkins B11-79-1HCM (B11 PAD)

Noble Energy

HALLIBURTON
Sperry Drilling

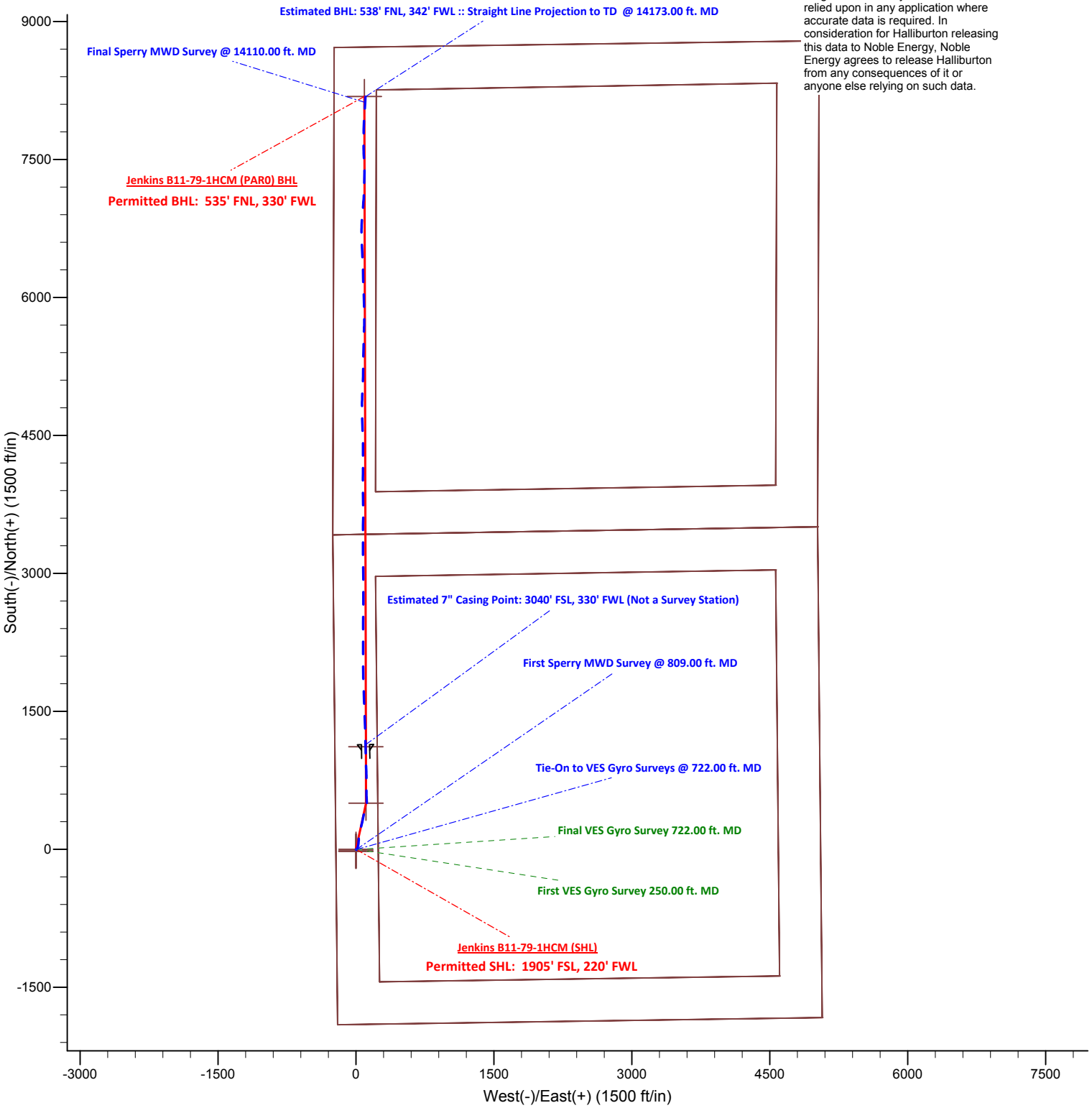
Azimuths to Grid North
True North: -0.63°
Magnetic North: 7.90°

Magnetic Field
Strength: 52856.7snT
Dip Angle: 67.00°
Date: 5/30/2013
Model: BGGM2012

