Project: Weld County, CO (NAD 83)
Site: Sec. 36-T7N-R63W (Crow Creek State 36 PAD)
Well: Crow Creek State AC36-77-1HN
Wellbore: Plan A
Design: Final Surveys

Noble Energy

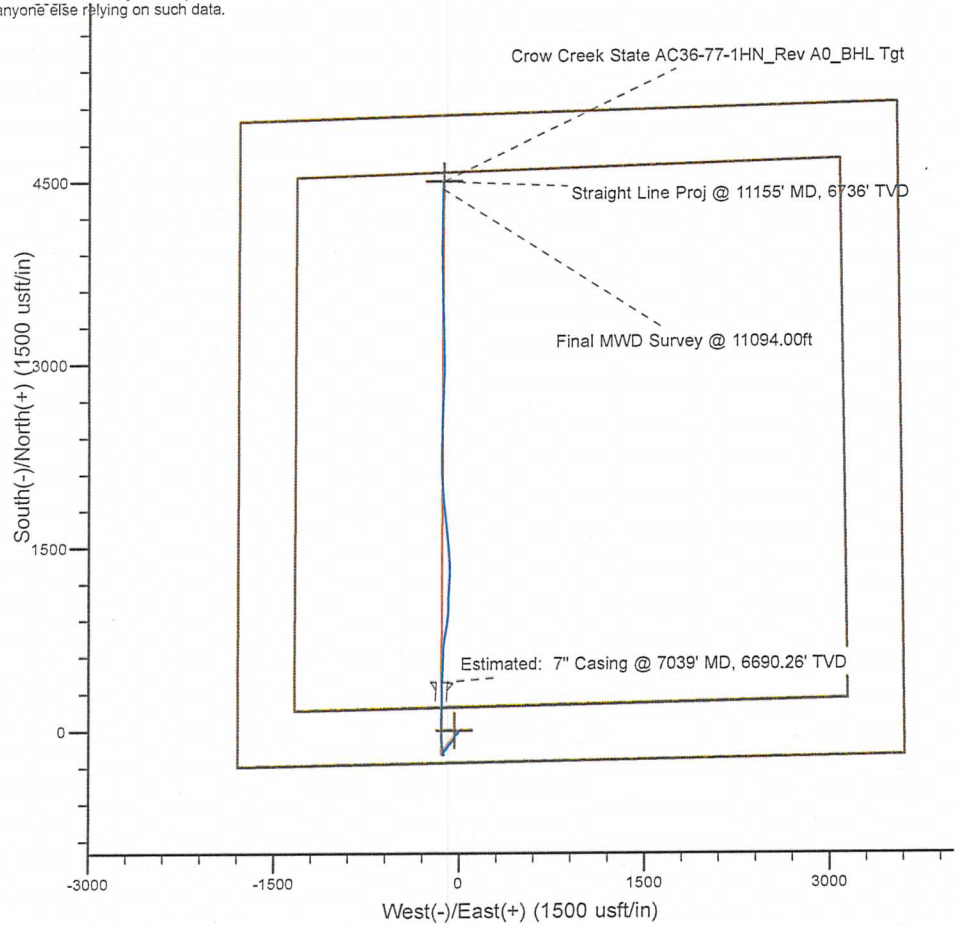
HALLIBURTON
Sperry Drilling

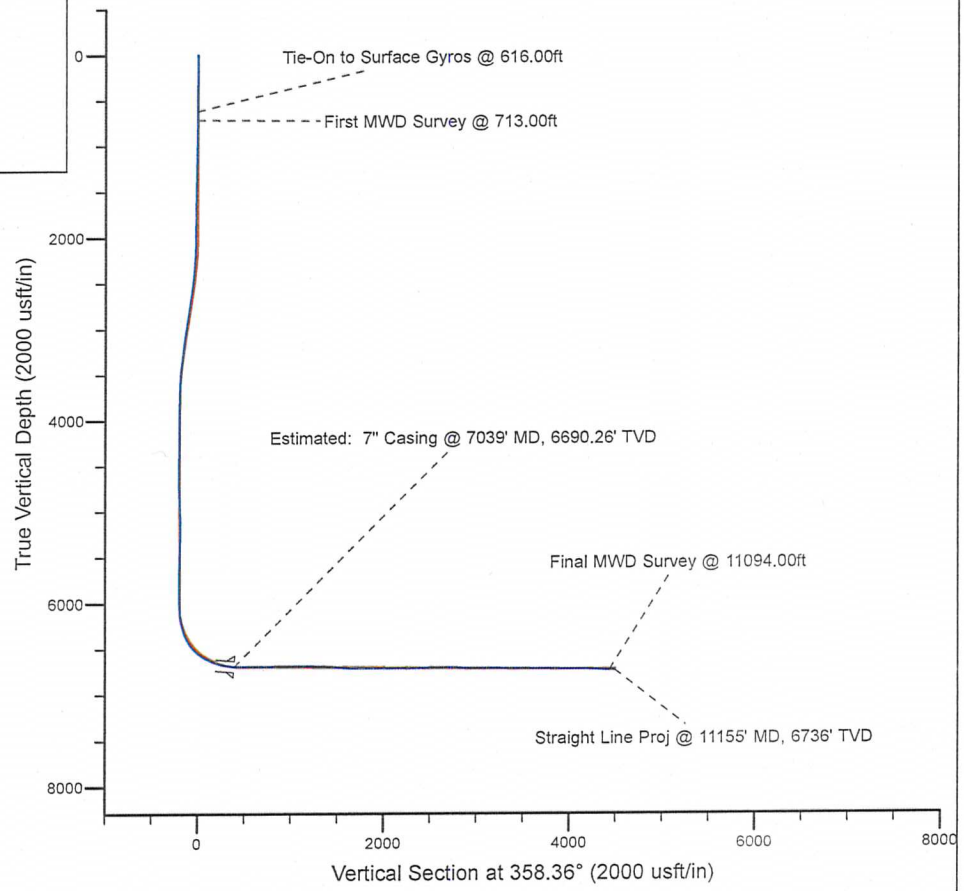
Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Wells Ranch AE20-63-1HN well located at Weld County, CO. At the conclusion of the job Halliburton performed a final survey on the well. Noble Energy has requested that Halliburton provide 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.

Platted SHL:	270' FSL, 1793' FWL
Platted Lat/Long:	40.52358 N, 104.38780 W
Location:	Sec. 36-T7N-R63W
7" Casing:	~658.92' FSL, ~1651.39' FWL
Lat/Long:	40° 31' 28.742 N, 104° 23' 17.812 W
State Planes - CO Northern:	1,435,908.18' N, 3,309,047.80' E
Location:	Sec. 36-T7N-R63W
BHL:	~537.12' FNL, ~1642.12' FWL
Lat/Long:	40° 32' 9.325 N, 104° 23' 17.125 W
State Planes - CO Northern:	1,440,015.32' N, 3,309,049.40' E
Location:	Sec. 36-T7N-R63W

LEGEND

Crow Creek State AC36-77-1HN, Plan A, Rev A0 Proposal V0
Final Surveys





WELL DETAILS: Crow Creek State AC36-77-1HN
Ground Level: 4789.00 KB=24' @ 4813.00usft (H&P 315)
Design: Final Surveys (Crow Creek State AC36-77-1HN/Plan A)
Created By: Fred Hartmann Date: 10/22/2013

Noble Energy

Weld County, CO (NAD 83)
Sec. 36-T7N-R63W (Crow Creek State 36 PAD)
Crow Creek State AC36-77-1HN - A2

Design: Final Surveys

Sperry Drilling Services

Final Survey Report

21 October, 2013

Well Coordinates: 1,435,519.85 N, 3,309,186.44 E (40° 31' 24.89" N, 104° 23' 16.08" W)
Ground Level: 4,789.00 usft

