

Noble Energy

Weld County, CO (NAD 83)

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

70 Ranch BB18-622

05-123-41539

Plan A

Design: Actual Surveys

Sperry Drilling Services

Final Survey Report

05 August, 2015

Surface UWI : 05-123-41539

Well Coordinates: 1,388,003.03 N, 3,291,442.20 E (40° 23' 37.50" N, 104° 27' 13.10" W)

Ground Level: 4,647.00 usft

Local Coordinate Origin:

Centered on Well 70 Ranch BB18-622

Viewing Datum:

KB = 24' @ 4671.00usft (H&P 343)

TVDs to System:

N

North Reference:

Grid

Unit System:

Dec-Deg - API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 5000.1 Build: 73

HALLIBURTON

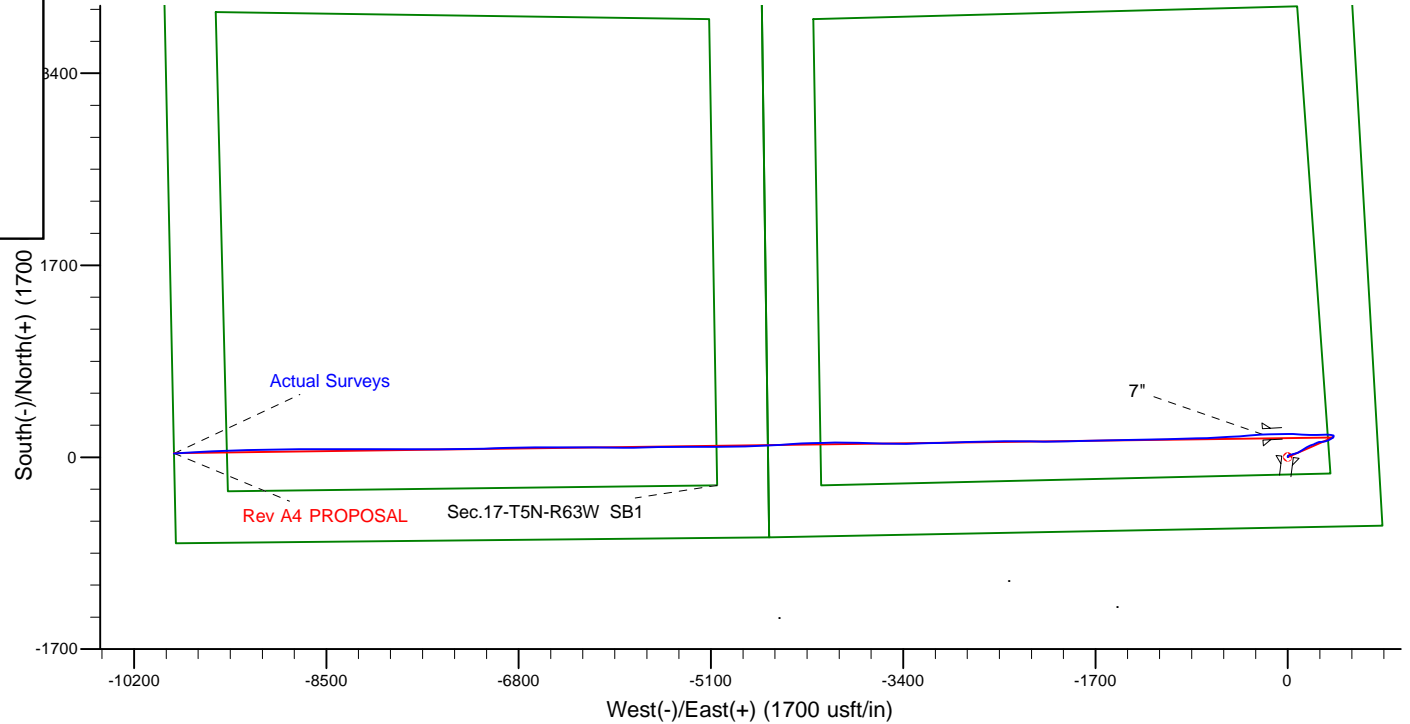
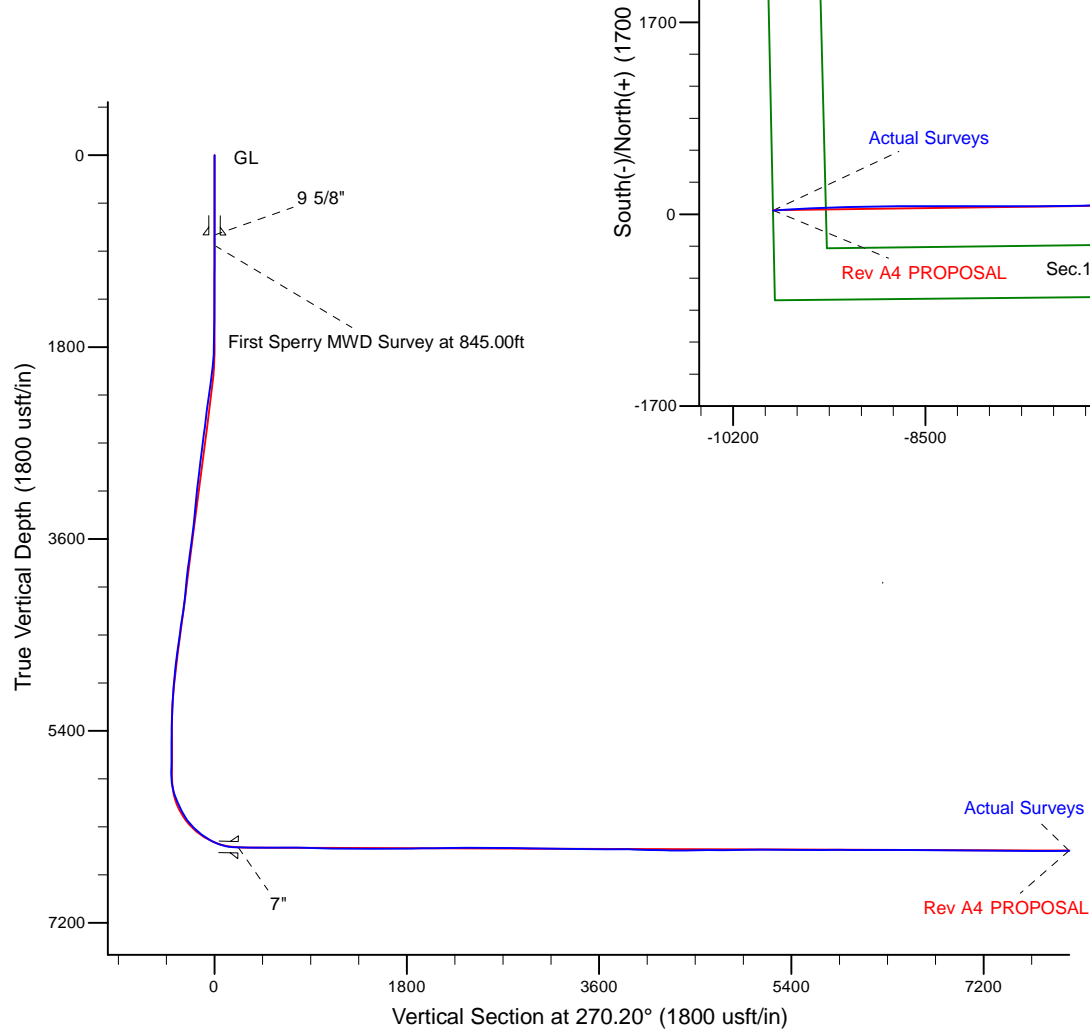
Project: Weld County, CO (NAD 83)
 Site: Sec. 17-T5N-R63W (70 Ranch State BB18 PAD)
 Well: 70 Ranch BB18-622
 Wellbore: Plan A
 Design: Actual Surveys



