

# NOBLE ENERGY, INC

Location: COLORADO Slot: SLOT#22 FREEDOM FEDERAL LC21-630(1588°FSL&399°FWL,SEC.22)  
Field: WELD COUNTY (NOBLE NAD 83 GRID) Well: FREEDOM FEDERAL LC21-630  
Facility: SEC 22-T09N-R59W Wellbore: FREEDOM FEDERAL LC21-630 PWB

This reference wellbore is FREEDOM FEDERAL LC21-630 (REV 5.0) PWB	Grid System: NAD83 (Lambert Colorado SP, Northern Zone 501), US feet
True vertical depths are referenced to H&P RIG (2016), (RIG)	North Reference: Grid north
Measured depths are referenced to H&P RIG (2016), (RIG)	Scale: True distance
H&P RIG (2016), (RIG) to Mean Sea Level: 4912 feet	Depths are in feet
Mean Sea Level to Ground level (At Slot) SLOT#22 FREEDOM FEDERAL LC21-630(1588°FSL&399°FWL,SEC.22) is feet	Created by: cadmyl on 2017-08-02
Coordinates are in feet referenced to Slot	Customer: Denver

## Comments

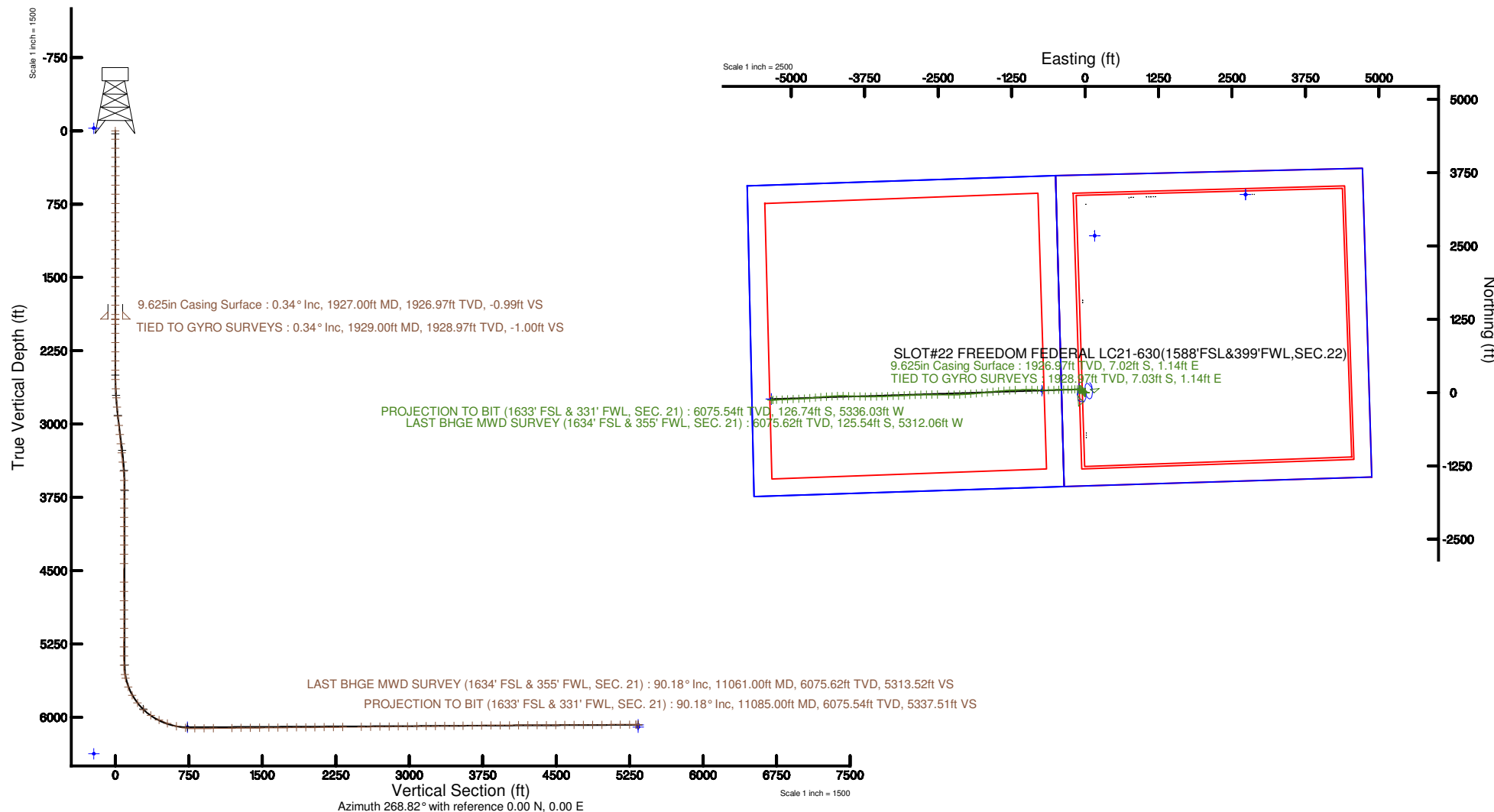
SURFACE LOCATION: NWSW  
40.73323N  
103.97207W  
API #: 05-123-42803



