Noble Energy Inc.- Weld County, CO (Grid North)

Well Name: **Five Rivers K18-69HN**

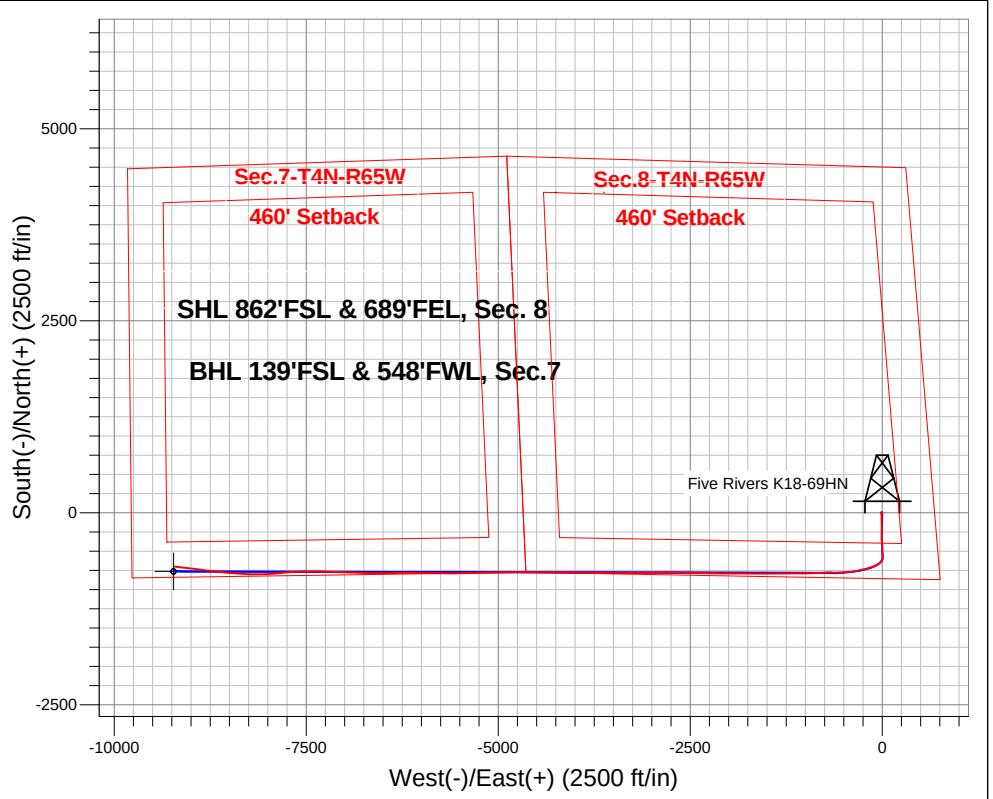
Surface Location: Five Rivers K07-62-1HN Pad Sec.8-T4N-R66W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4702.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1360676.24	3196664.86	40.321310	-104.794680	

