

ANADARKO PETROLEUM CORP

Project: Weld County, CO (UTM-NAD83)
Site: Windsock 15-21HZ
Well: Windsock 21-2HZ
Wellbore: OH
Design: OH



Azimuths to True North
Magnetic North: 8.05°

Magnetic Field
Strength: 51893.3nT
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)



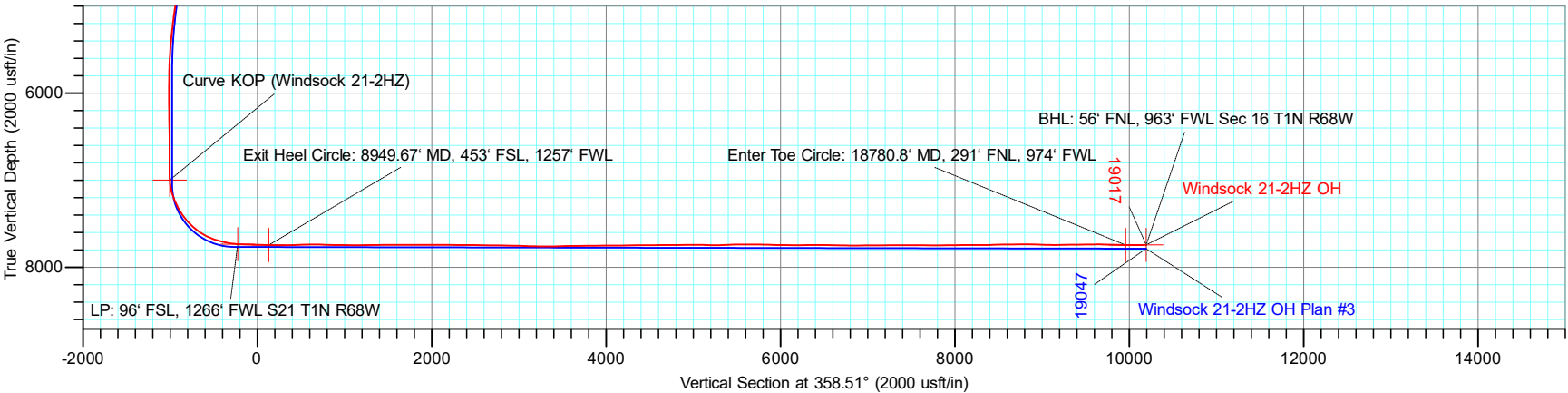
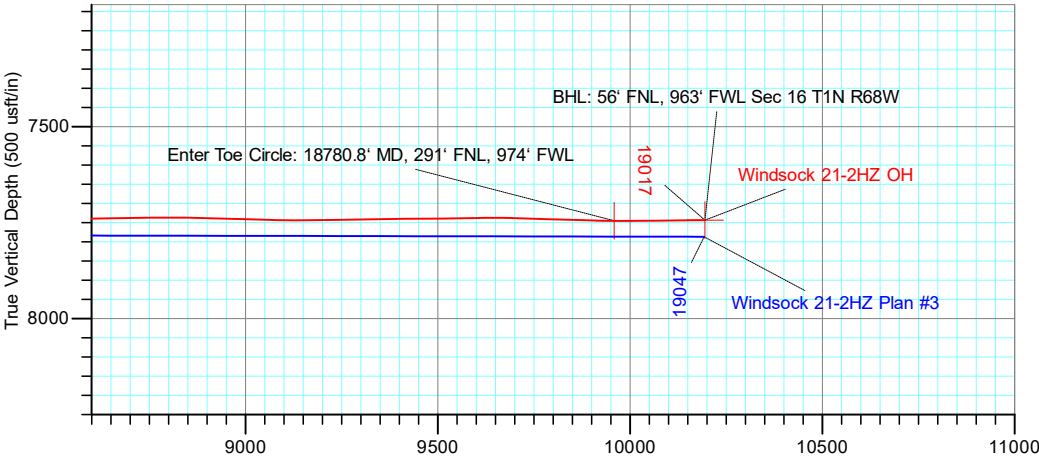
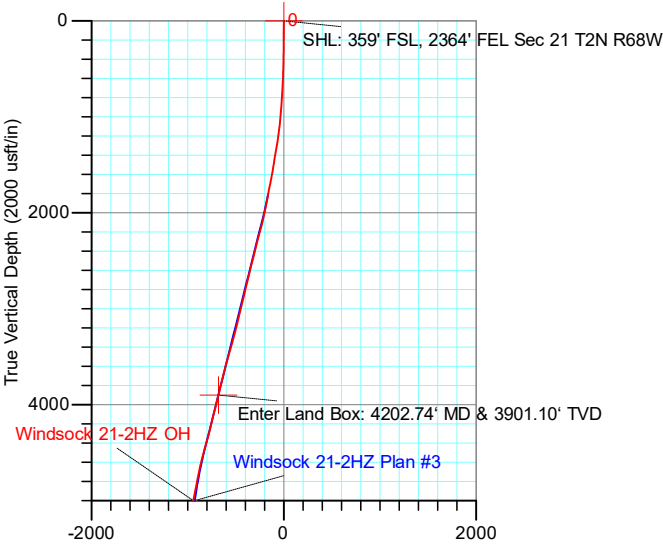
1N-68W-21