Local Coordinate Origin:	Centered on Well Crow Creek State AC36-77-1HN - Slot A2
Viewing Datum:	KB=24' @ 4813.00usft (H&P 315)
TVDs to System:	N
North Reference:	Grid
Unit System:	API - US Survey Feet - Custom

Geodetic Scale Factor Applied
Version: 5000.1 Build: 70

HALLIBURTON

Design Report for Crow Creek State AC36-77-1HN - Final 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
330.00	0.90	246.47	329.99	-1.03	-2.38	-0.97	0.27
616.00	0.40	214.47	615.97	-2.75	-5.00	-2.61	0.21
Tie-On to Surface Gyros @ 616.00ft							
713.00	0.43	202.99	712.97	-3.37	-5.33	-3.21	0.09
First MWD Survey @ 713.00ft							
804.00	0.65	228.89	803.96	-4.02	-5.86	-3.85	0.36
897.00	0.64	244.20	896.96	-4.60	-6.72	-4.40	0.19
989.00	0.60	264.22	988.95	-4.87	-7.66	-4.65	0.24
1,082.00	2.13	188.00	1,081.93	-6.63	-8.39	-6.39	2.23
1,175.00	2.51	189.37	1,174.85	-10.35	-8.96	-10.09	0.41
1,269.00	0.93	190.88	1,268.80	-13.13	-9.44	-12.85	1.68
1,362.00	0.68	165.09	1,361.80	-14.40	-9.44	-14.13	0.47
1,454.00	1.05	202.05	1,453.79	-15.71	-9.62	-15.43	0.71
1,549.00	0.84	175.68	1,548.77	-17.21	-9.89	-16.92	0.50
1,644.00	1.03	183.39	1,643.76	-18.76	-9.89	-18.47	0.24
1,739.00	0.73	158.62	1,738.75	-20.18	-9.72	-19.89	0.50
1,834.00	0.80	182.76	1,833.74	-21.40	-9.53	-21.12	0.34
1,929.00	0.66	212.77	1,928.73	-22.52	-9.86	-22.23	0.42
2,024.00	0.77	201.99	2,023.73	-23.58	-10.39	-23.27	0.18
2,119.00	3.03	225.35	2,118.67	-25.93	-12.42	-25.57	2.47
2,214.00	3.75	231.51	2,213.50	-29.63	-16.64	-29.14	0.85
2,309.00	5.32	229.16	2,308.20	-34.45	-22.40	-33.79	1.66
2,404.00	6.09	215.72	2,402.73	-41.42	-28.67	-40.58	1.62
2,498.00	7.18	212.18	2,496.10	-50.44	-34.71	-49.42	1.24
2,593.00	10.31	207.97	2,589.99	-62.97	-41.87	-61.75	3.36
2,688.00	10.34	210.35	2,683.45	-77.84	-50.16	-76.37	0.45
2,783.00	10.99	212.96	2,776.81	-92.79	-59.40	-91.06	0.85
2,878.00	10.83	219.70	2,870.10	-107.26	-70.02	-105.21	1.35
2,973.00	11.02	219.29	2,963.37	-121.15	-81.47	-118.77	0.22
3,068.00	11.11	217.87	3,056.61	-135.41	-92.84	-132.70	0.30
3,162.00	9.38	218.22	3,149.11	-148.58	-103.14	-145.57	1.84
3,257.00	8.41	214.97	3,242.96	-160.35	-111.91	-157.08	1.15
3,352.00	7.81	214.44	3,337.01	-171.37	-119.55	-167.88	0.64
3,447.00	6.01	214.23	3,431.32	-180.80	-125.99	-177.13	1.89
3,542.00	5.12	215.96	3,525.87	-188.35	-131.28	-184.51	0.95
3,637.00	2.94	202.28	3,620.63	-194.03	-134.69	-190.10	2.49
3,732.00	1.35	178.03	3,715.56	-197.41	-135.58	-193.45	1.89
3,827.00	0.25	53.67	3,810.56	-198.40	-135.37	-194.45	1.58
4,112.00	0.22	135.08	4,095.55	-198.42	-134.49	-194.49	0.11
4,397.00	2.23	135.09	4,380.47	-202.74	-130.19	-198.93	0.71
4,492.00	0.26	40.80	4,475.45	-203.88	-128.74	-200.12	2.38
4,776.00	1.66	328.45	4,759.41	-199.89	-130.47	-196.07	0.56
5,061.00	1.34	347.04	5,044.31	-193.12	-133.38	-189.23	0.20
5,346.00	1.77	151.53	5,329.27	-193.74	-132.03	-189.89	1.08
5,631.00	1.27	130.69	5,614.17	-199.67	-127.53	-195.94	0.26
5,916.00	0.61	38.28	5,899.15	-200.54	-124.20	-196.91	0.50
6,024.00	0.78	41.23	6,007.14	-199.54	-123.36	-195.93	0.16
6,154.00	7.60	341.22	6,136.73	-190.72	-125.55	-187.05	5.57
6,201.00	10.53	342.20	6,183.14	-183.69	-127.86	-179.96	6.24