Platted SHL: 622' FSL, 800' FEL
 Platted Lat/Long: 40.393750, -104.453640
 Location: Sec. 17-T5N-R63W

~7" Casing: 1003' FEL, 834' FSL
 Lat/Long: 40.394309 N, -104.454423 W
 State Planes - CO Northern: 1,388,204.00 N, 3,291,221.77 E
 Sec. 17-T5N-R63W

Platted BHL: 797' FSL, 1' FWL
 Platted Lat/Long: 40.394160 N, -104.4890 W
 State Planes - CO Northern: 1,388,039.54 N, 3,281,662.74 E
 Location: Sec. 18-T5N-R63W



LEGEND	
	70 Ranch BB18-622, Plan A, Rev A4 PROPOSAL V0
	Actual Surveys

WELL DETAILS: 70 Ranch BB18-622	
Ground Level:	4647.00
KB = 24' @ 4671.00usft (H&P 343)	
Created By:	Tatiana Gomez
Created On:	8/5/2015

Design Report for 70 Ranch BB18-622 - 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
1.68	0.00	7.50	1.68	0.00	0.00	0.00	0.00
Peterson Champlin K Unit 1 (OSW)							
748.00	0.46	7.50	747.99	2.98	0.39	-0.38	0.06
9 5/8"							
845.00	0.52	7.50	844.99	3.80	0.50	-0.49	0.06
First Sperry MWD Survey at 845.00ft							
940.00	0.52	11.07	939.98	4.65	0.64	-0.62	0.03
1,034.00	0.65	14.50	1,033.98	5.59	0.85	-0.84	0.14
1,127.00	0.71	16.00	1,126.97	6.65	1.15	-1.12	0.07
1,220.00	0.81	25.88	1,219.96	7.80	1.59	-1.56	0.18
1,313.00	0.89	22.29	1,312.95	9.06	2.15	-2.12	0.10
1,406.00	0.86	17.51	1,405.94	10.39	2.64	-2.60	0.08
1,499.00	0.91	18.05	1,498.93	11.76	3.08	-3.03	0.05
1,683.00	0.79	21.48	1,682.91	14.33	3.99	-3.94	0.07
1,776.00	0.66	30.68	1,775.90	15.39	4.50	-4.45	0.19
1,869.00	4.42	71.27	1,868.80	17.00	8.17	-8.11	4.24
1,962.00	6.51	71.26	1,961.37	19.84	16.56	-16.49	2.25
2,146.00	6.88	79.08	2,144.12	25.28	37.26	-37.17	0.53
2,240.00	8.60	75.30	2,237.26	28.13	49.58	-49.48	1.91
2,333.00	8.27	75.61	2,329.26	31.56	62.79	-62.67	0.36
2,425.00	8.06	74.05	2,420.32	34.97	75.40	-75.27	0.33
2,517.00	7.28	69.43	2,511.50	38.80	87.06	-86.92	1.08
2,610.00	8.53	58.38	2,603.62	44.48	98.45	-98.29	2.11
2,796.00	8.31	55.42	2,787.62	59.34	121.26	-121.05	0.26
2,890.00	8.58	61.09	2,880.60	66.59	132.99	-132.75	0.93
2,984.00	7.91	58.60	2,973.63	73.35	144.65	-144.39	0.81
3,079.00	7.08	57.75	3,067.81	79.88	155.18	-154.90	0.88
3,174.00	7.67	58.43	3,162.03	86.32	165.54	-165.23	0.63
3,268.00	5.97	58.28	3,255.36	92.18	175.04	-174.71	1.81
3,363.00	6.13	66.14	3,349.83	96.83	183.88	-183.53	0.89
3,552.00	7.41	71.43	3,537.51	104.79	204.66	-204.29	0.75
3,646.00	7.82	69.85	3,630.68	108.92	216.41	-216.02	0.49
3,741.00	8.33	67.82	3,724.74	113.75	228.85	-228.45	0.61
3,836.00	8.49	66.85	3,818.72	119.10	241.67	-241.25	0.23
3,930.00	7.52	66.24	3,911.80	124.31	253.68	-253.24	1.04
4,120.00	5.36	63.62	4,100.59	133.26	273.01	-272.54	1.15
4,214.00	6.57	87.00	4,194.10	135.49	282.32	-281.83	2.86
4,309.00	8.95	89.40	4,288.22	135.86	295.14	-294.65	2.53
4,404.00	9.02	86.53	4,382.05	136.38	309.96	-309.47	0.48
4,498.00	7.78	77.02	4,475.05	138.26	323.52	-323.02	1.98
4,688.00	8.31	69.74	4,663.18	145.90	348.93	-348.41	0.60
4,783.00	7.02	65.11	4,757.33	150.72	360.64	-360.10	1.50
4,877.00	6.67	62.53	4,850.66	155.66	370.69	-370.13	0.50
5,067.00	4.78	56.29	5,039.71	165.14	387.07	-386.48	1.05
5,161.00	3.96	53.89	5,133.43	169.23	392.95	-392.34	0.89
5,351.00	1.97	50.96	5,323.17	175.15	400.79	-400.16	1.05
5,445.00	2.27	25.49	5,417.11	177.85	402.84	-402.21	1.04
5,540.00	1.89	12.49	5,512.05	181.08	403.99	-403.34	0.64
5,634.00	2.10	12.02	5,605.99	184.28	404.69	-404.03	0.22

