

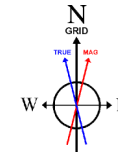
# NOBLE ENERGY, INC

Location: COLORADO Slot: SLOT#20 FREEDOM FEDERAL LC21-640(1663'FSL&400'FWL,SEC.22)  
 Field: WELD COUNTY (NOBLE NAD 83 GRID) Well: FREEDOM FEDERAL LC21-640  
 Facility: SEC.22-T09N-R59W Wellbore: FREEDOM FEDERAL LC21-640 PWB

Plot reference wellbore is FREEDOM FEDERAL LC21-640 (REV 0.0) PWB	Grid System: NAD83 - Lambert Colorado 50° Northern Zone (2011), US feet
True vertical depths are referenced to HRP FGS (2010) (FWS)	North Reference: Grid north
Measured depths are referenced to HRP FGS (2010) (FWS)	Scale: True distance
HRP FGS (2010) (FWS) is Mean Sea Level: 401.0 feet	Depths are in feet
Mean Sea Level is Ground level (At Site: SLOTHO FREEDOM FEDERAL LC21-640)(SEPTSL&400'FWL,SEC.22): 0 feet	Created by: Centryal on 2017-08-03
Coordinates are in feet referenced to Site	Disclaimer: DANGER

## Comments

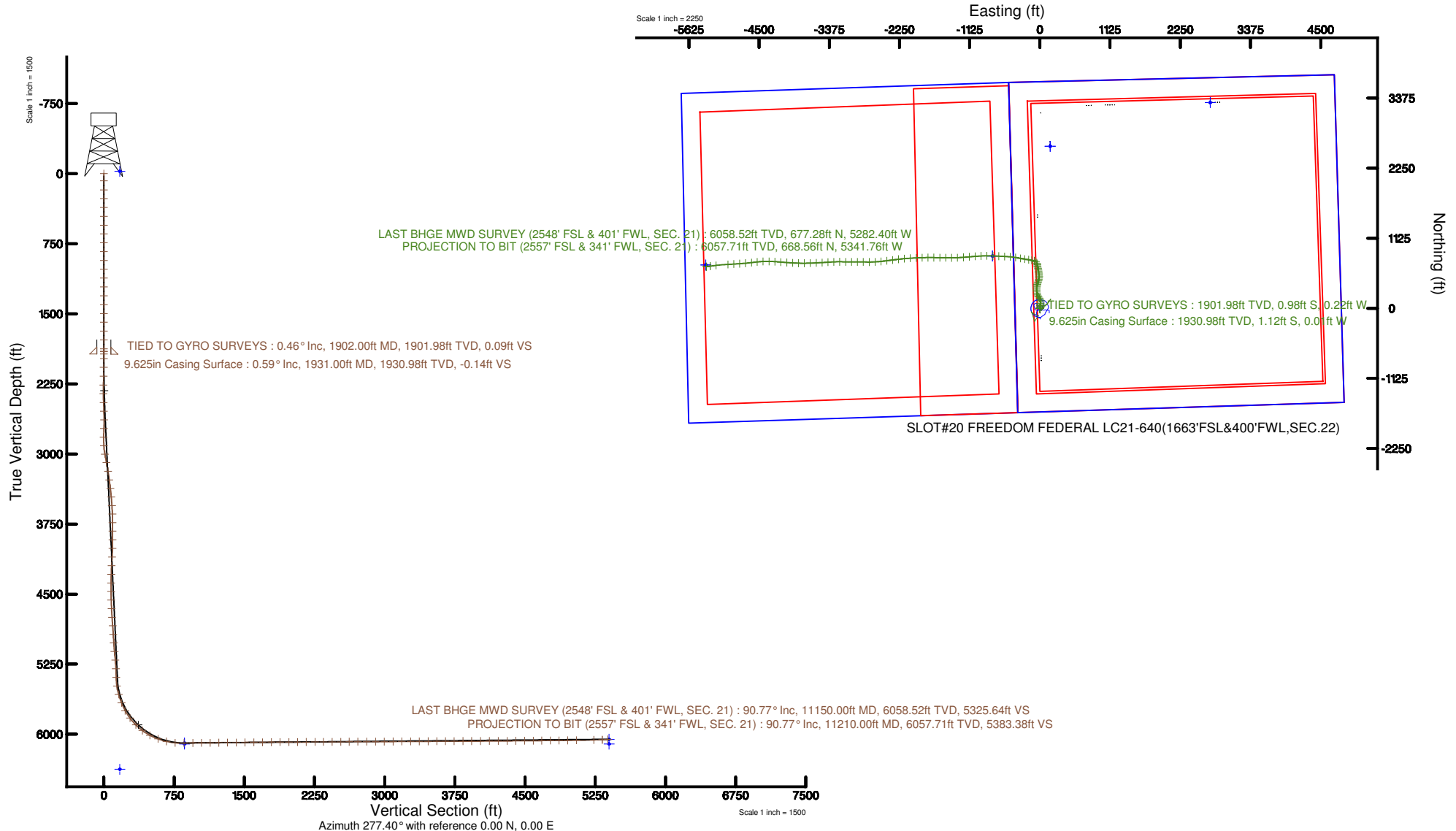
SURFACE LOCATION: NWSW  
 40.73343N  
 103.97207W  
 API #: 05-123-42804