**BAKER  
HUGHES**  
a GE company



BGGM (1900.0 to 2019.0) Dip: 67.26° Field: 52665.7 nT  
Magnetic North is 7.94 degrees East of True North (at 7/5/2017)  
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 LC21-630 AWP

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REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#22 FREEDOM FEDERAL LC21-630(1588'FSL&399'FWL,SEC.22)
Area	COLORADO	Well	FREEDOM FEDERAL LC21-630
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-630 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	8/2/2017 at 12:01:07 PM
Convergence at slot	0.99° East	Database/Source file	Denver/FREEDOM_FEDERAL_LC21-630_AWP.xml

WELLPATH LOCATION						
	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	-3377.70	-2729.90	3423431.57	1513608.26	40°43'59.628"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	4912.00ft
Horizontal Reference Pt	Slot	H&P RIG (30'KB) (RKB) to Mean Sea Level	4912.00ft
Vertical Reference Pt	H&P RIG (30'KB) (RKB)	H&P RIG (30'KB) (RKB) to Ground Level at Slot (SLOT#22 FREEDOM FEDERAL LC21-630 (1588'FSL&399'FWL,SEC.22))	4912.00ft
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	268.82°



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FREEDOM FEDERAL LC21-630 AWP

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## REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY, INC	Slot	SLOT#22 FREEDOM FEDERAL LC21-630(1588'FSL&399'FWL,SEC.22)
Area	COLORADO	Well	FREEDOM FEDERAL LC21-630
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-630 AWB
Facility	SEC.22-T09N-R59W		

## WELLPATH DATA (118 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]
0.00	0.000	184.190	0.00	0.00	0.00	0.00	0.00
84.94	0.260	184.190	84.94	0.02	-0.19	-0.01	0.31
178.64	0.540	199.010	178.64	0.19	-0.82	-0.17	0.32
270.39	0.480	220.200	270.38	0.59	-1.52	-0.56	0.21
365.09	0.330	213.350	365.08	1.01	-2.05	-0.97	0.17
459.65	0.240	119.750	459.64	0.99	-2.38	-0.95	0.44
554.90	0.160	167.690	554.89	0.80	-2.61	-0.74	0.19
648.67	0.290	200.010	648.66	0.86	-2.96	-0.80	0.19
743.14	0.370	137.120	743.13	0.74	-3.41	-0.67	0.37
837.66	0.320	57.120	837.65	0.31	-3.49	-0.24	0.47
932.18	0.030	306.430	932.17	0.11	-3.33	-0.04	0.35
1026.87	0.060	316.660	1026.86	0.16	-3.28	-0.09	0.03
1121.38	0.150	115.210	1121.37	0.08	-3.30	-0.02	0.22
1216.23	0.100	155.940	1216.22	-0.06	-3.43	0.13	0.10
1310.96	0.570	147.290	1310.94	-0.34	-3.90	0.42	0.50
1405.43	0.390	167.140	1405.41	-0.65	-4.61	0.74	0.26
1500.10	0.530	176.870	1500.08	-0.73	-5.36	0.84	0.17
1594.43	0.210	207.590	1594.41	-0.66	-5.95	0.78	0.39
1688.96	0.280	201.980	1688.93	-0.49	-6.31	0.62	0.08
1783.69	0.230	97.090	1783.66	-0.58	-6.55	0.72	0.43
1878.16	0.290	148.590	1878.13	-0.89	-6.78	1.03	0.25
1929.00	0.340	163.290	1928.97	-1.00	-7.03	1.14	0.19
1978.00	0.350	174.860	1977.97	-1.05	-7.32	1.20	0.14
2072.00	0.070	267.300	2071.97	-1.01	-7.61	1.16	0.38
2166.00	0.110	275.230	2165.97	-0.86	-7.61	1.02	0.04
2261.00	0.130	262.990	2260.97	-0.66	-7.61	0.82	0.03
2355.00	0.040	187.300	2354.97	-0.55	-7.66	0.71	0.13
2450.00	0.100	343.970	2449.97	-0.53	-7.61	0.68	0.14
2545.00	1.520	286.710	2544.96	0.69	-7.17	-0.55	1.55
2639.00	3.320	299.390	2638.87	4.22	-5.47	-4.11	1.99