20' KB + 5222' GE @ 5242.00usft

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
BHL: 56' FNL, 963' FWL Sec 16 T1N R68W	7743.70	10146.20	-2005.54	40.058216	-105.014740
Curve KOP (Windsock 21-2HZ)	6999.58	-1049.45	-1695.39	40.027471	-105.013629
Enter Land Box: 4202.74' MD & 3901.10' TVD	3901.10	-710.76	-1197.82	40.028401	-105.011852
Enter Toe Circle: 18780.8' MD, 291' FNL, 974' FWL	7745.47	9910.23	-1995.75	40.057568	-105.014705
Exit Heel Circle: 8949.67' MD, 453' FSL, 1257' FWL	7744.85	85.60	-1742.71	40.030588	-105.013799
LP: 96' FSL, 1266' FWL S21 T1N R68W	7735.53	-270.87	-1735.58	40.029609	-105.013773
SHL: 359' FSL, 2364' FEL Sec 21 T2N R68W	0.00	0.00	0.00	40.030353	-105.007573

ACTUAL LINE CALLS
SHL: 359' FSL, 2364' FEL Sec 21 T2N R68W
HEEL: 96' FSL, 1266' FWL S21 T1N R68W
BHL: 56' FNL, 963' FWL Sec 16 T1N R68W



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

Design: OH (Windsock 21-2HZ/OH)
Windsock 15-21HZ
Created By: Dustin Ault
Date: 1:03, February 25 2020
Approved: _____
Date: _____

ANADARKO PETROLEUM CORP

Project: Weld County, CO (UTM-NAD83)
 Site: Windsock 15-21HZ
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Azimuths to True North
 Magnetic North: 8.05°

Magnetic Field
 Strength: 51893.3nT
 Dip Angle: 66.46°
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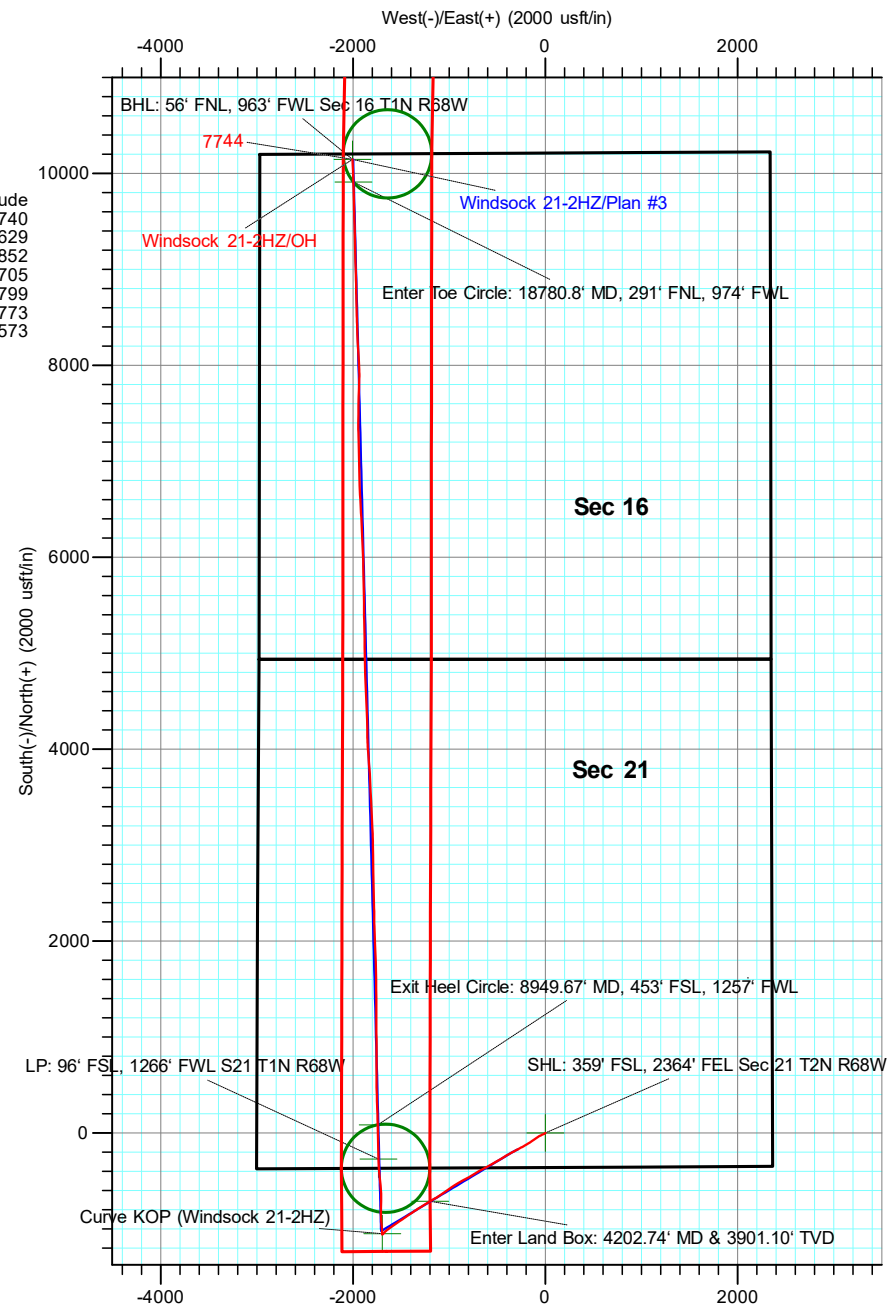
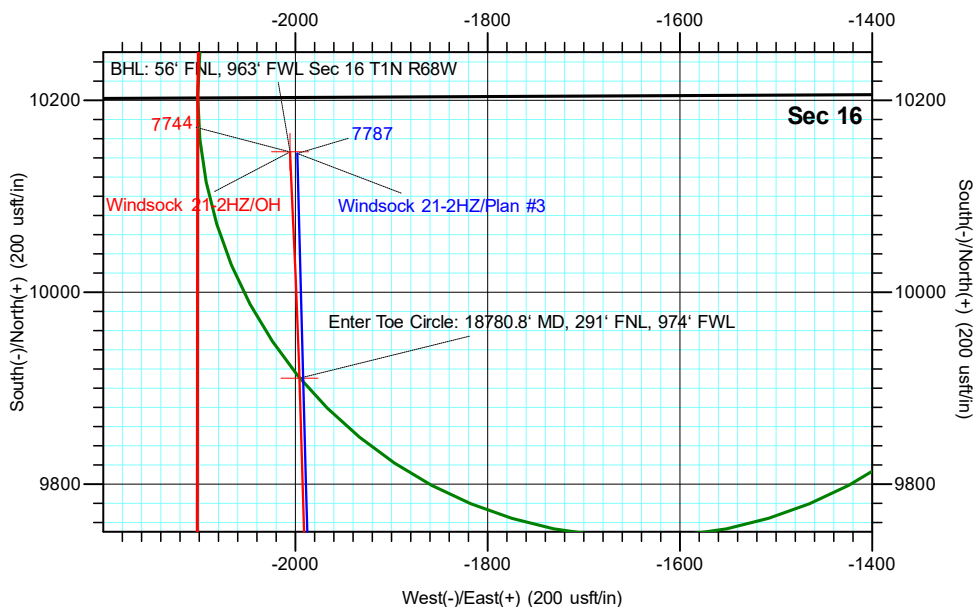


DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
BHL: 56' FNL, 963' FWL Sec 16 T1N R68W	7743.70	10146.20	-2005.54	14547932.72	1636292.10	40.058216	-105.014740
Curve KOP (Windsock 21-2HZ)	6999.58	-1049.45	-1695.39	14536737.04	1636601.30	40.027471	-105.013629
Enter Land Box: 4202.74' MD & 3901.10' TVD	3901.10	-710.76	-1197.82	14537075.69	1637098.90	40.028401	-105.011852
Enter Toe Circle: 18780.8' MD, 291' FNL, 974' FWL	7745.47	9910.23	-1995.75	14547696.75	1636301.87	40.057568	-105.014705
Exit Heel Circle: 8949.67' MD, 453' FSL, 1257' FWL	7744.85	85.60	-1742.71	14537872.10	1636554.08	40.030588	-105.013799
LP: 96' FSL, 1266' FWL S21 T1N R68W	7735.53	-270.87	-1735.58	14537515.63	1636561.18	40.029609	-105.013773
SHL: 359' FSL, 2364' FEL Sec 21 T2N R68W	0.00	0.00	0.00	14537786.35	1638296.78	40.030353	-105.007573

ACTUAL LINE CALLS

SHL: 359' FSL, 2364' FEL Sec 21 T2N R68W
HEEL: 96' FSL, 1266' FWL S21 T1N R68W
BHL: 56' FNL, 963' FWL Sec 16 T1N R68W



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

Design: OH (Windsock 21-2HZ/OH)
 Windsock 15-21HZ
 Created By: Dustin Ault
 Date: _____
 Approved: _____
 Date: 1:05, February 25 2020



ANADARKO PETROLEUM CORP

Weld County, CO (UTM-NAD83)

Windsock 15-21HZ

Windsock 21-2HZ

OH

Design: OH

Standard Survey Report

25 February, 2020



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Windsock 21-2HZ
Project:	Weld County, CO (UTM-NAD83)	TVD Reference:	20' KB + 5222' GE @ 5242.00usft
Site:	Windsock 15-21HZ	MD Reference:	20' KB + 5222' GE @ 5242.00usft
Well:	Windsock 21-2HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.15 Single User Db

Project	Weld County, CO (UTM-NAD83)		
Map System:	Universal Transverse Mercator (US Survey Feet)	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	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 21-2HZ					
Well Position	+N/-S	0.00 usft	Northing:	14,537,786.35 usft	Latitude:	40.030353
	+E/-W	0.00 usft	Easting:	1,638,296.78 usft	Longitude:	-105.007573
Position Uncertainty		3.28 usft	Wellhead Elevation:	usft	Ground Level:	5,222.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	11/25/2019	8.05	66.46	51,893.26145169

Design	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	358.51	

Survey Program	Date	2/25/2020			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
130.00	1,855.00	Survey #1 - Surface MWD+IFR (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	
1,933.00	18,962.00	Survey #2 - MWD+IFR (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	
19,017.00	19,017.00	Survey #3 - Proj to TD (OH)	BLIND	OWSG BLIND	

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)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
SHL: 359' FSL, 2364' FEL Sec 21 T2N R68W - SHL (Windsock 21-2HZ)										
130.00	0.48	106.49	130.00	-0.15	0.52	-0.17	0.37	0.37	0.00	
225.00	0.62	113.61	224.99	-0.47	1.37	-0.51	0.16	0.15	7.49	
320.00	1.27	214.77	319.99	-1.54	1.25	-1.58	1.60	0.68	106.48	
415.00	2.37	240.34	414.94	-3.38	-1.06	-3.35	1.41	1.16	26.92	
510.00	3.25	242.81	509.82	-5.58	-5.16	-5.45	0.93	0.93	2.60	
606.00	6.28	250.36	605.48	-8.59	-12.53	-8.26	3.22	3.16	7.86	
701.00	8.04	245.00	699.74	-13.15	-23.45	-12.53	1.98	1.85	-5.64	