Design Report for 70 Ranch BB18-622 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,729.00	1.64	346.96	5,700.94	187.30	404.74	-404.07	0.98
5,824.00	2.43	27.27	5,795.88	190.42	405.36	-404.68	1.67
5,918.00	6.35	285.15	5,889.68	193.55	401.25	-400.55	7.72
6,013.00	19.33	277.95	5,982.11	197.12	380.51	-379.81	13.74
6,107.00	23.06	269.19	6,069.76	199.01	346.68	-345.97	5.20
6,202.00	26.83	267.82	6,155.88	197.93	306.64	-305.93	4.01
6,296.00	36.08	268.38	6,235.98	196.34	257.66	-256.96	9.85
6,391.00	44.93	272.03	6,308.15	196.74	196.05	-195.34	9.64
6,485.00	54.16	273.82	6,369.08	200.46	124.70	-123.98	9.92
6,580.00	59.00	271.70	6,421.39	204.23	45.53	-44.80	5.42
6,627.00	63.94	270.60	6,443.83	205.05	4.26	-3.53	10.71
6,804.00	85.84	268.33	6,489.70	203.29	-165.56	166.29	12.43
6,859.00	88.49	266.84	6,492.42	200.98	-220.44	221.16	5.52
7"							
6,879.00	89.45	266.30	6,492.78	199.78	-240.40	241.11	5.52
6,974.00	89.60	264.78	6,493.57	192.39	-335.11	335.79	1.61
7,068.00	89.91	265.53	6,493.97	184.45	-428.77	429.43	0.86
7,163.00	90.22	267.58	6,493.86	178.75	-523.59	524.23	2.18
7,258.00	90.03	267.33	6,493.65	174.53	-618.50	619.12	0.33
7,353.00	90.28	267.16	6,493.40	169.96	-713.39	713.99	0.32
7,447.00	88.34	268.75	6,494.53	166.61	-807.32	807.90	2.67
7,541.00	87.94	268.48	6,497.58	164.34	-901.24	901.82	0.51
7,636.00	88.31	268.05	6,500.69	161.46	-996.14	996.71	0.60
7,731.00	89.05	268.84	6,502.88	158.88	-1,091.08	1,091.64	1.14
7,826.00	88.95	269.53	6,504.54	157.53	-1,186.06	1,186.61	0.73
7,920.00	90.28	268.78	6,505.17	156.15	-1,280.04	1,280.59	1.62
8,015.00	90.15	268.54	6,504.81	153.93	-1,375.02	1,375.56	0.29
8,110.00	89.97	267.97	6,504.71	151.03	-1,469.97	1,470.50	0.63
8,204.00	90.46	269.37	6,504.36	148.85	-1,563.94	1,564.46	1.58
8,299.00	90.80	268.67	6,503.31	147.23	-1,658.92	1,659.44	0.82
8,394.00	89.91	268.68	6,502.73	145.03	-1,753.89	1,754.40	0.94
8,488.00	90.31	268.73	6,502.54	142.90	-1,847.87	1,848.37	0.43
8,583.00	91.05	268.62	6,501.42	140.71	-1,942.84	1,943.33	0.79
8,677.00	90.25	269.25	6,500.35	138.96	-2,036.81	2,037.30	1.08
8,772.00	90.95	269.19	6,499.36	137.67	-2,131.80	2,132.28	0.74
8,867.00	90.06	271.38	6,498.52	138.14	-2,226.79	2,227.27	2.49
8,961.00	90.74	271.20	6,497.86	140.26	-2,320.76	2,321.25	0.75
9,056.00	89.51	270.24	6,497.66	141.45	-2,415.75	2,416.24	1.64
9,150.00	90.18	270.01	6,497.91	141.66	-2,509.75	2,510.24	0.75
9,245.00	90.09	268.14	6,497.69	140.12	-2,604.73	2,605.21	1.97
9,339.00	89.72	268.96	6,497.84	137.74	-2,698.70	2,699.17	0.96
9,434.00	90.62	268.22	6,497.56	135.41	-2,793.67	2,794.13	1.23
9,529.00	88.21	268.07	6,498.53	132.33	-2,888.61	2,889.06	2.54
9,623.00	88.37	268.26	6,501.33	129.32	-2,982.52	2,982.96	0.26
9,718.00	88.86	268.87	6,503.63	126.94	-3,077.46	3,077.89	0.82
9,813.00	88.95	268.46	6,505.45	124.73	-3,172.42	3,172.84	0.44
9,908.00	89.38	268.09	6,506.83	121.87	-3,267.36	3,267.78	0.60
10,003.00	89.01	268.69	6,508.17	119.20	-3,362.32	3,362.72	0.74
10,097.00	88.98	270.42	6,509.81	118.47	-3,456.29	3,456.69	1.84
10,192.00	89.88	271.12	6,510.76	119.75	-3,551.28	3,551.68	1.20
10,286.00	90.03	271.13	6,510.83	121.60	-3,645.26	3,645.67	0.16

Design Report for 70 Ranch BB18-622 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
10,380.00	90.92	272.28	6,510.05	124.39	-3,739.21	3,739.63	1.55
10,474.00	89.38	271.70	6,509.81	127.66	-3,833.15	3,833.58	1.75
10,567.00	88.15	270.22	6,511.81	129.21	-3,926.11	3,926.55	2.07
10,660.00	87.94	269.33	6,514.98	128.85	-4,019.06	4,019.49	0.98
10,752.00	89.01	268.50	6,517.43	127.11	-4,111.01	4,111.43	1.47
10,845.00	88.61	268.83	6,519.36	124.94	-4,203.96	4,204.38	0.56
10,939.00	89.66	266.57	6,520.78	121.17	-4,297.87	4,298.27	2.65
11,029.00	90.71	266.54	6,520.49	115.76	-4,387.70	4,388.09	1.17
11,122.00	90.83	266.62	6,519.24	110.21	-4,480.53	4,480.89	0.16
11,216.00	89.41	267.41	6,519.05	105.32	-4,574.40	4,574.75	1.73
11,309.00	89.63	267.66	6,519.83	101.32	-4,667.31	4,667.64	0.36
11,401.00	90.71	268.16	6,519.55	97.96	-4,759.25	4,759.57	1.29
11,493.00	91.72	268.36	6,517.60	95.17	-4,851.18	4,851.49	1.12
11,586.00	90.12	269.30	6,516.11	93.27	-4,944.15	4,944.45	2.00
11,679.00	90.46	269.93	6,515.64	92.65	-5,037.14	5,037.44	0.77
11,771.00	91.11	268.96	6,514.38	91.76	-5,129.13	5,129.42	1.27
11,864.00	90.59	270.66	6,513.00	91.45	-5,222.11	5,222.41	1.91
11,956.00	88.74	270.18	6,513.54	92.12	-5,314.10	5,314.40	2.08
12,049.00	88.58	270.18	6,515.71	92.42	-5,407.08	5,407.37	0.17
12,142.00	89.51	268.54	6,517.26	91.38	-5,500.06	5,500.35	2.03
12,236.00	89.72	267.98	6,517.89	88.52	-5,594.01	5,594.29	0.64
12,331.00	90.89	268.89	6,517.39	85.93	-5,688.97	5,689.24	1.56
12,425.00	90.68	269.68	6,516.10	84.75	-5,782.95	5,783.22	0.87
12,520.00	89.11	270.26	6,516.27	84.71	-5,877.95	5,878.22	1.76
12,614.00	89.42	270.11	6,517.48	85.01	-5,971.94	5,972.21	0.37
12,709.00	89.72	270.39	6,518.19	85.42	-6,066.94	6,067.20	0.43
12,804.00	90.12	270.24	6,518.32	85.95	-6,161.94	6,162.20	0.45
12,898.00	90.28	270.16	6,518.00	86.27	-6,255.94	6,256.20	0.19
12,993.00	90.92	270.38	6,517.00	86.72	-6,350.93	6,351.20	0.71
13,088.00	90.46	269.97	6,515.86	87.01	-6,445.92	6,446.19	0.65
13,182.00	89.45	269.90	6,515.93	86.90	-6,539.92	6,540.19	1.08
13,277.00	89.60	269.50	6,516.72	86.41	-6,634.91	6,635.18	0.45
13,372.00	89.63	269.45	6,517.36	85.54	-6,729.91	6,730.17	0.06
13,466.00	88.46	269.24	6,518.92	84.46	-6,823.89	6,824.15	1.26
13,561.00	89.14	267.89	6,520.91	82.08	-6,918.83	6,919.08	1.59
13,656.00	89.63	267.67	6,521.93	78.40	-7,013.76	7,013.99	0.57
13,750.00	89.20	268.85	6,522.89	75.55	-7,107.71	7,107.93	1.34
13,845.00	90.03	269.00	6,523.53	73.77	-7,202.69	7,202.90	0.89
13,939.00	90.25	269.36	6,523.30	72.42	-7,296.68	7,296.89	0.45
14,034.00	90.62	268.69	6,522.58	70.81	-7,391.66	7,391.87	0.81
14,129.00	89.08	270.30	6,522.83	69.97	-7,486.65	7,486.85	2.35
14,224.00	89.08	270.21	6,524.35	70.39	-7,581.64	7,581.84	0.09
14,318.00	89.45	269.63	6,525.56	70.26	-7,675.63	7,675.83	0.73
14,413.00	89.42	269.52	6,526.50	69.56	-7,770.62	7,770.82	0.12
14,508.00	90.74	270.72	6,526.36	69.75	-7,865.62	7,865.82	1.88
14,602.00	91.17	269.81	6,524.80	70.19	-7,959.60	7,959.80	1.07
14,697.00	89.20	270.40	6,524.49	70.36	-8,054.60	8,054.80	2.16
14,791.00	89.69	270.74	6,525.40	71.30	-8,148.59	8,148.79	0.63
14,886.00	90.25	270.02	6,525.45	71.93	-8,243.58	8,243.79	0.96
14,980.00	90.68	269.46	6,524.69	71.50	-8,337.58	8,337.78	0.75
15,075.00	89.75	270.18	6,524.33	71.20	-8,432.58	8,432.78	1.24