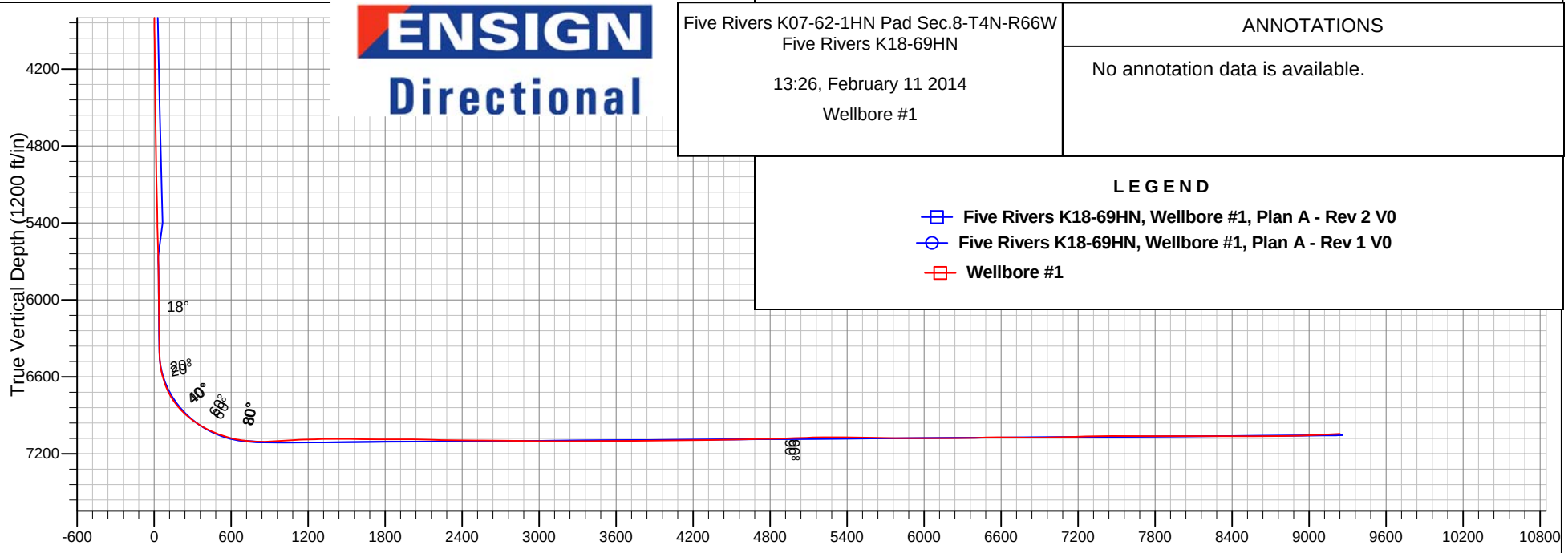
Precision 828 RKB - 16' WELL @ 4718.0ft (Precision 828 RKB - 16')

FINAL SURVEY

Projected Bottom Hole Location
16145'MD 7045'TVD 700'S & 9214'W of SHL
92.89 degree Incl @ 276.9 degree AZM



ENSIGN Directional



Five Rivers K07-62-1HN Pad Sec.8-T4N-R66W
Five Rivers K18-69HN

13:26, February 11 2014

Wellbore #1

ANNOTATIONS

No annotation data is available.

LEGEND

- **Five Rivers K18-69HN, Wellbore #1, Plan A - Rev 2 V0**
- **Five Rivers K18-69HN, Wellbore #1, Plan A - Rev 1 V0**
- **Wellbore #1**

Noble Energy Inc.- Weld County, CO (Grid North)

Sec.8-T4N-R66W
Five Rivers K07-62-1HN Pad Sec.8-T4N-R66W
Five Rivers K18-69HN

Wellbore #1

Design: Wellbore #1

Standard Survey Report

11 February, 2014

ENSIGN Directional

Survey Report

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	**Local Co-ordinate Reference:**	Well Five Rivers K18-69HN
Project:	Sec.8-T4N-R66W	**TVD Reference:**	WELL @ 4718.0ft (Precision 828 RKB - 16')
Site:	Five Rivers K07-62-1HN Pad Sec.8-T4N-R66W	**MD Reference:**	WELL @ 4718.0ft (Precision 828 RKB - 16')
Well:	Five Rivers K18-69HN	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	Landmark

Project Sec.8-T4N-R66W, Weld County, CO

Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site Five Rivers K07-62-1HN Pad Sec.8-T4N-R66W

Site Position:		**Northing:**	1,360,701.75 ft	**Latitude:**	40.321380
From:	Lat/Long	**Easting:**	3,196,664.66 ft	**Longitude:**	-104.794680
Position Uncertainty:	0.0 ft	**Slot Radius:**	"	**Grid Convergence:**	0.46 °

Well Five Rivers K18-69HN

Well Position	**+N/-S**	0.0 ft	**Northing:**	1,360,676.24 ft	**Latitude:**	40.321310
	+E/-W	0.0 ft	**Easting:**	3,196,664.86 ft	**Longitude:**	-104.794680
Position Uncertainty		0.0 ft	**Wellhead Elevation:**	ft	**Ground Level:**	4,702.0 ft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	1/27/2014	8.52	66.89	52,812

Design Wellbore #1

Audit Notes:

Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	265.27

Survey Program **Date** 2/11/2014

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
303.0	616.0	Surface (Wellbore #1)	Flexi-Shot	VES Flexi-Shot Tool
648.0	7,501.0	Intermediate (Wellbore #1)	MWD+IFR1+MS_WY	Fixed:v2:Rockies, crustal dec + 3-axis correction
7,577.0	16,145.0	Lateral (Wellbore #1)	MWD+IFR1+MS_WY	Fixed:v2:Rockies, crustal dec + 3-axis correction

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
303.0	0.00	135.49	303.0	0.0	0.0	0.0	0.00	0.00	0.00
616.0	0.00	135.49	616.0	0.0	0.0	0.0	0.00	0.00	0.00
648.0	0.45	242.13	648.0	-0.1	-0.1	0.1	1.41	1.41	0.00
737.0	0.52	244.05	737.0	-0.4	-0.8	0.8	0.08	0.08	2.16
827.0	0.60	239.01	827.0	-0.8	-1.6	1.6	0.10	0.09	-5.60
917.0	0.52	224.58	917.0	-1.4	-2.2	2.3	0.18	-0.09	-16.03
1,007.0	0.65	231.14	1,007.0	-2.0	-2.9	3.1	0.16	0.14	7.29
1,083.0	0.77	235.13	1,083.0	-2.5	-3.7	3.9	0.17	0.16	5.25
1,178.0	0.64	242.99	1,178.0	-3.1	-4.7	4.9	0.17	-0.14	8.27

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	**Local Co-ordinate Reference:**	Well Five Rivers K18-69HN
Project:	Sec.8-T4N-R66W	**TVD Reference:**	WELL @ 4718.0ft (Precision 828 RKB - 16')
Site:	Five Rivers K07-62-1HN Pad Sec.8-T4N-R66W	**MD Reference:**	WELL @ 4718.0ft (Precision 828 RKB - 16')
Well:	Five Rivers K18-69HN	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	Landmark