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Windsock 21-2HZ
Project:	Weld County, CO (UTM-NAD83)	TVD Reference:	20' KB + 5222' GE @ 5242.00usft
Site:	Windsock 15-21HZ	MD Reference:	20' KB + 5222' GE @ 5242.00usft
Well:	Windsock 21-2HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	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	8.96	242.81	793.69	-19.34	-36.05	-18.39	1.03	0.97	-2.31
892.00	9.45	244.39	888.46	-26.16	-49.81	-24.85	0.57	0.51	1.65
987.00	10.59	239.38	982.01	-33.98	-64.35	-32.29	1.51	1.20	-5.27
1,082.00	11.07	238.41	1,075.31	-43.20	-79.63	-41.11	0.54	0.51	-1.02
1,177.00	13.89	234.54	1,168.06	-54.59	-96.69	-52.06	3.09	2.97	-4.07
1,273.00	16.57	235.51	1,260.68	-69.03	-117.37	-65.96	2.80	2.79	1.01
1,368.00	17.36	235.07	1,351.55	-84.82	-140.15	-81.15	0.84	0.83	-0.46
1,463.00	16.88	236.92	1,442.34	-100.46	-163.33	-96.18	0.76	-0.51	1.95
1,558.00	18.41	239.82	1,532.87	-115.53	-187.85	-110.61	1.86	1.61	3.05
1,653.00	21.18	239.47	1,622.25	-131.80	-215.61	-126.15	2.92	2.92	-0.37
1,748.00	25.22	242.72	1,709.55	-149.80	-248.40	-143.29	4.46	4.25	3.42
1,844.00	23.73	242.72	1,796.92	-168.03	-283.74	-160.59	1.55	-1.55	0.00
1,855.00	23.73	242.72	1,806.99	-170.06	-287.68	-162.52	0.00	0.00	0.00
1,933.00	21.27	239.80	1,879.05	-184.37	-313.86	-176.15	3.46	-3.15	-3.74
2,026.00	23.26	241.31	1,965.11	-201.67	-344.55	-192.64	2.23	2.14	1.62
2,119.00	26.09	242.28	2,049.61	-220.00	-378.77	-210.08	3.07	3.04	1.04
2,212.00	28.19	237.86	2,132.38	-241.21	-415.48	-230.32	3.13	2.26	-4.75
2,305.00	28.92	237.66	2,214.06	-264.92	-453.08	-253.05	0.79	0.78	-0.22
2,398.00	28.17	240.86	2,295.76	-287.64	-491.25	-274.77	1.83	-0.81	3.44
2,492.00	27.86	239.64	2,378.75	-309.55	-529.59	-295.67	0.69	-0.33	-1.30
2,584.00	28.57	241.63	2,459.82	-330.87	-567.49	-316.00	1.28	0.77	2.16
2,678.00	28.37	240.39	2,542.45	-352.58	-606.69	-336.69	0.66	-0.21	-1.32
2,771.00	27.19	242.83	2,624.73	-373.20	-644.80	-356.31	1.76	-1.27	2.62
2,865.00	26.99	239.29	2,708.43	-393.90	-682.25	-376.03	1.73	-0.21	-3.77
2,958.00	26.92	238.82	2,791.32	-415.58	-718.41	-396.76	0.24	-0.08	-0.51
3,053.00	26.75	239.10	2,876.09	-437.69	-755.15	-417.91	0.22	-0.18	0.29
3,146.00	26.88	240.97	2,959.09	-458.64	-791.49	-437.91	0.92	0.14	2.01
3,239.00	28.30	242.97	3,041.52	-478.87	-829.51	-457.14	1.82	1.53	2.15
3,333.00	27.02	240.60	3,124.78	-499.48	-867.97	-476.74	1.80	-1.36	-2.52
3,426.00	26.62	238.04	3,207.78	-520.88	-904.05	-497.19	1.31	-0.43	-2.75
3,520.00	27.57	238.37	3,291.46	-543.43	-940.44	-518.79	1.02	1.01	0.35
3,612.00	27.49	235.64	3,373.04	-566.58	-976.10	-541.01	1.37	-0.09	-2.97
3,705.00	27.74	235.39	3,455.45	-590.99	-1,011.63	-564.49	0.30	0.27	-0.27
3,800.00	27.99	235.32	3,539.43	-616.23	-1,048.16	-588.77	0.27	0.26	-0.07
3,893.00	25.97	235.89	3,622.31	-640.07	-1,082.97	-611.69	2.19	-2.17	0.61
3,987.00	25.42	235.74	3,707.01	-662.97	-1,116.68	-633.71	0.59	-0.59	-0.16
4,079.00	25.94	240.69	3,789.94	-683.94	-1,150.55	-653.79	2.40	0.57	5.38
4,174.00	26.08	240.41	3,875.31	-704.42	-1,186.83	-673.32	0.20	0.15	-0.29
4,202.74	26.31	239.67	3,901.10	-710.76	-1,197.82	-679.37	1.38	0.79	-2.57
Enter Land Box: 4202.74' MD & 3901.10' TVD									
4,269.00	26.84	238.01	3,960.36	-726.10	-1,223.18	-694.04	1.38	0.81	-2.51
4,364.00	26.03	237.40	4,045.43	-748.69	-1,258.93	-715.70	0.90	-0.85	-0.64
4,457.00	25.38	238.49	4,129.23	-770.10	-1,293.11	-736.22	0.86	-0.70	1.17