Design Report for 70 Ranch BB18-622 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
15,170.00	89.78	269.92	6,524.72	71.29	-8,527.57	8,527.77	0.28
15,264.00	89.88	269.49	6,525.00	70.80	-8,621.57	8,621.77	0.47
15,359.00	90.06	269.69	6,525.05	70.12	-8,716.57	8,716.77	0.28
15,455.00	90.06	269.50	6,524.95	69.44	-8,812.57	8,812.76	0.20
15,548.00	90.37	269.53	6,524.60	68.66	-8,905.56	8,905.75	0.33
15,643.00	89.35	268.64	6,524.83	67.14	-9,000.55	9,000.73	1.42
15,738.00	90.03	268.93	6,525.35	65.13	-9,095.53	9,095.70	0.78
15,833.00	90.09	268.50	6,525.25	63.00	-9,190.50	9,190.67	0.46
15,928.00	89.78	268.15	6,525.36	60.22	-9,285.46	9,285.62	0.49
16,023.00	90.15	267.71	6,525.41	56.79	-9,380.40	9,380.54	0.61
16,118.00	90.40	267.34	6,524.96	52.68	-9,475.31	9,475.44	0.47
16,213.00	90.59	267.12	6,524.14	48.09	-9,570.19	9,570.30	0.31
16,308.00	90.68	266.72	6,523.08	42.99	-9,665.05	9,665.14	0.43
16,403.00	90.96	266.86	6,521.72	37.67	-9,759.89	9,759.96	0.33
16,423.00	91.11	266.49	6,521.36	36.51	-9,779.85	9,779.92	2.00
16,491.00	91.11	266.49	6,520.05	32.35	-9,847.71	9,847.77	0.00
70 Ranch BB18-622_Rev A4_BHL - 70 Ranch BB18-622_Rev A3_BHL - 70 Ranch BB18-622_Rev A2_BHL_NO - 70 Ranch							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
845.00	844.99	3.80	0.50	First Sperry MWD Survey at 845.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	+E/-W (usft)	Start TVD (usft)
Target	70 Ranch BB18-622_Rev A4_BHL	270.20	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
845.00	6,627.00	Intermediate Surveys	MWD
6,674.00	0.00	Production Surveys	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
748.00	747.99	9 5/8"	9-5/8	13-3/4
6,859.00	6,492.42	7"	7	8-3/4

Design Report for 70 Ranch BB18-622 - 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 BB18-622_F - actual wellpath misses target center by 0.03usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	0.03	0.00	1,388,003.06	3,291,442.20	40.393750	-104.453640
Peterson Champlin K l - actual wellpath misses target center by 608.55usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Circle (radius 100.00)	0.00	0.00	0.00	471.31	-384.96	1,388,474.33	3,291,057.25	40.395056	-104.455002
70 Ranch BB18-622_F - actual wellpath misses target center by 4.05usft at 16491.00usft MD (6520.05 TVD, 32.35 N, -9847.71 E) - Point	0.00	0.00	6,519.00	35.13	-9,850.47	1,388,038.16	3,281,592.13	40.394160	-104.489000
70 Ranch BB18-622_F - actual wellpath misses target center by 8.87usft at 16491.00usft MD (6520.05 TVD, 32.35 N, -9847.71 E) - Point	0.00	0.00	6,528.00	35.13	-9,850.47	1,388,038.16	3,281,592.13	40.394160	-104.489000
70 Ranch BB18-622_F - actual wellpath misses target center by 16.43usft at 16491.00usft MD (6520.05 TVD, 32.35 N, -9847.71 E) - Point	0.00	0.00	6,536.00	35.13	-9,850.47	1,388,038.16	3,281,592.13	40.394160	-104.489000
70 Ranch BB18-622_F - actual wellpath misses target center by 58.09usft at 16491.00usft MD (6520.05 TVD, 32.35 N, -9847.71 E) - Point	0.00	0.00	6,578.00	35.13	-9,850.47	1,388,038.16	3,281,592.13	40.394160	-104.489000
70 Ranch BB18-622_F - actual wellpath misses target center by 58.09usft at 16491.00usft MD (6520.05 TVD, 32.35 N, -9847.71 E) - Point	0.00	0.00	6,578.00	35.13	-9,850.47	1,388,038.16	3,281,592.13	40.394160	-104.489000

Directional Difficulty Index

Average Dogleg over Survey:	1.41 °/100usft	Maximum Dogleg over Survey:	13.74 °/100usft at 6,013.00 usft
Net Tortousity applicable to Plans:	0.77 °/100usft	Directional Difficulty Index:	6.801