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
1,273.0	0.59	231.73	1,273.0	-3.7	-5.5	5.8	0.14	-0.05	-11.85
1,368.0	1.01	98.83	1,368.0	-4.1	-5.1	5.4	1.55	0.44	-139.90
1,463.0	0.87	118.04	1,462.9	-4.6	-3.6	4.0	0.36	-0.15	20.22
1,558.0	0.71	125.78	1,557.9	-5.3	-2.5	2.9	0.20	-0.17	8.15
1,652.0	0.81	180.39	1,651.9	-6.3	-2.0	2.6	0.75	0.11	58.10
1,747.0	1.17	218.00	1,746.9	-7.7	-2.6	3.3	0.76	0.38	39.59
1,842.0	0.93	335.75	1,841.9	-7.8	-3.6	4.2	1.90	-0.25	123.95
1,937.0	1.17	313.52	1,936.9	-6.4	-4.6	5.1	0.49	0.25	-23.40
2,000.0	0.58	306.29	1,999.9	-5.8	-5.3	5.8	0.95	-0.94	-11.48
2,093.0	0.32	279.91	2,092.9	-5.4	-5.9	6.4	0.35	-0.28	-28.37
2,183.0	0.55	295.30	2,182.9	-5.2	-6.6	7.0	0.28	0.26	17.10
2,273.0	0.69	325.45	2,272.9	-4.6	-7.3	7.6	0.39	0.16	33.50
2,363.0	0.67	79.39	2,362.9	-4.0	-7.1	7.4	1.27	-0.02	126.60
2,452.0	0.65	61.65	2,451.9	-3.7	-6.1	6.4	0.23	-0.02	-19.93
2,542.0	0.93	51.65	2,541.9	-3.0	-5.1	5.3	0.35	0.31	-11.11
2,632.0	0.75	47.80	2,631.8	-2.2	-4.1	4.2	0.21	-0.20	-4.28
2,722.0	0.83	39.37	2,721.8	-1.3	-3.2	3.3	0.16	0.09	-9.37
2,812.0	0.66	336.82	2,811.8	-0.3	-3.0	3.0	0.87	-0.19	-69.50
2,902.0	0.72	298.17	2,901.8	0.5	-3.7	3.7	0.51	0.07	-42.94
2,992.0	0.87	307.19	2,991.8	1.1	-4.8	4.7	0.22	0.17	10.02
3,081.0	0.77	298.14	3,080.8	1.8	-5.8	5.7	0.18	-0.11	-10.17
3,171.0	0.68	295.70	3,170.8	2.4	-6.8	6.6	0.11	-0.10	-2.71
3,261.0	0.52	66.03	3,260.8	2.8	-7.0	6.7	1.21	-0.18	144.81
3,351.0	0.78	47.59	3,350.8	3.3	-6.1	5.8	0.37	0.29	-20.49
3,441.0	0.68	54.95	3,440.8	4.1	-5.2	4.9	0.15	-0.11	8.18
3,531.0	0.93	43.28	3,530.8	4.9	-4.3	3.9	0.33	0.28	-12.97
3,621.0	0.62	2.74	3,620.8	5.9	-3.8	3.3	0.68	-0.34	-45.04
3,711.0	0.58	15.41	3,710.8	6.8	-3.6	3.1	0.15	-0.04	14.08
3,800.0	0.58	333.44	3,799.8	7.7	-3.7	3.1	0.47	0.00	-47.16
3,890.0	0.68	334.51	3,889.8	8.6	-4.1	3.4	0.11	0.11	1.19
3,980.0	1.08	317.85	3,979.7	9.7	-4.9	4.1	0.52	0.44	-18.51
4,086.0	0.67	260.59	4,085.7	10.3	-6.2	5.4	0.86	-0.39	-54.02
4,176.0	0.66	250.10	4,175.7	10.1	-7.2	6.4	0.14	-0.01	-11.66
4,266.0	2.46	195.89	4,265.7	8.0	-8.3	7.6	2.38	2.00	-60.23
4,355.0	4.91	182.42	4,354.5	2.4	-8.9	8.7	2.90	2.75	-15.13
4,445.0	7.48	178.91	4,444.0	-7.3	-9.0	9.6	2.89	2.86	-3.90
4,535.0	9.08	180.51	4,533.0	-20.3	-8.9	10.6	1.80	1.78	1.78
4,625.0	10.52	179.09	4,621.7	-35.6	-8.9	11.8	1.62	1.60	-1.58
4,715.0	12.39	176.27	4,709.9	-53.5	-8.1	12.5	2.17	2.08	-3.13
4,805.0	14.24	180.65	4,797.5	-74.2	-7.6	13.7	2.34	2.06	4.87
4,894.0	16.26	179.06	4,883.4	-97.6	-7.5	15.6	2.32	2.27	-1.79
4,984.0	17.68	179.25	4,969.4	-123.8	-7.1	17.3	1.58	1.58	0.21
5,074.0	14.80	178.26	5,055.8	-149.0	-6.6	18.9	3.21	-3.20	-1.10
5,164.0	16.80	178.59	5,142.4	-173.5	-5.9	20.2	2.22	2.22	0.37
5,254.0	18.15	179.88	5,228.3	-200.5	-5.6	22.1	1.56	1.50	1.43
5,343.0	16.99	180.51	5,313.1	-227.4	-5.7	24.4	1.32	-1.30	0.71
5,433.0	17.27	176.27	5,399.1	-253.9	-4.9	25.9	1.42	0.31	-4.71
5,523.0	15.36	180.85	5,485.5	-279.1	-4.2	27.3	2.56	-2.12	5.09
5,613.0	16.71	181.80	5,572.0	-304.0	-4.8	29.9	1.53	1.50	1.06
5,703.0	18.14	180.57	5,657.9	-330.9	-5.4	32.7	1.64	1.59	-1.37
5,792.0	18.63	175.78	5,742.3	-358.9	-4.5	34.1	1.78	0.55	-5.38
5,882.0	18.20	177.25	5,827.7	-387.3	-2.7	34.7	0.70	-0.48	1.63
5,972.0	17.04	176.71	5,913.5	-414.5	-1.3	35.5	1.30	-1.29	-0.60
6,062.0	18.05	180.29	5,999.3	-441.6	-0.6	37.0	1.64	1.12	3.98