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Well:	Windsock 21-2HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	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)	
4,550.00	25.17	236.41	4,213.33	-791.46	-1,326.58	-756.70	0.98	-0.23	-2.24	
4,642.00	26.67	238.21	4,296.07	-813.16	-1,360.43	-777.51	1.84	1.63	1.96	
4,734.00	27.46	235.36	4,378.00	-836.10	-1,395.43	-799.53	1.65	0.86	-3.10	
4,826.00	26.33	235.10	4,460.05	-859.83	-1,429.62	-822.36	1.23	-1.23	-0.28	
4,921.00	25.78	234.92	4,545.39	-883.76	-1,463.81	-845.39	0.58	-0.58	-0.19	
5,013.00	23.68	237.02	4,628.95	-905.31	-1,495.68	-866.12	2.47	-2.28	2.28	
5,108.00	20.93	235.79	4,716.83	-925.24	-1,525.72	-885.26	2.94	-2.89	-1.29	
5,227.00	19.42	235.13	4,828.53	-948.50	-1,559.53	-907.63	1.28	-1.27	-0.55	
5,321.00	18.68	234.47	4,917.38	-966.19	-1,584.61	-924.66	0.82	-0.79	-0.70	
5,413.00	17.53	233.57	5,004.82	-982.98	-1,607.74	-940.84	1.29	-1.25	-0.98	
5,507.00	14.54	236.41	5,095.16	-997.91	-1,628.97	-955.22	3.29	-3.18	3.02	
5,599.00	10.88	231.70	5,184.89	-1,009.69	-1,645.41	-966.56	4.13	-3.98	-5.12	
5,694.00	8.75	226.29	5,278.50	-1,020.24	-1,657.67	-976.79	2.44	-2.24	-5.69	
5,788.00	7.19	218.14	5,371.59	-1,029.81	-1,666.47	-986.13	2.05	-1.66	-8.67	
5,880.00	7.45	228.86	5,462.84	-1,038.26	-1,674.52	-994.37	1.51	0.28	11.65	
5,974.00	5.70	225.44	5,556.22	-1,045.55	-1,682.44	-1,001.45	1.91	-1.86	-3.64	
6,069.00	3.93	220.70	5,650.88	-1,051.33	-1,687.92	-1,007.08	1.91	-1.86	-4.99	
6,163.00	1.82	240.33	5,744.76	-1,054.51	-1,691.32	-1,010.17	2.45	-2.24	20.88	
6,256.00	1.51	239.09	5,837.72	-1,055.87	-1,693.65	-1,011.47	0.34	-0.33	-1.33	
6,349.00	1.17	254.52	5,930.70	-1,056.75	-1,695.62	-1,012.30	0.53	-0.37	16.59	
6,443.00	0.67	274.73	6,024.69	-1,056.96	-1,697.09	-1,012.47	0.63	-0.53	21.50	
6,536.00	0.23	305.73	6,117.68	-1,056.81	-1,697.79	-1,012.30	0.52	-0.47	33.33	
6,630.00	0.37	1.49	6,211.68	-1,056.39	-1,697.93	-1,011.89	0.33	0.15	59.32	
6,723.00	0.85	14.23	6,304.68	-1,055.42	-1,697.75	-1,010.92	0.53	0.52	13.70	
6,816.00	1.28	28.32	6,397.66	-1,053.84	-1,697.09	-1,009.36	0.54	0.46	15.15	
6,911.00	1.43	33.00	6,492.63	-1,051.91	-1,695.94	-1,007.46	0.20	0.16	4.93	
7,004.00	0.45	51.94	6,585.62	-1,050.71	-1,695.02	-1,006.28	1.09	-1.05	20.37	
7,098.00	0.86	223.64	6,679.62	-1,051.00	-1,695.22	-1,006.56	1.39	0.44	182.66	
7,192.00	0.19	223.39	6,773.61	-1,051.62	-1,695.81	-1,007.17	0.71	-0.71	-0.27	
7,284.00	0.26	45.67	6,865.61	-1,051.59	-1,695.77	-1,007.14	0.49	0.08	-193.17	
7,378.00	0.70	23.18	6,959.61	-1,050.91	-1,695.39	-1,006.47	0.50	0.47	-23.93	
7,418.00	3.56	355.29	6,999.58	-1,049.45	-1,695.39	-1,005.01	7.39	7.14	-69.72	
Curve KOP (Windsock 21-2HZ)										
7,471.00	7.46	351.95	7,052.32	-1,044.40	-1,696.01	-999.95	7.39	7.37	-6.31	
7,564.00	16.21	357.26	7,143.26	-1,025.42	-1,697.48	-980.94	9.47	9.41	5.71	
7,658.00	23.55	355.56	7,231.60	-993.55	-1,699.56	-949.02	7.83	7.81	-1.81	
7,752.00	27.26	354.46	7,316.49	-953.39	-1,703.10	-908.78	3.98	3.95	-1.17	
7,845.00	34.27	356.91	7,396.36	-905.98	-1,706.57	-861.30	7.66	7.54	2.63	
7,939.00	41.11	358.35	7,470.70	-848.59	-1,708.89	-803.87	7.34	7.28	1.53	
8,033.00	49.31	1.96	7,536.88	-781.96	-1,708.56	-737.27	9.14	8.72	3.84	
8,126.00	53.86	1.40	7,594.65	-709.14	-1,706.43	-664.53	4.92	4.89	-0.60	
8,218.00	63.70	357.33	7,642.29	-630.60	-1,707.45	-585.98	11.34	10.70	-4.42	
8,312.00	70.45	354.17	7,678.90	-544.33	-1,713.92	-499.58	7.82	7.18	-3.36	
8,406.00	76.27	355.08	7,705.80	-454.70	-1,722.34	-409.76	6.26	6.19	0.97	

