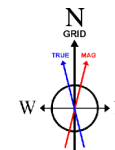


NOBLE ENERGY, INC

Location: COLORADO Slot: SLOT#21 FREEDOM FEDERAL LC21-635(1625'FSL&400'FWL,SEC.22)
 Field: WELD COUNTY (NOBLE NAD 83 GRID) Well: FREEDOM FEDERAL LC21-635
 Facility: SEC.22-T09N-R59W Wellbore: FREEDOM FEDERAL LC21-635 PWB



**BAKER
HUGHES**
a GE company

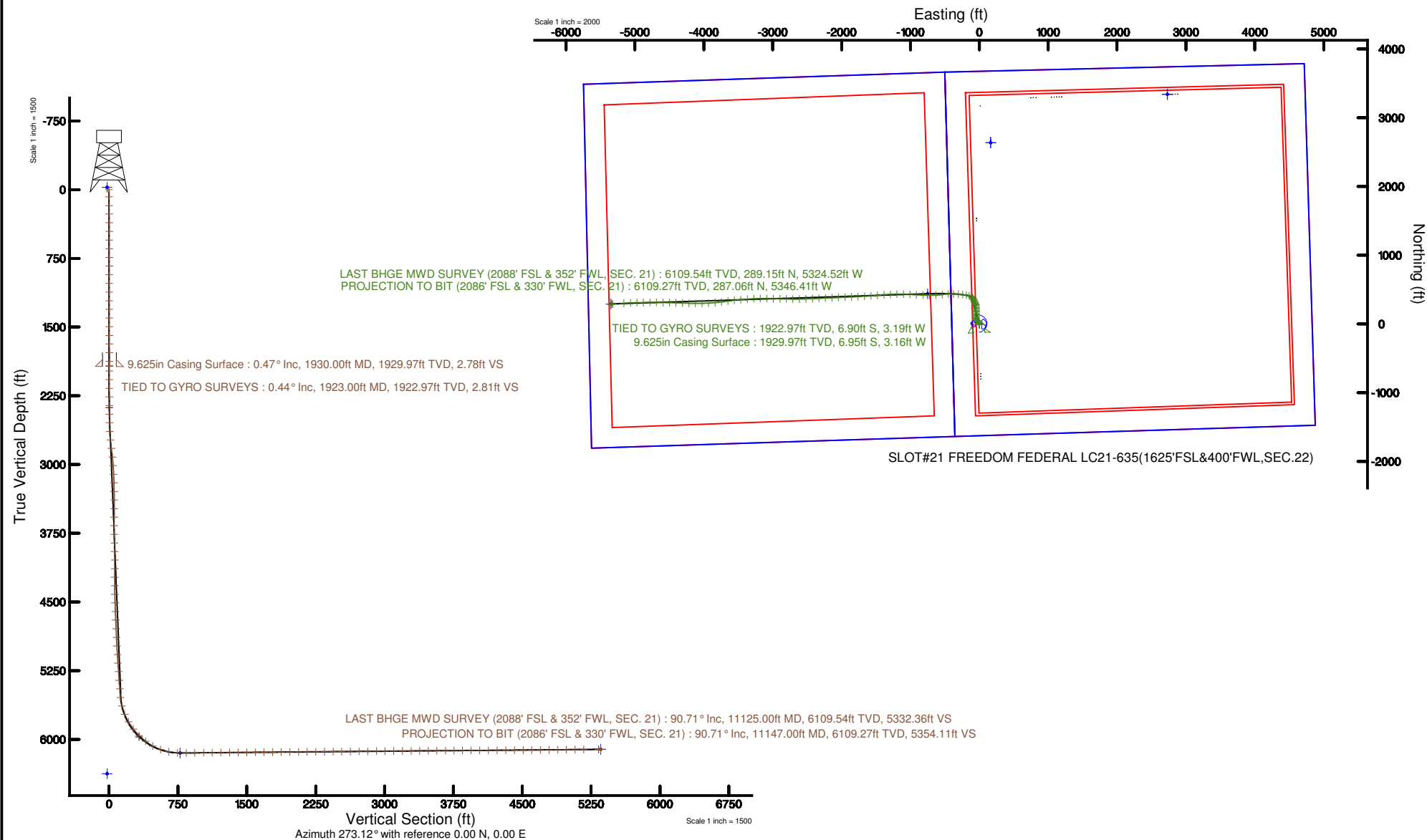


BGGM (1900.0 to 2019.0) Dip: 67.26° Field: 52662.8 nT
 Magnetic North is 7.93 degrees East of True North (at 7/14/2017)
 Grid North is 0.99 degrees East of True North
 To correct azimuth from True to Grid subtract 0.99 degrees
 To correct azimuth from Magnetic to Grid add 6.94 degrees