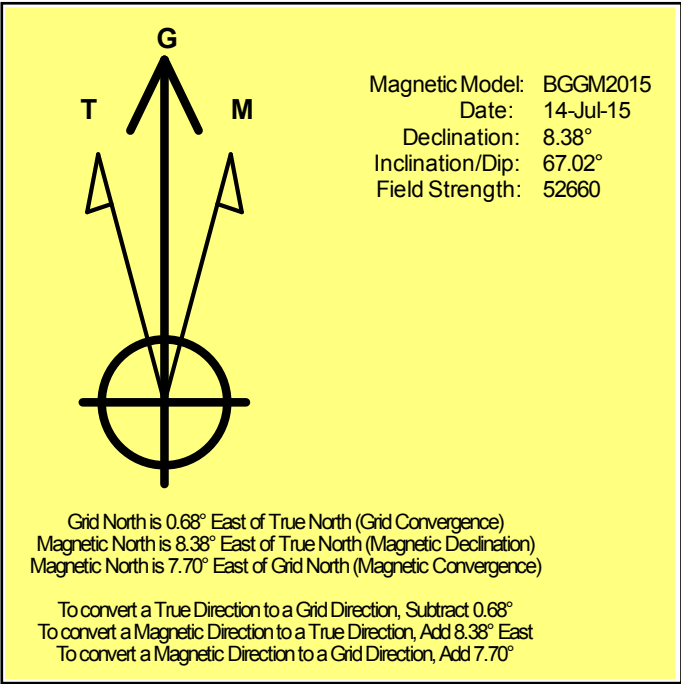
Audit Info

North Reference Sheet for Sec. 17-T5N-R63W (70 Ranch State BB18 PAD) - 70
Ranch BB18-622 - 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' @ 4671.00usft (H&P 343). Northing and Easting are relative to 70 Ranch BB18-622
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: 1,388,003.03 usft N, 3,291,442.20 usft E
Geographical Coordinates of Well: 40° 23' 37.50" N, 104° 27' 13.10" W
Grid Convergence at Surface is: 0.68°

Based upon Minimum Curvature type calculations, at a Measured Depth of 16,491.00usft
the Bottom Hole Displacement is 9,847.77usft in the Direction of 270.19° (Grid).
Magnetic Convergence at surface is: -7.70° (14 July 2015, , BGGM2015)



Noble Energy

Weld County, CO (NAD 83)

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

70 Ranch BB18-622

05-123-41539

Plan A

Design: Actual Surveys

Sperry Drilling Services

Geodetic Report

05 August, 2015

Well Coordinates: 1,388,003.03 N, 3,291,442.20 E (40° 23' 37.50" N, 104° 27' 13.10" W)

Ground Level: 4,647.00 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 BB18-622

KB = 24' @ 4671.00usft (H&P 343)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Design Report for 70 Ranch BB18-622 - Actual Surveys

Measured			Vertical			Local Coordinates		Geographic Coordinates		UTM Coordinates	
Depth (usft)	Inclination (°)	Azimuth (°)	Depth (usft)	+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
0.00	0.00	0.00	0.00	0.00	0.00	40.393750	-104.453640	40.393750	-104.453640	1,388,003.03	3,291,442.20
1.68	0.00	7.50	1.68	0.00	0.00	40.393750	-104.453640	40.393750	-104.453640	1,388,003.03	3,291,442.20
748.00	0.46	7.50	747.99	2.98	0.39	40.393758	-104.453639	40.393758	-104.453639	1,388,006.01	3,291,442.59
845.00	0.52	7.50	844.99	3.80	0.50	40.393760	-104.453638	40.393760	-104.453638	1,388,006.83	3,291,442.70
940.00	0.52	11.07	939.98	4.65	0.64	40.393763	-104.453638	40.393763	-104.453638	1,388,007.68	3,291,442.84
1,034.00	0.65	14.50	1,033.98	5.59	0.85	40.393765	-104.453637	40.393765	-104.453637	1,388,008.62	3,291,443.06
1,127.00	0.71	16.00	1,126.97	6.65	1.15	40.393768	-104.453636	40.393768	-104.453636	1,388,009.68	3,291,443.35
1,220.00	0.81	25.88	1,219.96	7.80	1.59	40.393771	-104.453634	40.393771	-104.453634	1,388,010.83	3,291,443.79
1,313.00	0.89	22.29	1,312.95	9.06	2.15	40.393775	-104.453632	40.393775	-104.453632	1,388,012.09	3,291,444.35
1,406.00	0.86	17.51	1,405.94	10.39	2.64	40.393778	-104.453630	40.393778	-104.453630	1,388,013.42	3,291,444.84
1,499.00	0.91	18.05	1,498.93	11.76	3.08	40.393782	-104.453629	40.393782	-104.453629	1,388,014.79	3,291,445.28
1,683.00	0.79	21.48	1,682.91	14.33	3.99	40.393789	-104.453625	40.393789	-104.453625	1,388,017.36	3,291,446.19
1,776.00	0.66	30.68	1,775.90	15.39	4.50	40.393792	-104.453623	40.393792	-104.453623	1,388,018.42	3,291,446.70
1,869.00	4.42	71.27	1,868.80	17.00	8.17	40.393796	-104.453610	40.393796	-104.453610	1,388,020.03	3,291,450.37
1,962.00	6.51	71.26	1,961.37	19.84	16.56	40.393804	-104.453580	40.393804	-104.453580	1,388,022.87	3,291,458.76
2,146.00	6.88	79.08	2,144.12	25.28	37.26	40.393818	-104.453505	40.393818	-104.453505	1,388,028.31	3,291,479.45
2,240.00	8.60	75.30	2,237.26	28.13	49.58	40.393826	-104.453461	40.393826	-104.453461	1,388,031.16	3,291,491.78
2,333.00	8.27	75.61	2,329.26	31.56	62.79	40.393835	-104.453414	40.393835	-104.453414	1,388,034.59	3,291,504.99
2,425.00	8.06	74.05	2,420.32	34.97	75.40	40.393844	-104.453368	40.393844	-104.453368	1,388,038.01	3,291,517.60
2,517.00	7.28	69.43	2,511.50	38.80	87.06	40.393854	-104.453326	40.393854	-104.453326	1,388,041.83	3,291,529.25
2,610.00	8.53	58.38	2,603.62	44.48	98.45	40.393869	-104.453285	40.393869	-104.453285	1,388,047.51	3,291,540.64
2,796.00	8.31	55.42	2,787.62	59.34	121.26	40.393909	-104.453202	40.393909	-104.453202	1,388,062.37	3,291,563.46
2,890.00	8.58	61.09	2,880.60	66.59	132.99	40.393928	-104.453160	40.393928	-104.453160	1,388,069.62	3,291,575.19
2,984.00	7.91	58.60	2,973.63	73.35	144.65	40.393947	-104.453118	40.393947	-104.453118	1,388,076.38	3,291,586.85
3,079.00	7.08	57.75	3,067.81	79.88	155.18	40.393964	-104.453080	40.393964	-104.453080	1,388,082.91	3,291,597.38
3,174.00	7.67	58.43	3,162.03	86.32	165.54	40.393982	-104.453042	40.393982	-104.453042	1,388,089.35	3,291,607.73
3,268.00	5.97	58.28	3,255.36	92.18	175.04	40.393997	-104.453008	40.393997	-104.453008	1,388,095.21	3,291,617.23
3,363.00	6.13	66.14	3,349.83	96.83	183.88	40.394010	-104.452976	40.394010	-104.452976	1,388,099.85	3,291,626.07
3,552.00	7.41	71.43	3,537.51	104.79	204.66	40.394031	-104.452901	40.394031	-104.452901	1,388,107.82	3,291,646.86
3,646.00	7.82	69.85	3,630.68	108.92	216.41	40.394042	-104.452859	40.394042	-104.452859	1,388,111.95	3,291,658.60
3,741.00	8.33	67.82	3,724.74	113.75	228.85	40.394055	-104.452814	40.394055	-104.452814	1,388,116.77	3,291,671.04
3,836.00	8.49	66.85	3,818.72	119.10	241.67	40.394069	-104.452768	40.394069	-104.452768	1,388,122.13	3,291,683.86
3,930.00	7.52	66.24	3,911.80	124.31	253.68	40.394083	-104.452724	40.394083	-104.452724	1,388,127.34	3,291,695.87
4,120.00	5.36	63.62	4,100.59	133.26	273.01	40.394107	-104.452655	40.394107	-104.452655	1,388,136.29	3,291,715.20
4,214.00	6.57	87.00	4,194.10	135.49	282.32	40.394113	-104.452621	40.394113	-104.452621	1,388,138.52	3,291,724.51
4,309.00	8.95	89.40	4,288.22	135.86	295.14	40.394113	-104.452575	40.394113	-104.452575	1,388,138.88	3,291,737.33
4,404.00	9.02	86.53	4,382.05	136.38	309.96	40.394114	-104.452522	40.394114	-104.452522	1,388,139.41	3,291,752.15
4,498.00	7.78	77.02	4,475.05	138.26	323.52	40.394119	-104.452473	40.394119	-104.452473	1,388,141.29	3,291,765.70
4,688.00	8.31	69.74	4,663.18	145.90	348.93	40.394139	-104.452381	40.394139	-104.452381	1,388,148.93	3,291,791.12
4,783.00	7.02	65.11	4,757.33	150.72	360.64	40.394152	-104.452339	40.394152	-104.452339	1,388,153.75	3,291,802.82
4,877.00	6.67	62.53	4,850.66	155.66	370.69	40.394165	-104.452303	40.394165	-104.452303	1,388,158.69	3,291,812.88
5,067.00	4.78	56.29	5,039.71	165.14	387.07	40.394191	-104.452244	40.394191	-104.452244	1,388,168.17	3,291,829.25