Design Report for Crow Creek State AC36-77-1HN - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
6,249.00	14.43	342.53	6,230.00	-173.80	-131.00	-169.99	8.13
6,296.00	15.12	348.45	6,275.45	-162.21	-133.98	-158.31	3.53
6,344.00	17.29	350.78	6,321.54	-149.03	-136.38	-145.07	4.72
6,391.00	22.15	350.89	6,365.77	-133.38	-138.90	-129.36	10.34
6,439.00	30.15	353.94	6,408.82	-112.43	-141.61	-108.33	16.90
6,486.00	35.25	355.35	6,448.36	-87.15	-143.96	-83.00	10.97
6,534.00	38.41	357.72	6,486.78	-58.44	-145.68	-54.25	7.22
6,581.00	44.94	359.26	6,521.86	-27.22	-146.47	-23.02	14.06
6,629.00	50.83	0.39	6,554.04	8.37	-146.57	12.56	12.39
6,676.00	56.35	1.57	6,581.93	46.18	-145.91	50.33	11.92
6,724.00	61.79	1.57	6,606.59	87.32	-144.78	91.42	11.33
6,771.00	66.23	0.85	6,627.18	129.55	-143.89	133.61	9.55
6,819.00	69.32	0.33	6,645.34	173.97	-143.44	178.00	6.52
6,866.00	73.17	359.98	6,660.44	218.47	-143.32	222.48	8.22
6,914.00	76.86	359.81	6,672.85	264.83	-143.40	268.82	7.70
6,946.00	79.78	0.67	6,679.33	296.16	-143.27	300.14	9.50
6,988.00	83.47	3.63	6,685.45	337.67	-141.71	341.59	11.22
7,039.00	85.70	3.29	6,690.26	388.35	-138.64	392.15	4.43
Estimated: 7" Casing @ 7039' MD, 6690.26' TVD							
7,132.00	89.78	2.68	6,693.92	481.13	-133.80	484.76	4.43
7,227.00	90.46	0.28	6,693.72	576.09	-131.35	579.61	2.63
7,322.00	89.72	2.93	6,693.57	671.04	-128.69	674.45	2.90
7,417.00	91.91	12.15	6,692.22	765.11	-116.24	768.12	9.97
7,511.00	91.20	8.44	6,689.67	857.54	-99.45	860.03	4.02
7,606.00	89.91	1.27	6,688.75	952.13	-91.42	954.36	7.67
7,701.00	89.88	1.67	6,688.92	1,047.10	-88.98	1,049.22	0.42
7,796.00	89.97	3.13	6,689.04	1,142.01	-85.00	1,143.98	1.54
7,891.00	89.32	2.01	6,689.63	1,236.91	-80.74	1,238.72	1.36
7,986.00	87.72	0.15	6,692.09	1,331.86	-78.95	1,333.57	2.58
8,081.00	86.20	355.68	6,697.13	1,426.64	-82.40	1,428.41	4.96
8,175.00	85.03	353.84	6,704.31	1,519.96	-90.96	1,521.94	2.31
8,270.00	86.57	353.75	6,711.27	1,614.15	-101.20	1,616.38	1.62
8,365.00	88.52	354.88	6,715.34	1,708.59	-110.60	1,711.05	2.37
8,460.00	90.83	354.09	6,715.88	1,803.14	-119.73	1,805.83	2.57
8,555.00	92.22	354.67	6,713.35	1,897.65	-129.03	1,900.56	1.59
8,650.00	91.26	356.90	6,710.47	1,992.34	-136.01	1,995.42	2.55
8,745.00	88.37	356.35	6,710.77	2,087.17	-141.60	2,090.36	3.10
8,840.00	89.01	358.96	6,712.95	2,182.05	-145.48	2,185.32	2.83
8,935.00	89.54	1.23	6,714.15	2,277.04	-145.33	2,280.26	2.45
9,030.00	91.39	2.21	6,713.38	2,371.99	-142.47	2,375.09	2.20
9,125.00	93.24	2.29	6,709.54	2,466.83	-138.75	2,469.79	1.95
9,220.00	91.94	2.18	6,705.25	2,561.66	-135.05	2,564.48	1.37
9,314.00	89.01	0.88	6,704.47	2,655.61	-132.54	2,658.32	3.41
9,410.00	87.84	2.20	6,707.11	2,751.54	-129.96	2,754.13	1.84
9,505.00	88.09	2.13	6,710.48	2,846.41	-126.37	2,848.86	0.27
9,600.00	90.74	1.96	6,711.45	2,941.34	-122.98	2,943.65	2.80
9,694.00	87.56	358.32	6,712.85	3,035.30	-122.75	3,037.57	5.14
9,789.00	88.52	358.74	6,716.09	3,130.21	-125.19	3,132.51	1.10
9,884.00	90.37	359.37	6,717.01	3,225.19	-126.75	3,227.49	2.06
9,979.00	89.75	358.38	6,716.91	3,320.17	-128.62	3,322.49	1.23
10,074.00	89.66	357.28	6,717.40	3,415.10	-132.22	3,417.48	1.16