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FREEDOM FEDERAL LC21-630 AWP

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REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#22 FREEDOM FEDERAL LC21-630(1588'FSL&399'FWL,SEC.22)
Area	COLORADO	Well	FREEDOM FEDERAL LC21-630
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-630 AWB
Facility	SEC.22-T09N-R59W		

WELLPATH DATA (118 stations)							
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]
2733.00	5.050	310.330	2732.62	9.67	-1.46	-9.64	2.02
2828.00	7.470	315.890	2827.05	17.01	5.68	-17.13	2.62
2922.00	8.220	313.010	2920.17	25.99	14.65	-26.29	0.90
3017.00	8.130	310.120	3014.20	35.90	23.61	-36.40	0.44
3111.00	8.180	311.620	3107.25	45.80	32.34	-46.48	0.23
3206.00	8.190	316.630	3201.28	55.31	41.75	-56.18	0.75
3300.00	8.240	311.820	3294.32	64.73	51.11	-65.80	0.73
3395.00	6.830	289.030	3388.52	75.02	57.49	-76.21	3.45
3490.00	4.690	245.200	3483.08	83.88	57.70	-85.08	4.98
3584.00	3.570	214.470	3576.84	89.11	53.68	-90.23	2.59
3679.00	1.090	122.060	3671.78	90.08	50.76	-91.14	3.97
3774.00	0.060	136.520	3766.77	89.29	50.24	-90.34	1.09
3868.00	0.130	179.350	3860.77	89.25	50.10	-90.30	0.10
3963.00	0.250	103.280	3955.77	89.05	49.94	-90.10	0.27
4057.00	0.190	67.430	4049.77	88.71	49.96	-89.76	0.16
4152.00	0.090	162.810	4144.77	88.54	49.95	-89.59	0.23
4246.00	0.090	132.740	4238.77	88.47	49.83	-89.51	0.05
4341.00	0.100	33.040	4333.77	88.37	49.84	-89.41	0.15
4436.00	0.160	99.020	4428.77	88.19	49.89	-89.24	0.16
4625.00	0.030	181.510	4617.77	87.93	49.80	-88.98	0.08
4719.00	0.220	341.140	4711.77	87.99	49.95	-89.03	0.26
4814.00	0.190	198.940	4806.77	88.10	49.97	-89.15	0.41
4909.00	0.030	271.500	4901.77	88.18	49.82	-89.22	0.19
5003.00	0.060	295.590	4995.77	88.25	49.85	-89.29	0.04
5097.00	0.290	296.490	5089.77	88.50	49.97	-89.55	0.24
5192.00	0.570	70.870	5184.77	88.27	50.23	-89.32	0.84
5287.00	0.340	197.380	5279.76	87.91	50.12	-88.95	0.86
5381.00	0.100	4.880	5373.76	87.99	49.94	-89.03	0.47
5476.00	0.480	267.360	5468.76	88.38	50.00	-89.42	0.53
5570.00	10.130	275.350	5562.25	97.00	50.76	-98.06	10.27



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REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#22 FREEDOM FEDERAL LC21-630(1588'FSL&399'FWL,SEC.22)
Area	COLORADO	Well	FREEDOM FEDERAL LC21-630
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-630 AWB
Facility	SEC.22-T09N-R59W		