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Windsock 21-2HZ
Project:	Weld County, CO (UTM-NAD83)	TVD Reference:	20' KB + 5222' GE @ 5242.00usft
Site:	Windsock 15-21HZ	MD Reference:	20' KB + 5222' GE @ 5242.00usft
Well:	Windsock 21-2HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	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)
8,499.00	79.99	355.10	7,724.93	-364.04	-1,730.13	-318.93	4.00	4.00	0.02
8,559.82	84.56	357.10	7,733.10	-303.93	-1,734.22	-258.73	8.19	7.51	3.29
Heel (Windsock 21-2HZ)									
8,593.00	87.05	358.18	7,735.53	-270.87	-1,735.58	-225.65	8.19	7.52	3.25
LP: 96' FSL, 1266' FWL S21 T1N R68W									
8,685.00	89.17	359.04	7,738.57	-178.95	-1,737.81	-133.70	2.49	2.30	0.93
8,778.00	88.73	358.99	7,740.27	-85.98	-1,739.41	-40.72	0.48	-0.47	-0.05
8,871.00	88.08	358.81	7,742.86	6.97	-1,741.20	52.24	0.73	-0.70	-0.19
8,949.67	89.02	358.99	7,744.85	85.60	-1,742.71	130.89	1.21	1.19	0.22
Exit Heel Circle: 8949.67' MD, 453' FSL, 1257' FWL									
8,965.00	89.20	359.02	7,745.09	100.92	-1,742.98	146.21	1.21	1.19	0.22
9,059.00	88.89	357.94	7,746.66	194.87	-1,745.47	240.19	1.20	-0.33	-1.15
9,154.00	90.74	357.70	7,746.96	289.80	-1,749.08	335.18	1.96	1.95	-0.25
9,247.00	91.63	358.76	7,745.04	382.73	-1,751.96	428.16	1.49	0.96	1.14
9,340.00	92.20	358.53	7,741.93	475.66	-1,754.15	521.11	0.66	0.61	-0.25
9,434.00	91.08	359.94	7,739.24	569.60	-1,755.41	615.06	1.92	-1.19	1.50
9,526.00	88.51	0.19	7,739.57	661.60	-1,755.30	707.01	2.81	-2.79	0.27
9,618.00	88.44	359.77	7,742.02	753.56	-1,755.34	798.95	0.46	-0.08	-0.46
9,711.00	88.32	359.95	7,744.65	846.53	-1,755.56	891.89	0.23	-0.13	0.19
9,805.00	90.04	0.15	7,745.99	940.51	-1,755.48	985.84	1.84	1.83	0.21
9,900.00	89.73	359.06	7,746.18	1,035.51	-1,756.14	1,080.82	1.19	-0.33	-1.15
9,993.00	90.13	359.31	7,746.30	1,128.50	-1,757.46	1,173.82	0.51	0.43	0.27
10,087.00	90.53	0.09	7,745.76	1,222.50	-1,757.95	1,267.79	0.93	0.43	0.83
10,181.00	90.91	0.52	7,744.58	1,316.49	-1,757.45	1,361.74	0.61	0.40	0.46
10,273.00	90.18	359.35	7,743.70	1,408.48	-1,757.55	1,453.70	1.50	-0.79	-1.27
10,365.00	90.48	359.73	7,743.17	1,500.47	-1,758.29	1,545.69	0.53	0.33	0.41
10,459.00	90.41	359.20	7,742.44	1,594.47	-1,759.17	1,639.67	0.57	-0.07	-0.56
10,553.00	89.48	358.43	7,742.53	1,688.45	-1,761.11	1,733.67	1.28	-0.99	-0.82
10,647.00	90.21	358.86	7,742.79	1,782.42	-1,763.34	1,827.67	0.90	0.78	0.46
10,741.00	89.66	357.07	7,742.89	1,876.35	-1,766.67	1,921.66	1.99	-0.59	-1.90
10,834.00	89.91	357.56	7,743.24	1,969.25	-1,771.03	2,014.64	0.59	0.27	0.53
11,021.00	89.81	358.17	7,743.70	2,156.12	-1,778.00	2,201.62	0.33	-0.05	0.33
11,114.00	89.65	0.47	7,744.14	2,249.11	-1,779.10	2,294.61	2.48	-0.17	2.47
11,207.00	89.62	357.93	7,744.73	2,342.09	-1,780.40	2,387.59	2.73	-0.03	-2.73
11,302.00	89.35	358.60	7,745.58	2,437.04	-1,783.28	2,482.59	0.76	-0.28	0.71
11,395.00	88.98	358.94	7,746.94	2,530.01	-1,785.27	2,575.57	0.54	-0.40	0.37
11,488.00	89.12	358.78	7,748.48	2,622.98	-1,787.12	2,668.56	0.23	0.15	-0.17
11,581.00	89.36	358.97	7,749.71	2,715.95	-1,788.95	2,761.55	0.33	0.26	0.20
11,769.00	89.04	359.40	7,752.34	2,903.91	-1,791.62	2,949.52	0.29	-0.17	0.23
11,862.00	87.75	359.54	7,754.94	2,996.87	-1,792.48	3,042.47	1.40	-1.39	0.15
11,954.00	88.21	358.44	7,758.19	3,088.80	-1,794.10	3,134.40	1.30	0.50	-1.20
12,047.00	89.49	356.72	7,760.05	3,181.69	-1,798.03	3,227.37	2.31	1.38	-1.85
12,141.00	89.10	356.98	7,761.21	3,275.54	-1,803.19	3,321.32	0.50	-0.41	0.28
12,235.00	91.50	357.44	7,760.72	3,369.42	-1,807.77	3,415.29	2.60	2.55	0.49

