

Noble Energy

Weld County, CO (NAD 83)

Sec. 17-T5N-R63W (70 Ranch State BB18 PAD)

70 Ranch State BB18-615

05-123-41537

Plan A

Design: Actual Surveys

Sperry Drilling Services

Final Survey Report

04 August, 2015

Surface UWI : 05-123-41537

Well Coordinates: 1,387,966.65 N, 3,291,445.42 E (40° 23' 37.14" N, 104° 27' 13.07" W)

Ground Level: 4,646.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 73

Centered on Well 70 Ranch State BB18-615

KB = 24' @ 4670.00usft (H&P 343)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

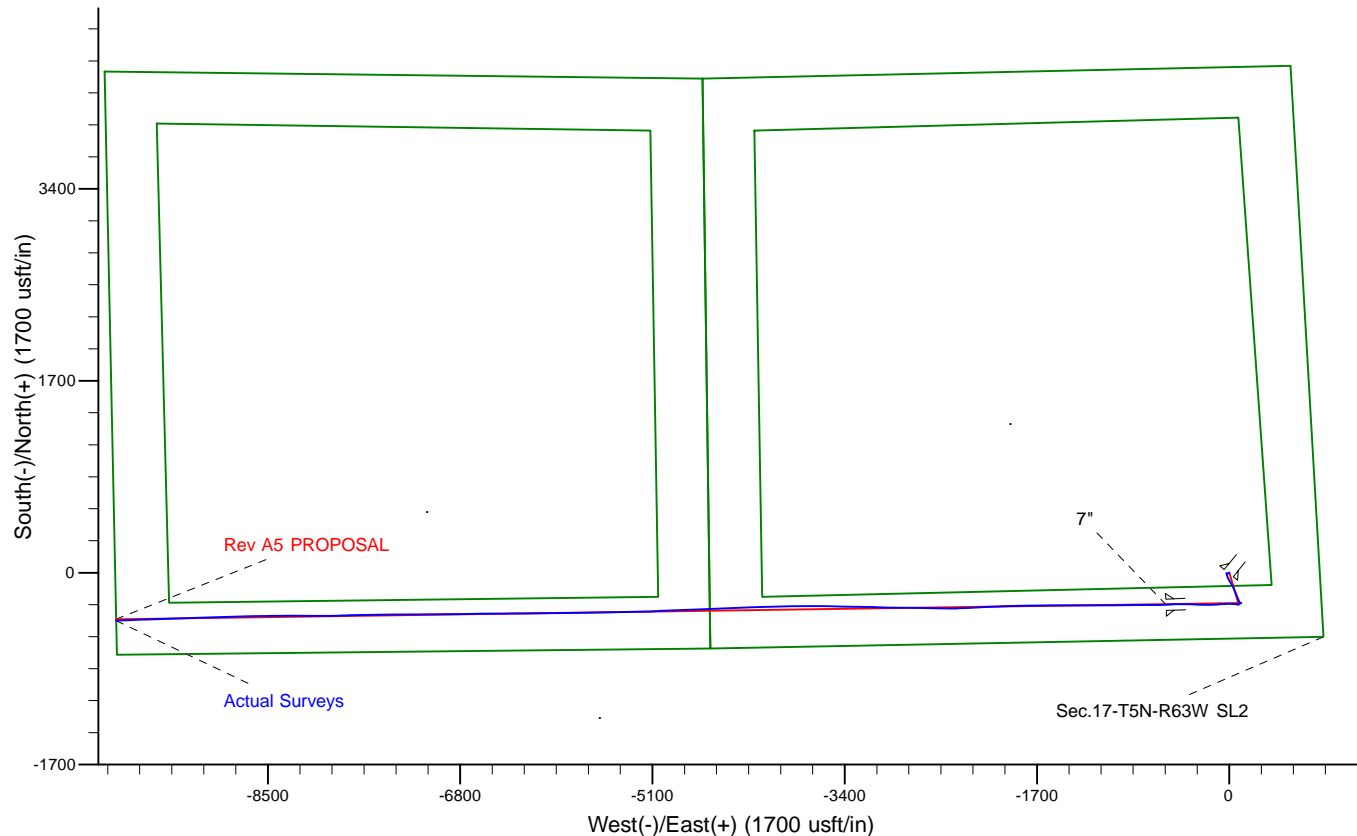
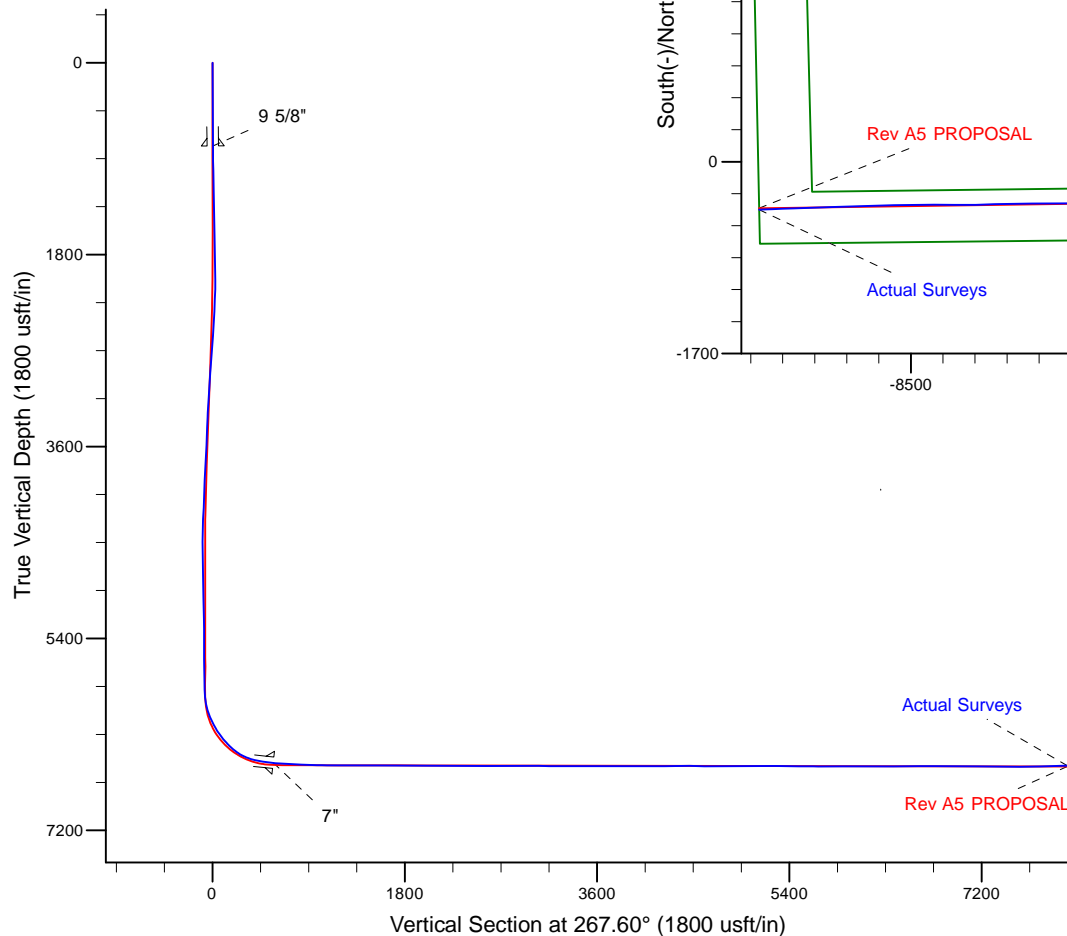
Project: Weld County, CO (NAD 83)
 Site: Sec. 17-T5N-R63W (70 Ranch State BB18 PAD)
 Well: 70 Ranch State BB18-615
 Wellbore: Plan A
 Design: Actual Surveys