Plot reference wellbore is FREEDOM FEDERAL LC21-635 (REV C-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: 4013 feet	Depths are in feet
Mean Sea Level is Ground level (in feet) - SLOTH#1 FREEDOM FEDERAL LC21-635(1625'FSL&400'FWL,SEC.22) 0 feet	Created by: centryal on 2017-08-03
Coordinates are in feet referenced to State	Database: Datar

Comments

SURFACE LOCATION: NWSW
 40.73333N
 103.97207W
 API #: 05-123-42805





Actual Wellpath Report

FREEDOM FEDERAL LC21-635 AWP

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REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY, INC	Slot	SLOT#21 FREEDOM FEDERAL LC21-635(1625'FSL&400'FWL,SEC.22)
Area	COLORADO	Well	FREEDOM FEDERAL LC21-635
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-635 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 9:00:16 AM
Convergence at slot	0.99° East	Database/Source file	Denver/FREEDOM_FEDERAL_LC21-635_AWP.xml

WELLPATH LOCATION

	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	-3341.27	-2730.52	3423430.94	1513644.68	40°43'59.988"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#21 FREEDOM FEDERAL LC21-635 (1625'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	273.12°



Actual Wellpath Report

FREEDOM FEDERAL LC21-635 AWP

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REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#21 FREEDOM FEDERAL LC21-635(1625'FSL&400'FWL,SEC.22)
Area	COLORADO	Well	FREEDOM FEDERAL LC21-635
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-635 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	115.730	0.00	0.00	0.00	0.00	0.00	
78.00	0.090	115.730	78.00	-0.06	-0.03	0.06	0.12	
175.00	0.210	322.100	175.00	-0.01	0.08	0.01	0.30	
267.00	0.210	274.240	267.00	0.27	0.23	-0.26	0.19	
362.00	0.710	233.130	362.00	0.89	-0.11	-0.90	0.60	
456.00	0.410	235.230	455.99	1.61	-0.66	-1.64	0.32	
551.00	0.290	213.210	550.99	1.99	-1.05	-2.05	0.19	
645.00	0.710	212.440	644.99	2.40	-1.74	-2.50	0.45	
740.00	0.350	204.050	739.98	2.79	-2.50	-2.93	0.39	
834.00	0.280	125.890	833.98	2.70	-2.90	-2.86	0.43	
929.00	0.230	122.440	928.98	2.34	-3.14	-2.51	0.06	
1023.00	0.140	274.000	1022.98	2.29	-3.23	-2.47	0.38	
1118.00	0.260	113.000	1117.98	2.20	-3.31	-2.39	0.42	
1213.00	0.530	216.590	1212.98	2.24	-3.74	-2.45	0.68	
1307.00	0.110	173.480	1306.98	2.47	-4.18	-2.70	0.49	
1402.00	0.460	188.110	1401.97	2.48	-4.65	-2.74	0.37	
1497.00	0.430	197.920	1496.97	2.61	-5.37	-2.91	0.09	
1591.00	0.190	214.320	1590.97	2.78	-5.83	-3.10	0.27	
1685.00	0.180	145.720	1684.97	2.77	-6.08	-3.11	0.22	
1780.00	0.340	229.810	1779.97	2.89	-6.39	-3.24	0.39	
1875.00	0.190	142.740	1874.97	2.99	-6.70	-3.36	0.40	
1923.00	0.440	140.680	1922.97	2.81	-6.90	-3.19	0.52	TIED TO GYRO SURVEYS
1979.00	0.790	170.460	1978.96	2.58	-7.45	-2.99	0.83	
2073.00	0.850	178.240	2072.96	2.38	-8.78	-2.86	0.13	
2168.00	0.900	196.790	2167.94	2.50	-10.20	-3.06	0.30	
2262.00	1.520	347.410	2261.94	3.01	-9.69	-3.54	2.50	
2357.00	3.520	1.190	2356.84	3.45	-5.55	-3.76	2.18	
2451.00	5.300	7.910	2450.56	3.18	1.64	-3.10	1.97	
2546.00	7.140	358.660	2545.00	3.28	11.89	-2.63	2.20	
2640.00	7.830	336.400	2638.21	6.61	23.60	-5.33	3.15	



