

ANADARKO PETROLEUM CORP

Project: Weld County, CO (UTM-NAD83)  
Site: Windsock 15-21HZ  
Well: Windsock 21-8HZ  
Wellbore: OH  
Design: OH



Azimuths to True North  
Magnetic North: 8.05°  
  
Magnetic Field  
Strength: 51893.2nT  
Dip Angle: 66.46°  
Date: 11/25/2019  
Model: IGRF2015

PROJECT DETAILS: Weld County, CO (UTM-NAD83)  
  
Geodetic System: Universal Transverse Mercator (US Survey Feet)  
Datum: North American Datum 1983  
Ellipsoid: GRS 1980  
Zone: Zone 13N (108 W to 102 W)



1N-68W-21

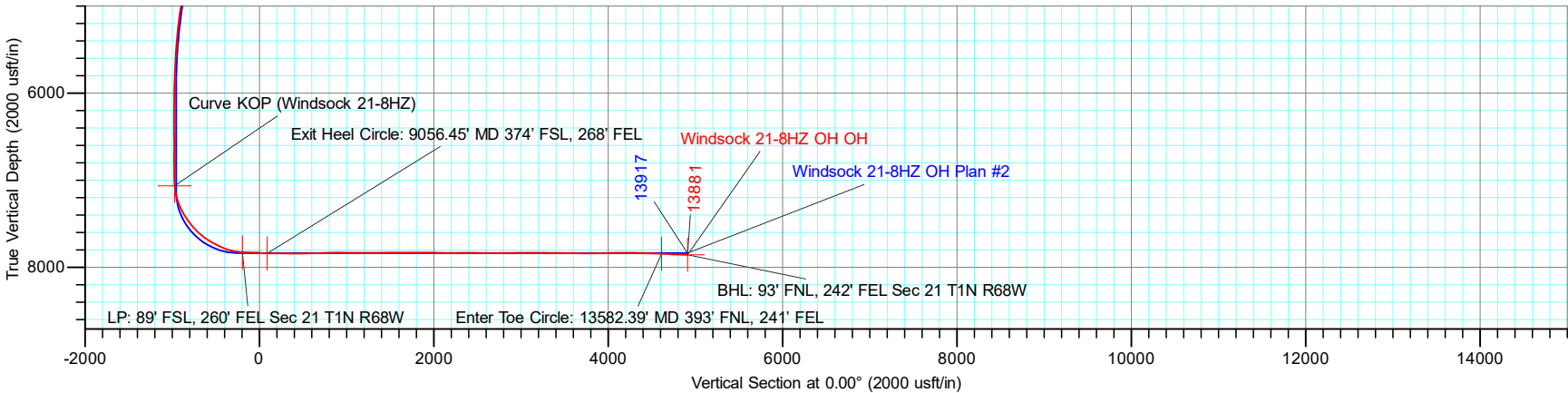
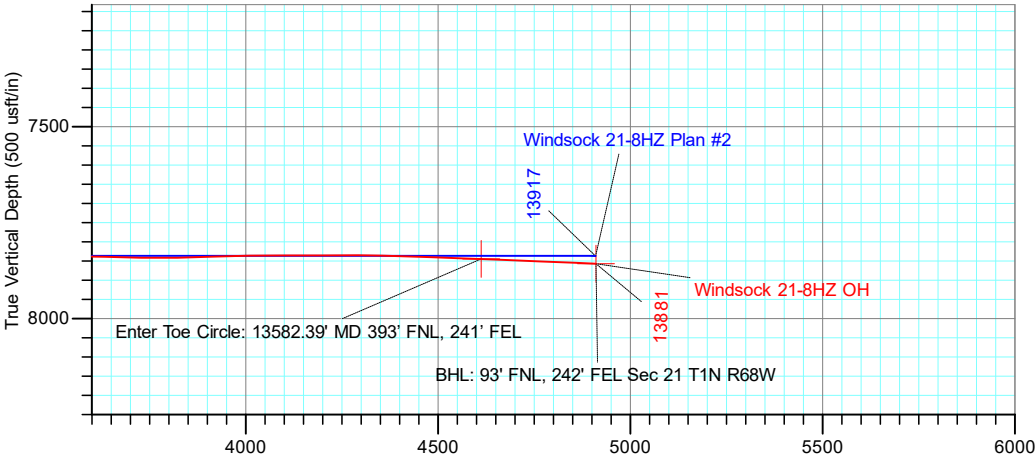
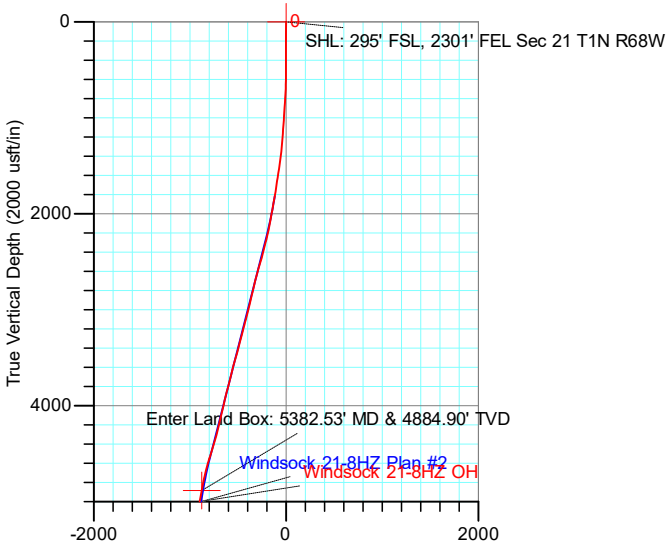
20' KB + 5222' GE @ 5242.00usft