LEGEND

Jenkins B11-79-1HCM, PAR0
Vaughn ESS and Sperry MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the "Jenkins B11-79-1HCM" well located at Weld County, CO. At the conclusion of the job Halliburton performed a final survey on the well. Noble Energy has requested that Halliburton provide them the distances from BHL to section lines from that final survey to allow Noble Energy to meet its requirements under Colorado law. These distances are generated by a mathematical algorithm based on rough data collected after the well is drilled. Halliburton considers it to be a rough estimate only and it is not to be relied upon in any application where accurate data is required. In consideration for Halliburton releasing this data to Noble Energy, Noble Energy agrees to release Halliburton from any consequences of it or anyone else relying on such data.



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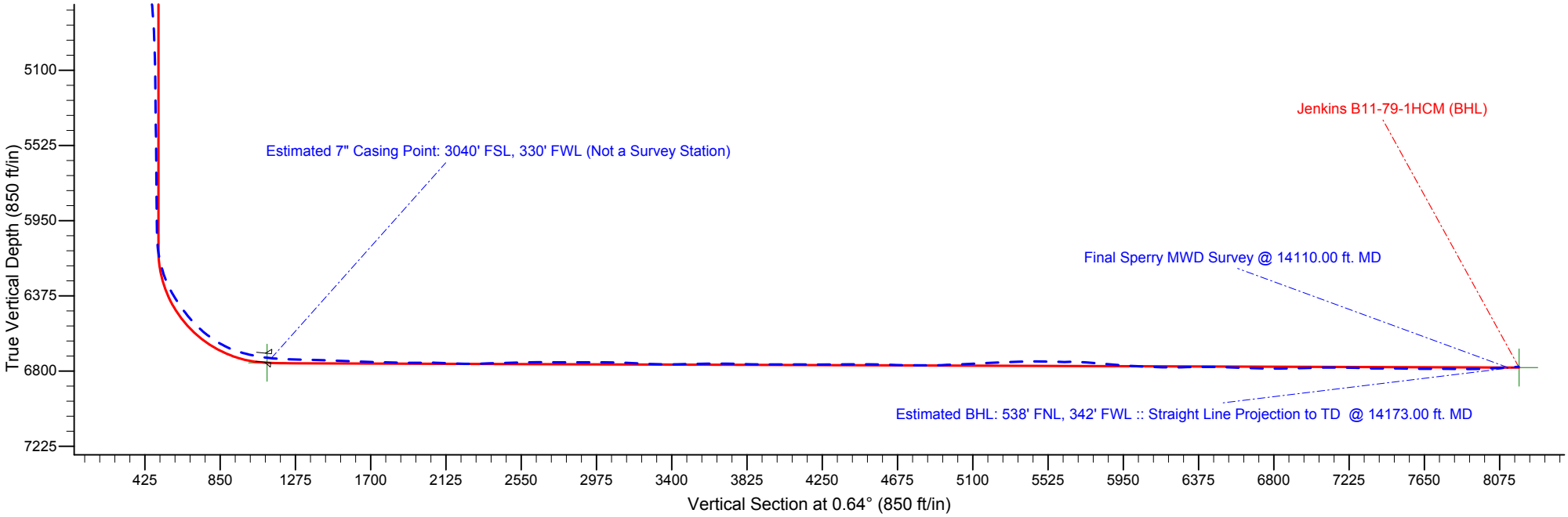

Noble Energy

Weld County, CO (NAD 83)
Sec. 11-T5N-R64W
Jenkins B11-79-1HCM

Design: Vaughn ESS and Sperry MWD Survey

Sperry Drilling Services

Final Survey Report

17 June, 2013

Well Coordinates: 1,394,307.76 N, 3,271,144.46 E (40° 24' 42.08" N, 104° 31' 34.54" W)
Ground Level: 4,603.00 ft

Local Coordinate Origin:	Centered on Well Jenkins B11-79-1HCM (B11 PAD)
Viewing Datum:	RKB 26 ft. @ 4629.00ft (H&P 315)
TVDs to System:	N
North Reference:	Grid
Unit System:	API - US Survey Feet - Custom