Actual Wellpath Report

FREEDOM FEDERAL LC21-635 AWP

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REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#21 FREEDOM FEDERAL LC21-635(1625'FSL&400'FWL,SEC.22)
Area	COLORADO	Well	FREEDOM FEDERAL LC21-635
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-635 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	8.690	319.520	2732.24	14.47	34.99	-12.59	2.70	
2829.00	7.840	299.820	2825.28	25.09	43.58	-22.76	3.13	
2924.00	6.360	293.740	2919.55	35.81	48.92	-33.20	1.75	
3018.00	7.260	328.670	3012.93	44.04	56.09	-41.06	4.43	
3113.00	7.830	341.480	3107.11	49.83	67.36	-46.23	1.86	
3207.00	7.690	351.160	3200.26	53.49	79.64	-49.23	1.40	
3302.00	8.140	359.990	3294.35	55.17	92.65	-50.21	1.36	
3396.00	8.310	1.040	3387.39	55.78	106.10	-50.09	0.24	
3491.00	8.250	4.490	3481.40	55.87	119.76	-49.43	0.53	
3586.00	8.390	5.600	3575.40	55.40	133.45	-48.22	0.22	
3680.00	8.300	2.440	3668.40	55.19	147.05	-47.26	0.50	
3775.00	8.350	356.700	3762.40	56.04	160.79	-47.37	0.88	
3870.00	8.300	351.140	3856.40	58.23	174.45	-48.82	0.85	
3964.00	8.180	354.740	3949.43	60.61	187.82	-50.48	0.56	
4059.00	8.170	5.600	4043.47	61.31	201.26	-50.44	1.62	
4153.00	8.180	6.160	4136.52	60.66	214.56	-49.07	0.09	
4248.00	8.170	1.250	4230.56	60.52	228.03	-48.20	0.73	
4342.00	8.220	358.370	4323.60	61.30	241.42	-48.24	0.44	
4437.00	8.150	353.440	4417.63	62.99	254.90	-49.21	0.74	
4531.00	7.320	350.480	4510.77	65.42	267.43	-50.96	0.98	
4626.00	7.150	344.820	4605.02	68.60	279.10	-53.51	0.77	
4720.00	7.050	339.740	4698.30	72.73	290.16	-57.04	0.68	
4815.00	7.100	341.540	4792.58	77.20	301.20	-60.91	0.24	
4910.00	7.350	345.630	4886.82	81.18	312.65	-64.28	0.60	
5004.00	7.260	338.230	4980.06	85.49	323.99	-67.98	1.00	
5099.00	7.410	335.220	5074.28	90.88	335.13	-72.77	0.43	
5193.00	7.570	332.870	5167.48	96.84	346.14	-78.13	0.37	
5288.00	7.290	328.490	5261.68	103.41	356.85	-84.14	0.66	
5383.00	7.200	329.280	5355.93	110.15	367.11	-90.33	0.14	
5477.00	7.120	331.790	5449.19	116.46	377.31	-96.09	0.34	