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
BHL: 93' FNL, 242' FEL Sec 21 T1N R68W	7857.06	4910.55	2043.34	40.043662	-105.000046
Curve KOP (Windsock 21-8HZ)	7064.60	-973.62	2024.76	40.027503	-105.000114
Enter Land Box: 5382.53' MD & 4884.90' TVD	4884.90	-876.94	1843.90	40.027769	-105.000760
Enter Toe Circle: 13582.39' MD 393' FNL, 241' FEL	7844.96	4612.19	2044.65	40.042843	-105.000041
Exit Heel Circle: 9056.45' MD 374' FSL, 268' FEL	7840.35	88.38	2031.67	40.030419	-105.000089
LP: 89' FSL, 260' FEL Sec 21 T1N R68W	7828.58	-195.65	2040.65	40.029639	-105.000057
SHL: 295' FSL, 2301' FEL Sec 21 T1N R68W	0.00	0.00	0.00	40.030177	-105.007347

ACTUAL LINE CALLS

SHL: 295' FSL, 2301' FEL Sec 21 T1N R68W  
HEEL: 89' FSL, 260' FEL Sec 21 T1N R68W  
BHL: 93' FNL, 242' FEL Sec 21 T1N R68W



TOTAL DIRECTIONAL SERVICES LLC  
671 Academy Ct, Windsor, CO 80550  
Phone: (970) 460-9402

Design: OH (Windsock 21-8HZ/OH)  
Windsock 15-21HZ  
Created By: Micah Ault  
Date: 16:33, February 14 2020  
Approved: \_\_\_\_\_  
Date: \_\_\_\_\_

# ANADARKO PETROLEUM CORP

Project: Weld County, CO (UTM-NAD83)  
 Site: Windsock 15-21HZ  
 Well: Windsock 21-8HZ  
 Wellbore: OH  
 Design: OH



Azimuths to True North  
 Magnetic North: 8.05°

Magnetic Field  
 Strength: 51893.2nT  
 Dip Angle: 66.46°  
 Date: 11/25/2019  
 Model: IGRF2015

PROJECT DETAILS: Weld County, CO (UTM-NAD83)  
 Geodetic System: Universal Transverse Mercator (US Survey Feet)  
 Datum: North American Datum 1983  
 Ellipsoid: GRS 1980  
 Zone: Zone 13N (108 W to 102 W)