Geodetic Scale Factor Applied
Version: 2003.16 Build: 43I

HALLIBURTON

Design Report for Jenkins B11-79-1HCM (B11 PAD) - Vaughn ESS and Sperry MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
250.00	0.70	110.10	249.99	-0.52	1.43	-0.51	0.28
First VES Gyro Survey 250.00 ft. MD							
550.00	0.30	153.00	549.98	-1.85	3.51	-1.82	0.17
722.00	0.40	146.10	721.98	-2.75	4.05	-2.71	0.06
Final VES Gyro Survey 722.00 ft. MD - Tie-On to VES Gyro Surveys @ 722.00 ft. MD							
809.00	0.40	171.46	808.98	-3.31	4.27	-3.26	0.20
First Sperry MWD Survey @ 809.00 ft. MD							
1,085.00	0.37	157.65	1,084.97	-5.08	4.75	-5.03	0.04
1,178.00	0.83	106.19	1,177.97	-5.55	5.51	-5.49	0.72
1,270.00	0.98	39.92	1,269.96	-5.13	6.65	-5.06	1.08
1,457.00	1.01	41.74	1,456.93	-2.67	8.78	-2.58	0.02
1,552.00	1.36	24.62	1,551.91	-1.03	9.80	-0.92	0.52
1,646.00	1.26	22.54	1,645.88	0.94	10.66	1.06	0.12
1,741.00	0.99	42.38	1,740.87	2.51	11.62	2.64	0.49
1,836.00	2.02	27.49	1,835.83	4.61	12.94	4.75	1.15
1,931.00	4.55	24.13	1,930.67	9.53	15.26	9.70	2.67
2,026.00	5.07	11.82	2,025.34	17.08	17.66	17.27	1.21
2,121.00	6.21	9.15	2,119.88	26.26	19.34	26.47	1.23
2,216.00	6.06	18.51	2,214.33	36.09	21.74	36.33	1.06
2,311.00	7.05	13.54	2,308.71	46.51	24.70	46.78	1.20
2,406.00	8.54	7.73	2,402.83	59.17	27.02	59.47	1.77
2,501.00	9.92	3.63	2,496.60	74.33	28.48	74.64	1.61
2,596.00	11.23	0.93	2,589.99	91.74	29.15	92.06	1.47
2,691.00	13.34	2.63	2,682.81	111.94	29.80	112.27	2.25
2,786.00	13.39	5.60	2,775.23	133.84	31.38	134.18	0.72
2,881.00	12.87	7.65	2,867.75	155.27	33.86	155.64	0.73
2,976.00	12.97	12.61	2,960.35	176.16	37.60	176.57	1.17
3,071.00	13.83	14.24	3,052.76	197.57	42.72	198.04	0.99
3,166.00	12.16	16.95	3,145.33	218.15	48.43	218.68	1.87
3,261.00	10.76	17.61	3,238.43	236.18	54.03	236.76	1.48
3,355.00	12.00	11.00	3,330.58	254.13	58.55	254.77	1.91
3,450.00	12.85	14.47	3,423.36	274.06	63.07	274.74	1.19
3,545.00	13.40	12.75	3,515.88	295.02	68.14	295.76	0.71
3,640.00	15.11	11.52	3,607.95	317.89	73.04	318.69	1.83
3,735.00	15.66	11.32	3,699.55	342.60	78.03	343.45	0.58
3,830.00	14.08	11.97	3,791.36	366.48	82.95	367.38	1.67
3,925.00	11.11	13.91	3,884.06	386.67	87.55	387.62	3.16
4,020.00	8.72	12.48	3,977.64	402.59	91.30	403.58	2.53
4,115.00	6.66	17.78	4,071.78	414.87	94.54	415.89	2.29
4,210.00	4.91	17.79	4,166.29	423.98	97.47	425.04	1.84
4,305.00	4.61	9.60	4,260.97	431.62	99.35	432.70	0.78
4,400.00	5.45	7.63	4,355.60	439.86	100.58	440.95	0.90
4,495.00	3.84	11.73	4,450.29	447.44	101.83	448.55	1.73
4,590.00	2.44	8.05	4,545.14	452.56	102.76	453.68	1.49
4,685.00	3.93	4.91	4,639.99	457.81	103.32	458.93	1.58
4,780.00	4.89	19.43	4,734.71	464.87	104.94	466.01	1.54
4,875.00	4.08	24.24	4,829.42	471.77	107.68	472.94	0.94
4,969.00	2.34	31.70	4,923.27	476.45	110.06	477.65	1.90
5,064.00	1.66	20.36	5,018.21	479.39	111.56	480.60	0.82