Platted SHL: 585' FSL, 800' FEL
 Platted Lat/Long: 40.393650, -104.453630
 Location: Sec. 17-T5N-R63W

~7" Casing: 1366' FEL, 310' FSL
 Lat/Long: 40.392888 N, -104.455645 W
 State Planes - CO Northern: 1,387,682.39 N, 3,290,887.60 E
 Sec. 17-T5N-R63W

Platted BHL: 312' FSL, 1' FWL
 Platted Lat/Long: 40.392801 N, 104.488729 W
 State Planes - CO Northern: 1,387,543.95 N, 3,281,673.35 E
 Location: Sec. 18-T5N-R63W



LEGEND	
	70 Ranch State BB18-615, Plan A, Rev A5 PROPOSAL V0
	Actual Surveys

WELL DETAILS: 70 Ranch State BB18-615	
Ground Level:	4646.00
KB = 24' @ 4670.00usft (H&P 343)	
Created By:	Tatiana Gomez
Created On:	8-3-15

Design Report for 70 Ranch State BB18-615 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
780.00	0.93	218.94	779.97	-4.91	-3.97	4.17	0.12
9 5/8"							
824.00	0.98	218.94	823.96	-5.48	-4.43	4.65	0.12
First Sperry MWD Survey at 824.00ft							
919.00	1.04	233.63	918.95	-6.62	-5.63	5.91	0.28
1,014.00	1.14	250.00	1,013.93	-7.46	-7.22	7.52	0.34
1,107.00	1.09	268.58	1,106.91	-7.80	-8.97	9.29	0.39
1,200.00	0.78	274.00	1,199.90	-7.77	-10.49	10.80	0.35
1,293.00	1.15	272.63	1,292.89	-7.69	-12.05	12.36	0.40
1,385.00	1.13	276.63	1,384.87	-7.54	-13.87	14.18	0.09
1,478.00	1.09	275.01	1,477.85	-7.36	-15.66	15.96	0.05
1,572.00	1.26	287.34	1,571.83	-6.97	-17.54	17.82	0.32
1,662.00	0.96	276.49	1,661.81	-6.59	-19.24	19.49	0.41
1,755.00	1.13	304.57	1,754.80	-5.98	-20.76	21.00	0.57
1,849.00	0.86	306.05	1,848.78	-5.04	-22.10	22.29	0.29
1,942.00	1.01	293.73	1,941.77	-4.30	-23.41	23.57	0.27
2,034.00	1.95	201.61	2,033.75	-5.43	-24.73	24.94	2.42
2,126.00	5.46	166.94	2,125.55	-11.15	-24.32	24.77	4.36
2,219.00	7.85	162.28	2,217.92	-21.51	-21.39	22.27	2.63
2,312.00	7.74	156.91	2,310.06	-33.32	-17.00	18.38	0.79
2,405.00	8.97	158.44	2,402.07	-45.83	-11.88	13.79	1.34
2,497.00	9.07	152.54	2,492.94	-58.93	-5.90	8.36	1.01
2,589.00	8.71	151.22	2,583.83	-71.47	0.80	2.20	0.45
2,682.00	8.54	148.42	2,675.78	-83.53	7.81	-4.30	0.49
2,775.00	8.71	145.85	2,767.73	-95.24	15.38	-11.37	0.45
2,869.00	9.07	155.28	2,860.60	-107.86	22.47	-17.93	1.59
2,964.00	9.01	153.18	2,954.42	-121.30	28.96	-23.85	0.35
3,058.00	8.72	149.27	3,047.30	-133.99	35.92	-30.27	0.71
3,153.00	8.43	155.96	3,141.24	-146.54	42.44	-36.26	1.09
3,248.00	8.56	152.15	3,235.20	-159.15	48.58	-41.86	0.61
3,342.00	7.34	163.26	3,328.30	-171.09	53.58	-46.36	2.08
3,437.00	7.32	157.87	3,422.53	-182.51	57.60	-49.90	0.72
3,531.00	7.18	157.75	3,515.77	-193.49	62.08	-53.92	0.15
3,626.00	8.19	157.95	3,609.92	-205.26	66.87	-58.21	1.06
3,721.00	8.24	157.42	3,703.94	-217.82	72.03	-62.83	0.10
3,815.00	8.04	156.58	3,797.00	-230.07	77.23	-67.51	0.25
3,910.00	7.83	156.38	3,891.09	-242.09	82.46	-72.24	0.22
4,004.00	7.13	157.51	3,984.29	-253.35	87.26	-76.56	0.76
4,099.00	4.89	157.63	4,078.76	-262.54	91.05	-79.97	2.36
4,194.00	3.00	152.71	4,173.53	-268.50	93.73	-82.40	2.02
4,288.00	2.85	106.68	4,267.42	-271.35	97.10	-85.64	2.44
4,383.00	2.53	76.67	4,362.32	-271.55	101.40	-89.93	1.50
4,478.00	2.71	26.86	4,457.23	-269.06	104.46	-93.09	2.33
4,572.00	0.78	300.41	4,551.19	-266.76	104.91	-93.64	2.95
4,667.00	0.97	251.42	4,646.18	-266.68	103.59	-92.32	0.79
4,762.00	1.05	251.62	4,741.17	-267.21	102.00	-90.71	0.08
4,857.00	1.16	255.52	4,836.15	-267.73	100.25	-88.94	0.14
4,951.00	1.14	248.03	4,930.13	-268.32	98.46	-87.12	0.16
5,046.00	1.21	248.44	5,025.11	-269.04	96.65	-85.29	0.07

