

ANADARKO PETROLEUM CORP

Project: Weld County, CO (UTM-NAD83)
Site: Windsock 15-21HZ
Well: Windsock 21-3HZ
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

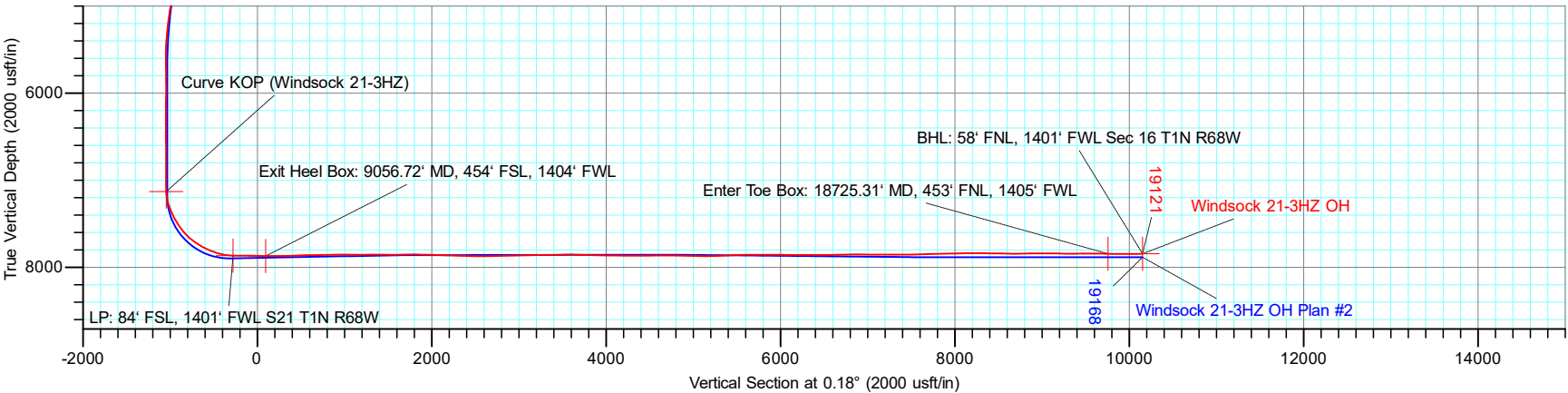
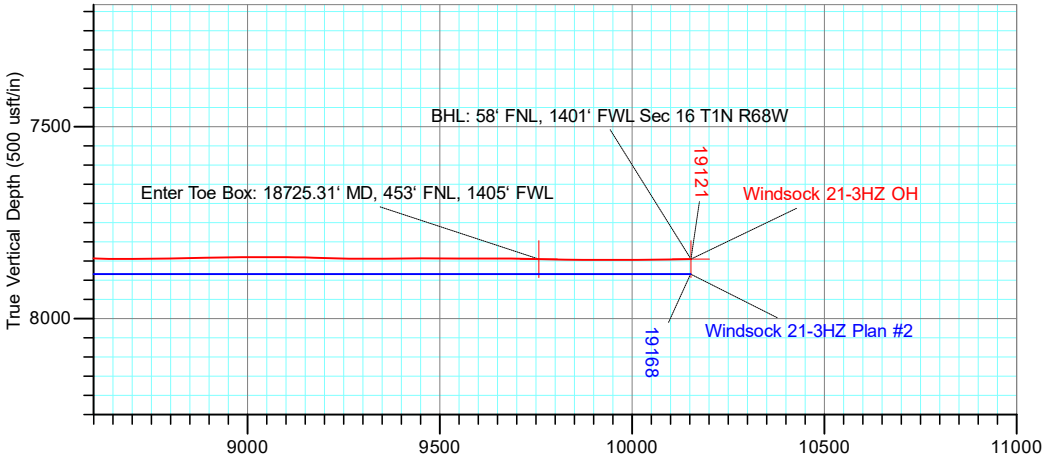
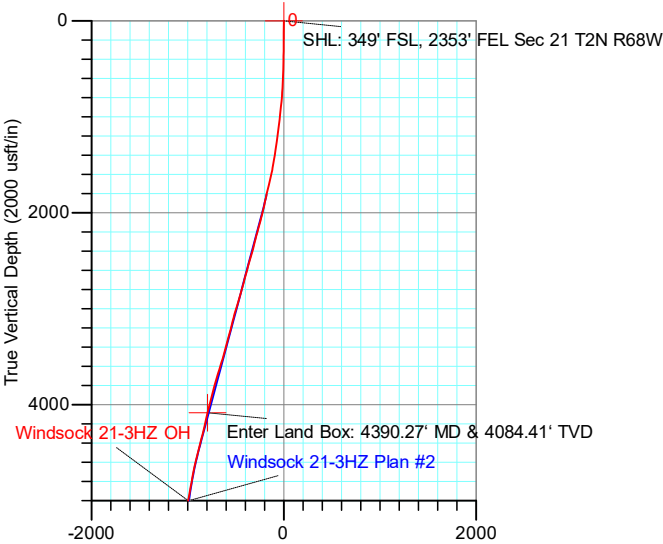
20' KB + 5222' GE @ 5242.00usft

