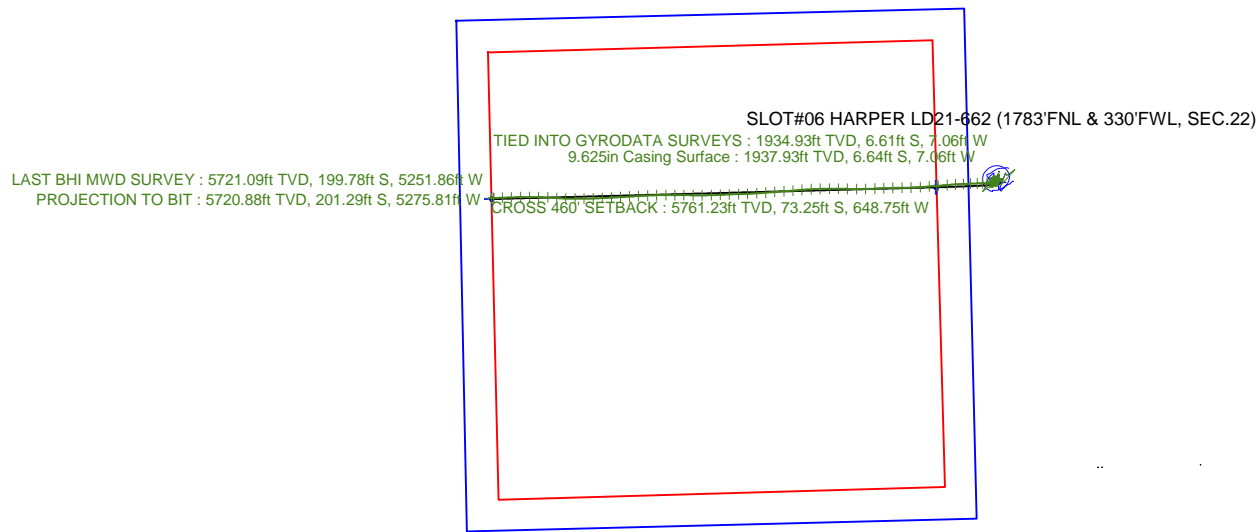


Scale 1 inch = 2000

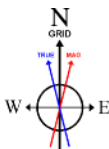
Easting (ft) -15000 -14000 -13000 -12000 -11000 -10000 -9000 -8000 -7000 -6000 -5000 -4000 -3000 -2000 -1000 0 1000 2000 3000

2000
1000
0
-1000
-2000
-3000
Northing (ft)



Scale 1 inch = 1500
2250
3000
3750
4500
5250
6000
True Vertical Depth (ft)

TIED INTO GYRODATA SURVEYS : 0.63° Inc, 1935.00ft MD, 1934.93ft TVD, 7.32ft VS
9.625in Casing Surface : 0.58° Inc, 1938.00ft MD, 1937.93ft TVD, 7.32ft VS



BGGM (1900.0 to 2018.0) Dip: 67.33° Field: 52800.1 nT
Magnetic North is 7.94 degrees East of True North (at 8/23/16)
Grid North is 1.06 degrees East of True North
To correct azimuth from True to Grid subtract 1.06 degrees
To correct azimuth from Magnetic to Grid add 6.88 degrees

CROSS 460' SETBACK : 86.51° Inc, 6067.00ft MD, 5761.23ft TVD, 651.15ft VS

LAST BHI MWD SURVEY : 90.49° Inc, 10675.00ft MD, 5721.09ft TVD, 5255.65ft VS
PROJECTION TO BIT : 90.49° Inc, 10699.00ft MD, 5720.88ft TVD, 5279.65ft VS

NOBLE ENERGY, INC

Location: COLORADO Slot: SLOT#06 HARPER LD21-662 (1783'FNL & 330'FWL, SEC.22)
Field: WELD COUNTY (NOBLE NAD 83 GRID) Well: HARPER LD21-662
Facility: SEC.22-T09N-R58W Wellbore: HARPER LD21-662 PWB