Design Report for Crow Creek State AC36-77-1HN - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
10,169.00	89.91	358.20	6,717.76	3,510.02	-135.96	3,512.47	1.00
10,264.00	89.35	358.64	6,718.37	3,604.98	-138.58	3,607.47	0.75
10,359.00	89.41	359.92	6,719.40	3,699.97	-139.78	3,702.45	1.35
10,454.00	89.54	359.22	6,720.27	3,794.96	-140.49	3,797.42	0.75
10,549.00	89.23	357.91	6,721.29	3,889.92	-142.87	3,892.42	1.42
10,643.00	88.89	1.60	6,722.83	3,983.89	-143.27	3,986.36	3.94
10,738.00	88.61	359.91	6,724.91	4,078.86	-142.02	4,081.25	1.80
10,833.00	90.03	0.55	6,726.03	4,173.85	-141.64	4,176.19	1.64
10,928.00	88.61	1.51	6,727.16	4,268.82	-139.93	4,271.08	1.80
11,023.00	87.96	0.73	6,730.01	4,363.76	-138.07	4,365.92	1.07
11,094.00	87.19	0.34	6,733.01	4,434.69	-137.41	4,436.81	1.22
Final MWD Survey @ 11094.00ft							
11,155.00	87.19	0.34	6,736.00	4,495.62	-137.05	4,497.70	0.00
Straight Line Proj @ 11155' MD, 6736' TVD							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
616.00	615.97	-2.75	-5.00	Tie-On to Surface Gyros @ 616.00ft
713.00	712.97	-3.37	-5.33	First MWD Survey @ 713.00ft
11,094.00	6,733.01	4,434.69	-137.41	Final MWD Survey @ 11094.00ft
11,155.00	6,736.00	4,495.62	-137.05	Straight Line Proj @ 11155' MD, 6736' TVD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Crow Creek State AC36-77-1HN_Rev A0_BHL Tgt	358.36	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
330.00	616.00	Surface Gyros	Flexi-Shot
713.00	6,988.00	MWD Surveys - Vert/Build	MWD
7,132.00	11,094.00	MWD Surveys - Lateral	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
7,039.00	6,690.26	Estimated: 7" Casing @ 7039' MD, 6690.26' TVD	7	8-3/4