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
BHL: 58' FNL, 1401' FWL Sec 16 T1N R68W	7845.14	10158.20	-1577.44	40.058219	-105.013173
Curve KOP (Windsock 21-3HZ)	7131.43	-1040.03	-1601.99	40.027467	-105.013258
Enter Land Box: 4390.27' MD & 4084.41' TVD	4084.41	-788.77	-1207.73	40.028157	-105.011849
Enter Toe Box: 18725.31' MD, 453' FNL, 1405' FWL	7845.40	9762.60	-1572.61	40.057133	-105.013155
Exit Heel Box: 9056.72' MD, 454' FSL, 1404' FWL	7870.68	99.14	-1607.18	40.030595	-105.013276
LP: 84' FSL, 1401' FWL S21 T1N R68W	7866.37	-273.54	-1610.34	40.029572	-105.013288
SHL: 349' FSL, 2353' FEL Sec 21 T2N R68W	0.00	0.00	0.00	40.030323	-105.007535

ACTUAL LINE CALLS

SHL: 349' FSL, 2353' FEL Sec 21 T2N R68W
HEEL: 84' FSL, 1401' FWL S21 T1N R68W
BHL: 58' FNL, 1401' FWL Sec 16 T1N R68W



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

Design: OH (Windsock 21-3HZ/OH)
Windsock 15-21HZ
Created By: Dustin Ault
Date: 23:55, February 24 2020
Approved: _____
Date: _____

ANADARKO PETROLEUM CORP

Project: Weld County, CO (UTM-NAD83)
 Site: Windsock 15-21HZ
 Well: Windsock 21-3HZ
 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)