Design Report for 70 Ranch State BB18-615 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,235.00	1.57	252.96	5,214.06	-270.53	92.32	-80.90	0.20
5,330.00	0.69	153.70	5,309.04	-271.43	91.33	-79.87	1.91
5,425.00	0.59	193.79	5,404.04	-272.41	91.46	-79.96	0.47
5,519.00	0.55	200.58	5,498.03	-273.31	91.19	-79.65	0.08
5,614.00	1.05	199.90	5,593.02	-274.55	90.73	-79.14	0.53
5,708.00	1.27	217.50	5,687.01	-276.19	89.80	-78.15	0.44
5,803.00	1.73	217.12	5,781.97	-278.17	88.30	-76.56	0.48
5,898.00	2.12	214.60	5,876.92	-280.76	86.44	-74.59	0.42
5,992.00	5.93	266.89	5,970.69	-282.45	80.60	-68.69	5.24
6,087.00	18.12	277.61	6,063.44	-280.75	60.98	-49.16	12.99
6,181.00	23.29	275.61	6,151.34	-277.00	27.97	-16.34	5.55
6,276.00	30.20	267.40	6,236.16	-276.25	-14.65	26.22	8.23
6,370.00	36.18	265.79	6,314.79	-279.36	-65.99	77.64	6.43
6,465.00	44.06	266.89	6,387.38	-283.22	-127.04	138.80	8.33
6,559.00	50.84	271.19	6,450.92	-284.23	-196.21	207.95	7.96
6,654.00	63.73	271.47	6,502.16	-282.37	-275.94	287.54	13.57
6,748.00	74.85	271.26	6,535.35	-280.28	-363.71	375.14	11.83
6,843.00	81.84	269.17	6,554.53	-279.96	-456.69	468.02	7.67
6,890.00	83.15	266.73	6,560.67	-281.62	-503.25	514.61	5.85
6,945.00	84.08	267.70	6,566.78	-284.28	-557.84	569.27	2.45
7"							
7,068.00	86.18	269.87	6,577.22	-286.87	-680.36	691.78	2.45
7,163.00	88.61	269.73	6,581.54	-287.20	-775.25	786.61	2.56
7,258.00	87.94	268.49	6,584.40	-288.67	-870.19	881.53	1.48
7,353.00	88.52	270.00	6,587.33	-289.92	-965.14	976.44	1.70
7,447.00	89.60	269.94	6,588.87	-289.97	-1,059.12	1,070.35	1.15
7,541.00	89.63	270.37	6,589.51	-289.72	-1,153.12	1,164.25	0.46
7,636.00	89.08	269.45	6,590.58	-289.87	-1,248.11	1,259.17	1.13
7,731.00	89.04	270.38	6,592.13	-290.01	-1,343.10	1,354.07	0.98
7,825.00	90.52	270.01	6,592.50	-289.69	-1,437.09	1,447.97	1.62
7,920.00	90.83	269.56	6,591.38	-290.05	-1,532.09	1,542.90	0.58
8,015.00	91.20	269.18	6,589.69	-291.09	-1,627.07	1,637.84	0.56
8,110.00	88.92	269.39	6,589.59	-292.28	-1,722.05	1,732.79	2.41
8,204.00	88.55	269.40	6,591.67	-293.27	-1,816.02	1,826.72	0.39
8,299.00	90.09	268.33	6,592.80	-295.15	-1,910.99	1,921.69	1.97
8,394.00	89.66	268.12	6,593.00	-298.09	-2,005.95	2,016.68	0.50
8,488.00	88.98	266.98	6,594.12	-302.11	-2,099.85	2,110.67	1.41
8,583.00	90.34	267.37	6,594.68	-306.79	-2,194.73	2,205.66	1.49
8,677.00	89.57	266.63	6,594.76	-311.71	-2,288.60	2,299.66	1.14
8,772.00	89.72	268.30	6,595.35	-315.91	-2,383.51	2,394.65	1.76
8,866.00	89.69	270.84	6,595.83	-316.62	-2,477.49	2,488.59	2.70
8,961.00	91.48	270.90	6,594.86	-315.18	-2,572.47	2,583.42	1.89
9,056.00	89.63	270.69	6,593.94	-313.86	-2,667.46	2,678.27	1.96
9,150.00	88.68	269.98	6,595.33	-313.31	-2,761.44	2,772.15	1.26
9,245.00	90.34	271.88	6,596.14	-311.77	-2,856.42	2,866.98	2.66
9,339.00	90.25	271.12	6,595.65	-309.31	-2,950.39	2,960.76	0.81
9,434.00	89.82	270.70	6,595.60	-307.80	-3,045.37	3,055.60	0.63
9,529.00	89.85	271.51	6,595.87	-305.97	-3,140.35	3,150.42	0.85
9,623.00	89.48	271.58	6,596.42	-303.43	-3,234.32	3,244.19	0.40
9,718.00	90.18	271.34	6,596.70	-301.01	-3,329.29	3,338.98	0.78
9,813.00	89.97	270.83	6,596.58	-299.21	-3,424.27	3,433.80	0.58

Design Report for 70 Ranch State BB18-615 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,908.00	89.41	271.08	6,597.09	-297.63	-3,519.25	3,528.64	0.65
10,002.00	90.43	270.03	6,597.22	-296.72	-3,613.25	3,622.51	1.56
10,097.00	90.34	269.88	6,596.58	-296.79	-3,708.24	3,717.43	0.18
10,192.00	89.88	269.40	6,596.40	-297.39	-3,803.24	3,812.36	0.70
10,287.00	88.98	269.27	6,597.35	-298.49	-3,898.23	3,907.32	0.96
10,381.00	89.69	268.62	6,598.44	-300.22	-3,992.21	4,001.28	1.02
10,474.00	90.80	268.34	6,598.04	-302.69	-4,085.17	4,094.27	1.23
10,567.00	90.37	268.19	6,597.09	-305.51	-4,178.12	4,187.26	0.49
10,660.00	90.71	268.43	6,596.21	-308.25	-4,271.08	4,280.25	0.45
10,752.00	90.34	267.77	6,595.37	-311.30	-4,363.02	4,372.24	0.82
10,846.00	89.41	267.48	6,595.58	-315.19	-4,456.94	4,466.24	1.04
10,939.00	88.83	267.29	6,597.00	-319.44	-4,549.83	4,559.22	0.66
11,029.00	89.94	267.32	6,597.97	-323.67	-4,639.73	4,649.22	1.23
11,122.00	89.45	267.31	6,598.47	-328.02	-4,732.62	4,742.21	0.53
11,216.00	91.32	268.21	6,597.83	-331.70	-4,826.54	4,836.21	2.21
11,309.00	90.92	268.18	6,596.02	-334.63	-4,919.48	4,929.18	0.43
11,402.00	90.18	267.31	6,595.12	-338.29	-5,012.40	5,022.18	1.23
11,493.00	89.48	266.61	6,595.39	-343.11	-5,103.27	5,113.17	1.09
11,586.00	90.03	269.46	6,595.79	-346.30	-5,196.21	5,206.16	3.12
11,680.00	90.06	269.32	6,595.72	-347.30	-5,290.20	5,300.11	0.15
11,772.00	89.26	268.98	6,596.26	-348.67	-5,382.19	5,392.07	0.94
11,864.00	88.80	268.46	6,597.82	-350.72	-5,474.15	5,484.04	0.75
11,956.00	90.06	269.69	6,598.74	-352.21	-5,566.13	5,576.00	1.91
12,050.00	88.89	268.87	6,599.60	-353.39	-5,660.12	5,669.96	1.52
12,143.00	89.72	268.25	6,600.72	-355.72	-5,753.08	5,762.94	1.11
12,236.00	90.89	269.36	6,600.23	-357.66	-5,846.06	5,855.91	1.73
12,330.00	90.80	269.60	6,598.84	-358.52	-5,940.04	5,949.85	0.27
12,425.00	89.88	269.19	6,598.28	-359.52	-6,035.03	6,044.80	1.06
12,520.00	89.05	268.96	6,599.17	-361.05	-6,130.02	6,139.76	0.91
12,614.00	89.54	270.37	6,600.32	-361.60	-6,224.01	6,233.69	1.59
12,709.00	90.80	269.55	6,600.04	-361.67	-6,319.00	6,328.61	1.58
12,804.00	90.65	269.81	6,598.84	-362.20	-6,413.99	6,423.54	0.32
12,898.00	90.86	269.64	6,597.60	-362.65	-6,507.98	6,517.46	0.29
12,993.00	90.59	269.71	6,596.40	-363.19	-6,602.97	6,612.39	0.29
13,087.00	89.97	268.84	6,595.94	-364.38	-6,696.96	6,706.35	1.14
13,182.00	88.89	268.16	6,596.88	-366.86	-6,791.93	6,801.33	1.34
13,277.00	89.91	268.96	6,597.88	-369.25	-6,886.89	6,896.31	1.36
13,372.00	89.57	269.77	6,598.31	-370.30	-6,981.88	6,991.27	0.92
13,466.00	90.37	270.52	6,598.36	-370.07	-7,075.88	7,085.17	1.17
13,561.00	89.51	270.37	6,598.46	-369.33	-7,170.87	7,180.05	0.92
13,656.00	88.71	270.70	6,599.93	-368.44	-7,265.86	7,274.92	0.91
13,750.00	88.98	269.17	6,601.83	-368.55	-7,359.84	7,368.82	1.65
13,845.00	89.26	268.93	6,603.29	-370.12	-7,454.81	7,463.77	0.39
13,940.00	90.15	268.08	6,603.78	-372.60	-7,549.78	7,558.76	1.30
14,034.00	91.97	268.62	6,602.04	-375.31	-7,643.72	7,652.73	2.02
14,129.00	91.45	268.22	6,599.20	-377.93	-7,738.64	7,747.68	0.69
14,224.00	91.54	268.12	6,596.73	-380.96	-7,833.56	7,842.64	0.14
14,318.00	90.62	269.88	6,594.95	-382.60	-7,927.52	7,936.59	2.11
14,413.00	90.80	269.41	6,593.78	-383.19	-8,022.51	8,031.52	0.53
14,508.00	90.12	270.67	6,593.01	-383.12	-8,117.51	8,126.43	1.51
14,602.00	90.06	270.40	6,592.87	-382.24	-8,211.50	8,220.31	0.29