Design Report for Jenkins B11-79-1HCM (B11 PAD) - Vaughn ESS and Sperry MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,159.00	0.90	37.56	5,113.19	481.27	112.49	482.49	0.89
5,444.00	1.42	56.53	5,398.13	484.99	116.80	486.26	0.22
5,539.00	0.66	16.98	5,493.11	486.17	117.94	487.45	1.06
5,823.00	0.57	8.86	5,777.10	489.13	118.64	490.42	0.04
6,013.00	0.45	5.10	5,967.09	490.80	118.85	492.10	0.07
6,067.00	0.65	352.21	6,021.09	491.32	118.83	492.61	0.43
6,200.00	10.00	356.95	6,153.37	503.62	118.11	504.91	7.03
6,248.00	14.60	359.01	6,200.25	513.84	117.78	515.12	9.63
6,295.00	18.50	357.66	6,245.30	527.22	117.38	528.49	8.34
6,343.00	22.32	356.45	6,290.28	543.93	116.50	545.19	8.01
6,390.00	26.55	356.18	6,333.06	563.33	115.25	564.58	9.00
6,438.00	31.26	358.33	6,375.07	586.49	114.17	587.73	10.05
6,484.00	33.92	0.52	6,413.82	611.26	113.94	612.49	6.32
6,532.00	36.06	359.60	6,453.14	638.79	113.96	640.02	4.59
6,579.00	39.33	0.41	6,490.33	667.52	113.97	668.75	7.04
6,627.00	43.06	359.96	6,526.44	699.13	114.07	700.36	7.80
6,674.00	47.55	359.97	6,559.49	732.53	114.05	733.76	9.55
6,722.00	51.32	359.51	6,590.70	768.99	113.88	770.21	7.89
6,769.00	55.42	358.58	6,618.73	806.69	113.24	807.90	8.87
6,817.00	60.30	357.45	6,644.26	847.30	111.82	848.49	10.36
6,864.00	64.83	357.84	6,665.91	888.97	110.11	890.14	9.67
6,912.00	70.63	358.39	6,684.10	933.34	108.66	934.49	12.13
6,959.00	74.41	358.73	6,698.21	978.15	107.53	979.29	8.07
7,007.00	78.02	358.40	6,709.65	1,024.74	106.36	1,025.86	7.55
7,054.00	79.65	359.21	6,718.75	1,070.84	105.40	1,071.95	3.86
7,072.00	81.64	359.00	6,721.67	1,088.60	105.13	1,089.70	11.12
7,121.00	84.49	358.91	6,727.59	1,137.23	104.24	1,138.32	5.83
Estimated 7" Casing Point: 3040' FSL, 330' FWL (Not a Survey Station)							
7,158.00	86.65	358.84	6,730.44	1,174.11	103.51	1,175.19	5.83
7,221.00	87.44	358.25	6,733.69	1,237.00	101.92	1,238.06	1.56
7,316.00	89.20	358.18	6,736.48	1,331.91	98.96	1,332.93	1.85
7,411.00	87.59	358.08	6,739.14	1,426.82	95.86	1,427.80	1.70
7,506.00	88.24	357.87	6,742.59	1,521.70	92.50	1,522.64	0.72
7,600.00	87.90	357.62	6,745.76	1,615.57	88.81	1,616.46	0.45
7,695.00	88.21	358.04	6,748.98	1,710.45	85.21	1,711.29	0.55
7,790.00	88.27	357.50	6,751.90	1,805.33	81.52	1,806.13	0.57
7,885.00	89.72	359.17	6,753.57	1,900.27	78.76	1,901.03	2.33
7,980.00	91.11	359.88	6,752.88	1,995.26	77.97	1,996.01	1.64
8,075.00	87.41	359.87	6,754.11	2,090.24	77.76	2,090.98	3.89
8,168.00	87.84	359.79	6,757.96	2,183.16	77.49	2,183.89	0.47
8,261.00	90.77	0.88	6,759.09	2,276.14	78.03	2,276.87	3.36
8,354.00	91.85	359.23	6,756.96	2,369.11	78.12	2,369.83	2.12
8,447.00	91.67	0.57	6,754.10	2,462.06	77.96	2,462.78	1.45
8,539.00	91.64	1.25	6,751.45	2,554.01	79.42	2,554.74	0.74
8,631.00	90.28	0.46	6,749.91	2,645.99	80.79	2,646.72	1.71
8,724.00	89.01	359.40	6,750.48	2,738.98	80.68	2,739.71	1.78
8,816.00	90.52	0.95	6,750.86	2,830.98	80.96	2,831.70	2.35
8,908.00	90.12	359.15	6,750.35	2,922.97	81.04	2,923.69	2.00
9,001.00	89.26	358.82	6,750.85	3,015.95	79.39	3,016.65	0.99
9,094.00	88.46	359.15	6,752.70	3,108.92	77.75	3,109.59	0.93
9,186.00	86.45	358.90	6,756.78	3,200.81	76.18	3,201.46	2.20