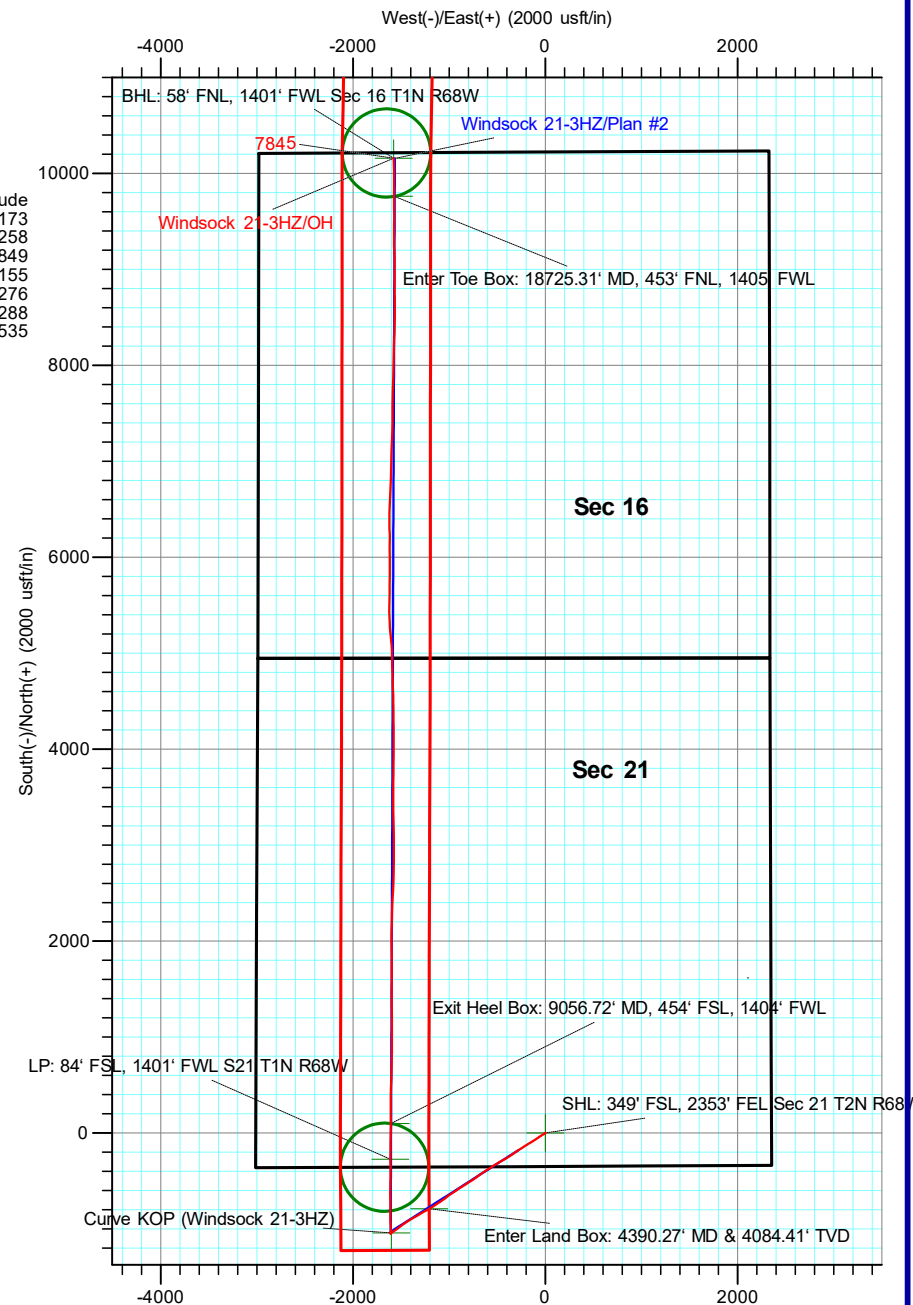
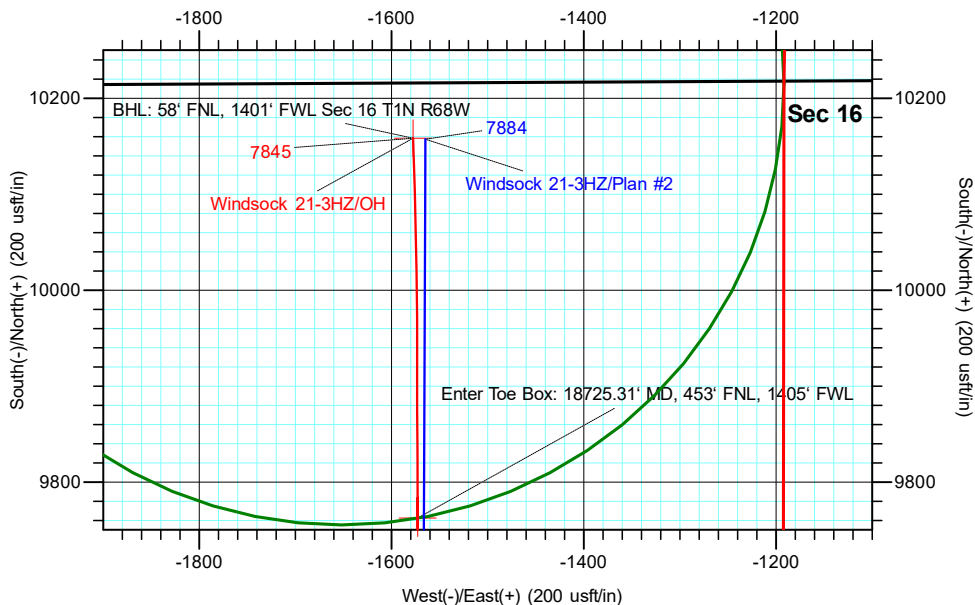


DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
BHL: 58' FNL, 1401' FWL Sec 16 T1N R68W	7845.14	10158.20	-1577.44	14547933.76	1636730.83	40.058219	-105.013173
Curve KOP (Windsock 21-3HZ)	7131.43	-1040.03	-1601.99	14536735.54	1636705.33	40.027467	-105.013258
Enter Land Box: 4390.27' MD & 4084.41' TVD	4084.41	-788.77	-1207.73	14536986.76	1637099.61	40.028157	-105.011849
Enter Toe Box: 18725.31' MD, 453' FNL, 1405' FWL	7845.40	9762.60	-1572.61	14547538.16	1636735.63	40.057133	-105.013155
Exit Heel Box: 9056.72' MD, 454' FSL, 1404' FWL	7870.68	99.14	-1607.18	14537874.71	1636700.24	40.030595	-105.013276
LP: 84' FSL, 1401' FWL S21 T1N R68W	7866.37	-273.54	-1610.34	14537502.03	1636697.05	40.029572	-105.013288
SHL: 349' FSL, 2353' FEL Sec 21 T2N R68W	0.00	0.00	0.00	14537775.43	1638307.41	40.030323	-105.007535

ACTUAL LINE CALLS

SHL: 349' FSL, 2353' FEL Sec 21 T2N R68W
HEEL: 84' FSL, 1401' FWL S21 T1N R68W
BHL: 58' FNL, 1401' FWL Sec 16 T1N R68W



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

Design: OH (Windsock 21-3HZ/OH)
 Windsock 15-21HZ
 Created By: Dustin Ault
 Date: 23:57, February 24 2020
 Approved: _____
 Date: _____



ANADARKO PETROLEUM CORP

Weld County, CO (UTM-NAD83)

Windsock 15-21HZ

Windsock 21-3HZ

OH

Design: OH

Standard Survey Report

24 February, 2020



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Windsock 21-3HZ
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 21-3HZ	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 21-3HZ					
Well Position	+N/-S	0.00 usft	Northing:	14,537,775.43 usft	Latitude:	40.030323
	+E/-W	0.00 usft	Easting:	1,638,307.41 usft	Longitude:	-105.007535
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	51,893.24985246

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	0.18	

Survey Program	Date	2/24/2020			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
130.00	1,856.00	Survey #1 - Surface MWD+IFR (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	
1,933.00	19,066.00	Survey #2 - MWD+IFR (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	
19,121.00	19,121.00	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: 349' FSL, 2353' FEL Sec 21 T2N R68W - SHL (Windsock 21-3HZ)										
130.00	0.04	192.44	130.00	-0.04	-0.01	-0.04	0.03	0.03	0.00	
225.00	0.40	142.61	225.00	-0.34	0.18	-0.34	0.40	0.38	-52.45	
320.00	0.92	206.33	319.99	-1.29	0.05	-1.29	0.87	0.55	67.07	
415.00	2.29	235.34	414.96	-3.05	-1.85	-3.06	1.63	1.44	30.54	
510.00	3.12	241.14	509.85	-5.38	-5.68	-5.40	0.92	0.87	6.11	
606.00	5.05	243.68	605.60	-8.51	-11.75	-8.55	2.02	2.01	2.65	
701.00	6.81	240.78	700.09	-13.12	-20.42	-13.18	1.88	1.85	-3.05	