Design Report for 70 Ranch State BB18-615 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
14,697.00	90.92	271.29	6,592.05	-380.84	-8,306.49	8,315.15	1.30
14,791.00	87.35	268.87	6,593.47	-380.71	-8,400.45	8,409.03	4.59
14,886.00	88.00	268.69	6,597.33	-382.73	-8,495.35	8,503.93	0.71
14,981.00	87.72	268.50	6,600.87	-385.06	-8,590.26	8,598.85	0.36
15,075.00	88.58	268.49	6,603.91	-387.53	-8,684.18	8,692.79	0.91
15,170.00	88.34	268.67	6,606.46	-389.88	-8,779.11	8,787.74	0.32
15,264.00	88.49	268.40	6,609.06	-392.28	-8,873.05	8,881.69	0.33
15,359.00	89.51	268.34	6,610.72	-394.98	-8,967.99	8,976.67	1.08
15,453.00	90.09	268.42	6,611.05	-397.64	-9,061.95	9,070.66	0.62
15,548.00	89.85	268.24	6,611.10	-400.41	-9,156.91	9,165.65	0.32
15,643.00	90.52	267.76	6,610.79	-403.73	-9,251.85	9,260.64	0.87
15,738.00	91.45	268.17	6,609.16	-407.10	-9,346.78	9,355.63	1.07
15,833.00	90.09	267.88	6,607.88	-410.37	-9,441.71	9,450.61	1.46
15,928.00	89.57	267.39	6,608.16	-414.29	-9,536.63	9,545.61	0.75
16,023.00	89.54	268.04	6,608.90	-418.08	-9,631.55	9,640.61	0.68
16,118.00	88.86	268.20	6,610.23	-421.20	-9,726.49	9,735.60	0.74
16,164.00	88.89	268.02	6,611.13	-422.71	-9,772.46	9,781.58	0.40
Final Sperry MWD Survey at 16164.00ft							
16,232.00	88.89	268.02	6,612.45	-425.06	-9,840.40	9,849.57	0.00
Stright Line Projection to TD at 16232.00ft							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
824.00	823.96	-5.48	-4.43	First Sperry MWD Survey at 824.00ft
16,164.00	6,611.13	-422.71	-9,772.46	Final Sperry MWD Survey at 16164.00ft
16,232.00	6,612.45	-425.06	-9,840.40	Stright Line Projection to TD at 16232.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	+E/-W (usft)	Start TVD (usft)
Target	70 Ranch State BB18-615_Rev A5_BHL	267.60	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
824.00	6,945.00	Intermediate Surveys	MWD
6,945.00	16,232.00	Production Surveys	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
780.00	779.97	9 5/8"	9-5/8	13-3/4
6,945.00	6,566.78	7"	7	8-3/4

Design Report for 70 Ranch State BB18-615 - Actual Surveys

Wellbore Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
70 Ranch State BB18- - actual wellpath misses target center by 0.02usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	0.02	0.00	1,387,966.67	3,291,445.41	40.393650	-104.453630
70 Ranch State BB18- - actual wellpath misses target center by 14.95usft at 16232.00usft MD (6612.45 TVD, -425.06 N, -9840.40 E) - Point	0.00	0.00	6,604.00	-412.93	-9,842.59	1,387,553.74	3,281,603.22	40.392830	-104.488980
70 Ranch State BB18- - actual wellpath misses target center by 14.95usft at 16232.00usft MD (6612.45 TVD, -425.06 N, -9840.40 E) - Point	0.00	0.00	6,604.00	-412.93	-9,842.59	1,387,553.74	3,281,603.22	40.392830	-104.488980
70 Ranch State BB18- - actual wellpath misses target center by 19.85usft at 16232.00usft MD (6612.45 TVD, -425.06 N, -9840.40 E) - Point	0.00	0.00	6,628.00	-412.93	-9,842.59	1,387,553.74	3,281,603.22	40.392830	-104.488980

Directional Difficulty Index

Average Dogleg over Survey:	1.45 °/100usft	Maximum Dogleg over Survey:	13.57 °/100usft at 6,654.00 usft
Net Tortousity applicable to Plans:	0.80 °/100usft	Directional Difficulty Index:	6.775