Design Report for 70 Ranch BB18-622 - 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)
5,161.00	3.96	53.89	5,133.43	169.23	392.95	40.394202	-104.452222	1,388,172.26	3,291,835.13
5,351.00	1.97	50.96	5,323.17	175.15	400.79	40.394218	-104.452194	1,388,178.18	3,291,842.97
5,445.00	2.27	25.49	5,417.11	177.85	402.84	40.394225	-104.452187	1,388,180.88	3,291,845.03
5,540.00	1.89	12.49	5,512.05	181.08	403.99	40.394234	-104.452182	1,388,184.11	3,291,846.18
5,634.00	2.10	12.02	5,605.99	184.28	404.69	40.394243	-104.452180	1,388,187.30	3,291,846.87
5,729.00	1.64	346.96	5,700.94	187.30	404.74	40.394251	-104.452179	1,388,190.33	3,291,846.92
5,824.00	2.43	27.27	5,795.88	190.42	405.36	40.394260	-104.452177	1,388,193.44	3,291,847.54
5,918.00	6.35	285.15	5,889.68	193.55	401.25	40.394268	-104.452192	1,388,196.58	3,291,843.43
6,013.00	19.33	277.95	5,982.11	197.12	380.51	40.394279	-104.452266	1,388,200.14	3,291,822.70
6,107.00	23.06	269.19	6,069.76	199.01	346.68	40.394285	-104.452387	1,388,202.03	3,291,788.86
6,202.00	26.83	267.82	6,155.88	197.93	306.64	40.394283	-104.452531	1,388,200.95	3,291,748.82
6,296.00	36.08	268.38	6,235.98	196.34	257.66	40.394281	-104.452707	1,388,199.36	3,291,699.85
6,391.00	44.93	272.03	6,308.15	196.74	196.05	40.394284	-104.452928	1,388,199.76	3,291,638.24
6,485.00	54.16	273.82	6,369.08	200.46	124.70	40.394296	-104.453184	1,388,203.48	3,291,566.89
6,580.00	59.00	271.70	6,421.39	204.23	45.53	40.394309	-104.453468	1,388,207.26	3,291,487.73
6,627.00	63.94	270.60	6,443.83	205.05	4.26	40.394313	-104.453616	1,388,208.08	3,291,446.46
6,804.00	85.84	268.33	6,489.70	203.29	-165.56	40.394313	-104.454226	1,388,206.32	3,291,276.64
6,859.00	88.49	266.84	6,492.42	200.98	-220.44	40.394309	-104.454423	1,388,204.00	3,291,221.77
6,879.00	89.45	266.30	6,492.78	199.78	-240.40	40.394306	-104.454495	1,388,202.80	3,291,201.81
6,974.00	89.60	264.78	6,493.57	192.39	-335.11	40.394289	-104.454835	1,388,195.42	3,291,107.11
7,068.00	89.91	265.53	6,493.97	184.45	-428.77	40.394270	-104.455172	1,388,187.48	3,291,013.45
7,163.00	90.22	267.58	6,493.86	178.75	-523.59	40.394258	-104.455512	1,388,181.77	3,290,918.63
7,258.00	90.03	267.33	6,493.65	174.53	-618.50	40.394249	-104.455853	1,388,177.55	3,290,823.72
7,353.00	90.28	267.16	6,493.40	169.96	-713.39	40.394240	-104.456194	1,388,172.99	3,290,728.84
7,447.00	88.34	268.75	6,494.53	166.61	-807.32	40.394233	-104.456531	1,388,169.63	3,290,634.92
7,541.00	87.94	268.48	6,497.58	164.34	-901.24	40.394230	-104.456869	1,388,167.36	3,290,541.00
7,636.00	88.31	268.05	6,500.69	161.46	-996.14	40.394225	-104.457209	1,388,164.49	3,290,446.10
7,731.00	89.05	268.84	6,502.88	158.88	-1,091.08	40.394221	-104.457550	1,388,161.91	3,290,351.16
7,826.00	88.95	269.53	6,504.54	157.53	-1,186.06	40.394221	-104.457891	1,388,160.56	3,290,256.19
7,920.00	90.28	268.78	6,505.17	156.15	-1,280.04	40.394220	-104.458229	1,388,159.17	3,290,162.21
8,015.00	90.15	268.54	6,504.81	153.93	-1,375.02	40.394217	-104.458570	1,388,156.95	3,290,067.24
8,110.00	89.97	267.97	6,504.71	151.03	-1,469.97	40.394212	-104.458911	1,388,154.06	3,289,972.29
8,204.00	90.46	269.37	6,504.36	148.85	-1,563.94	40.394209	-104.459248	1,388,151.88	3,289,878.32
8,299.00	90.80	268.67	6,503.31	147.23	-1,658.92	40.394208	-104.459589	1,388,150.25	3,289,783.34
8,394.00	89.91	268.68	6,502.73	145.03	-1,753.89	40.394205	-104.459930	1,388,148.06	3,289,688.38
8,488.00	90.31	268.73	6,502.54	142.90	-1,847.87	40.394202	-104.460268	1,388,145.93	3,289,594.40
8,583.00	91.05	268.62	6,501.42	140.71	-1,942.84	40.394199	-104.460609	1,388,143.74	3,289,499.44
8,677.00	90.25	269.25	6,500.35	138.96	-2,036.81	40.394197	-104.460946	1,388,141.99	3,289,405.47
8,772.00	90.95	269.19	6,499.36	137.67	-2,131.80	40.394197	-104.461287	1,388,140.70	3,289,310.49
8,867.00	90.06	271.38	6,498.52	138.14	-2,226.79	40.394201	-104.461628	1,388,141.17	3,289,215.50
8,961.00	90.74	271.20	6,497.86	140.26	-2,320.76	40.394210	-104.461965	1,388,143.28	3,289,121.53
9,056.00	89.51	270.24	6,497.66	141.45	-2,415.75	40.394216	-104.462306	1,388,144.48	3,289,026.55