**BAKER HUGHES**  
 a GE company



BGGM (1900.0 to 2019.0) Dip: 67.26° Field: 52668 nT  
 Magnetic North is 7.94 degrees East of True North (at 5/28/2017)  
 Grid North is 0.99 degrees East of True North  
 To correct azimuth from True to Grid subtract 0.99 degrees  
 To correct azimuth from Magnetic to Grid add 6.95 degrees





# Actual Wellpath Report

FREEDOM FEDERAL LC21-640 AWP

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## REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY, INC	Slot	SLOT#20 FREEDOM FEDERAL LC21-640(1663'FSL&400'FWL,SEC.22)
Area	COLORADO	Well	FREEDOM FEDERAL LC21-640
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-640 AWB
Facility	SEC.22-T09N-R59W		

## REPORT SETUP INFORMATION

Projection System	NAD83 / Lambert Colorado SP, Northern Zone (501), US feet	Software System	WellArchitect® 5.1
North Reference	Grid	User	Cantryat
Scale	0.999992	Report Generated	8/3/2017 at 9:44:15 AM
Convergence at slot	0.99° East	Database/Source file	Denver/FREEDOM_FEDERAL_LC21-640_AWP.xml

## WELLPATH LOCATION

	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	-3304.85	-2731.15	3423430.32	1513681.11	40°44'00.348"N	103°58'19.452"W
Facility Reference Pt			3426161.44	1516985.93	40°44'32.532"N	103°57'43.236"W
Field Reference Pt			3000000.00	4454105.15	48°46'34.315"N	105°30'00.000"W

## WELLPATH DATUM

Calculation method	Minimum curvature	H&P RIG (30'KB) (RKB) to Facility Vertical Datum	4913.00ft
Horizontal Reference Pt	Slot	H&P RIG (30'KB) (RKB) to Mean Sea Level	4913.00ft
Vertical Reference Pt	H&P RIG (30'KB) (RKB)	H&P RIG (30'KB) (RKB) to Ground Level at Slot (SLOT#20 FREEDOM FEDERAL LC21-640 (1663'FSL&400'FWL,SEC.22))	4913.00ft
MD Reference Pt	H&P RIG (30'KB) (RKB)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	277.13°



# Actual Wellpath Report

FREEDOM FEDERAL LC21-640 AWP

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REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#20 FREEDOM FEDERAL LC21-640(1663'FSL&400'FWL,SEC.22)
Area	COLORADO	Well	FREEDOM FEDERAL LC21-640
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-640 AWB
Facility	SEC.22-T09N-R59W		