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Windsock 21-2HZ
Project:	Weld County, CO (UTM-NAD83)	TVD Reference:	20' KB + 5222' GE @ 5242.00usft
Site:	Windsock 15-21HZ	MD Reference:	20' KB + 5222' GE @ 5242.00usft
Well:	Windsock 21-2HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	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)
12,327.00	92.01	357.62	7,757.90	3,461.29	-1,811.73	3,507.23	0.59	0.55	0.20
12,422.00	90.80	357.21	7,755.57	3,556.16	-1,816.02	3,602.18	1.34	-1.27	-0.43
12,516.00	90.98	357.12	7,754.11	3,650.04	-1,820.66	3,696.15	0.21	0.19	-0.10
12,611.00	90.66	356.65	7,752.75	3,744.89	-1,825.83	3,791.10	0.60	-0.34	-0.49
12,705.00	90.24	355.70	7,752.01	3,838.67	-1,832.10	3,885.02	1.10	-0.45	-1.01
12,800.00	90.82	355.67	7,751.13	3,933.40	-1,839.24	3,979.90	0.61	0.61	-0.03
12,893.00	89.82	355.96	7,750.61	4,026.15	-1,846.03	4,072.79	1.12	-1.08	0.31
12,987.00	90.62	358.94	7,750.25	4,120.04	-1,850.21	4,166.76	3.28	0.85	3.17
13,081.00	90.71	359.10	7,749.16	4,214.02	-1,851.82	4,260.75	0.20	0.10	0.17
13,176.00	91.00	358.32	7,747.74	4,308.99	-1,853.96	4,355.74	0.88	0.31	-0.82
13,271.00	90.37	357.28	7,746.61	4,403.91	-1,857.60	4,450.72	1.28	-0.66	-1.09
13,365.00	90.34	358.22	7,746.03	4,497.84	-1,861.29	4,544.71	1.00	-0.03	1.00
13,458.00	89.93	357.17	7,745.81	4,590.76	-1,865.04	4,637.70	1.21	-0.44	-1.13
13,553.00	90.16	357.64	7,745.73	4,685.66	-1,869.34	4,732.68	0.55	0.24	0.49
13,647.00	90.74	358.82	7,744.99	4,779.61	-1,872.24	4,826.68	1.40	0.62	1.26
13,742.00	90.67	358.79	7,743.83	4,874.58	-1,874.22	4,921.67	0.08	-0.07	-0.03
13,837.00	90.13	358.72	7,743.16	4,969.56	-1,876.28	5,016.67	0.57	-0.57	-0.07
13,930.00	88.92	358.92	7,743.93	5,062.53	-1,878.20	5,109.66	1.32	-1.30	0.22
14,023.00	88.18	359.10	7,746.29	5,155.49	-1,879.81	5,202.63	0.82	-0.80	0.19
14,116.00	91.89	358.80	7,746.23	5,248.46	-1,881.51	5,295.61	4.00	3.99	-0.32
14,210.00	92.32	358.45	7,742.78	5,342.37	-1,883.76	5,389.54	0.59	0.46	-0.37
14,304.00	91.41	359.64	7,739.72	5,436.30	-1,885.33	5,483.49	1.59	-0.97	1.27
14,398.00	89.87	359.56	7,738.67	5,530.29	-1,885.99	5,577.46	1.64	-1.64	-0.09
14,491.00	89.51	359.23	7,739.17	5,623.28	-1,886.97	5,670.45	0.53	-0.39	-0.35
14,584.00	89.70	358.34	7,739.81	5,716.26	-1,888.94	5,763.44	0.98	0.20	-0.96
14,678.00	88.45	359.12	7,741.33	5,810.22	-1,891.02	5,857.43	1.57	-1.33	0.83
14,773.00	88.22	359.40	7,744.09	5,905.17	-1,892.25	5,952.38	0.38	-0.24	0.29
14,866.00	89.77	357.52	7,745.72	5,998.12	-1,894.75	6,045.36	2.62	1.67	-2.02
14,958.00	89.84	357.46	7,746.03	6,090.03	-1,898.78	6,137.34	0.10	0.08	-0.07
15,050.00	89.89	356.94	7,746.25	6,181.92	-1,903.27	6,229.32	0.57	0.05	-0.57
15,144.00	90.67	357.77	7,745.79	6,275.82	-1,907.61	6,323.30	1.21	0.83	0.88
15,238.00	89.80	357.58	7,745.41	6,369.74	-1,911.42	6,417.28	0.95	-0.93	-0.20
15,332.00	89.48	356.31	7,746.00	6,463.60	-1,916.43	6,511.25	1.39	-0.34	-1.35
15,424.00	89.03	357.60	7,747.19	6,555.46	-1,921.32	6,603.20	1.48	-0.49	1.40
15,519.00	88.78	356.58	7,749.01	6,650.32	-1,926.14	6,698.15	1.11	-0.26	-1.07
15,613.00	89.81	358.27	7,750.17	6,744.21	-1,930.36	6,792.13	2.11	1.10	1.80
15,707.00	90.27	358.99	7,750.10	6,838.18	-1,932.61	6,886.12	0.91	0.49	0.77
15,801.00	90.31	358.33	7,749.62	6,932.16	-1,934.81	6,980.12	0.70	0.04	-0.70
15,895.00	90.49	358.75	7,748.97	7,026.12	-1,937.20	7,074.12	0.49	0.19	0.45
15,987.00	90.39	358.97	7,748.26	7,118.10	-1,939.03	7,166.11	0.26	-0.11	0.24
16,079.00	90.25	358.24	7,747.75	7,210.07	-1,941.27	7,258.11	0.81	-0.15	-0.79
16,172.00	90.70	358.83	7,746.98	7,303.04	-1,943.65	7,351.11	0.80	0.48	0.63
16,266.00	89.18	0.23	7,747.07	7,397.03	-1,944.42	7,445.09	2.20	-1.62	1.49