Actual Wellpath Report

FREEDOM FEDERAL LC21-635 AWP

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REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#21 FREEDOM FEDERAL LC21-635(1625'FSL&400'FWL,SEC.22)
Area	COLORADO	Well	FREEDOM FEDERAL LC21-635
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-635 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	7.500	325.360	5543.42	123.32	387.60	-102.40	0.95	
5667.00	16.260	295.550	5636.37	139.45	398.46	-117.97	10.97	
5761.00	23.800	288.000	5724.64	170.00	410.02	-147.93	8.46	
5855.00	30.250	279.590	5808.36	211.91	419.84	-189.37	7.96	
5950.00	37.900	273.270	5887.02	264.96	425.50	-242.19	8.86	
6044.00	44.530	277.210	5957.70	326.79	431.29	-303.79	7.57	
6139.00	51.570	273.000	6021.18	397.33	437.43	-374.11	8.11	
6233.00	61.040	265.370	6073.32	475.15	436.03	-452.12	12.12	
6328.00	71.880	262.990	6111.21	561.04	427.14	-538.62	11.64	
6422.00	79.410	266.880	6134.51	651.11	419.16	-629.25	8.96	
6517.00	86.920	270.200	6145.81	745.05	416.78	-723.46	8.63	
6612.00	90.460	272.840	6147.98	839.97	419.30	-818.38	4.65	
6706.00	90.520	273.390	6147.18	933.96	424.41	-912.24	0.59	
6801.00	90.740	272.880	6146.13	1028.96	429.60	-1007.09	0.58	
6895.00	90.520	271.010	6145.10	1122.93	432.79	-1101.03	2.00	
6990.00	90.650	269.310	6144.13	1217.79	433.06	-1196.02	1.79	
7084.00	90.550	267.400	6143.15	1311.46	430.36	-1289.97	2.03	
7179.00	90.430	266.220	6142.33	1405.88	425.07	-1384.82	1.25	
7273.00	90.340	265.200	6141.70	1499.09	418.04	-1478.55	1.09	
7368.00	90.340	265.110	6141.14	1593.17	410.02	-1573.21	0.09	
7462.00	90.590	266.520	6140.38	1686.40	403.16	-1666.95	1.52	
7557.00	90.340	266.810	6139.60	1780.80	397.63	-1761.79	0.40	
7651.00	90.710	267.870	6138.74	1874.32	393.27	-1855.68	1.19	
7746.00	90.430	267.690	6137.80	1968.90	389.59	-1950.61	0.35	
7841.00	90.550	267.530	6136.99	2063.46	385.63	-2045.52	0.21	
7935.00	90.620	267.260	6136.03	2156.99	381.36	-2139.42	0.30	
8030.00	90.490	267.450	6135.11	2251.50	376.97	-2234.31	0.24	
8124.00	90.550	266.870	6134.25	2344.99	372.32	-2328.19	0.62	
8219.00	90.490	267.860	6133.39	2439.51	367.95	-2423.09	1.04	
8313.00	90.460	267.870	6132.61	2533.11	364.45	-2517.02	0.03	



Actual Wellpath Report

FREEDOM FEDERAL LC21-635 AWP

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REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY, INC	Slot	SLOT#21 FREEDOM FEDERAL LC21-635(1625'FSL&400'FWL,SEC.22)
Area	COLORADO	Well	FREEDOM FEDERAL LC21-635
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-635 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
8408.00	90.460	268.750	6131.85	2627.77	361.64	-2611.97	0.93	
8503.00	90.590	270.650	6130.98	2722.59	361.15	-2706.96	2.00	
8597.00	90.490	271.210	6130.09	2816.52	362.67	-2800.95	0.61	
8692.00	90.620	271.750	6129.17	2911.48	365.13	-2895.91	0.58	
8786.00	90.490	272.090	6128.26	3005.45	368.28	-2989.85	0.39	
8881.00	90.680	271.110	6127.29	3100.41	370.93	-3084.81	1.05	
8976.00	90.620	268.390	6126.21	3195.23	370.51	-3179.79	2.86	
9070.00	90.520	266.410	6125.28	3288.76	366.25	-3273.69	2.11	
9164.00	90.680	266.370	6124.29	3382.10	360.33	-3367.50	0.18	
9259.00	90.520	265.360	6123.30	3476.34	353.48	-3462.24	1.08	
9353.00	89.940	264.220	6122.92	3569.34	344.95	-3555.85	1.36	
9448.00	90.400	261.600	6122.64	3662.83	333.22	-3650.12	2.80	
9542.00	90.340	263.410	6122.03	3755.22	320.96	-3743.31	1.93	
9637.00	90.340	264.690	6121.47	3849.03	311.11	-3837.79	1.35	
9731.00	90.370	266.710	6120.89	3942.24	304.07	-3931.52	2.15	
9826.00	90.150	268.370	6120.46	4036.78	299.99	-4026.43	1.76	
9921.00	90.120	270.850	6120.23	4131.60	299.34	-4121.42	2.61	
10015.00	90.400	271.670	6119.81	4225.55	301.41	-4215.39	0.92	
10110.00	90.460	272.220	6119.09	4320.52	304.63	-4310.34	0.58	
10204.00	90.460	271.900	6118.34	4414.50	308.01	-4404.27	0.34	
10299.00	90.520	271.010	6117.52	4509.46	310.42	-4499.24	0.94	
10393.00	90.460	270.700	6116.72	4603.38	311.83	-4593.22	0.34	
10488.00	90.370	270.330	6116.03	4698.28	312.68	-4688.22	0.40	
10582.00	90.620	269.700	6115.22	4792.14	312.71	-4782.21	0.72	
10677.00	90.710	268.660	6114.12	4886.91	311.35	-4877.20	1.10	
10771.00	90.580	268.690	6113.06	4980.62	309.17	-4971.16	0.14	
10866.00	90.430	267.350	6112.22	5075.24	305.89	-5066.10	1.42	
10961.00	90.580	267.010	6111.39	5169.73	301.22	-5160.98	0.39	
11125.00	90.710	264.550	6109.54	5332.36	289.15	-5324.52	1.50	LAST BHGE MWD SURVEY (2088' FSL & 352' FWL, SEC. 21)
11147.00	90.710	264.550	6109.27	5354.11	287.06	-5346.41	0.00	PROJECTION TO BIT (2086' FSL & 330' FWL, SEC. 21)