## WELLPATH DATA (120 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
0.00	0.000	285.960	0.00	0.00	0.00	0.00	0.00	
78.00	0.170	285.960	78.00	0.11	0.03	-0.11	0.22	
175.00	0.170	304.810	175.00	0.38	0.15	-0.37	0.06	
267.00	0.420	40.250	267.00	0.32	0.49	-0.26	0.51	
362.00	0.370	43.830	362.00	-0.05	0.98	0.18	0.06	
456.00	0.190	270.560	456.00	-0.08	1.20	0.23	0.55	
551.00	0.570	170.810	550.99	-0.06	0.73	0.15	0.66	
645.00	0.260	155.660	644.99	-0.30	0.08	0.31	0.35	
740.00	0.050	284.800	739.99	-0.37	-0.11	0.36	0.31	
834.00	0.180	324.400	833.99	-0.23	0.02	0.23	0.15	
929.00	0.300	152.860	928.99	-0.27	-0.08	0.26	0.50	
1023.00	0.420	223.260	1022.99	-0.20	-0.55	0.14	0.45	
1118.00	0.140	191.830	1117.99	0.01	-0.92	-0.13	0.33	
1213.00	0.130	320.050	1212.99	0.10	-0.95	-0.22	0.26	
1307.00	0.190	146.010	1306.99	0.08	-1.00	-0.20	0.34	
1402.00	0.090	336.640	1401.99	0.01	-1.06	-0.14	0.29	
1497.00	0.260	335.700	1496.99	0.16	-0.79	-0.26	0.18	
1591.00	0.020	257.750	1590.99	0.29	-0.60	-0.36	0.27	
1685.00	0.190	200.800	1684.99	0.34	-0.75	-0.44	0.19	
1780.00	0.180	275.590	1779.99	0.53	-0.88	-0.64	0.24	
1875.00	0.440	99.110	1874.99	0.31	-0.93	-0.43	0.65	
1902.00	0.460	107.140	1901.98	0.10	-0.98	-0.22	0.24	TIED TO GYRO SURVEYS
1979.00	0.980	159.080	1978.98	-0.51	-1.68	0.31	1.02	
2073.00	0.890	86.820	2072.97	-1.61	-2.39	1.32	1.18	
2167.00	2.530	23.670	2166.93	-2.92	-0.45	2.89	2.42	
2262.00	4.860	25.320	2261.73	-4.77	5.11	5.45	2.45	
2357.00	7.200	4.370	2356.21	-5.74	14.68	7.62	3.34	
2451.00	8.950	350.750	2449.28	-3.40	27.78	6.90	2.75	
2546.00	10.060	357.580	2542.98	0.07	43.36	5.36	1.66	
2640.00	10.530	5.740	2635.47	1.64	60.11	5.87	1.63	



# Actual Wellpath Report

FREEDOM FEDERAL LC21-640 AWP

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REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#20 FREEDOM FEDERAL LC21-640(1663'FSL&400'FWL,SEC.22)
Area	COLORADO	Well	FREEDOM FEDERAL LC21-640
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-640 AWB
Facility	SEC.22-T09N-R59W		

## WELLPATH DATA (120 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
2735.00	13.020	16.730	2728.47	0.07	79.00	9.82	3.52	
2829.00	13.820	12.630	2819.91	-2.78	100.10	15.33	1.32	
2924.00	14.720	351.830	2912.04	-0.68	123.13	16.09	5.45	
3018.00	15.030	325.840	3002.99	10.53	145.06	7.54	7.05	
3112.00	13.750	318.480	3094.04	26.96	163.52	-6.71	2.37	
3207.00	13.750	325.530	3186.33	42.94	181.28	-20.58	1.76	
3302.00	14.610	335.510	3278.45	56.72	201.49	-31.94	2.72	
3396.00	14.940	342.790	3369.35	67.93	223.86	-40.44	2.00	
3491.00	14.760	345.830	3461.17	77.38	247.29	-47.03	0.84	
3585.00	14.940	352.190	3552.04	84.85	270.91	-51.61	1.74	
3680.00	14.780	359.010	3643.87	89.72	295.16	-53.48	1.85	
3775.00	14.830	7.340	3735.73	91.39	319.33	-52.14	2.24	
3869.00	13.800	9.140	3826.81	90.95	342.33	-48.82	1.19	
3964.00	13.160	7.080	3919.19	90.57	364.25	-45.69	0.84	
4058.00	11.580	11.490	4011.01	89.86	384.12	-42.49	1.96	
4153.00	12.700	24.680	4103.90	85.99	402.95	-36.23	3.14	
4248.00	12.800	20.780	4196.56	80.36	422.28	-28.13	0.91	
4342.00	13.410	15.200	4288.11	76.37	442.54	-21.58	1.49	
4437.00	13.770	9.510	4380.46	74.36	464.32	-16.82	1.46	
4531.00	13.790	5.080	4471.75	74.29	486.51	-13.98	1.12	
4626.00	13.760	0.400	4564.03	76.02	509.09	-12.90	1.17	
4720.00	13.780	355.130	4655.33	79.66	531.42	-13.77	1.33	
4815.00	13.780	351.490	4747.59	85.07	553.89	-16.41	0.91	
4910.00	13.690	351.320	4839.88	91.18	576.19	-19.78	0.10	
5004.00	13.830	352.050	4931.18	97.14	598.31	-23.01	0.24	
5098.00	13.810	351.140	5022.46	103.15	620.53	-26.29	0.23	
5193.00	13.430	347.090	5114.79	110.06	642.48	-30.51	1.08	
5288.00	12.400	338.850	5207.39	118.67	662.75	-36.65	2.22	
5382.00	11.770	356.150	5299.34	125.28	681.74	-40.94	3.90	
5477.00	12.850	0.730	5392.16	128.31	701.97	-41.45	1.53	