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Site:	Five Rivers K07-62-1HN Pad Sec.8-T4N-R66W	**MD Reference:**	WELL @ 4718.0ft (Precision 828 RKB - 16')
Well:	Five Rivers K18-69HN	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	Landmark

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
6,152.0	18.62	179.69	6,084.8	-469.9	-0.6	39.4	0.67	0.63	-0.67
6,242.0	17.97	174.95	6,170.2	-498.1	0.7	40.4	1.80	-0.72	-5.27
6,332.0	18.51	176.73	6,255.7	-526.2	2.7	40.7	0.86	0.60	1.98
6,422.0	18.52	175.10	6,341.0	-554.7	4.8	41.0	0.58	0.01	-1.81
6,466.0	18.34	177.07	6,382.8	-568.6	5.7	41.2	1.47	-0.41	4.48
6,511.0	17.46	182.01	6,425.6	-582.4	5.8	42.2	3.90	-1.96	10.98
6,556.0	17.03	191.30	6,468.6	-595.6	4.3	44.8	6.19	-0.96	20.64
6,601.0	18.29	199.57	6,511.5	-608.8	0.7	49.6	6.23	2.80	18.38
6,646.0	19.77	207.66	6,554.0	-622.2	-5.2	56.6	6.71	3.29	17.98
6,691.0	21.74	217.07	6,596.1	-635.6	-13.8	66.2	8.59	4.38	20.91
6,736.0	23.73	226.11	6,637.6	-648.5	-25.4	78.8	8.92	4.42	20.09
6,781.0	25.76	233.96	6,678.5	-660.5	-39.8	94.2	8.57	4.51	17.44
6,826.0	29.12	240.20	6,718.4	-671.7	-57.2	112.4	9.82	7.47	13.87
6,871.0	32.15	245.04	6,757.2	-682.2	-77.6	133.6	8.68	6.73	10.76
6,916.0	36.24	247.27	6,794.4	-692.4	-100.7	157.5	9.50	9.09	4.96
6,961.0	40.06	249.66	6,829.8	-702.6	-126.6	184.1	9.10	8.49	5.31
7,006.0	44.73	251.47	6,863.0	-712.7	-155.2	213.4	10.73	10.38	4.02
7,051.0	47.77	254.48	6,894.1	-722.2	-186.3	245.2	8.30	6.76	6.69
7,096.0	51.98	255.09	6,923.1	-731.2	-219.4	279.0	9.41	9.36	1.36
7,141.0	55.81	256.02	6,949.6	-740.2	-254.7	314.9	8.67	8.51	2.07
7,186.0	59.22	257.89	6,973.8	-748.8	-291.6	352.4	8.35	7.58	4.16
7,231.0	61.18	259.49	6,996.1	-756.5	-329.9	391.2	5.34	4.36	3.56
7,276.0	64.12	261.20	7,016.8	-763.1	-369.3	431.0	7.35	6.53	3.80
7,321.0	67.58	263.47	7,035.2	-768.6	-410.0	472.0	8.96	7.69	5.04
7,366.0	69.90	265.34	7,051.5	-772.7	-451.7	513.9	6.45	5.16	4.16
7,411.0	72.27	267.10	7,066.1	-775.5	-494.2	556.5	6.44	5.27	3.91
7,456.0	75.41	268.64	7,078.6	-777.1	-537.4	599.7	7.71	6.98	3.42
7,501.0	79.56	269.44	7,088.4	-777.8	-581.3	643.5	9.38	9.22	1.78
7,577.0	84.02	269.48	7,099.2	-778.5	-656.5	718.5	5.87	5.87	0.05
7,667.0	87.63	267.51	7,105.8	-780.9	-746.2	808.1	4.57	4.01	-2.19
7,757.0	93.16	267.50	7,105.2	-784.8	-836.1	898.0	6.14	6.14	-0.01
7,846.0	93.95	267.70	7,099.7	-788.5	-924.8	986.7	0.92	0.89	0.22
7,936.0	93.81	269.78	7,093.6	-790.5	-1,014.6	1,076.4	2.31	-0.16	2.31
8,026.0	91.31	269.79	7,089.5	-790.8	-1,104.5	1,166.0	2.78	-2.78	0.01
8,116.0	91.58	270.47	7,087.3	-790.6	-1,194.5	1,255.6	0.81	0.30	0.76
8,205.0	91.10	271.10	7,085.2	-789.4	-1,283.4	1,344.2	0.89	-0.54	0.71
8,295.0	89.86	269.38	7,084.4	-789.0	-1,373.4	1,433.9	2.36	-1.38	-1.91
8,385.0	88.80	269.12	7,085.5	-790.2	-1,463.4	1,523.6	1.21	-1.18	-0.29
8,475.0	89.69	268.68	7,086.7	-792.0	-1,553.4	1,613.4	1.10	0.99	-0.49
8,565.0	90.14	270.92	7,086.8	-792.3	-1,643.4	1,703.2	2.54	0.50	2.49
8,655.0	89.76	269.82	7,086.9	-791.7	-1,733.4	1,792.8	1.29	-0.42	-1.22
8,745.0	90.10	270.06	7,087.0	-791.8	-1,823.4	1,882.5	0.46	0.38	0.27
8,835.0	89.31	270.82	7,087.5	-791.1	-1,913.4	1,972.1	1.22	-0.88	0.84
8,925.0	88.52	271.65	7,089.2	-789.2	-2,003.3	2,061.6	1.27	-0.88	0.92
9,015.0	88.87	271.15	7,091.2	-787.0	-2,093.3	2,151.1	0.68	0.39	-0.56
9,105.0	88.83	270.93	7,093.0	-785.3	-2,183.3	2,240.6	0.25	-0.04	-0.24
9,195.0	89.31	270.33	7,094.5	-784.3	-2,273.2	2,330.2	0.85	0.53	-0.67
9,285.0	88.90	271.26	7,095.9	-783.1	-2,363.2	2,419.8	1.13	-0.46	1.03
9,375.0	89.59	270.61	7,097.1	-781.6	-2,453.2	2,509.3	1.05	0.77	-0.72
9,464.0	90.79	272.06	7,096.8	-779.5	-2,542.2	2,597.8	2.11	1.35	1.63
9,554.0	88.25	271.86	7,097.5	-776.5	-2,632.1	2,687.2	2.83	-2.82	-0.22
9,644.0	88.90	270.30	7,099.8	-774.8	-2,722.1	2,776.7	1.88	0.72	-1.73
9,734.0	88.97	268.90	7,101.4	-775.4	-2,812.0	2,866.4	1.56	0.08	-1.56