Design Report for Jenkins B11-79-1HCM (B11 PAD) - Vaughn ESS and Sperry MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
9,277.00	88.33	0.38	6,760.93	3,291.71	75.61	3,292.35	2.63
9,370.00	90.06	359.59	6,762.23	3,384.69	75.59	3,385.33	2.04
9,462.00	91.29	0.76	6,761.15	3,476.68	75.87	3,477.31	1.85
9,554.00	91.33	1.94	6,759.05	3,568.63	78.03	3,569.28	1.28
9,648.00	89.94	359.76	6,758.01	3,662.61	79.43	3,663.27	2.75
9,741.00	88.49	358.98	6,759.28	3,755.59	78.41	3,756.23	1.77
9,834.00	88.77	358.48	6,761.50	3,848.54	76.35	3,849.15	0.62
9,927.00	89.57	359.61	6,762.85	3,941.52	74.80	3,942.11	1.49
10,022.00	90.68	0.81	6,762.64	4,036.51	75.14	4,037.10	1.72
10,117.00	89.29	359.79	6,762.67	4,131.51	75.64	4,132.09	1.81
10,211.00	90.12	0.49	6,763.15	4,225.50	75.87	4,226.09	1.16
10,306.00	90.52	0.43	6,762.62	4,320.50	76.63	4,321.09	0.43
10,401.00	90.59	359.30	6,761.70	4,415.49	76.41	4,416.07	1.19
10,496.00	89.26	357.73	6,761.83	4,510.46	73.95	4,511.00	2.17
10,591.00	87.69	357.43	6,764.35	4,605.34	69.94	4,605.83	1.68
10,686.00	89.20	359.61	6,766.93	4,700.26	67.49	4,700.72	2.79
10,781.00	89.48	359.39	6,768.03	4,795.25	66.66	4,795.69	0.37
10,876.00	91.30	0.59	6,767.38	4,890.24	66.64	4,890.68	2.29
10,971.00	92.47	3.30	6,764.25	4,985.13	69.86	4,985.59	3.11
11,066.00	92.87	2.84	6,759.83	5,079.89	74.95	5,080.41	0.64
11,160.00	93.02	0.79	6,755.00	5,173.71	77.92	5,174.26	2.18
11,255.00	92.40	1.13	6,750.51	5,268.59	79.51	5,269.15	0.74
11,350.00	91.79	0.80	6,747.03	5,363.51	81.11	5,364.08	0.73
11,445.00	89.41	0.73	6,746.04	5,458.49	82.38	5,459.07	2.51
11,540.00	88.40	1.83	6,747.85	5,553.45	84.50	5,554.04	1.57
11,635.00	91.05	2.41	6,748.31	5,648.37	88.01	5,649.00	2.86
11,729.00	85.03	0.19	6,751.52	5,742.24	90.14	5,742.89	6.82
11,824.00	85.74	359.33	6,759.17	5,836.93	89.75	5,837.57	1.17
11,919.00	85.18	358.39	6,766.69	5,931.62	87.86	5,932.23	1.15
12,014.00	87.07	357.92	6,773.11	6,026.34	84.81	6,026.92	2.05
12,109.00	88.12	357.92	6,777.09	6,121.20	81.37	6,121.72	1.11
12,204.00	89.44	358.57	6,779.12	6,216.13	78.46	6,216.62	1.55
12,298.00	91.54	357.98	6,778.31	6,310.08	75.63	6,310.53	2.32
12,393.00	90.37	357.68	6,776.73	6,404.99	72.03	6,405.40	1.27
12,488.00	87.78	357.09	6,778.26	6,499.87	67.70	6,500.22	2.80
12,583.00	88.61	357.47	6,781.26	6,594.72	63.19	6,595.01	0.96
12,678.00	87.81	359.25	6,784.22	6,689.63	60.48	6,689.89	2.05
12,773.00	89.72	2.12	6,786.27	6,784.59	61.61	6,784.85	3.63
12,867.00	91.26	4.72	6,785.47	6,878.40	67.22	6,878.73	3.21
12,962.00	91.79	5.57	6,782.94	6,972.99	75.73	6,973.40	1.05
13,057.00	90.92	3.70	6,780.69	7,067.64	83.41	7,068.13	2.17
13,152.00	89.57	1.37	6,780.29	7,162.54	87.61	7,163.07	2.83
13,247.00	87.90	2.05	6,782.38	7,257.47	90.44	7,258.03	1.90
13,342.00	88.70	0.86	6,785.20	7,352.40	92.85	7,352.98	1.51
13,437.00	90.71	356.69	6,785.69	7,447.35	90.82	7,447.90	4.87
13,532.00	88.30	356.78	6,786.51	7,542.18	85.41	7,542.67	2.54
13,627.00	90.68	359.60	6,787.36	7,637.12	82.41	7,637.56	3.88
13,722.00	89.91	0.46	6,786.87	7,732.11	82.46	7,732.55	1.22
13,817.00	88.83	1.64	6,787.91	7,827.09	84.20	7,827.54	1.68
13,912.00	90.55	3.24	6,788.43	7,921.99	88.25	7,922.49	2.47
14,007.00	93.08	3.70	6,785.42	8,016.76	93.99	8,017.31	2.71