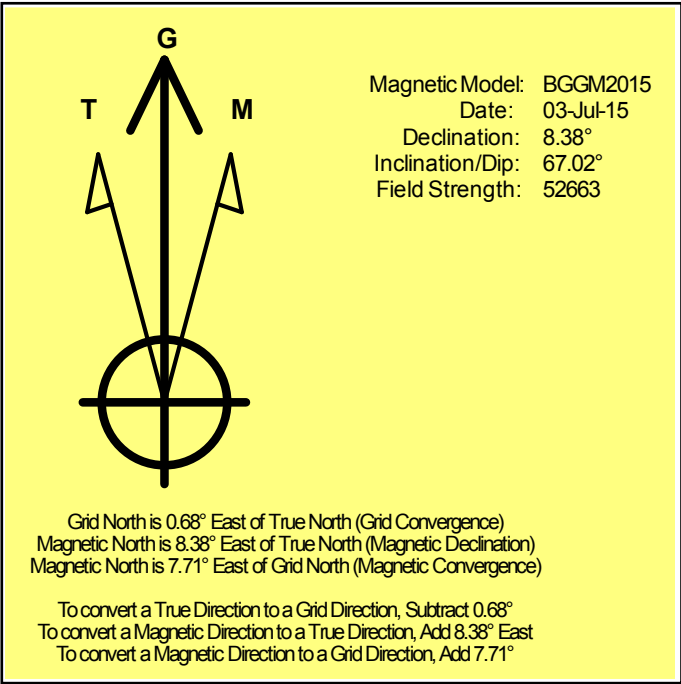
Audit Info

North Reference Sheet for Sec. 17-T5N-R63W (70 Ranch State BB18 PAD) - 70
Ranch State BB18-615 - Plan A

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.
Vertical Depths are relative to KB = 24' @ 4670.00usft (H&P 343). Northing and Easting are relative to 70 Ranch State BB18-615
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: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99995995

Grid Coordinates of Well: 1,387,966.65 usft N, 3,291,445.42 usft E
Geographical Coordinates of Well: 40° 23' 37.14" N, 104° 27' 13.07" W
Grid Convergence at Surface is: 0.68°

Based upon Minimum Curvature type calculations, at a Measured Depth of 16,232.00usft
the Bottom Hole Displacement is 9,849.58usft in the Direction of 267.53° (Grid).
Magnetic Convergence at surface is: -7.71° (3 July 2015, , BGGM2015)



Noble Energy

Weld County, CO (NAD 83)

Sec. 17-T5N-R63W (70 Ranch State BB18 PAD)

70 Ranch State BB18-615

Plan A

Design: Actual Surveys

Sperry Drilling Services

Geodetic Report

03 August, 2015

Well Coordinates: 1,387,966.65 N, 3,291,445.42 E (40° 23' 37.14" N, 104° 27' 13.07" W)

Ground Level: 4,646.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 73

Centered on Well 70 Ranch State BB18-615

KB = 24' @ 4670.00usft (H&P 343)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Design Report for 70 Ranch State BB18-615 - Actual Surveys

Measured			Vertical	Local Coordinates		Geographic Coordinates		UTM Coordinates	
Depth	Inclination	Azimuth	Depth	+N/-S	+E/-W	Latitude	Longitude	Northing	Easting
(usft)	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)
0.00	0.00	0.00	0.00	0.00	0.00	40.393650	-104.453630	1,387,966.65	3,291,445.42
780.00	0.93	218.94	779.97	-4.91	-3.97	40.393637	-104.453645	1,387,961.74	3,291,441.45
824.00	0.98	218.94	823.96	-5.48	-4.43	40.393635	-104.453646	1,387,961.17	3,291,440.99
919.00	1.04	233.63	918.95	-6.62	-5.63	40.393632	-104.453651	1,387,960.03	3,291,439.78
1,014.00	1.14	250.00	1,013.93	-7.46	-7.22	40.393630	-104.453656	1,387,959.19	3,291,438.20
1,107.00	1.09	268.58	1,106.91	-7.80	-8.97	40.393629	-104.453663	1,387,958.85	3,291,436.45
1,200.00	0.78	274.00	1,199.90	-7.77	-10.49	40.393629	-104.453668	1,387,958.88	3,291,434.93
1,293.00	1.15	272.63	1,292.89	-7.69	-12.05	40.393629	-104.453674	1,387,958.96	3,291,433.37
1,385.00	1.13	276.63	1,384.87	-7.54	-13.87	40.393630	-104.453680	1,387,959.11	3,291,431.54
1,478.00	1.09	275.01	1,477.85	-7.36	-15.66	40.393630	-104.453687	1,387,959.29	3,291,429.75
1,572.00	1.26	287.34	1,571.83	-6.97	-17.54	40.393631	-104.453694	1,387,959.68	3,291,427.87
1,662.00	0.96	276.49	1,661.81	-6.59	-19.24	40.393633	-104.453700	1,387,960.06	3,291,426.18
1,755.00	1.13	304.57	1,754.80	-5.98	-20.76	40.393634	-104.453705	1,387,960.67	3,291,424.65
1,849.00	0.86	306.05	1,848.78	-5.04	-22.10	40.393637	-104.453710	1,387,961.61	3,291,423.32
1,942.00	1.01	293.73	1,941.77	-4.30	-23.41	40.393639	-104.453714	1,387,962.35	3,291,422.00
2,034.00	1.95	201.61	2,033.75	-5.43	-24.73	40.393636	-104.453719	1,387,961.22	3,291,420.68
2,126.00	5.46	166.94	2,125.55	-11.15	-24.32	40.393620	-104.453718	1,387,955.50	3,291,421.10
2,219.00	7.85	162.28	2,217.92	-21.51	-21.39	40.393592	-104.453708	1,387,945.14	3,291,424.03
2,312.00	7.74	156.91	2,310.06	-33.32	-17.00	40.393559	-104.453693	1,387,933.33	3,291,428.42
2,405.00	8.97	158.44	2,402.07	-45.83	-11.88	40.393525	-104.453675	1,387,920.82	3,291,433.54
2,497.00	9.07	152.54	2,492.94	-58.93	-5.90	40.393488	-104.453654	1,387,907.72	3,291,439.52
2,589.00	8.71	151.22	2,583.83	-71.47	0.80	40.393454	-104.453630	1,387,895.18	3,291,446.22
2,682.00	8.54	148.42	2,675.78	-83.53	7.81	40.393421	-104.453606	1,387,883.13	3,291,453.22
2,775.00	8.71	145.85	2,767.73	-95.24	15.38	40.393388	-104.453579	1,387,871.42	3,291,460.79
2,869.00	9.07	155.28	2,860.60	-107.86	22.47	40.393353	-104.453554	1,387,858.80	3,291,467.89
2,964.00	9.01	153.18	2,954.42	-121.30	28.96	40.393316	-104.453531	1,387,845.36	3,291,474.37
3,058.00	8.72	149.27	3,047.30	-133.99	35.92	40.393281	-104.453507	1,387,832.66	3,291,481.33
3,153.00	8.43	155.96	3,141.24	-146.54	42.44	40.393246	-104.453484	1,387,820.11	3,291,487.85
3,248.00	8.56	152.15	3,235.20	-159.15	48.58	40.393212	-104.453463	1,387,807.50	3,291,493.99
3,342.00	7.34	163.26	3,328.30	-171.09	53.58	40.393179	-104.453445	1,387,795.57	3,291,498.99
3,437.00	7.32	157.87	3,422.53	-182.51	57.60	40.393147	-104.453431	1,387,784.15	3,291,503.02
3,531.00	7.18	157.75	3,515.77	-193.49	62.08	40.393117	-104.453416	1,387,773.17	3,291,507.50
3,626.00	8.19	157.95	3,609.92	-205.26	66.87	40.393085	-104.453399	1,387,761.40	3,291,512.28
3,721.00	8.24	157.42	3,703.94	-217.82	72.03	40.393050	-104.453381	1,387,748.84	3,291,517.44
3,815.00	8.04	156.58	3,797.00	-230.07	77.23	40.393016	-104.453363	1,387,736.59	3,291,522.64
3,910.00	7.83	156.38	3,891.09	-242.09	82.46	40.392983	-104.453345	1,387,724.57	3,291,527.87
4,004.00	7.13	157.51	3,984.29	-253.35	87.26	40.392952	-104.453328	1,387,713.31	3,291,532.67
4,099.00	4.89	157.63	4,078.76	-262.54	91.05	40.392926	-104.453315	1,387,704.12	3,291,536.46
4,194.00	3.00	152.71	4,173.53	-268.50	93.73	40.392910	-104.453305	1,387,698.16	3,291,539.14
4,288.00	2.85	106.68	4,267.42	-271.35	97.10	40.392902	-104.453293	1,387,695.31	3,291,542.51
4,383.00	2.53	76.67	4,362.32	-271.55	101.40	40.392901	-104.453278	1,387,695.11	3,291,546.81
4,478.00	2.71	26.86	4,457.23	-269.06	104.46	40.392908	-104.453267	1,387,697.60	3,291,549.87