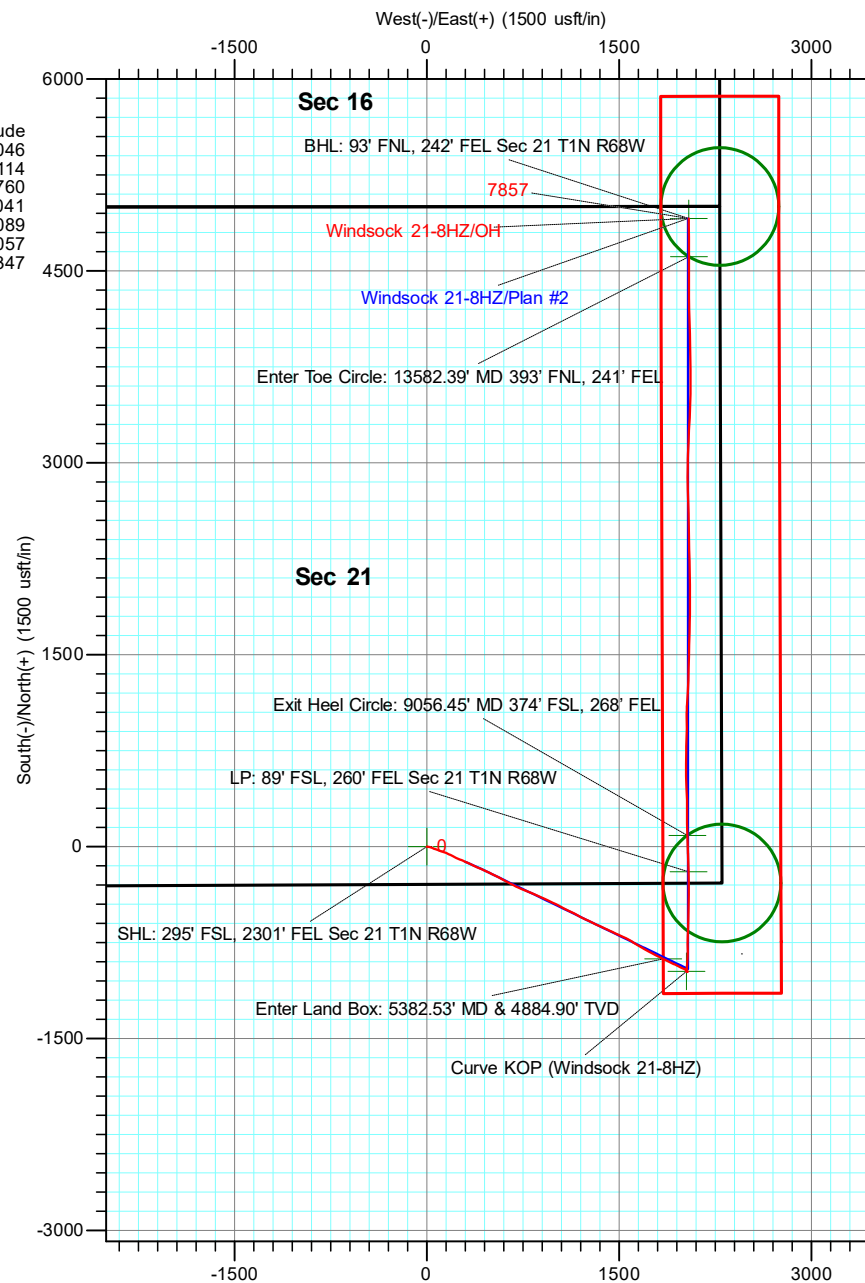
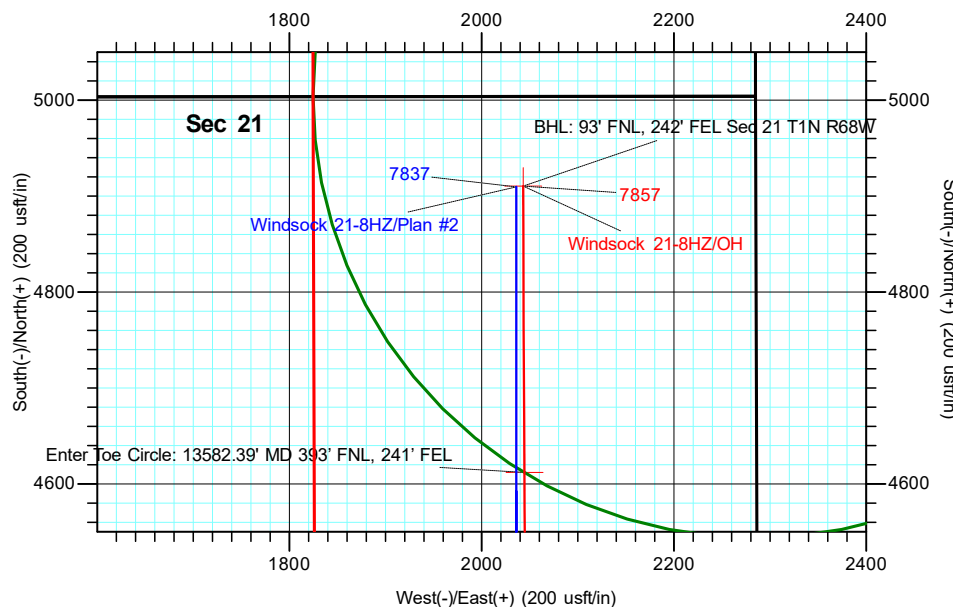


## DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
BHL: 93' FNL, 242' FEL Sec 21 T1N R68W	7857.06	4910.55	2043.34	14542632.64	1640403.78	40.043662	-105.000046
Curve KOP (Windsock 21-8HZ)	7064.60	-973.62	2024.76	14536748.47	1640384.71	40.027503	-105.000114
Enter Land Box: 5382.53' MD & 4884.90' TVD	4884.90	-876.94	1843.90	14536845.17	1640203.86	40.027769	-105.000760
Enter Toe Circle: 13582.39' MD 393' FNL, 241' FEL	7844.96	4612.19	2044.65	14542334.28	1640405.06	40.042843	-105.000041
Exit Heel Circle: 9056.45' MD 374' FSL, 268' FEL	7840.35	88.38	2031.67	14537810.47	1640391.71	40.030419	-105.000089
LP: 89' FSL, 260' FEL Sec 21 T1N R68W	7828.58	-195.65	2040.65	14537526.44	1640400.66	40.029639	-105.000057
SHL: 295' FSL, 2301' FEL Sec 21 T1N R68W	0.00	0.00	0.00	14537722.26	1638360.03	40.030177	-105.007347

## ACTUAL LINE CALLS

**SHL: 295' FSL, 2301' FEL Sec 21 T1N R68W**  
**HEEL: 89' FSL, 260' FEL Sec 21 T1N R68W**  
**BHL: 93' FNL, 242' FEL Sec 21 T1N R68W**



**TOTAL DIRECTIONAL SERVICES LLC**  
 671 Academy Ct, Windsor, CO 80550  
 Phone: (970) 460-9402

Design: OH (Windsock 21-8HZ/OH)  
 Windsock 15-21HZ  
 Created By: Micah Ault  
 Date: 16:35, February 14 2020  
 Approved: \_\_\_\_\_  
 Date: \_\_\_\_\_