Design Report for Jenkins B11-79-1HCM (B11 PAD) - Vaughn ESS and Sperry MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
14,110.00	93.11	2.94	6,779.86	8,119.44	99.95	8,120.05	0.74
Final Sperry MWD Survey @ 14110.00 ft. MD							
14,173.00	93.11	2.94	6,776.44	8,182.27	103.18	8,182.91	0.00
Estimated BHL: 538' FNL, 342' FWL :: Straight Line Projection to TD @ 14173.00 ft. MD							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
250.00	249.99	-0.52	1.43	First VES Gyro Survey 250.00 ft. MD
722.00	721.98	-2.75	4.05	Final VES Gyro Survey 722.00 ft. MD
722.00	721.98	-2.75	4.05	Tie-On to VES Gyro Surveys @ 722.00 ft. MD
809.00	808.98	-3.31	4.27	First Sperry MWD Survey @ 809.00 ft. MD
7,121.00	6,727.59	1,137.23	104.24	Estimated 7" Casing Point: 3040' FSL, 330' FWL (Not a Survey Station)
14,110.00	6,779.86	8,119.44	99.95	Final Sperry MWD Survey @ 14110.00 ft. MD
14,173.00	6,776.44	8,182.27	103.18	Estimated BHL: 538' FNL, 342' FWL :: Straight Line Projection to TD @ 14173.00 ft. MD

Vertical Section Information

	Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (ft)	Origin +E/-W (ft)	Start TVD (ft)
Target		Jenkins B11-79-1HCM (PAR0) BHL	0.64	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
250.00	722.00	Vaughn ESS Survey	Flexi-Shot
809.00	7,121.00	Sperry MWD Survey	MWD+IFR1+MS_WY
7,121.00	14,173.00	Sperry MWD Survey	MWD+IFR1+MS_WY

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,121.00	6,727.59	7" Casing PT	7	8-3/4

Design Report for Jenkins B11-79-1HCM (B11 PAD) - Vaughn ESS and Sperry MWD Survey