Plot reference wellpath is HARPER LD21-662 (REV-C.O. A-MARL NIO) PWP	Grid System: NAD83 / Lambert Colorado SP, Northern Zone (501), US feet
True vertical depths are referenced to H&P 517 (30KB) (RKB)	* = Wellpath was transformed from a different geodetic datum
Measured depths are referenced to H&P 517 (30KB) (RKB)	North Reference: Grid north
H&P 517 (30KB) (RKB) to Mean Sea Level: 4807 feet	Scale: True distance
Mean Sea Level to Mud line (At Slot: SLOT#06 HARPER LD21-662 (1783'FNL & 330'FWL, SEC.22)): 0 feet	Depths are in feet
Coordinates are in feet referenced to Slot	Created by: cookdanm on 2016-09-23
	Database: WA_DEN_Denver_Defn

Vertical Section (ft) 0 750 1500 2250 3000 3750 4500 5250 6000 6750 7500 8250 9000 9750 10500 11250 12000
Azimuth 267.72° with reference 0.00 N, 0.00 E

Scale 1 inch = 1500

REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#06 HARPER LD21-662 (1783'FNL & 330'FWL, SEC.22)
Area	COLORADO	Well	HARPER LD21-662
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	HARPER LD21-662 AWB
Facility	SEC.22-T09N-R58W		

REPORT SETUP INFORMATION			
Projection System	NAD83 / Lambert Colorado SP, Northern Zone (501), US feet	Software System	WellArchitect® 5.0
North Reference	Grid	User	Cookdanm
Scale	0.999993	Report Generated	9/23/16 at 12:33:02 PM
Convergence at slot	1.07° East	Database/Source file	WA_DEN_Denver_Defn/HARPER_LD21-662_AWP.xml

WELLPATH LOCATION						
	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	3005.32	-1034.16	3454900.35	1516327.90	40°44'20.940"N	103°51'30.096"W
Facility Reference Pt			3455934.50	1513322.61	40°43'51.060"N	103°51'17.388"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 517 (30'KB) (RKB) to Facility Vertical Datum	4807.00ft
Horizontal Reference Pt	Slot	H&P 517 (30'KB) (RKB) to Mean Sea Level	4807.00ft
Vertical Reference Pt	H&P 517 (30'KB) (RKB)	H&P 517 (30'KB) (RKB) to Mud Line at Slot (SLOT#06 HARPER LD21-662 (1783'FNL & 330'FWL, SEC.22))	4807.00ft
MD Reference Pt	H&P 517 (30'KB) (RKB)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	267.72°

REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#06 HARPER LD21-662 (1783'FNL & 330'FWL, SEC.22)
Area	COLORADO	Well	HARPER LD21-662
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	HARPER LD21-662 AWB
Facility	SEC.22-T09N-R58W		

WELLPATH DATA (96 stations)								
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
1935.00	0.630	176.580	1934.93	7.32	-6.61	-7.06	0.14	TIED INTO GYRODATA SURVEYS
1981.00	0.310	58.890	1980.93	7.21	-6.80	-6.94	1.79	
2076.00	0.100	333.720	2075.93	7.02	-6.59	-6.76	0.33	
2170.00	0.030	46.040	2169.93	7.03	-6.50	-6.78	0.10	
2265.00	0.150	206.730	2264.93	7.07	-6.59	-6.82	0.19	
2359.00	0.040	113.940	2358.93	7.10	-6.72	-6.84	0.17	
2454.00	2.020	230.460	2453.91	8.41	-7.79	-8.10	2.15	
2548.00	2.060	232.620	2547.85	11.11	-9.87	-10.72	0.09	
2643.00	2.080	230.970	2642.79	13.88	-12.00	-13.42	0.07	
2738.00	1.830	212.480	2737.74	16.13	-14.36	-15.57	0.71	
2832.00	1.690	204.380	2831.69	17.61	-16.89	-16.95	0.30	
2927.00	1.550	176.610	2926.66	18.21	-19.45	-17.45	0.83	
3021.00	1.470	210.250	3020.62	18.84	-21.76	-17.98	0.93	
3116.00	1.660	235.820	3115.59	20.66	-23.59	-19.74	0.75	
3210.00	1.550	241.530	3209.55	22.96	-24.96	-21.98	0.21	
3305.00	1.590	257.150	3304.52	25.40	-25.86	-24.40	0.45	
3399.00	1.730	289.830	3398.48	28.00	-25.67	-27.00	1.00	
3494.00	1.890	280.340	3493.43	30.86	-24.90	-29.89	0.36	
3588.00	1.820	290.670	3587.38	33.75	-24.10	-32.81	0.36	
3683.00	2.700	309.420	3682.31	36.81	-22.15	-35.95	1.20	
3778.00	2.410	286.210	3777.22	40.37	-20.17	-39.60	1.12	
3872.00	2.250	251.310	3871.15	44.02	-20.21	-43.25	1.50	
3967.00	2.180	246.010	3966.07	47.48	-21.54	-46.66	0.23	
4061.00	2.310	238.520	4060.00	50.80	-23.25	-49.91	0.34	
4156.00	2.320	241.710	4154.93	54.20	-25.17	-53.24	0.14	
4251.00	2.320	229.700	4249.85	57.44	-27.32	-56.40	0.51	
4345.00	1.960	207.400	4343.78	59.73	-29.98	-58.59	0.96	
4440.00	2.110	195.640	4438.72	61.08	-33.10	-59.81	0.47	
4534.00	1.970	211.100	4532.67	62.50	-36.15	-61.11	0.60	
4629.00	2.140	255.740	4627.61	65.13	-37.99	-63.67	1.65	

REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#06 HARPER LD21-662 (1783'FNL & 330'FWL, SEC.22)
Area	COLORADO	Well	HARPER LD21-662
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	HARPER LD21-662 AWB
Facility	SEC.22-T09N-R58W		

WELLPATH DATA (96 stations) † = interpolated/extrapolated station								
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
4723.00	2.250	273.560	4721.54	68.68	-38.31	-67.21	0.73	
4818.00	2.150	287.880	4816.47	72.21	-37.64	-70.77	0.59	
4913.00	2.190	286.190	4911.41	75.61	-36.59	-74.21	0.08	
5007.00	2.670	224.010	5005.34	78.89	-37.67	-77.46	2.70	
5102.00	0.680	43.080	5100.31	80.09	-38.85	-78.61	3.53	
5196.00	2.850	255.170	5194.27	81.98	-39.04	-80.49	3.66	
5291.00	14.420	261.900	5288.04	96.10	-41.32	-94.53	12.20	
5385.00	23.750	267.090	5376.78	126.74	-43.93	-125.09	10.08	
5480.00	32.390	268.690	5460.53	171.40	-45.49	-169.72	9.13	
5574.00	39.960	268.390	5536.35	226.83	-46.91	-225.15	8.06	
5669.00	49.600	266.750	5603.71	293.67	-49.83	-291.92	10.22	
5763.00	57.010	268.410	5659.84	368.98	-52.96	-367.17	8.01	
5858.00	62.550	266.140	5707.64	451.03	-56.90	-449.12	6.19	
5953.00	73.810	264.960	5742.90	539.01	-63.77	-536.90	11.91	
6047.00	85.410	265.250	5759.82	631.22	-71.64	-628.87	12.34	
6067.00†	86.513	265.525	5761.23	651.15	-73.25	-648.75	5.68	CROSS 460' SETBACK
6142.00	90.650	266.550	5763.09	726.08	-78.43	-723.53	5.68	
6236.00	90.650	266.100	5762.02	820.05	-84.45	-817.33	0.48	
6331.00	90.710	266.960	5760.89	915.02	-90.20	-912.15	0.91	
6425.00	90.710	269.720	5759.73	1009.00	-92.92	-1006.10	2.94	
6520.00	90.340	268.680	5758.86	1103.96	-94.25	-1101.08	1.16	
6614.00	90.650	268.040	5758.04	1197.95	-96.94	-1195.04	0.76	
6709.00	90.710	267.000	5756.92	1292.94	-101.05	-1289.94	1.10	
6803.00	90.620	268.130	5755.83	1386.93	-105.04	-1383.85	1.21	
6898.00	90.490	270.650	5754.90	1481.88	-106.05	-1478.83	2.66	
6993.00	90.710	271.910	5753.91	1576.69	-103.93	-1573.80	1.35	
7087.00	90.550	269.670	5752.88	1670.54	-102.64	-1667.78	2.39	
7182.00	91.790	269.820	5750.94	1765.46	-103.06	-1762.76	1.31	
7276.00	90.620	268.880	5748.96	1859.40	-104.12	-1856.73	1.60	
7371.00	90.370	267.010	5748.14	1954.39	-107.53	-1951.66	1.99	

REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#06 HARPER LD21-662 (1783'FNL & 330'FWL, SEC.22)
Area	COLORADO	Well	HARPER LD21-662
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	HARPER LD21-662 AWB
Facility	SEC.22-T09N-R58W		

WELLPATH DATA (96 stations)								
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
7466.00	90.370	264.890	5747.53	2049.34	-114.24	-2046.41	2.23	
7561.00	90.430	265.610	5746.86	2144.25	-122.11	-2141.08	0.76	
7655.00	90.310	265.550	5746.26	2238.18	-129.35	-2234.80	0.14	
7750.00	90.460	265.690	5745.62	2333.11	-136.61	-2329.52	0.22	
7844.00	90.650	265.880	5744.71	2427.06	-143.51	-2423.26	0.29	
7939.00	90.430	266.350	5743.81	2522.01	-149.95	-2518.04	0.55	
8034.00	90.490	267.460	5743.05	2617.00	-155.08	-2612.90	1.17	
8128.00	90.550	268.250	5742.19	2710.99	-158.60	-2706.83	0.84	
8223.00	90.400	267.390	5741.41	2805.99	-162.21	-2801.75	0.92	
8317.00	90.430	267.780	5740.73	2899.99	-166.17	-2895.67	0.42	
8412.00	90.460	268.110	5739.99	2994.98	-169.58	-2990.60	0.35	
8506.00	90.400	269.750	5739.28	3088.96	-171.33	-3084.58	1.75	
8601.00	90.430	270.620	5738.60	3183.87	-171.03	-3179.58	0.92	
8696.00	90.650	270.660	5737.70	3278.74	-169.97	-3274.57	0.24	
8790.00	90.770	270.590	5736.53	3372.61	-168.94	-3368.56	0.15	
8885.00	90.920	269.660	5735.13	3467.51	-168.73	-3463.54	0.99	
8979.00	90.400	268.330	5734.05	3561.48	-170.38	-3557.52	1.52	
9074.00	90.310	267.550	5733.46	3656.48	-173.80	-3652.46	0.83	
9169.00	90.370	266.710	5732.90	3751.47	-178.55	-3747.34	0.89	
9263.00	90.400	266.460	5732.27	3845.45	-184.15	-3841.17	0.27	
9358.00	90.280	266.260	5731.70	3940.42	-190.18	-3935.97	0.25	
9452.00	90.400	267.440	5731.15	4034.41	-195.35	-4029.83	1.26	
9547.00	90.520	267.270	5730.38	4129.40	-199.73	-4124.72	0.22	
9641.00	90.280	267.480	5729.73	4223.40	-204.04	-4218.62	0.34	
9736.00	90.550	269.600	5729.04	4318.38	-206.46	-4313.58	2.25	
9831.00	90.490	270.820	5728.18	4413.29	-206.11	-4408.58	1.29	
9925.00	90.490	271.140	5727.37	4507.13	-204.50	-4502.56	0.34	
10020.00	90.650	274.000	5726.43	4601.78	-200.24	-4597.45	3.02	
10114.00	90.460	274.280	5725.52	4695.18	-193.46	-4691.20	0.36	
10209.00	90.400	270.520	5724.80	4789.85	-189.48	-4786.10	3.96	

REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#06 HARPER LD21-662 (1783'FNL & 330'FWL, SEC.22)
Area	COLORADO	Well	HARPER LD21-662
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	HARPER LD21-662 AWB
Facility	SEC.22-T09N-R58W		

WELLPATH DATA (96 stations)									
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments	
10303.00	90.430	270.110	5724.12	4883.75	-188.96	-4880.09	0.44		
10398.00	90.550	269.290	5723.31	4978.69	-189.46	-4975.09	0.87		
10493.00	90.400	268.020	5722.52	5073.67	-191.69	-5070.06	1.35		
10587.00	90.460	267.680	5721.82	5167.66	-195.22	-5163.99	0.37		
10675.00	90.490	266.380	5721.09	5255.65	-199.78	-5251.86	1.48	LAST BHI MWD SURVEY	
10699.00	90.490	266.380	5720.88	5279.65	-201.29	-5275.81	0.00	PROJECTION TO BIT	