# **ANADARKO PETROLEUM CORP**

**Weld County, CO (UTM-NAD83)**

**Windsock 15-21HZ**

**Windsock 21-8HZ**

**OH**

**Design: OH**

## **Standard Survey Report**

**14 February, 2020**



<b>Company:</b>	ANADARKO PETROLEUM CORP	<b>Local Co-ordinate Reference:</b>	Well Windsock 21-8HZ
<b>Project:</b>	Weld County, CO (UTM-NAD83)	<b>TVD Reference:</b>	20' KB + 5222' GE @ 5242.00usft
<b>Site:</b>	Windsock 15-21HZ	<b>MD Reference:</b>	20' KB + 5222' GE @ 5242.00usft
<b>Well:</b>	Windsock 21-8HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.15 Single User Db

<b>Project</b>	Weld County, CO (UTM-NAD83)		
<b>Map System:</b>	Universal Transverse Mercator (US Survey Feet)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Zone 13N (108 W to 102 W)		

Site		Windsock 15-21HZ			
Site Position:		Northing:	14,537,796.91 usft	Latitude:	40.030382
From:	Map	Easting:	1,638,286.42 usft	Longitude:	-105.007610
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.00 °

Well	Windsock 21-8HZ					
Well Position	+N/-S	0.00 usft	Northing:	14,537,722.26 usft	Latitude:	40.030177
	+E/-W	0.00 usft	Easting:	1,638,360.03 usft	Longitude:	-105.007347
Position Uncertainty		3.28 usft	Wellhead Elevation:	usft	Ground Level:	5,222.00 usft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	11/25/2019	8.05	66.46	51,893.19370271

<b>Design</b>	OH				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	0.00	

<b>Survey Program</b>	<b>Date</b>	2/13/2020			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
130.00	1,861.00	Survey #1 - Surface (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	
2,021.00	13,826.00	Survey #2 (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	
13,881.00	13,881.00	Survey #3 (OH)	BLIND	OWSG BLIND	

<b>Survey</b>									
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>SHL: 295' FSL, 2301' FEL Sec 21 T1N R68W - SHL (Windsock 21-8HZ)</b>									
130.00	0.26	256.69	130.00	-0.07	-0.29	-0.07	0.20	0.20	0.00
225.00	0.44	253.18	225.00	-0.22	-0.85	-0.22	0.19	0.19	-3.69
320.00	0.88	93.74	319.99	-0.38	-0.47	-0.38	1.37	0.46	-167.83
415.00	2.64	87.24	414.95	-0.32	2.45	-0.32	1.86	1.85	-6.84
510.00	4.35	97.17	509.77	-0.66	8.21	-0.66	1.90	1.80	10.45
606.00	5.49	95.85	605.41	-1.59	16.39	-1.59	1.19	1.19	-1.38
701.00	6.86	107.54	699.86	-3.76	26.32	-3.76	1.95	1.44	12.31