# Actual Wellpath Report

FREEDOM FEDERAL LC21-640 AWP

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## REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY, INC	Slot	SLOT#20 FREEDOM FEDERAL LC21-640(1663'FSL&400'FWL,SEC.22)
Area	COLORADO	Well	FREEDOM FEDERAL LC21-640
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-640 AWB
Facility	SEC.22-T09N-R59W		

## WELLPATH DATA (120 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
5572.00	15.510	336.260	5484.34	136.01	724.18	-46.44	6.84	
5666.00	18.860	311.910	5574.24	154.97	745.87	-62.83	8.36	
5761.00	21.920	290.540	5663.40	184.88	762.37	-90.91	8.42	
5855.00	28.630	279.960	5748.40	224.51	772.44	-129.58	8.58	
5949.00	36.520	278.700	5827.55	275.04	780.58	-179.49	8.42	
6044.00	45.920	278.200	5898.93	337.55	789.74	-241.35	9.90	
6138.00	52.620	282.450	5960.24	408.60	802.63	-311.33	7.91	
6233.00	61.890	278.950	6011.58	488.25	817.32	-389.76	10.24	
6328.00	70.440	273.880	6049.96	575.02	826.89	-476.01	10.24	
6422.00	77.140	273.190	6076.19	665.05	832.44	-566.05	7.16	
6517.00	84.200	272.820	6091.58	758.49	837.35	-659.61	7.44	
6611.00	91.850	271.930	6094.81	852.04	841.24	-753.40	8.19	
6706.00	90.680	270.120	6092.72	946.47	842.94	-848.36	2.27	
6801.00	90.400	266.980	6091.82	1040.39	840.53	-943.31	3.32	
6895.00	90.550	265.740	6091.04	1132.73	834.57	-1037.12	1.33	
6990.00	90.120	264.330	6090.49	1225.62	826.34	-1131.76	1.55	
7084.00	90.550	266.130	6089.94	1317.59	818.53	-1225.43	1.97	
7179.00	90.520	267.440	6089.05	1411.04	813.20	-1320.27	1.38	
7273.00	90.650	269.900	6088.09	1504.00	811.02	-1414.23	2.62	
7368.00	90.680	271.320	6086.99	1598.38	812.03	-1509.22	1.49	
7462.00	90.490	270.730	6086.03	1691.84	813.71	-1603.20	0.66	
7557.00	90.280	270.390	6085.39	1786.21	814.64	-1698.19	0.42	
7651.00	90.280	269.900	6084.93	1879.51	814.88	-1792.19	0.52	
7746.00	90.340	268.530	6084.42	1973.60	813.58	-1887.18	1.44	
7841.00	90.370	267.160	6083.83	2067.35	810.00	-1982.10	1.44	
7935.00	90.370	266.430	6083.22	2159.82	804.75	-2075.96	0.78	
8030.00	90.370	264.840	6082.61	2252.91	797.52	-2170.67	1.67	
8124.00	90.280	263.240	6082.07	2344.46	787.76	-2264.16	1.70	
8219.00	90.370	263.040	6081.53	2436.64	776.41	-2358.48	0.23	
8313.00	90.340	262.750	6080.95	2527.75	764.79	-2451.76	0.31	