Design Report for 70 Ranch State BB18-615 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
4,572.00	0.78	300.41	4,551.19	-266.76	104.91	40.392914	-104.453265	1,387,699.91	3,291,550.32
4,667.00	0.97	251.42	4,646.18	-266.68	103.59	40.392915	-104.453270	1,387,699.98	3,291,549.00
4,762.00	1.05	251.62	4,741.17	-267.21	102.00	40.392913	-104.453275	1,387,699.45	3,291,547.41
4,857.00	1.16	255.52	4,836.15	-267.73	100.25	40.392912	-104.453282	1,387,698.93	3,291,545.66
4,951.00	1.14	248.03	4,930.13	-268.32	98.46	40.392910	-104.453288	1,387,698.34	3,291,543.87
5,046.00	1.21	248.44	5,025.11	-269.04	96.65	40.392908	-104.453295	1,387,697.62	3,291,542.06
5,235.00	1.57	252.96	5,214.06	-270.53	92.32	40.392905	-104.453310	1,387,696.13	3,291,537.73
5,330.00	0.69	153.70	5,309.04	-271.43	91.33	40.392902	-104.453314	1,387,695.24	3,291,536.74
5,425.00	0.59	193.79	5,404.04	-272.41	91.46	40.392899	-104.453313	1,387,694.25	3,291,536.87
5,519.00	0.55	200.58	5,498.03	-273.31	91.19	40.392897	-104.453314	1,387,693.36	3,291,536.60
5,614.00	1.05	199.90	5,593.02	-274.55	90.73	40.392894	-104.453316	1,387,692.11	3,291,536.14
5,708.00	1.27	217.50	5,687.01	-276.19	89.80	40.392889	-104.453320	1,387,690.47	3,291,535.22
5,803.00	1.73	217.12	5,781.97	-278.17	88.30	40.392884	-104.453325	1,387,688.50	3,291,533.71
5,898.00	2.12	214.60	5,876.92	-280.76	86.44	40.392877	-104.453332	1,387,685.91	3,291,531.85
5,992.00	5.93	266.89	5,970.69	-282.45	80.60	40.392872	-104.453353	1,387,684.21	3,291,526.01
6,087.00	18.12	277.61	6,063.44	-280.75	60.98	40.392877	-104.453423	1,387,685.91	3,291,506.39
6,181.00	23.29	275.61	6,151.34	-277.00	27.97	40.392889	-104.453542	1,387,689.66	3,291,473.39
6,276.00	30.20	267.40	6,236.16	-276.25	-14.65	40.392892	-104.453695	1,387,690.42	3,291,430.76
6,370.00	36.18	265.79	6,314.79	-279.36	-65.99	40.392885	-104.453879	1,387,687.30	3,291,379.43
6,465.00	44.06	266.89	6,387.38	-283.22	-127.04	40.392877	-104.454098	1,387,683.45	3,291,318.38
6,559.00	50.84	271.19	6,450.92	-284.23	-196.21	40.392876	-104.454347	1,387,682.43	3,291,249.22
6,654.00	63.73	271.47	6,502.16	-282.37	-275.94	40.392884	-104.454633	1,387,684.29	3,291,169.48
6,748.00	74.85	271.26	6,535.35	-280.28	-363.71	40.392893	-104.454948	1,387,686.38	3,291,081.72
6,843.00	81.84	269.17	6,554.53	-279.96	-456.69	40.392896	-104.455282	1,387,686.71	3,290,988.75
6,890.00	83.15	266.73	6,560.67	-281.62	-503.25	40.392893	-104.455449	1,387,685.04	3,290,942.19
6,945.00	84.08	267.70	6,566.78	-284.28	-557.84	40.392888	-104.455645	1,387,682.39	3,290,887.60
7,068.00	86.18	269.87	6,577.22	-286.87	-680.36	40.392885	-104.456085	1,387,679.79	3,290,765.09
7,163.00	88.61	269.73	6,581.54	-287.20	-775.25	40.392887	-104.456425	1,387,679.46	3,290,670.20
7,258.00	87.94	268.49	6,584.40	-288.67	-870.19	40.392886	-104.456766	1,387,677.99	3,290,575.26
7,353.00	88.52	270.00	6,587.33	-289.92	-965.14	40.392885	-104.457107	1,387,676.74	3,290,480.32
7,447.00	89.60	269.94	6,588.87	-289.97	-1,059.12	40.392888	-104.457445	1,387,676.69	3,290,386.33
7,541.00	89.63	270.37	6,589.51	-289.72	-1,153.12	40.392892	-104.457782	1,387,676.94	3,290,292.34
7,636.00	89.08	269.45	6,590.58	-289.87	-1,248.11	40.392895	-104.458123	1,387,676.79	3,290,197.35
7,731.00	89.04	270.38	6,592.13	-290.01	-1,343.10	40.392897	-104.458464	1,387,676.65	3,290,102.37
7,825.00	90.52	270.01	6,592.50	-289.69	-1,437.09	40.392901	-104.458801	1,387,676.97	3,290,008.38
7,920.00	90.83	269.56	6,591.38	-290.05	-1,532.09	40.392903	-104.459142	1,387,676.62	3,289,913.39
8,015.00	91.20	269.18	6,589.69	-291.09	-1,627.07	40.392904	-104.459483	1,387,675.57	3,289,818.41
8,110.00	88.92	269.39	6,589.59	-292.28	-1,722.05	40.392903	-104.459824	1,387,674.39	3,289,723.43
8,204.00	88.55	269.40	6,591.67	-293.27	-1,816.02	40.392904	-104.460162	1,387,673.39	3,289,629.46
8,299.00	90.09	268.33	6,592.80	-295.15	-1,910.99	40.392902	-104.460503	1,387,671.51	3,289,534.50
8,394.00	89.66	268.12	6,593.00	-298.09	-2,005.95	40.392897	-104.460844	1,387,668.57	3,289,439.55
8,488.00	88.98	266.98	6,594.12	-302.11	-2,099.85	40.392889	-104.461181	1,387,664.55	3,289,345.65