WELLPATH DATA (118 stations)								
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	
5608.00	13.410	280.220	5599.45	104.64	51.85	-105.73	9.01	
5703.00	20.820	274.780	5690.18	132.27	55.22	-133.44	7.97	
5797.00	29.810	267.090	5775.09	172.34	55.42	-173.51	10.16	
5892.00	38.210	267.390	5853.77	225.41	52.88	-226.54	8.84	
5986.00	47.050	269.600	5922.86	289.00	51.31	-290.11	9.54	
6080.00	56.140	269.230	5981.20	362.58	50.55	-363.69	9.68	
6175.00	64.740	268.320	6028.02	445.13	48.75	-446.23	9.09	
6269.00	70.080	267.570	6064.12	531.88	45.63	-532.93	5.73	
6364.00	75.880	267.180	6091.91	622.65	41.47	-623.63	6.12	
6460.00	83.610	270.760	6109.00	717.03	39.81	-718.00	8.85	
6554.00	90.430	274.120	6113.88	810.65	43.81	-811.72	8.08	
6649.00	90.620	271.620	6113.01	905.40	48.57	-906.59	2.64	
6743.00	90.650	268.670	6111.97	999.36	48.80	-1000.57	3.14	
6933.00	90.520	267.320	6110.03	1189.32	42.16	-1190.44	0.71	
7027.00	90.550	266.930	6109.15	1283.28	37.44	-1284.32	0.42	
7122.00	90.550	265.320	6108.24	1378.16	31.02	-1379.09	1.69	
7216.00	90.550	265.020	6107.34	1471.97	23.11	-1472.75	0.32	
7311.00	90.550	263.740	6106.42	1566.68	13.81	-1567.29	1.35	
7405.00	90.550	264.060	6105.52	1660.32	3.82	-1660.75	0.34	
7500.00	90.430	265.240	6104.71	1755.07	-5.04	-1755.33	1.25	
7594.00	90.490	265.150	6103.96	1848.88	-12.91	-1849.00	0.12	
7689.00	90.520	265.550	6103.12	1943.70	-20.61	-1943.68	0.42	
7783.00	90.460	266.150	6102.31	2037.57	-27.42	-2037.43	0.64	
7878.00	90.520	268.050	6101.50	2132.52	-32.22	-2132.30	2.00	
7973.00	90.590	269.500	6100.58	2227.51	-34.25	-2227.28	1.53	
8067.00	90.620	270.370	6099.59	2321.49	-34.36	-2321.27	0.93	
8256.00	90.430	270.250	6097.86	2510.41	-33.34	-2510.26	0.12	
8351.00	90.580	269.970	6097.02	2605.39	-33.16	-2605.25	0.33	
8445.00	90.650	268.840	6096.01	2699.37	-34.13	-2699.24	1.20	
8540.00	90.620	268.060	6094.96	2794.37	-36.70	-2794.20	0.82	



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REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#22 FREEDOM FEDERAL LC21-630(1588'FSL&399'FWL,SEC.22)
Area	COLORADO	Well	FREEDOM FEDERAL LC21-630
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-630 AWB
Facility	SEC.22-T09N-R59W		

WELLPATH DATA (118 stations)							
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]
8634.00	90.740	267.710	6093.84	2888.35	-40.17	-2888.13	0.39
8729.00	90.620	267.100	6092.71	2983.31	-44.47	-2983.03	0.65
8824.00	90.580	267.270	6091.72	3078.27	-49.14	-3077.91	0.18
8918.00	90.590	267.750	6090.76	3172.24	-53.22	-3171.81	0.51
9013.00	90.590	267.430	6089.78	3267.21	-57.21	-3266.72	0.34
9107.00	90.620	267.830	6088.79	3361.18	-61.10	-3360.64	0.43
9202.00	90.550	268.490	6087.82	3456.17	-64.15	-3455.58	0.70
9296.00	90.710	269.180	6086.79	3550.17	-66.06	-3549.56	0.75
9391.00	90.680	269.750	6085.63	3645.15	-66.95	-3644.55	0.60
9485.00	90.490	269.550	6084.67	3739.14	-67.52	-3738.54	0.29
9579.00	90.740	271.660	6083.66	3833.08	-66.53	-3832.52	2.26
9674.00	90.150	272.670	6082.93	3927.91	-62.94	-3927.45	1.23
9769.00	90.400	272.460	6082.47	4022.71	-58.69	-4022.35	0.34
9863.00	90.370	270.470	6081.84	4116.60	-56.29	-4116.32	2.12
9958.00	90.280	267.300	6081.30	4211.59	-58.14	-4211.28	3.34
10052.00	90.310	266.000	6080.82	4305.52	-63.63	-4305.12	1.38
10147.00	90.280	266.030	6080.33	4400.40	-70.23	-4399.89	0.04
10242.00	90.340	264.970	6079.81	4495.24	-77.68	-4494.59	1.12
10336.00	90.310	264.980	6079.28	4589.03	-85.92	-4588.23	0.03
10431.00	90.310	265.480	6078.77	4683.84	-93.82	-4682.90	0.53
10525.00	90.180	266.410	6078.36	4777.72	-100.46	-4776.66	1.00
10619.00	90.310	267.190	6077.96	4871.66	-105.71	-4870.52	0.84
10714.00	90.280	267.590	6077.47	4966.63	-110.04	-4965.42	0.42
10809.00	90.370	267.490	6076.93	5061.60	-114.12	-5060.33	0.14
10903.00	90.370	267.740	6076.33	5155.58	-118.03	-5154.24	0.27
10998.00	90.220	267.050	6075.84	5250.55	-122.34	-5249.14	0.74
11061.00	90.180	267.130	6075.62	5313.52	-125.54	-5312.06	0.14
11085.00	90.180	267.130	6075.54	5337.51	-126.74	-5336.03	0.00