# Actual Wellpath Report

FREEDOM FEDERAL LC21-640 AWP

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## REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY, INC	Slot	SLOT#20 FREEDOM FEDERAL LC21-640(1663'FSL&400'FWL,SEC.22)
Area	COLORADO	Well	FREEDOM FEDERAL LC21-640
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-640 AWP
Facility	SEC.22-T09N-R59W		

## WELLPATH DATA (120 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
8408.00	90.280	263.740	6080.44	2619.97	753.61	-2546.09	1.04	
8502.00	90.180	266.480	6080.06	2711.90	745.60	-2639.74	2.92	
8597.00	90.280	270.420	6079.68	2805.79	743.03	-2734.69	4.15	
8692.00	90.370	270.720	6079.14	2900.17	743.98	-2829.68	0.33	
8786.00	90.340	269.430	6078.56	2993.45	744.10	-2923.68	1.37	
8881.00	90.280	270.740	6078.04	3087.73	744.24	-3018.67	1.38	
8975.00	90.280	271.380	6077.58	3181.20	745.98	-3112.66	0.68	
9070.00	90.430	270.390	6077.00	3275.64	747.45	-3207.64	1.05	
9164.00	90.460	267.660	6076.27	3368.68	745.85	-3301.62	2.90	
9259.00	90.250	266.170	6075.68	3462.17	740.73	-3396.48	1.58	
9353.00	90.650	266.570	6074.94	3554.52	734.78	-3490.28	0.60	
9447.00	90.310	266.990	6074.15	3646.98	729.50	-3584.13	0.57	
9542.00	90.250	268.520	6073.69	3740.71	725.78	-3679.05	1.61	
9637.00	90.250	269.480	6073.27	3834.75	724.12	-3774.04	1.01	
9731.00	89.750	271.590	6073.27	3928.12	725.00	-3868.03	2.31	
9826.00	90.430	273.590	6073.12	4022.82	729.29	-3962.93	2.22	
9920.00	90.520	274.050	6072.34	4116.66	735.56	-4056.71	0.50	
10015.00	90.340	274.250	6071.63	4211.52	742.43	-4151.46	0.28	
10110.00	90.460	273.750	6070.97	4306.38	749.06	-4246.23	0.54	
10204.00	90.400	271.460	6070.26	4400.08	753.33	-4340.12	2.44	
10299.00	90.430	267.690	6069.57	4494.23	752.63	-4435.10	3.97	
10393.00	90.520	263.160	6068.79	4586.25	745.13	-4528.77	4.82	
10487.00	90.430	263.500	6068.01	4677.53	734.21	-4622.13	0.37	
10582.00	90.520	264.460	6067.23	4770.03	724.25	-4716.60	1.01	
10677.00	90.550	266.240	6066.34	4863.02	716.55	-4811.28	1.87	
10771.00	90.430	266.090	6065.54	4955.30	710.26	-4905.07	0.20	
10866.00	90.550	267.040	6064.72	5048.69	704.57	-4999.89	1.01	
11055.00	91.880	263.730	6060.72	5233.66	689.37	-5188.21	1.89	
11150.00	90.770	261.640	6058.52	5325.62	677.28	-5282.40	2.49	LAST BHGE MWD SURVEY (2548' FSL & 401' FWL, SEC. 21)
11210.00	90.770	261.640	6057.71	5383.44	668.56	-5341.76	0.00	PROJECTION TO BIT (2557' FSL & 341' FWL, SEC. 21)

## HOLE & CASING SECTIONS - Ref Wellbore: FREEDOM FEDERAL LC21-640 AWP Ref Wellpath: FREEDOM FEDERAL LC21-640 AWP

String/Diameter	Start MD [ft]	End MD [ft]	Interval [ft]	Start TVD [ft]	End TVD [ft]	Start N/S [ft]	Start E/W [ft]	End N/S [ft]	End E/W [ft]
9.625in Casing Surface	30.00	1931.00	1901.00	30.00	1930.98	0.00	-0.02	-1.12	-0.01
8.5in Open Hole	30.00	11210.00	11180.00	30.00	6057.71	0.00	-0.02	668.56	-5341.76