Design Report for 70 Ranch BB18-622 - 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)
9,150.00	90.18	270.01	6,497.91	141.66	-2,509.75	40.394220	-104.462644	1,388,144.68	3,288,932.55
9,245.00	90.09	268.14	6,497.69	140.12	-2,604.73	40.394219	-104.462985	1,388,143.15	3,288,837.57
9,339.00	89.72	268.96	6,497.84	137.74	-2,698.70	40.394215	-104.463322	1,388,140.77	3,288,743.61
9,434.00	90.62	268.22	6,497.56	135.41	-2,793.67	40.394212	-104.463663	1,388,138.43	3,288,648.64
9,529.00	88.21	268.07	6,498.53	132.33	-2,888.61	40.394206	-104.464004	1,388,135.36	3,288,553.71
9,623.00	88.37	268.26	6,501.33	129.32	-2,982.52	40.394201	-104.464342	1,388,132.35	3,288,459.80
9,718.00	88.86	268.87	6,503.63	126.94	-3,077.46	40.394198	-104.464682	1,388,129.97	3,288,364.86
9,813.00	88.95	268.46	6,505.45	124.73	-3,172.42	40.394195	-104.465023	1,388,127.76	3,288,269.91
9,908.00	89.38	268.09	6,506.83	121.87	-3,267.36	40.394190	-104.465364	1,388,124.90	3,288,174.97
10,003.00	89.01	268.69	6,508.17	119.20	-3,362.32	40.394185	-104.465705	1,388,122.23	3,288,080.02
10,097.00	88.98	270.42	6,509.81	118.47	-3,456.29	40.394186	-104.466043	1,388,121.50	3,287,986.04
10,192.00	89.88	271.12	6,510.76	119.75	-3,551.28	40.394193	-104.466384	1,388,122.78	3,287,891.06
10,286.00	90.03	271.13	6,510.83	121.60	-3,645.26	40.394201	-104.466721	1,388,124.62	3,287,797.09
10,380.00	90.92	272.28	6,510.05	124.39	-3,739.21	40.394212	-104.467058	1,388,127.42	3,287,703.14
10,474.00	89.38	271.70	6,509.81	127.66	-3,833.15	40.394224	-104.467395	1,388,130.68	3,287,609.20
10,567.00	88.15	270.22	6,511.81	129.21	-3,926.11	40.394231	-104.467729	1,388,132.24	3,287,516.24
10,660.00	87.94	269.33	6,514.98	128.85	-4,019.06	40.394233	-104.468063	1,388,131.88	3,287,423.30
10,752.00	89.01	268.50	6,517.43	127.11	-4,111.01	40.394231	-104.468393	1,388,130.14	3,287,331.36
10,845.00	88.61	268.83	6,519.36	124.94	-4,203.96	40.394228	-104.468726	1,388,127.97	3,287,238.41
10,939.00	89.66	266.57	6,520.78	121.17	-4,297.87	40.394221	-104.469064	1,388,124.20	3,287,144.50
11,029.00	90.71	266.54	6,520.49	115.76	-4,387.70	40.394209	-104.469386	1,388,118.79	3,287,054.67
11,122.00	90.83	266.62	6,519.24	110.21	-4,480.53	40.394197	-104.469720	1,388,113.24	3,286,961.85
11,216.00	89.41	267.41	6,519.05	105.32	-4,574.40	40.394186	-104.470057	1,388,108.35	3,286,867.98
11,309.00	89.63	267.66	6,519.83	101.32	-4,667.31	40.394178	-104.470391	1,388,104.35	3,286,775.08
11,401.00	90.71	268.16	6,519.55	97.96	-4,759.25	40.394172	-104.470721	1,388,100.99	3,286,683.14
11,493.00	91.72	268.36	6,517.60	95.17	-4,851.18	40.394167	-104.471051	1,388,098.20	3,286,591.21
11,586.00	90.12	269.30	6,516.11	93.27	-4,944.15	40.394165	-104.471385	1,388,096.30	3,286,498.25
11,679.00	90.46	269.93	6,515.64	92.65	-5,037.14	40.394166	-104.471719	1,388,095.68	3,286,405.26
11,771.00	91.11	268.96	6,514.38	91.76	-5,129.13	40.394167	-104.472049	1,388,094.79	3,286,313.28
11,864.00	90.59	270.66	6,513.00	91.45	-5,222.11	40.394169	-104.472383	1,388,094.48	3,286,220.30
11,956.00	88.74	270.18	6,513.54	92.12	-5,314.10	40.394173	-104.472713	1,388,095.15	3,286,128.31
12,049.00	88.58	270.18	6,515.71	92.42	-5,407.08	40.394177	-104.473047	1,388,095.44	3,286,035.34
12,142.00	89.51	268.54	6,517.26	91.38	-5,500.06	40.394177	-104.473381	1,388,094.41	3,285,942.36
12,236.00	89.72	267.98	6,517.89	88.52	-5,594.01	40.394172	-104.473718	1,388,091.55	3,285,848.41
12,331.00	90.89	268.89	6,517.39	85.93	-5,688.97	40.394168	-104.474059	1,388,088.96	3,285,753.46
12,425.00	90.68	269.68	6,516.10	84.75	-5,782.95	40.394168	-104.474396	1,388,087.78	3,285,659.48
12,520.00	89.11	270.26	6,516.27	84.71	-5,877.95	40.394171	-104.474738	1,388,087.73	3,285,564.49
12,614.00	89.42	270.11	6,517.48	85.01	-5,971.94	40.394175	-104.475075	1,388,088.04	3,285,470.50
12,709.00	89.72	270.39	6,518.19	85.42	-6,066.94	40.394179	-104.475416	1,388,088.45	3,285,375.51
12,804.00	90.12	270.24	6,518.32	85.95	-6,161.94	40.394183	-104.475757	1,388,088.97	3,285,280.51
12,898.00	90.28	270.16	6,518.00	86.27	-6,255.94	40.394187	-104.476094	1,388,089.30	3,285,186.52
12,993.00	90.92	270.38	6,517.00	86.72	-6,350.93	40.394191	-104.476435	1,388,089.75	3,285,091.53