Design Report for 70 Ranch State BB18-615 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
8,583.00	90.34	267.37	6,594.68	-306.79	-2,194.73	40.392879	-104.461522	1,387,659.87	3,289,250.77
8,677.00	89.57	266.63	6,594.76	-311.71	-2,288.60	40.392868	-104.461859	1,387,654.95	3,289,156.90
8,772.00	89.72	268.30	6,595.35	-315.91	-2,383.51	40.392860	-104.462200	1,387,650.75	3,289,062.00
8,866.00	89.69	270.84	6,595.83	-316.62	-2,477.49	40.392861	-104.462537	1,387,650.04	3,288,968.02
8,961.00	91.48	270.90	6,594.86	-315.18	-2,572.47	40.392868	-104.462878	1,387,651.49	3,288,873.04
9,056.00	89.63	270.69	6,593.94	-313.86	-2,667.46	40.392875	-104.463219	1,387,652.80	3,288,778.07
9,150.00	88.68	269.98	6,595.33	-313.31	-2,761.44	40.392879	-104.463556	1,387,653.35	3,288,684.08
9,245.00	90.34	271.88	6,596.14	-311.77	-2,856.42	40.392886	-104.463897	1,387,654.90	3,288,589.11
9,339.00	90.25	271.12	6,595.65	-309.31	-2,950.39	40.392896	-104.464235	1,387,657.36	3,288,495.15
9,434.00	89.82	270.70	6,595.60	-307.80	-3,045.37	40.392903	-104.464575	1,387,658.87	3,288,400.16
9,529.00	89.85	271.51	6,595.87	-305.97	-3,140.35	40.392911	-104.464916	1,387,660.70	3,288,305.19
9,623.00	89.48	271.58	6,596.42	-303.43	-3,234.32	40.392921	-104.465254	1,387,663.23	3,288,211.23
9,718.00	90.18	271.34	6,596.70	-301.01	-3,329.29	40.392931	-104.465594	1,387,665.65	3,288,116.26
9,813.00	89.97	270.83	6,596.58	-299.21	-3,424.27	40.392939	-104.465935	1,387,667.45	3,288,021.28
9,908.00	89.41	271.08	6,597.09	-297.63	-3,519.25	40.392946	-104.466276	1,387,669.03	3,287,926.30
10,002.00	90.43	270.03	6,597.22	-296.72	-3,613.25	40.392952	-104.466614	1,387,669.94	3,287,832.31
10,097.00	90.34	269.88	6,596.58	-296.79	-3,708.24	40.392955	-104.466955	1,387,669.87	3,287,737.32
10,192.00	89.88	269.40	6,596.40	-297.39	-3,803.24	40.392956	-104.467296	1,387,669.27	3,287,642.33
10,287.00	88.98	269.27	6,597.35	-298.49	-3,898.23	40.392956	-104.467637	1,387,668.17	3,287,547.34
10,381.00	89.69	268.62	6,598.44	-300.22	-3,992.21	40.392954	-104.467974	1,387,666.44	3,287,453.37
10,474.00	90.80	268.34	6,598.04	-302.69	-4,085.17	40.392951	-104.468308	1,387,663.97	3,287,360.41
10,567.00	90.37	268.19	6,597.09	-305.51	-4,178.12	40.392946	-104.468642	1,387,661.16	3,287,267.46
10,660.00	90.71	268.43	6,596.21	-308.25	-4,271.08	40.392941	-104.468975	1,387,658.42	3,287,174.51
10,752.00	90.34	267.77	6,595.37	-311.30	-4,363.02	40.392936	-104.469306	1,387,655.37	3,287,082.57
10,846.00	89.41	267.48	6,595.58	-315.19	-4,456.94	40.392928	-104.469643	1,387,651.47	3,286,988.65
10,939.00	88.83	267.29	6,597.00	-319.44	-4,549.83	40.392919	-104.469977	1,387,647.23	3,286,895.76
11,029.00	89.94	267.32	6,597.97	-323.67	-4,639.73	40.392911	-104.470299	1,387,643.00	3,286,805.87
11,122.00	89.45	267.31	6,598.47	-328.02	-4,732.62	40.392902	-104.470633	1,387,638.64	3,286,712.98
11,216.00	91.32	268.21	6,597.83	-331.70	-4,826.54	40.392895	-104.470970	1,387,634.97	3,286,619.06
11,309.00	90.92	268.18	6,596.02	-334.63	-4,919.48	40.392890	-104.471304	1,387,632.04	3,286,526.13
11,402.00	90.18	267.31	6,595.12	-338.29	-5,012.40	40.392882	-104.471638	1,387,628.38	3,286,433.21
11,493.00	89.48	266.61	6,595.39	-343.11	-5,103.27	40.392872	-104.471964	1,387,623.55	3,286,342.35
11,586.00	90.03	269.46	6,595.79	-346.30	-5,196.21	40.392866	-104.472298	1,387,620.36	3,286,249.42
11,680.00	90.06	269.32	6,595.72	-347.30	-5,290.20	40.392867	-104.472636	1,387,619.36	3,286,155.43
11,772.00	89.26	268.98	6,596.26	-348.67	-5,382.19	40.392866	-104.472966	1,387,618.00	3,286,063.44
11,864.00	88.80	268.46	6,597.82	-350.72	-5,474.15	40.392863	-104.473296	1,387,615.94	3,285,971.48
11,956.00	90.06	269.69	6,598.74	-352.21	-5,566.13	40.392862	-104.473626	1,387,614.46	3,285,879.51
12,050.00	88.89	268.87	6,599.60	-353.39	-5,660.12	40.392862	-104.473964	1,387,613.28	3,285,785.52
12,143.00	89.72	268.25	6,600.72	-355.72	-5,753.08	40.392858	-104.474298	1,387,610.94	3,285,692.56
12,236.00	90.89	269.36	6,600.23	-357.66	-5,846.06	40.392856	-104.474631	1,387,609.00	3,285,599.59
12,330.00	90.80	269.60	6,598.84	-358.52	-5,940.04	40.392856	-104.474969	1,387,608.15	3,285,505.61
12,425.00	89.88	269.19	6,598.28	-359.52	-6,035.03	40.392857	-104.475310	1,387,607.15	3,285,410.62