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
(B11 PAD) Sec.	0.00	0.00	0.00	-21.85	0.24	1,394,285.91	3,271,144.70	40.411630	-104.526260
- actual wellpath misses target center by 21.86ft at 0.05ft MD (0.05 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				-199.08	-1,907.64	1,392,400.19	3,270,945.39		
Point 2				5,069.52	-1,831.06	1,392,476.77	3,276,213.78		
Point 3				5,020.96	3,505.91	1,397,813.53	3,276,165.22		
Point 4				-251.95	3,418.34	1,397,725.96	3,270,892.52		
Jenkins	0.00	0.00	0.00	0.00	0.00	1,394,307.76	3,271,144.46	40.411690	-104.526260
- actual wellpath hits target center									
- Point									
Jenkins		0.00	4,672.35	500.00	110.00	1,394,807.74	3,271,254.46	40.413059	-104.525845
- actual wellpath misses target center by 40.31ft at 4720.51ft MD (4675.41 TVD, 460.31 N, 103.68 E)									
- Point									
Jenkins		0.00	6,753.59	1,114.40	108.50	1,395,422.12	3,271,252.96	40.414745	-104.525826
- actual wellpath misses target center by 28.54ft at 7101.40ft MD (6725.51 TVD, 1117.75 N, 104.60 E)									
- Point									
(B11 PAD) Sec.	0.00	0.00	0.00	-21.85	0.24	1,394,285.91	3,271,144.70	40.411630	-104.526260
- actual wellpath misses target center by 21.86ft at 0.05ft MD (0.05 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				255.92	-1,441.64	1,392,866.17	3,271,400.37		
Point 2				4,606.52	-1,379.06	1,392,928.75	3,275,750.80		
Point 3				4,564.96	3,037.91	1,397,345.55	3,275,709.24		
Point 4				213.05	2,966.34	1,397,273.98	3,271,357.50		
(B11 PAD) Sec.	0.00	0.00	0.00	-21.85	0.24	1,394,285.91	3,271,144.70	40.411630	-104.526260
- actual wellpath misses target center by 21.86ft at 0.05ft MD (0.05 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				213.05	3,886.34	1,398,193.94	3,271,357.50		
Point 2				4,564.96	3,957.91	1,398,265.51	3,275,709.24		
Point 3				4,577.02	8,328.97	1,402,636.40	3,275,721.30		
Point 4				222.31	8,255.94	1,402,563.37	3,271,366.76		
Jenkins	0.00	0.00	6,780.54	8,183.97	91.09	1,402,491.41	3,271,235.54	40.434150	-104.525610
- actual wellpath misses target center by 12.88ft at 14173.00ft MD (6776.44 TVD, 8182.27 N, 103.18 E)									
- Point									
(B11 PAD) Sec.	0.00	0.00	0.00	-21.85	0.24	1,394,285.91	3,271,144.70	40.411630	-104.526260
- actual wellpath misses target center by 21.86ft at 0.05ft MD (0.05 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				-251.95	3,418.34	1,397,725.96	3,270,892.52		
Point 2				5,020.96	3,505.91	1,397,813.53	3,276,165.22		
Point 3				5,037.02	8,788.97	1,403,096.38	3,276,181.28		
Point 4				-237.69	8,715.94	1,403,023.35	3,270,906.78		

North Reference Sheet for Sec. 11-T5N-R64W - Jenkins B11-79-1HCM

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.

Vertical Depths are relative to RKB 26 ft. @ 4629.00ft (H&P 315). Northing and Easting are relative to Jenkins B11-79-1HCM (B11 PAD) - Slot A2

Coordinate System is US State Plane 1983, Colorado Northern Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99996078

Grid Coordinates of Well: 1,394,307.76 ft N, 3,271,144.46 ft E

Geographical Coordinates of Well: 40° 24' 42.08" N, 104° 31' 34.54" W

Grid Convergence at Surface is: 0.63°

Based upon Minimum Curvature type calculations, at a Measured Depth of 14,173.00ft
the Bottom Hole Displacement is 8,182.92ft in the Direction of 0.72° (Grid).

Magnetic Convergence at surface is: -7.90° (30 May 2013, , BGGM2012)