HOLE & CASING SECTIONS - Ref Wellbore: HARPER LD21-662 AWB Ref Wellpath: HARPER LD21-662 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	0.00	1938.00	1938.00	0.00	1937.93	0.00	0.00	-6.64	-7.06
8.5in Open Hole	1938.00	10699.00	8761.00	1937.93	5720.88	-6.64	-7.06	-201.29	-5275.81

REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#06 HARPER LD21-662 (1783'FNL & 330'FWL, SEC.22)
Area	COLORADO	Well	HARPER LD21-662
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	HARPER LD21-662 AWB
Facility	SEC.22-T09N-R58W		

TARGETS								
Name	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
SEC.21-T09N-R58W	0.00	-36.43	0.67	3454901.02	1516291.47	40°44'20.580"N	103°51'30.096"W	polygon
HARPER LD21-662 BHL ON PLAT REV-3 (1870'FNL & 330'FWL, SEC.21)	5719.92	-210.08	-5276.16	3449624.23	1516117.82	40°44'19.824"N	103°52'38.676"W	point
HARPER LD21-662 BHL ON PLAT REV-1 (1870'FNL & 330'FWL, SEC.21)	5739.91	-210.08	-5276.16	3449624.23	1516117.82	40°44'19.824"N	103°52'38.676"W	point
HARPER LD21-662 BHL ON PLAT REV-2 (1870'FNL & 330'FWL, SEC.21)	5739.92	-210.08	-5276.16	3449624.23	1516117.82	40°44'19.824"N	103°52'38.676"W	point
HARPER LD21-662 LANDING POINT REV-3 (1870'FNL & 330'FEL, SEC.21)	5760.33	-87.00	-647.00	3454253.35	1516240.90	40°44'20.199"N	103°51'38.520"W	point
HARPER LD21-662 LANDING POINT REV-1 (1870'FNL & 330'FEL, SEC.21)	5768.82	-87.00	-660.00	3454240.35	1516240.90	40°44'20.201"N	103°51'38.689"W	point
HARPER LD21-662 LANDING POINT REV-2 (1870'FNL & 330'FEL, SEC.21)	5780.33	-87.00	-647.00	3454253.35	1516240.90	40°44'20.199"N	103°51'38.520"W	point
SEC.21-T09N-R58W HARDLINES (330' SETBACKS)	5827.00	-36.43	0.67	3454901.02	1516291.47	40°44'20.580"N	103°51'30.096"W	polygon

WELLPATH COMPOSITION - Ref Wellbore: HARPER LD21-662 AWB Ref Wellpath: HARPER LD21-662 AWP					
Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore	
0.00	1935.00	Approximation of GYD GC+DROP+OH	13 1/2" GYRODATA SURFACE SURVEYS <83.87 - 1935>	HARPER LD21-662 AWB	
1935.00	10675.00	OWSG MWD rev2 + IFR1 + Multi-Station Correction	8 1/2" BHI MWD AUTOTRAK CURVE MONOBORE (MSA CORRECTED) <1935 - 10675>	HARPER LD21-662 AWB	
10675.00	10699.00	Blind Drilling (std)	Projection to bit	HARPER LD21-662 AWB	

REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY, INC	Slot	SLOT#06 HARPER LD21-662 (1783'FNL & 330'FWL, SEC.22)
Area	COLORADO	Well	HARPER LD21-662
Field	WELD COUNTY (NOBLE NAD 83 GRID)	Wellbore	HARPER LD21-662 AWB
Facility	SEC.22-T09N-R58W		

WELLPATH COMMENTS				
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Comment
1935.00	0.630	176.580	1934.93	TIED INTO GYRODATA SURVEYS
6067.00	86.513	265.525	5761.23	CROSS 460' SETBACK
10675.00	90.490	266.380	5721.09	LAST BHI MWD SURVEY
10699.00	90.490	266.380	5720.88	PROJECTION TO BIT