## TARGETS

Name	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
MAGPUL FEDERAL LC21-670 SECTION 21	-25.00	2600.94	165.82	3423596.13	1516282.03	40°44'26.016"N	103°58'16.716"W	polygon
DUKES FEDERAL LC10-745 SECTION 22	-11.00	3304.85	2731.15	3426161.44	1516985.93	40°44'32.532"N	103°57'43.236"W	polygon
FREEDOM FEDERAL LC21-640 REV-2 BHL(2530'FSL&330'FWL,SEC.21)	6053.90	695.41	-5353.15	3418077.21	1514376.51	40°44'08.124"N	103°59'28.824"W	point
FREEDOM FEDERAL LC21-640 REV-2 LANDING POINT (2530'FSL&332'FEL,SEC.21)	6094.00	840.00	-760.00	3422670.32	1514521.10	40°44'08.776"N	103°58'29.135"W	point
FREEDOM FEDERAL LC21-640 LANDING POINT (2530'FSL&332'FEL,SEC.21)	6104.00	840.00	-760.00	3422670.32	1514521.10	40°44'08.776"N	103°58'29.135"W	point
FREEDOM FEDERAL LC21-640 REV-1 BHL(2530'FSL&330'FWL,SEC.21)	6104.00	695.41	-5353.15	3418077.21	1514376.51	40°44'08.124"N	103°59'28.824"W	point
MAGPUL FEDERAL LC21-670 SECTION 21 HARDLINE (300'SETBACK)	6375.00	2600.94	165.82	3423596.13	1516282.03	40°44'26.016"N	103°58'16.716"W	polygon
DUKES FEDERAL LC10-745 SECTION 22 300' SETBACK	6489.00	3304.85	2731.15	3426161.44	1516985.93	40°44'32.532"N	103°57'43.236"W	polygon



# Actual Wellpath Report

FREEDOM FEDERAL LC21-640 AWP

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REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#20 FREEDOM FEDERAL LC21-640(1663'FSL&400'FWL,SEC.22)
Area	COLORADO	Well	FREEDOM FEDERAL LC21-640
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-640 AWB
Facility	SEC.22-T09N-R59W		

WELLPATH COMPOSITION - Ref Wellbore: FREEDOM FEDERAL LC21-640 AWB    Ref Wellpath: FREEDOM FEDERAL LC21-640 AWP				
Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
0.00	1902.00	Gyrodata standard - Drop gyro or Multi-shot	3rd Party Surface Gyro <78'-1902>	FREEDOM FEDERAL LC21-640 AWB
1902.00	11150.00	OWSG MWD rev2 + IFR1 + Multi-Station Correction	BHI/ATC OWSG MWD rev2+IFR1+MSA 8.5 " Hole <1979'-11150>	FREEDOM FEDERAL LC21-640 AWB
11150.00	11210.00	Blind Drilling (std)	Projection to bit	FREEDOM FEDERAL LC21-640 AWB

**Actual Wellpath Report**

FREEDOM FEDERAL LC21-640 AWP

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REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#20 FREEDOM FEDERAL LC21-640(1663'FSL&400'FWL,SEC.22)
Area	COLORADO	Well	FREEDOM FEDERAL LC21-640
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-640 AWB
Facility	SEC.22-T09N-R59W		

WELLPATH COMMENTS				
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Comment
1902.00	0.460	107.140	1901.98	TIED TO GYRO SURVEYS
11150.00	90.770	261.640	6058.52	LAST BHGE MWD SURVEY (2548' FSL & 401' FWL, SEC. 21)
11210.00	90.770	261.640	6057.71	PROJECTION TO BIT (2557' FSL & 341' FWL, SEC. 21)

**COMMENTS**

Wellpath general comments  
SURFACE LOCATION: NWSW  
40.73343N  
103.97207W  
API #: 05-123-42804