<b>Company:</b>	ANADARKO PETROLEUM CORP	<b>Local Co-ordinate Reference:</b>	Well Windsock 21-8HZ
<b>Project:</b>	Weld County, CO (UTM-NAD83)	<b>TVD Reference:</b>	20' KB + 5222' GE @ 5242.00usft
<b>Site:</b>	Windsock 15-21HZ	<b>MD Reference:</b>	20' KB + 5222' GE @ 5242.00usft
<b>Well:</b>	Windsock 21-8HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.15 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
796.00	9.27	114.66	793.92	-8.66	38.68	-8.66	2.74	2.54	7.49
892.00	10.33	111.94	888.52	-15.10	53.70	-15.10	1.20	1.10	-2.83
987.00	10.37	107.72	981.97	-20.89	69.74	-20.89	0.80	0.04	-4.44
1,082.00	11.73	110.00	1,075.21	-26.79	86.96	-26.79	1.50	1.43	2.40
1,177.00	13.05	107.81	1,167.99	-33.38	106.25	-33.38	1.47	1.39	-2.31
1,273.00	14.63	109.56	1,261.20	-40.75	127.99	-40.75	1.70	1.65	1.82
1,368.00	15.16	112.38	1,353.01	-49.50	150.78	-49.50	0.95	0.56	2.97
1,463.00	16.39	115.54	1,444.44	-60.01	174.37	-60.01	1.58	1.29	3.33
1,558.00	18.90	117.65	1,534.96	-72.93	200.09	-72.93	2.73	2.64	2.22
1,653.00	20.04	117.56	1,624.53	-87.60	228.15	-87.60	1.20	1.20	-0.09
1,748.00	21.09	109.65	1,713.49	-100.88	258.69	-100.88	3.12	1.11	-8.33
1,844.00	23.42	113.78	1,802.34	-114.39	292.42	-114.39	2.92	2.43	4.30
1,861.00	23.42	113.78	1,817.94	-117.11	298.60	-117.11	0.00	0.00	0.00
2,021.00	22.30	116.93	1,965.37	-143.68	354.77	-143.68	1.04	-0.70	1.97
2,114.00	24.71	113.01	2,050.65	-159.28	388.40	-159.28	3.09	2.59	-4.22
2,207.00	26.12	113.38	2,134.65	-175.00	425.08	-175.00	1.53	1.52	0.40
2,300.00	27.69	115.32	2,217.58	-192.36	463.41	-192.36	1.93	1.69	2.09
2,393.00	29.86	117.07	2,299.10	-212.14	503.56	-212.14	2.50	2.33	1.88
2,485.00	29.52	115.74	2,379.02	-232.41	544.37	-232.41	0.81	-0.37	-1.45
2,579.00	30.91	118.41	2,460.25	-253.96	586.47	-253.96	2.06	1.48	2.84
2,671.00	32.33	118.14	2,538.59	-276.80	628.95	-276.80	1.55	1.54	-0.29
2,765.00	31.19	117.61	2,618.51	-299.94	672.69	-299.94	1.25	-1.21	-0.56
2,858.00	31.19	114.20	2,698.08	-320.97	715.99	-320.97	1.90	0.00	-3.67
2,952.00	30.46	112.01	2,778.80	-339.88	760.29	-339.88	1.42	-0.78	-2.33
3,046.00	31.44	112.15	2,859.42	-358.05	805.08	-358.05	1.05	1.04	0.15
3,140.00	31.09	113.43	2,939.77	-376.95	850.06	-376.95	0.80	-0.37	1.36
3,233.00	31.75	113.87	3,019.13	-396.40	894.47	-396.40	0.75	0.71	0.47
3,327.00	32.54	116.06	3,098.72	-417.51	939.80	-417.51	1.50	0.84	2.33
3,420.00	29.01	115.31	3,178.61	-438.15	982.67	-438.15	3.82	-3.80	-0.81
3,513.00	29.94	117.51	3,259.58	-458.51	1,023.64	-458.51	1.53	1.00	2.37
3,607.00	30.12	117.34	3,340.96	-480.18	1,065.39	-480.18	0.21	0.19	-0.18
3,699.00	31.23	115.65	3,420.09	-501.10	1,107.40	-501.10	1.53	1.21	-1.84
3,792.00	32.45	118.22	3,499.09	-523.34	1,151.12	-523.34	1.96	1.31	2.76
3,888.00	29.10	118.60	3,581.56	-546.70	1,194.32	-546.70	3.50	-3.49	0.40
3,981.00	30.03	114.70	3,662.46	-567.25	1,235.32	-567.25	2.30	1.00	-4.19
4,074.00	30.31	116.65	3,742.87	-587.50	1,277.44	-587.50	1.10	0.30	2.10
4,167.00	31.33	114.29	3,822.73	-607.97	1,320.46	-607.97	1.70	1.10	-2.54
4,262.00	30.26	115.28	3,904.34	-628.36	1,364.61	-628.36	1.25	-1.13	1.04
4,356.00	28.92	113.93	3,986.08	-647.69	1,406.81	-647.69	1.59	-1.43	-1.44
4,451.00	28.30	116.13	4,069.48	-666.93	1,448.02	-666.93	1.29	-0.65	2.32
4,544.00	29.55	114.42	4,150.88	-686.12	1,488.70	-686.12	1.61	1.34	-1.84
4,637.00	29.97	114.80	4,231.61	-705.34	1,530.67	-705.34	0.50	0.45	0.41
4,730.00	29.48	118.16	4,312.38	-725.89	1,571.93	-725.89	1.87	-0.53	3.61

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<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.15 Single User Db