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Well:	Five Rivers K18-69HN	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	Landmark

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
9,824.0	90.48	270.00	7,101.9	-776.3	-2,902.0	2,956.2	2.08	1.68	1.22
9,914.0	89.24	267.93	7,102.1	-777.9	-2,992.0	3,046.0	2.68	-1.38	-2.30
10,004.0	90.00	267.88	7,102.7	-781.2	-3,081.9	3,135.9	0.85	0.84	-0.06
10,094.0	90.21	268.33	7,102.5	-784.1	-3,171.9	3,225.8	0.55	0.23	0.50
10,184.0	90.48	269.79	7,102.0	-785.6	-3,261.9	3,315.6	1.65	0.30	1.62
10,278.0	90.34	270.02	7,101.3	-785.8	-3,355.9	3,409.3	0.29	-0.15	0.24
10,372.0	91.34	270.33	7,099.9	-785.5	-3,449.9	3,502.9	1.11	1.06	0.33
10,467.0	90.03	270.17	7,098.8	-785.1	-3,544.9	3,597.5	1.39	-1.38	-0.17
10,561.0	89.62	270.17	7,099.1	-784.8	-3,638.9	3,691.2	0.44	-0.44	0.00
10,656.0	89.69	270.84	7,099.7	-784.0	-3,733.8	3,785.8	0.71	0.07	0.71
10,750.0	90.79	271.53	7,099.3	-782.0	-3,827.8	3,879.3	1.38	1.17	0.73
10,844.0	91.48	271.27	7,097.4	-779.7	-3,921.8	3,972.7	0.78	0.73	-0.28
10,938.0	90.79	270.64	7,095.5	-778.2	-4,015.7	4,066.3	0.99	-0.73	-0.67
11,031.0	90.17	269.97	7,094.8	-777.7	-4,108.7	4,158.9	0.98	-0.67	-0.72
11,125.0	90.21	269.81	7,094.5	-777.8	-4,202.7	4,252.6	0.18	0.04	-0.17
11,218.0	91.17	271.12	7,093.3	-777.1	-4,295.7	4,345.2	1.75	1.03	1.41
11,311.0	91.30	271.41	7,091.3	-775.0	-4,388.7	4,437.7	0.34	0.14	0.31
11,403.0	91.27	269.51	7,089.3	-774.3	-4,480.7	4,529.3	2.06	-0.03	-2.07
11,496.0	91.58	270.58	7,087.0	-774.2	-4,573.6	4,621.9	1.20	0.33	1.15
11,588.0	90.96	270.10	7,084.9	-773.7	-4,665.6	4,713.5	0.85	-0.67	-0.52
11,681.0	91.03	269.62	7,083.3	-773.9	-4,758.6	4,806.2	0.52	0.08	-0.52
11,775.0	91.65	269.27	7,081.1	-774.8	-4,852.6	4,899.9	0.76	0.66	-0.37
11,868.0	91.75	269.24	7,078.3	-776.0	-4,945.5	4,992.7	0.11	0.11	-0.03
11,961.0	92.61	269.18	7,074.8	-777.3	-5,038.4	5,085.4	0.93	0.92	-0.06
12,054.0	91.13	269.05	7,071.8	-778.7	-5,131.4	5,178.1	1.60	-1.59	-0.14