Design Report for 70 Ranch State BB18-615 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
12,520.00	89.05	268.96	6,599.17	-361.05	-6,130.02	40.392856	-104.475651	1,387,605.61	3,285,315.64
12,614.00	89.54	270.37	6,600.32	-361.60	-6,224.01	40.392857	-104.475988	1,387,605.06	3,285,221.66
12,709.00	90.80	269.55	6,600.04	-361.67	-6,319.00	40.392860	-104.476329	1,387,605.00	3,285,126.67
12,804.00	90.65	269.81	6,598.84	-362.20	-6,413.99	40.392861	-104.476670	1,387,604.47	3,285,031.68
12,898.00	90.86	269.64	6,597.60	-362.65	-6,507.98	40.392863	-104.477008	1,387,604.02	3,284,937.69
12,993.00	90.59	269.71	6,596.40	-363.19	-6,602.97	40.392865	-104.477349	1,387,603.48	3,284,842.71
13,087.00	89.97	268.84	6,595.94	-364.38	-6,696.96	40.392864	-104.477686	1,387,602.29	3,284,748.72
13,182.00	88.89	268.16	6,596.88	-366.86	-6,791.93	40.392861	-104.478027	1,387,599.80	3,284,653.76
13,277.00	89.91	268.96	6,597.88	-369.25	-6,886.89	40.392857	-104.478368	1,387,597.41	3,284,558.80
13,372.00	89.57	269.77	6,598.31	-370.30	-6,981.88	40.392857	-104.478709	1,387,596.36	3,284,463.81
13,466.00	90.37	270.52	6,598.36	-370.07	-7,075.88	40.392861	-104.479047	1,387,596.60	3,284,369.82
13,561.00	89.51	270.37	6,598.46	-369.33	-7,170.87	40.392866	-104.479388	1,387,597.34	3,284,274.83
13,656.00	88.71	270.70	6,599.93	-368.44	-7,265.86	40.392871	-104.479729	1,387,598.22	3,284,179.85
13,750.00	88.98	269.17	6,601.83	-368.55	-7,359.84	40.392874	-104.480066	1,387,598.12	3,284,085.87
13,845.00	89.26	268.93	6,603.29	-370.12	-7,454.81	40.392873	-104.480407	1,387,596.54	3,283,990.90
13,940.00	90.15	268.08	6,603.78	-372.60	-7,549.78	40.392869	-104.480748	1,387,594.06	3,283,895.94
14,034.00	91.97	268.62	6,602.04	-375.31	-7,643.72	40.392864	-104.481085	1,387,591.36	3,283,802.00
14,129.00	91.45	268.22	6,599.20	-377.93	-7,738.64	40.392860	-104.481426	1,387,588.74	3,283,707.09
14,224.00	91.54	268.12	6,596.73	-380.96	-7,833.56	40.392855	-104.481767	1,387,585.71	3,283,612.17
14,318.00	90.62	269.88	6,594.95	-382.60	-7,927.52	40.392853	-104.482104	1,387,584.07	3,283,518.21
14,413.00	90.80	269.41	6,593.78	-383.19	-8,022.51	40.392855	-104.482445	1,387,583.48	3,283,423.22
14,508.00	90.12	270.67	6,593.01	-383.12	-8,117.51	40.392858	-104.482786	1,387,583.55	3,283,328.23
14,602.00	90.06	270.40	6,592.87	-382.24	-8,211.50	40.392863	-104.483124	1,387,584.42	3,283,234.24
14,697.00	90.92	271.29	6,592.05	-380.84	-8,306.49	40.392870	-104.483465	1,387,585.82	3,283,139.26
14,791.00	87.35	268.87	6,593.47	-380.71	-8,400.45	40.392873	-104.483802	1,387,585.96	3,283,045.30
14,886.00	88.00	268.69	6,597.33	-382.73	-8,495.35	40.392871	-104.484143	1,387,583.93	3,282,950.40
14,981.00	87.72	268.50	6,600.87	-385.06	-8,590.26	40.392867	-104.484484	1,387,581.61	3,282,855.50
15,075.00	88.58	268.49	6,603.91	-387.53	-8,684.18	40.392863	-104.484821	1,387,579.14	3,282,761.59
15,170.00	88.34	268.67	6,606.46	-389.88	-8,779.11	40.392860	-104.485162	1,387,576.79	3,282,666.65
15,264.00	88.49	268.40	6,609.06	-392.28	-8,873.05	40.392856	-104.485499	1,387,574.38	3,282,572.72
15,359.00	89.51	268.34	6,610.72	-394.98	-8,967.99	40.392852	-104.485840	1,387,571.68	3,282,477.78
15,453.00	90.09	268.42	6,611.05	-397.64	-9,061.95	40.392848	-104.486177	1,387,569.03	3,282,383.83
15,548.00	89.85	268.24	6,611.10	-400.41	-9,156.91	40.392843	-104.486518	1,387,566.26	3,282,288.87
15,643.00	90.52	267.76	6,610.79	-403.73	-9,251.85	40.392837	-104.486859	1,387,562.94	3,282,193.93
15,738.00	91.45	268.17	6,609.16	-407.10	-9,346.78	40.392831	-104.487200	1,387,559.57	3,282,099.01
15,833.00	90.09	267.88	6,607.88	-410.37	-9,441.71	40.392825	-104.487541	1,387,556.30	3,282,004.08
15,928.00	89.57	267.39	6,608.16	-414.29	-9,536.63	40.392817	-104.487882	1,387,552.38	3,281,909.17
16,023.00	89.54	268.04	6,608.90	-418.08	-9,631.55	40.392809	-104.488223	1,387,548.59	3,281,814.25
16,118.00	88.86	268.20	6,610.23	-421.20	-9,726.49	40.392804	-104.488564	1,387,545.47	3,281,719.32
16,164.00	88.89	268.02	6,611.13	-422.71	-9,772.46	40.392801	-104.488729	1,387,543.95	3,281,673.35
16,232.00	88.89	268.02	6,612.45	-425.06	-9,840.40	40.392797	-104.488973	1,387,541.61	3,281,605.41

Design Report for 70 Ranch State BB18-615 - Actual Surveys

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
824.00	823.96	-5.48	-4.43	First Sperry MWD Survey at 824.00ft
16,164.00	6,611.13	-422.71	-9,772.46	Final Sperry MWD Survey at 16164.00ft
16,232.00	6,612.45	-425.06	-9,840.40	Striaght Line Projection to TD at 16232.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
Target	70 Ranch State BB18-615_Rev A5_BHL	267.60	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
824.00	6,945.00	Intermediate Surveys	MWD
6,945.00	16,232.00	Production Surveys	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
780.00	779.97	9 5/8"	9-5/8	13-3/4
6,945.00	6,566.78	7"	7	8-3/4

Design Targets

Shape	Target Name	TVD ()	Northing ()	Easting ()	+N/-S	+E/-W	Created	Updated
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Design Report for 70 Ranch State BB18-615 - Actual Surveys

Directional Difficulty Index

Average Dogleg over Survey: 1.45 °/100usft

Maximum Dogleg over Survey: 13.57 °/100usft at 6,654.00
usft

Net Tortosity applicable to Plans: 0.80 °/100usft

Directional Difficulty Index: 6.775

Audit Info

North Reference Sheet for Sec. 17-T5N-R63W (70 Ranch State BB18 PAD) - 70 Ranch State BB18-615 - Plan**A**

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

Vertical Depths are relative to KB = 24' @ 4670.00usft (H&P 343). Northing and Easting are relative to 70 Ranch State BB18-615

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: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99995995

Grid Coordinates of Well: 1,387,966.65 usft N, 3,291,445.42 usft E

Geographical Coordinates of Well: 40° 23' 37.14" N, 104° 27' 13.07" W

Grid Convergence at Surface is: 0.68°

Based upon Minimum Curvature type calculations, at a Measured Depth of 16,232.00usft

the Bottom Hole Displacement is 9,849.58usft in the Direction of 267.53° (Grid).

Magnetic Convergence at surface is: -7.71° (3 July 2015, , BGGM2015)