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Windsock 21-2HZ
Project:	Weld County, CO (UTM-NAD83)	TVD Reference:	20' KB + 5222' GE @ 5242.00usft
Site:	Windsock 15-21HZ	MD Reference:	20' KB + 5222' GE @ 5242.00usft
Well:	Windsock 21-2HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	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)	
16,359.00	90.26	0.53	7,747.53	7,490.03	-1,943.81	7,538.04	1.21	1.16	0.32	
16,453.00	89.49	1.19	7,747.73	7,584.01	-1,942.39	7,631.96	1.08	-0.82	0.70	
16,546.00	89.64	1.07	7,748.44	7,676.99	-1,940.56	7,724.86	0.21	0.16	-0.13	
16,640.00	90.48	3.01	7,748.34	7,770.93	-1,937.21	7,818.67	2.25	0.89	2.06	
16,733.00	90.69	0.93	7,747.39	7,863.86	-1,934.02	7,911.49	2.25	0.23	-2.24	
16,826.00	90.76	357.67	7,746.22	7,956.84	-1,935.15	8,004.46	3.51	0.08	-3.51	
16,919.00	90.16	357.10	7,745.47	8,049.74	-1,939.40	8,097.44	0.89	-0.65	-0.61	
17,012.00	90.01	356.56	7,745.33	8,142.59	-1,944.54	8,190.40	0.60	-0.16	-0.58	
17,107.00	90.38	356.84	7,745.01	8,237.43	-1,950.01	8,285.35	0.49	0.39	0.29	
17,201.00	90.69	357.81	7,744.13	8,331.33	-1,954.40	8,379.33	1.08	0.33	1.03	
17,294.00	92.21	357.87	7,741.78	8,424.23	-1,957.90	8,472.29	1.64	1.63	0.06	
17,388.00	90.44	359.20	7,739.60	8,518.17	-1,960.30	8,566.26	2.36	-1.88	1.41	
17,482.00	90.69	358.57	7,738.68	8,612.14	-1,962.13	8,660.25	0.72	0.27	-0.67	
17,577.00	91.33	358.10	7,737.00	8,707.09	-1,964.89	8,755.24	0.84	0.67	-0.49	
17,670.00	88.46	359.60	7,737.17	8,800.06	-1,966.76	8,848.22	3.48	-3.09	1.61	
17,764.00	88.48	358.23	7,739.68	8,894.00	-1,968.54	8,942.18	1.46	0.02	-1.46	
17,859.00	88.23	358.07	7,742.41	8,988.91	-1,971.60	9,037.14	0.31	-0.26	-0.17	
17,954.00	89.85	358.49	7,744.00	9,083.86	-1,974.45	9,132.12	1.76	1.71	0.44	
18,048.00	90.86	358.34	7,743.42	9,177.82	-1,977.05	9,226.12	1.09	1.07	-0.16	
18,141.00	91.30	358.30	7,741.67	9,270.76	-1,979.78	9,319.10	0.48	0.47	-0.04	
18,233.00	90.27	359.30	7,740.40	9,362.73	-1,981.70	9,411.09	1.56	-1.12	1.09	
18,327.00	90.70	358.78	7,739.61	9,456.71	-1,983.28	9,505.08	0.72	0.46	-0.55	
18,422.00	91.17	357.88	7,738.06	9,551.66	-1,986.05	9,600.07	1.07	0.49	-0.95	
18,514.00	88.35	359.04	7,738.44	9,643.61	-1,988.52	9,692.06	3.31	-3.07	1.26	
18,607.00	88.41	358.49	7,741.07	9,736.55	-1,990.52	9,785.02	0.59	0.06	-0.59	
18,701.00	88.11	358.19	7,743.93	9,830.47	-1,993.24	9,878.98	0.45	-0.32	-0.32	
18,780.82	89.68	358.22	7,745.47	9,910.23	-1,995.75	9,958.77	1.97	1.97	0.03	
Enter Toe Circle: 18780.8' MD, 291' FNL, 974' FWL										
18,795.00	89.96	358.22	7,745.51	9,924.41	-1,996.19	9,972.96	1.97	1.97	0.03	
18,888.00	90.43	357.45	7,745.19	10,017.34	-1,999.70	10,065.95	0.97	0.51	-0.83	
18,962.00	90.76	357.39	7,744.43	10,091.26	-2,003.03	10,139.93	0.45	0.45	-0.08	
19,014.30	90.76	357.39	7,743.73	10,143.50	-2,005.41	10,192.22	0.00	0.00	0.00	
PBHL (Windsock 21-2HZ)										
19,017.00	90.76	357.39	7,743.70	10,146.20	-2,005.54	10,194.92	0.00	0.00	0.00	
BHL: 56' FNL, 963' FWL Sec 16 T1N R68W										

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Windsock 21-2HZ
Project:	Weld County, CO (UTM-NAD83)	TVD Reference:	20' KB + 5222' GE @ 5242.00usft
Site:	Windsock 15-21HZ	MD Reference:	20' KB + 5222' GE @ 5242.00usft
Well:	Windsock 21-2HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	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: 359' FSL, 2364' FE - actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	14,537,786.35	1,638,296.78	40.030353	-105.007573
Enter Land Box: 4202.74 - actual wellpath hits target center - Point	0.00	0.00	3,901.10	-710.76	-1,197.82	14,537,075.70	1,637,098.90	40.028401	-105.011852
Curve KOP (Windsock 2) - actual wellpath misses target center by 0.01usft at 7418.00usft MD (6999.58 TVD, -1049.45 N, -1695.39 E) - Point	0.00	0.00	6,999.58	-1,049.45	-1,695.39	14,536,737.05	1,636,601.30	40.027471	-105.013630
LP: 96' FSL, 1266' FWL - actual wellpath hits target center - Point	0.00	0.00	7,735.53	-270.87	-1,735.58	14,537,515.63	1,636,561.17	40.029609	-105.013773
BHL: 56' FNL, 963' FWL - actual wellpath misses target center by 0.01usft at 19017.00usft MD (7743.70 TVD, 10146.20 N, -2005.54 E) - Point	0.00	0.00	7,743.70	10,146.20	-2,005.54	14,547,932.72	1,636,292.10	40.058216	-105.014741
Exit Heel Circle: 8949.67 - actual wellpath hits target center - Point	0.00	0.00	7,744.85	85.60	-1,742.71	14,537,872.10	1,636,554.07	40.030588	-105.013799
Enter Toe Circle: 18780. - actual wellpath hits target center - Point	0.00	0.00	7,745.47	9,910.23	-1,995.75	14,547,696.74	1,636,301.87	40.057568	-105.014706

Checked By: _____	Approved By: _____	Date: _____
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