12,146.0	88.70	268.99	7,071.9	-780.3	-5,223.3	5,269.9	2.64	-2.64	-0.07
12,241.0	91.20	267.99	7,072.0	-782.8	-5,318.3	5,364.8	2.83	2.63	-1.05
12,335.0	89.24	268.09	7,071.6	-786.0	-5,412.2	5,458.6	2.09	-2.09	0.11
12,430.0	88.18	268.87	7,073.8	-788.6	-5,507.2	5,553.5	1.39	-1.12	0.82
12,524.0	88.45	270.23	7,076.5	-789.3	-5,601.1	5,647.2	1.47	0.29	1.45
12,618.0	88.80	271.15	7,078.8	-788.2	-5,695.1	5,740.7	1.05	0.37	0.98
12,695.0	90.07	271.09	7,079.5	-786.7	-5,772.1	5,817.3	1.65	1.65	-0.08
12,785.0	90.03	271.14	7,079.5	-784.9	-5,862.1	5,906.8	0.07	-0.04	0.06
12,875.0	90.10	270.46	7,079.4	-783.6	-5,952.1	5,996.4	0.76	0.08	-0.76
12,965.0	90.17	270.90	7,079.2	-782.6	-6,042.0	6,086.0	0.50	0.08	0.49
13,054.0	90.24	270.23	7,078.8	-781.7	-6,131.0	6,174.6	0.76	0.08	-0.75
13,144.0	90.45	270.38	7,078.3	-781.2	-6,221.0	6,264.3	0.29	0.23	0.17
13,234.0	91.03	268.82	7,077.1	-781.8	-6,311.0	6,354.0	1.85	0.64	-1.73
13,324.0	92.17	268.27	7,074.6	-784.1	-6,401.0	6,443.8	1.41	1.27	-0.61
13,414.0	90.65	268.80	7,072.4	-786.4	-6,490.9	6,533.7	1.79	-1.69	0.59
13,504.0	89.50	269.66	7,072.3	-787.6	-6,580.9	6,623.4	1.60	-1.28	0.96
13,594.0	88.87	271.67	7,073.6	-786.6	-6,670.9	6,713.0	2.34	-0.70	2.23
13,684.0	89.93	272.08	7,074.5	-783.7	-6,760.8	6,802.4	1.26	1.18	0.46
13,774.0	90.45	273.52	7,074.2	-779.3	-6,850.7	6,891.6	1.70	0.58	1.60
13,864.0	91.55	272.13	7,072.6	-774.8	-6,940.6	6,980.8	1.97	1.22	-1.54
13,954.0	91.06	271.90	7,070.6	-771.7	-7,030.5	7,070.2	0.60	-0.54	-0.26
14,044.0	91.72	271.98	7,068.4	-768.6	-7,120.4	7,159.6	0.74	0.73	0.09
14,133.0	91.17	270.71	7,066.2	-766.5	-7,209.4	7,248.0	1.55	-0.62	-1.43
14,223.0	91.71	270.38	7,063.9	-765.7	-7,299.3	7,337.6	0.70	0.60	-0.37
14,313.0	91.20	270.00	7,061.6	-765.4	-7,389.3	7,427.3	0.71	-0.57	-0.42
14,403.0	89.14	270.19	7,061.3	-765.2	-7,479.3	7,516.9	2.30	-2.29	0.21
14,493.0	90.21	269.51	7,061.9	-765.5	-7,569.3	7,606.6	1.41	1.19	-0.76
14,583.0	89.66	268.23	7,062.0	-767.2	-7,659.3	7,696.5	1.55	-0.61	-1.42