Design Report for Crow Creek State AC36-77-1HN - Final 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
Crow Creek State AC3	0.00	0.00	1.00	-0.49	-38.91	1,435,519.36	3,309,147.53	40° 31' 24.888 N	104° 23' 16.584 W
- actual wellpath misses target center by 38.92usft at 1.28usft MD (1.28 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				1.00	161.00	-1,293.00	1,435,680.35	3,307,854.57	
Point 2				1.00	4,528.00	-1,279.00	1,440,047.22	3,307,868.57	
Point 3				1.00	4,675.00	3,109.00	1,440,194.21	3,312,256.43	
Point 4				1.00	255.00	3,185.00	1,435,774.35	3,312,332.43	
Point 5				1.00	161.00	-1,293.00	1,435,680.35	3,307,854.57	
Crow Creek State AC3	0.00	0.00	1.00	-0.49	-38.91	1,435,519.36	3,309,147.53	40° 31' 24.888 N	104° 23' 16.584 W
- actual wellpath misses target center by 38.92usft at 1.28usft MD (1.28 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				1.00	-299.00	-1,753.00	1,435,220.37	3,307,394.58	
Point 2				1.00	4,988.00	-1,739.00	1,440,507.20	3,307,408.58	
Point 3				1.00	5,135.00	3,569.00	1,440,654.20	3,312,716.41	
Point 4				1.00	-205.00	3,645.00	1,435,314.37	3,312,792.41	
Point 5				1.00	-299.00	-1,753.00	1,435,220.37	3,307,394.58	
Crow Creek State AC3	0.00	0.00	6,058.39	-195.00	-143.00	1,435,324.86	3,309,043.44	40° 31' 22.979 N	104° 23' 17.963 W
- actual wellpath misses target center by 19.78usft at 6075.80usft MD (6058.90 TVD, -197.82 N, -123.43 E)									
- Circle (radius 35.00)									
Crow Creek State AC3	270.40	0.17	6,698.68	523.20	-140.81	1,436,043.03	3,309,045.63	40° 31' 30.075 N	104° 23' 17.818 W
- actual wellpath misses target center by 9.79usft at 7173.87usft MD (6693.97 TVD, 522.97 N, -132.23 E)									
- Rectangle (sides W16.00 H70.00 D3,975.01)									
Crow Creek State AC3	0.00	0.00	6,726.43	4,498.09	-128.69	1,440,017.79	3,309,057.75	40° 32' 9.348 N	104° 23' 17.016 W
- actual wellpath misses target center by 12.94usft at 11155.00usft MD (6736.00 TVD, 4495.62 N, -137.05 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	2.11 °/100usft	Maximum Dogleg over Survey:	16.90 °/100usft at 6,439.00 usft
Net Tortousity applicable to Plans:	1.10 °/100usft	Directional Difficulty Index:	6.288

Audit Info

North Reference Sheet for Sec. 36-T7N-R63W (Crow Creek State 36 PAD) - Crow Creek State AC36-77-1HN -

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' @ 4813.00usft (H&P 315). Northing and Easting are relative to Crow Creek State AC36-77-1HN - 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° 30' 0.000 W°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:40° 47' 0.000 N°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996816

Grid Coordinates of Well: 1,435,519.85 usft N, 3,309,186.44 usft E

Geographical Coordinates of Well: 40° 31' 24.89" N, 104° 23' 16.08" W

Grid Convergence at Surface is: 0.72°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,155.00usft

the Bottom Hole Displacement is 4,497.71usft in the Direction of 358.25° (Grid).

Magnetic Convergence at surface is: -7.67° (26 September 2013, , BGGM2013)