HOLE & CASING SECTIONS - Ref Wellbore: FREEDOM FEDERAL LC21-635 AWB Ref Wellpath: FREEDOM FEDERAL LC21-635 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	1930.00	1900.00	30.00	1929.97	0.00	0.01	-6.95	-3.16
8.5in Open Hole	30.00	11149.00	11119.00	30.00	N/A	0.00	0.01	N/A	N/A

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	2637.37	165.19	3423596.13	1516282.03	40°44'26.016"N	103°58'16.716"W	polygon
DUKES FEDERAL LC10-745 SECTION 22	-11.00	3341.28	2730.53	3426161.44	1516985.93	40°44'32.532"N	103°57'43.236"W	polygon
FREEDOM FEDERAL LC21-635 REV-2 BHL(2090'FSL&330'FWL,SEC.21)	6108.88	291.06	-5346.28	3418084.71	1513935.74	40°44'03.768"N	103°59'28.824"W	point
FREEDOM FEDERAL LC21-635 REV-2 LANDING (2089'FSL&332'FEL,SEC.21)	6149.00	439.50	-751.30	3422679.65	1514084.18	40°44'04.458"N	103°58'29.111"W	point
MAGPUL FEDERAL LC21-670 SECTION 21 HARDLINE (300'SETBACK)	6375.00	2637.37	165.19	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	3341.28	2730.53	3426161.44	1516985.93	40°44'32.532"N	103°57'43.236"W	polygon

WELLPATH COMPOSITION - Ref Wellbore: FREEDOM FEDERAL LC21-635 AWB Ref Wellpath: FREEDOM FEDERAL LC21-635 AWP

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
0.00	1923.00	Gyrodata standard - Drop gyro or Multi-shot	3rd Party Surface Gyro <78'-1923>	FREEDOM FEDERAL LC21-635 AWB
1923.00	11125.00	OWSG MWD rev2 + IFR1 + Multi-Station Correction	BHI/ATC 8.5" Hole OWSG MWD rev2+IFR1+MSA <1979'-11125>	FREEDOM FEDERAL LC21-635 AWB
11125.00	11147.00	Blind Drilling (std)	Projection to bit	FREEDOM FEDERAL LC21-635 AWB

**Actual Wellpath Report**

FREEDOM FEDERAL LC21-635 AWP

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REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#21 FREEDOM FEDERAL LC21-635(1625'FSL&400'FWL,SEC.22)
Area	COLORADO	Well	FREEDOM FEDERAL LC21-635
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-635 AWB
Facility	SEC.22-T09N-R59W		

WELLPATH COMMENTS				
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Comment
1923.00	0.440	140.680	1922.97	TIED TO GYRO SURVEYS
11125.00	90.710	264.550	6109.54	LAST BHGE MWD SURVEY (2088' FSL & 352' FWL, SEC. 21)
11147.00	90.710	264.550	6109.27	PROJECTION TO BIT (2086' FSL & 330' FWL, SEC. 21)

COMMENTS

Wellpath general comments
SURFACE LOCATION: NWSW
40.73333N
103.97207W
API #: 05-123-42805