Survey									
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4,822.00	29.64	122.71	4,392.42	-748.87	1,611.04	-748.87	2.45	0.17	4.95
4,914.00	30.33	121.09	4,472.11	-773.16	1,650.07	-773.16	1.16	0.75	-1.76
5,008.00	33.37	119.24	4,551.94	-798.05	1,692.97	-798.05	3.40	3.23	-1.97
5,100.00	28.90	119.31	4,630.67	-821.30	1,734.45	-821.30	4.86	-4.86	0.08
5,221.00	26.99	116.36	4,737.56	-847.81	1,784.55	-847.81	1.95	-1.58	-2.44
5,314.00	23.01	116.10	4,821.83	-865.18	1,819.80	-865.18	4.28	-4.28	-0.28
5,382.53	23.06	115.93	4,884.90	-876.94	1,843.90	-876.94	0.12	0.08	-0.25
Enter Land Box: 5382.53' MD & 4884.90' TVD									
5,407.00	23.08	115.87	4,907.41	-881.13	1,852.53	-881.13	0.12	0.08	-0.25
5,500.00	22.75	116.68	4,993.07	-897.16	1,885.00	-897.16	0.49	-0.35	0.87
5,594.00	19.16	115.72	5,080.84	-912.02	1,915.14	-912.02	3.84	-3.82	-1.02
5,686.00	15.54	113.92	5,168.64	-923.57	1,940.02	-923.57	3.98	-3.93	-1.96
5,781.00	14.54	117.48	5,260.39	-934.24	1,962.23	-934.24	1.43	-1.05	3.75
5,875.00	11.95	114.98	5,351.88	-943.79	1,981.53	-943.79	2.82	-2.76	-2.66
5,967.00	10.52	114.76	5,442.11	-951.33	1,997.79	-951.33	1.56	-1.55	-0.24
6,061.00	7.52	121.02	5,534.94	-958.10	2,010.85	-958.10	3.35	-3.19	6.66
6,156.00	5.69	120.88	5,629.31	-963.72	2,020.22	-963.72	1.93	-1.93	-0.15
6,250.00	3.90	121.35	5,722.98	-967.77	2,026.95	-967.77	1.90	-1.90	0.50
6,343.00	2.34	155.04	5,815.84	-971.14	2,030.46	-971.14	2.52	-1.68	36.23
6,436.00	1.81	149.16	5,908.78	-974.12	2,032.01	-974.12	0.61	-0.57	-6.32
6,530.00	1.25	157.75	6,002.75	-976.35	2,033.16	-976.35	0.64	-0.60	9.14
6,623.00	0.65	156.89	6,095.74	-977.77	2,033.75	-977.77	0.65	-0.65	-0.92
6,717.00	0.35	180.09	6,189.73	-978.55	2,033.96	-978.55	0.38	-0.32	24.68
6,810.00	0.22	225.83	6,282.73	-978.96	2,033.83	-978.96	0.27	-0.14	49.18
6,903.00	0.35	287.71	6,375.73	-979.00	2,033.43	-979.00	0.34	0.14	66.54
6,998.00	0.77	309.65	6,470.72	-978.50	2,032.66	-978.50	0.49	0.44	23.09
7,091.00	1.05	315.07	6,563.71	-977.50	2,031.58	-977.50	0.31	0.30	5.83
7,184.00	0.71	208.54	6,656.71	-977.40	2,030.70	-977.40	1.53	-0.37	-114.55
7,279.00	0.61	259.62	6,751.70	-978.01	2,029.93	-978.01	0.61	-0.11	53.77
7,371.00	0.85	300.44	6,843.69	-977.75	2,028.86	-977.75	0.61	0.26	44.37
7,465.00	1.33	307.60	6,937.68	-976.73	2,027.39	-976.73	0.53	0.51	7.62
7,558.00	1.87	306.93	7,030.64	-975.16	2,025.32	-975.16	0.58	0.58	-0.72
7,591.99	4.10	354.56	7,064.59	-973.62	2,024.76	-973.62	9.28	6.55	140.13
Curve KOP (Windsock 21-8HZ)									
7,651.00	9.33	9.51	7,123.18	-966.80	2,025.35	-966.80	9.28	8.87	25.33
7,745.00	17.86	6.70	7,214.46	-944.93	2,028.30	-944.93	9.10	9.07	-2.99
7,839.00	23.15	4.29	7,302.47	-912.16	2,031.37	-912.16	5.70	5.63	-2.56
7,932.00	30.16	2.65	7,385.54	-870.54	2,033.82	-870.54	7.58	7.54	-1.76
8,026.00	36.22	359.20	7,464.17	-819.13	2,034.52	-819.13	6.75	6.45	-3.67
8,120.00	39.93	359.70	7,538.16	-761.18	2,033.98	-761.18	3.96	3.95	0.53
8,213.00	46.59	2.44	7,605.85	-697.50	2,035.26	-697.50	7.44	7.16	2.95
8,305.00	55.24	1.77	7,663.80	-626.21	2,037.85	-626.21	9.42	9.40	-0.73
8,399.00	60.33	0.84	7,713.90	-546.73	2,039.65	-546.73	5.48	5.41	-0.99
8,493.00	65.63	0.95	7,756.59	-463.03	2,040.96	-463.03	5.64	5.64	0.12