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Area	COLORADO	Well	FREEDOM FEDERAL LC21-630
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-630 AWB
Facility	SEC.22-T09N-R59W		

## HOLE & CASING SECTIONS - Ref Wellbore: FREEDOM FEDERAL LC21-630 AWB Ref Wellpath: FREEDOM FEDERAL LC21-630 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	1927.00	1897.00	30.00	1926.97	-0.02	0.00	-7.02	1.14
8.5in Open Hole	30.00	11085.00	11055.00	30.00	6075.54	-0.02	0.00	-126.74	-5336.03

## 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	-26.00	2673.80	164.56	3423596.13	1516282.03	40°44'26.016"N	103°58'16.716"W	polygon
DUKES FEDERAL LC10-745 SECTION 22	-12.00	3377.71	2729.90	3426161.44	1516985.93	40°44'32.532"N	103°57'43.236"W	polygon
FREEDOM FEDERAL LC21-630 REV-2 BHL(1650'FSL&330'FWL,SEC.21)	6077.90	-109.60	-5336.70	3418094.92	1513498.65	40°43'59.448"N	103°59'28.788"W	point
FREEDOM FEDERAL LC21-630 LANDING POINT (1652'FSL&330'FEL,SEC.21)	6102.00	35.00	-736.30	3422695.28	1513643.26	40°44'00.099"N	103°58'29.007"W	point
FREEDOM FEDERAL LC21-630 REV-1 BHL(1650'FSL&330'FWL,SEC.21)	6102.00	-109.60	-5336.70	3418094.92	1513498.65	40°43'59.448"N	103°59'28.788"W	point
MAGPUL FEDERAL LC21-670 SECTION 21 HARDLINE (300'SETBACK)	6374.00	2673.80	164.56	3423596.13	1516282.03	40°44'26.016"N	103°58'16.716"W	polygon
DUKES FEDERAL LC10-745 SECTION 22 300' SETBACK	6488.00	3377.71	2729.90	3426161.44	1516985.93	40°44'32.532"N	103°57'43.236"W	polygon



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Area	COLORADO	Well	FREEDOM FEDERAL LC21-630
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	FREEDOM FEDERAL LC21-630 AWB
Facility	SEC.22-T09N-R59W		

WELLPATH COMPOSITION - Ref Wellbore: FREEDOM FEDERAL LC21-630 AWB      Ref Wellpath: FREEDOM FEDERAL LC21-630 AWP				
Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
0.00	1878.16	BHI Generic gyro - northseeking (Standard)	Surface MWD Surveys <84.94'-1878.16'>	FREEDOM FEDERAL LC21-630 AWB
1878.16	11061.00	OWSG MWD rev2 + IFR1 + Sag + Multi-Station Correction	BHI/ATC OWSG MWD rev2+IFR1+MSA <1929'-11061'>	FREEDOM FEDERAL LC21-630 AWB
11061.00	11085.00	Blind Drilling (std)	Projection to bit	FREEDOM FEDERAL LC21-630 AWB