ENSIGN Directional

Survey Report

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	**Local Co-ordinate Reference:**	Well Five Rivers K18-69HN
Project:	Sec.8-T4N-R66W	**TVD Reference:**	WELL @ 4718.0ft (Precision 828 RKB - 16')
Site:	Five Rivers K07-62-1HN Pad Sec.8-T4N-R66W	**MD Reference:**	WELL @ 4718.0ft (Precision 828 RKB - 16')
Well:	Five Rivers K18-69HN	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	Landmark

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
14,673.0	89.90	262.92	7,062.3	-774.2	-7,749.0	7,786.4	5.91	0.27	-5.90
14,763.0	89.73	263.09	7,062.6	-785.1	-7,838.3	7,876.4	0.27	-0.19	0.19
14,853.0	90.89	265.08	7,062.1	-794.4	-7,927.8	7,966.3	2.56	1.29	2.21
14,942.0	88.66	268.94	7,062.5	-799.0	-8,016.7	8,055.3	5.01	-2.51	4.34
15,032.0	90.31	269.35	7,063.3	-800.4	-8,106.7	8,145.1	1.89	1.83	0.46
15,122.0	90.14	271.61	7,062.9	-799.6	-8,196.6	8,234.7	2.52	-0.19	2.51
15,212.0	90.17	272.48	7,062.7	-796.4	-8,286.6	8,324.0	0.97	0.03	0.97
15,302.0	90.17	273.32	7,062.4	-791.9	-8,376.5	8,413.2	0.93	0.00	0.93
15,392.0	89.76	273.75	7,062.5	-786.3	-8,466.3	8,502.3	0.66	-0.46	0.48
15,482.0	90.00	275.76	7,062.6	-778.9	-8,556.0	8,591.1	2.25	0.27	2.23
15,571.0	89.76	276.92	7,062.8	-769.0	-8,644.4	8,678.4	1.33	-0.27	1.30
15,661.0	90.41	276.92	7,062.7	-758.2	-8,733.8	8,766.6	0.72	0.72	0.00
15,751.0	91.44	276.92	7,061.2	-747.4	-8,823.1	8,854.7	1.14	1.14	0.00
15,841.0	92.61	276.92	7,058.1	-736.5	-8,912.4	8,942.8	1.30	1.30	0.00
15,931.0	91.99	276.92	7,054.5	-725.7	-9,001.7	9,030.9	0.69	-0.69	0.00
16,021.0	92.75	276.92	7,050.7	-714.8	-9,090.9	9,118.9	0.84	0.84	0.00
16,085.0	92.89	276.92	7,047.6	-707.1	-9,154.4	9,181.5	0.22	0.22	0.00
16,145.0	92.89	276.92	7,044.6	-699.9	-9,213.9	9,240.2	0.00	0.00	0.00
Five Rivers K18-69HN BHL 75'FSL & 535'FWL									

Checked By: _____ Approved By: _____ Date: _____