<b>Company:</b>	ANADARKO PETROLEUM CORP	<b>Local Co-ordinate Reference:</b>	Well Windsock 21-8HZ
<b>Project:</b>	Weld County, CO (UTM-NAD83)	<b>TVD Reference:</b>	20' KB + 5222' GE @ 5242.00usft
<b>Site:</b>	Windsock 15-21HZ	<b>MD Reference:</b>	20' KB + 5222' GE @ 5242.00usft
<b>Well:</b>	Windsock 21-8HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.15 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,585.00	68.92	1.75	7,792.12	-378.21	2,042.96	-378.21	3.66	3.58	0.87
8,680.00	79.52	358.46	7,817.93	-286.93	2,043.06	-286.93	11.64	11.16	-3.46
8,729.47	83.63	358.49	7,825.17	-238.02	2,041.76	-238.02	8.32	8.32	0.05
<b>Heel (Windsock 21-8HZ)</b>									
8,772.00	87.17	358.51	7,828.58	-195.65	2,040.65	-195.65	8.32	8.32	0.05
<b>LP: 89' FSL, 260' FEL Sec 21 T1N R68W</b>									
8,865.00	87.22	358.68	7,833.13	-102.79	2,038.37	-102.79	0.19	0.05	0.18
8,958.00	87.17	357.54	7,837.68	-9.95	2,035.31	-9.95	1.23	-0.05	-1.23
9,052.00	89.62	358.19	7,840.32	83.94	2,031.81	83.94	2.70	2.61	0.69
9,056.45	89.62	358.25	7,840.35	88.38	2,031.67	88.38	1.40	0.00	1.40
<b>Exit Heel Circle: 9056.45' MD 374' FSL, 268' FEL</b>									
9,146.00	89.62	359.51	7,840.94	177.91	2,029.92	177.91	1.40	0.00	1.40
9,240.00	89.73	0.58	7,841.47	271.91	2,029.99	271.91	1.14	0.12	1.14
9,334.00	88.94	358.34	7,842.56	365.89	2,029.11	365.89	2.53	-0.84	-2.38
9,427.00	90.70	357.09	7,842.86	458.81	2,025.40	458.81	2.32	1.89	-1.34
9,521.00	90.84	359.16	7,841.59	552.75	2,022.33	552.75	2.21	0.15	2.20
9,613.00	92.25	0.85	7,839.11	644.71	2,022.33	644.71	2.39	1.53	1.84
9,705.00	91.27	0.46	7,836.29	736.66	2,023.38	736.66	1.15	-1.07	-0.42
9,798.00	91.57	1.47	7,833.98	829.62	2,024.95	829.62	1.13	0.32	1.09
9,892.00	89.39	1.04	7,833.19	923.59	2,027.01	923.59	2.36	-2.32	-0.46
9,986.00	88.91	358.86	7,834.59	1,017.57	2,026.93	1,017.57	2.37	-0.51	-2.32
10,080.00	90.23	4.19	7,835.30	1,111.50	2,029.43	1,111.50	5.84	1.40	5.67
10,174.00	89.60	2.63	7,835.43	1,205.33	2,035.02	1,205.33	1.79	-0.67	-1.66
10,268.00	90.61	2.27	7,835.26	1,299.24	2,039.04	1,299.24	1.14	1.07	-0.38
10,360.00	90.79	1.37	7,834.14	1,391.19	2,041.96	1,391.19	1.00	0.20	-0.98
10,452.00	90.63	1.09	7,833.00	1,483.16	2,043.93	1,483.16	0.35	-0.17	-0.30
10,546.00	89.86	1.32	7,832.60	1,577.13	2,045.91	1,577.13	0.85	-0.82	0.24
10,640.00	90.50	1.45	7,832.30	1,671.11	2,048.18	1,671.11	0.69	0.68	0.14
10,734.00	89.77	1.79	7,832.08	1,765.07	2,050.84	1,765.07	0.86	-0.78	0.36
10,828.00	89.15	0.02	7,832.97	1,859.05	2,052.32	1,859.05	2.00	-0.66	-1.88
10,921.00	90.68	359.60	7,833.10	1,952.04	2,052.02	1,952.04	1.71	1.65	-0.45
11,015.00	88.16	359.64	7,834.05	2,046.03	2,051.39	2,046.03	2.68	-2.68	0.04
11,108.00	88.97	358.99	7,836.38	2,138.99	2,050.28	2,138.99	1.12	0.87	-0.70
11,201.00	90.10	358.72	7,837.14	2,231.97	2,048.42	2,231.97	1.25	1.22	-0.29
11,294.00	91.44	358.23	7,835.89	2,324.93	2,045.95	2,324.93	1.53	1.44	-0.53
11,389.00	89.43	359.57	7,835.17	2,419.90	2,044.12	2,419.90	2.54	-2.12	1.41
11,481.00	89.35	359.60	7,836.15	2,511.89	2,043.46	2,511.89	0.09	-0.09	0.03
11,574.00	89.13	358.47	7,837.38	2,604.87	2,041.89	2,604.87	1.24	-0.24	-1.22
11,668.00	90.08	357.91	7,838.03	2,698.82	2,038.92	2,698.82	1.17	1.01	-0.60
11,761.00	90.33	358.20	7,837.70	2,791.76	2,035.77	2,791.76	0.41	0.27	0.31
11,856.00	91.41	359.98	7,836.25	2,886.73	2,034.26	2,886.73	2.19	1.14	1.87
11,949.00	90.83	0.79	7,834.44	2,979.71	2,034.88	2,979.71	1.07	-0.62	0.87
12,041.00	89.62	2.00	7,834.07	3,071.68	2,037.12	3,071.68	1.86	-1.32	1.32
12,134.00	89.56	2.17	7,834.74	3,164.62	2,040.51	3,164.62	0.19	-0.06	0.18

<b>Company:</b>	ANADARKO PETROLEUM CORP	<b>Local Co-ordinate Reference:</b>	Well Windsock 21-8HZ
<b>Project:</b>	Weld County, CO (UTM-NAD83)	<b>TVD Reference:</b>	20' KB + 5222' GE @ 5242.00usft
<b>Site:</b>	Windsock 15-21HZ	<b>MD Reference:</b>	20' KB + 5222' GE @ 5242.00usft
<b>Well:</b>	Windsock 21-8HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.15 Single User Db