Design Report for 70 Ranch BB18-622 - 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)
13,088.00	90.46	269.97	6,515.86	87.01	-6,445.92	40.394195	-104.476776	1,388,090.04	3,284,996.54
13,182.00	89.45	269.90	6,515.93	86.90	-6,539.92	40.394198	-104.477114	1,388,089.93	3,284,902.54
13,277.00	89.60	269.50	6,516.72	86.41	-6,634.91	40.394200	-104.477455	1,388,089.44	3,284,807.55
13,372.00	89.63	269.45	6,517.36	85.54	-6,729.91	40.394200	-104.477796	1,388,088.57	3,284,712.56
13,466.00	88.46	269.24	6,518.92	84.46	-6,823.89	40.394200	-104.478133	1,388,087.49	3,284,618.59
13,561.00	89.14	267.89	6,520.91	82.08	-6,918.83	40.394197	-104.478474	1,388,085.11	3,284,523.64
13,656.00	89.63	267.67	6,521.93	78.40	-7,013.76	40.394190	-104.478815	1,388,081.43	3,284,428.72
13,750.00	89.20	268.85	6,522.89	75.55	-7,107.71	40.394185	-104.479153	1,388,078.58	3,284,334.78
13,845.00	90.03	269.00	6,523.53	73.77	-7,202.69	40.394183	-104.479494	1,388,076.80	3,284,239.80
13,939.00	90.25	269.36	6,523.30	72.42	-7,296.68	40.394182	-104.479831	1,388,075.45	3,284,145.82
14,034.00	90.62	268.69	6,522.58	70.81	-7,391.66	40.394181	-104.480172	1,388,073.84	3,284,050.84
14,129.00	89.08	270.30	6,522.83	69.97	-7,486.65	40.394181	-104.480513	1,388,073.00	3,283,955.85
14,224.00	89.08	270.21	6,524.35	70.39	-7,581.64	40.394186	-104.480854	1,388,073.42	3,283,860.87
14,318.00	89.45	269.63	6,525.56	70.26	-7,675.63	40.394188	-104.481191	1,388,073.29	3,283,766.88
14,413.00	89.42	269.52	6,526.50	69.56	-7,770.62	40.394189	-104.481533	1,388,072.59	3,283,671.89
14,508.00	90.74	270.72	6,526.36	69.75	-7,865.62	40.394193	-104.481874	1,388,072.78	3,283,576.90
14,602.00	91.17	269.81	6,524.80	70.19	-7,959.60	40.394197	-104.482211	1,388,073.22	3,283,482.92
14,697.00	89.20	270.40	6,524.49	70.36	-8,054.60	40.394200	-104.482552	1,388,073.39	3,283,387.93
14,791.00	89.69	270.74	6,525.40	71.30	-8,148.59	40.394206	-104.482889	1,388,074.33	3,283,293.94
14,886.00	90.25	270.02	6,525.45	71.93	-8,243.58	40.394211	-104.483230	1,388,074.96	3,283,198.95
14,980.00	90.68	269.46	6,524.69	71.50	-8,337.58	40.394212	-104.483568	1,388,074.53	3,283,104.96
15,075.00	89.75	270.18	6,524.33	71.20	-8,432.58	40.394215	-104.483909	1,388,074.23	3,283,009.96
15,170.00	89.78	269.92	6,524.72	71.29	-8,527.57	40.394218	-104.484250	1,388,074.32	3,282,914.97
15,264.00	89.88	269.49	6,525.00	70.80	-8,621.57	40.394219	-104.484587	1,388,073.83	3,282,820.97
15,359.00	90.06	269.69	6,525.05	70.12	-8,716.57	40.394221	-104.484928	1,388,073.15	3,282,725.98
15,455.00	90.06	269.50	6,524.95	69.44	-8,812.57	40.394222	-104.485273	1,388,072.47	3,282,629.99
15,548.00	90.37	269.53	6,524.60	68.66	-8,905.56	40.394222	-104.485607	1,388,071.69	3,282,536.99
15,643.00	89.35	268.64	6,524.83	67.14	-9,000.55	40.394221	-104.485948	1,388,070.17	3,282,442.01
15,738.00	90.03	268.93	6,525.35	65.13	-9,095.53	40.394219	-104.486289	1,388,068.16	3,282,347.04
15,833.00	90.09	268.50	6,525.25	63.00	-9,190.50	40.394216	-104.486630	1,388,066.03	3,282,252.07
15,928.00	89.78	268.15	6,525.36	60.22	-9,285.46	40.394211	-104.486971	1,388,063.25	3,282,157.11
16,023.00	90.15	267.71	6,525.41	56.79	-9,380.40	40.394205	-104.487312	1,388,059.82	3,282,062.18
16,118.00	90.40	267.34	6,524.96	52.68	-9,475.31	40.394197	-104.487653	1,388,055.72	3,281,967.27
16,213.00	90.59	267.12	6,524.14	48.09	-9,570.19	40.394187	-104.487994	1,388,051.12	3,281,872.39
16,308.00	90.68	266.72	6,523.08	42.99	-9,665.05	40.394176	-104.488334	1,388,046.02	3,281,777.54
16,403.00	90.96	266.86	6,521.72	37.67	-9,759.89	40.394164	-104.488675	1,388,040.70	3,281,682.70
16,423.00	91.11	266.49	6,521.36	36.51	-9,779.85	40.394162	-104.488747	1,388,039.54	3,281,662.74
16,491.00	91.11	266.49	6,520.05	32.35	-9,847.71	40.394152	-104.488990	1,388,035.38	3,281,594.88

Design Report for 70 Ranch BB18-622 - Actual Surveys

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
+N/-S (usft)	+E/-W (usft)			
845.00	844.99	3.80	0.50	First Sperry MWD Survey at 845.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
Target	70 Ranch BB18-622_Rev A4_BHL	270.20	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
845.00	6,627.00	Intermediate Surveys	MWD
6,674.00	0.00	Production Surveys	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
748.00	747.99	9 5/8"	9-5/8	13-3/4
6,859.00	6,492.42	7"	7	8-3/4

Design Targets

Shape	Target Name	TVD (')	Northing (')	Easting (')	+N/-S	+E/-W	Created	Updated
-------	-------------	---------	--------------	-------------	-------	-------	---------	---------

Design Report for 70 Ranch BB18-622 - Actual Surveys

Directional Difficulty Index

Average Dogleg over Survey: 1.41 °/100usft

Maximum Dogleg over Survey: 13.74 °/100usft at 6,013.00
usft

Net Tortosity applicable to Plans: 0.77 °/100usft

Directional Difficulty Index: 6.801

Audit Info

North Reference Sheet for Sec. 17-T5N-R63W (70 Ranch State BB18 PAD) - 70 Ranch BB18-622 - 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' @ 4671.00usft (H&P 343). Northing and Easting are relative to 70 Ranch BB18-622

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: 1,388,003.03 usft N, 3,291,442.20 usft E

Geographical Coordinates of Well: 40° 23' 37.50" N, 104° 27' 13.10" W

Grid Convergence at Surface is: 0.68°

Based upon Minimum Curvature type calculations, at a Measured Depth of 16,491.00usft

the Bottom Hole Displacement is 9,847.77usft in the Direction of 270.19° (Grid).

Magnetic Convergence at surface is: -7.70° (14 July 2015, , BGGM2015)