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
12,228.00	89.41	3.02	7,835.58	3,258.52	2,044.76	3,258.52	0.92	-0.16	0.90	
12,322.00	89.19	3.17	7,836.73	3,352.37	2,049.84	3,352.37	0.28	-0.23	0.16	
12,414.00	89.69	1.31	7,837.63	3,444.29	2,053.43	3,444.29	2.09	0.54	-2.02	
12,509.00	89.65	1.56	7,838.18	3,539.26	2,055.81	3,539.26	0.27	-0.04	0.26	
12,603.00	88.84	359.68	7,839.42	3,633.24	2,056.83	3,633.24	2.18	-0.86	-2.00	
12,698.00	88.52	359.34	7,841.61	3,728.21	2,056.02	3,728.21	0.49	-0.34	-0.36	
12,792.00	91.35	359.57	7,841.71	3,822.20	2,055.12	3,822.20	3.02	3.01	0.24	
12,887.00	92.25	358.97	7,838.73	3,917.14	2,053.91	3,917.14	1.14	0.95	-0.63	
12,980.00	90.74	358.57	7,836.30	4,010.09	2,051.92	4,010.09	1.68	-1.62	-0.43	
13,074.00	89.63	358.19	7,836.00	4,104.05	2,049.26	4,104.05	1.25	-1.18	-0.40	
13,168.00	90.47	357.67	7,835.92	4,197.99	2,045.86	4,197.99	1.05	0.89	-0.55	
13,263.00	90.07	0.31	7,835.47	4,292.96	2,044.19	4,292.96	2.81	-0.42	2.78	
13,358.00	87.91	0.26	7,837.14	4,387.94	2,044.66	4,387.94	2.27	-2.27	-0.05	
13,452.00	88.06	359.96	7,840.45	4,481.88	2,044.84	4,481.88	0.36	0.16	-0.32	
13,544.00	88.04	359.92	7,843.58	4,573.83	2,044.75	4,573.83	0.05	-0.02	-0.04	
13,582.39	87.85	359.79	7,844.96	4,612.19	2,044.65	4,612.19	0.59	-0.49	-0.33	
Enter Toe Circle: 13582.39' MD 393' FNL, 241' FEL										
13,640.00	87.57	359.60	7,847.26	4,669.76	2,044.34	4,669.76	0.59	-0.49	-0.33	
13,734.00	87.53	359.70	7,851.27	4,763.67	2,043.77	4,763.67	0.11	-0.04	0.11	
13,826.00	87.84	359.89	7,854.99	4,855.59	2,043.44	4,855.59	0.40	0.34	0.21	
13,879.65	87.84	359.89	7,857.01	4,909.21	2,043.34	4,909.21	0.00	0.00	0.00	
PBHL (Windsock 21-8HZ)										
13,881.00	87.84	359.89	7,857.06	4,910.55	2,043.34	4,910.55	0.00	0.00	0.00	
BHL: 93' FNL, 242' FEL Sec 21 T1N R68W										



<b>Company:</b>	ANADARKO PETROLEUM CORP	<b>Local Co-ordinate Reference:</b>	Well Windsock 21-8HZ
<b>Project:</b>	Weld County, CO (UTM-NAD83)	<b>TVD Reference:</b>	20' KB + 5222' GE @ 5242.00usft
<b>Site:</b>	Windsock 15-21HZ	<b>MD Reference:</b>	20' KB + 5222' GE @ 5242.00usft
<b>Well:</b>	Windsock 21-8HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.15 Single User Db

Design Targets									
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
SHL: 295' FSL, 2301' FE - actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	14,537,722.26	1,638,360.03	40.030177	-105.007347
Enter Land Box: 5382.5' - actual wellpath hits target center - Point	0.00	0.00	4,884.90	-876.94	1,843.90	14,536,845.17	1,640,203.85	40.027769	-105.000760
Curve KOP (Windsock 2 - actual wellpath hits target center - Point	0.00	0.00	7,064.60	-973.62	2,024.76	14,536,748.48	1,640,384.71	40.027503	-105.000114
LP: 89' FSL, 260' FEL S - actual wellpath hits target center - Point	0.00	0.00	7,828.58	-195.65	2,040.65	14,537,526.45	1,640,400.66	40.029640	-105.000057
Exit Heel Circle: 9056.4' - actual wellpath hits target center - Point	0.00	0.00	7,840.35	88.38	2,031.67	14,537,810.48	1,640,391.70	40.030420	-105.000089
Enter Toe Circle: 13582. - actual wellpath hits target center - Point	0.00	0.00	7,844.96	4,612.19	2,044.65	14,542,334.28	1,640,405.06	40.042843	-105.000042
BHL: 93' FNL, 242' FEL - actual wellpath misses target center by 0.01usft at 13881.00usft MD (7857.06 TVD, 4910.55 N, 2043.34 E) - Point	0.00	0.00	7,857.06	4,910.55	2,043.34	14,542,632.64	1,640,403.77	40.043662	-105.000046

Checked By: _____	Approved By: _____	Date: _____
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