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Windsock 21-3HZ
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 21-3HZ	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	8.48	236.57	794.24	-19.73	-31.18	-19.82	1.85	1.76	-4.43
892.00	10.02	235.25	888.99	-28.39	-43.95	-28.52	1.62	1.60	-1.38
987.00	10.94	237.97	982.41	-37.88	-58.38	-38.06	1.10	0.97	2.86
1,082.00	12.35	234.90	1,075.45	-48.50	-74.34	-48.73	1.62	1.48	-3.23
1,177.00	13.80	235.86	1,167.98	-60.70	-92.03	-60.99	1.54	1.53	1.01
1,273.00	14.81	238.59	1,261.01	-73.52	-111.98	-73.87	1.26	1.05	2.84
1,368.00	15.47	238.41	1,352.71	-86.49	-133.13	-86.91	0.70	0.69	-0.19
1,463.00	16.92	238.32	1,443.94	-100.39	-155.69	-100.87	1.53	1.53	-0.09
1,558.00	18.63	238.06	1,534.40	-115.67	-180.33	-116.24	1.80	1.80	-0.27
1,653.00	22.81	236.92	1,623.23	-133.76	-208.65	-134.42	4.42	4.40	-1.20
1,748.00	23.91	236.30	1,710.45	-154.49	-240.10	-155.25	1.19	1.16	-0.65
1,844.00	23.33	237.80	1,798.40	-175.42	-272.37	-176.27	0.87	-0.60	1.56
1,856.00	22.85	239.11	1,809.44	-177.88	-276.38	-178.75	5.86	-4.00	10.92
1,933.00	20.70	235.41	1,880.95	-193.28	-300.42	-194.23	3.31	-2.79	-4.81
2,026.00	22.33	235.96	1,967.46	-212.51	-328.59	-213.54	1.77	1.75	0.59
2,119.00	24.67	236.00	2,052.75	-233.25	-359.33	-234.38	2.52	2.52	0.04
2,212.00	26.97	237.94	2,136.46	-255.30	-393.29	-256.54	2.63	2.47	2.09
2,305.00	28.76	240.52	2,218.67	-277.51	-430.65	-278.86	2.32	1.92	2.77
2,398.00	26.75	240.56	2,300.97	-298.81	-468.36	-300.28	2.16	-2.16	0.04
2,492.00	27.37	238.78	2,384.68	-320.41	-505.26	-321.99	1.08	0.66	-1.89
2,584.00	27.96	236.79	2,466.16	-343.18	-541.39	-344.88	1.19	0.64	-2.16
2,677.00	26.23	237.40	2,548.95	-366.20	-576.95	-368.01	1.88	-1.86	0.66
2,771.00	27.45	236.89	2,632.83	-389.23	-612.60	-391.15	1.32	1.30	-0.54
2,864.00	24.35	237.23	2,716.47	-411.32	-646.68	-413.35	3.34	-3.33	0.37
2,958.00	25.60	233.39	2,801.69	-433.92	-679.28	-436.05	2.18	1.33	-4.09
3,052.00	27.44	233.94	2,885.79	-458.78	-713.09	-461.02	1.97	1.96	0.59
3,145.00	27.23	234.91	2,968.41	-483.63	-747.83	-485.97	0.53	-0.23	1.04
3,239.00	28.05	237.67	3,051.69	-507.81	-784.10	-510.27	1.62	0.87	2.94
3,332.00	25.04	238.06	3,134.87	-529.92	-819.29	-532.49	3.24	-3.24	0.42
3,425.00	26.12	238.26	3,218.76	-551.10	-853.40	-553.78	1.16	1.16	0.22
3,519.00	26.40	236.19	3,303.06	-573.62	-888.36	-576.41	1.02	0.30	-2.20
3,612.00	26.45	238.00	3,386.34	-596.10	-923.10	-598.99	0.87	0.05	1.95
3,705.00	26.02	236.45	3,469.76	-618.35	-957.67	-621.35	0.87	-0.46	-1.67
3,800.00	28.40	233.94	3,554.25	-643.17	-993.31	-646.28	2.78	2.51	-2.64
3,893.00	25.39	232.51	3,637.18	-668.33	-1,027.01	-671.55	3.31	-3.24	-1.54
3,987.00	26.80	232.76	3,721.59	-693.42	-1,059.88	-696.74	1.50	1.50	0.27
4,079.00	26.36	238.29	3,803.88	-716.71	-1,093.77	-720.14	2.73	-0.48	6.01
4,174.00	26.29	236.07	3,889.03	-739.54	-1,129.17	-743.08	1.04	-0.07	-2.34
4,269.00	25.56	237.45	3,974.47	-762.31	-1,163.90	-765.96	1.00	-0.77	1.45
4,363.00	24.62	239.77	4,059.60	-783.08	-1,197.91	-786.84	1.45	-1.00	2.47
4,390.28	24.55	240.05	4,084.41	-788.77	-1,207.73	-792.56	0.49	-0.24	1.02
Enter Land Box: 4390.27' MD & 4084.41' TVD									
4,456.00	24.40	240.72	4,144.22	-802.22	-1,231.40	-806.09	0.49	-0.24	1.02

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Windsock 21-3HZ
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 21-3HZ	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	25.12	239.40	4,229.58	-821.88	-1,265.51	-825.85	0.97	0.77	-1.40
4,642.00	25.55	239.45	4,312.73	-841.90	-1,299.41	-845.98	0.47	0.47	0.05
4,734.00	26.85	240.50	4,395.28	-862.22	-1,334.58	-866.41	1.50	1.41	1.14
4,826.00	26.46	240.29	4,477.50	-882.61	-1,370.46	-886.91	0.44	-0.42	-0.23
4,921.00	25.48	237.21	4,562.91	-904.16	-1,406.03	-908.58	1.75	-1.03	-3.24
5,013.00	21.16	236.98	4,647.38	-923.94	-1,436.60	-928.45	4.70	-4.70	-0.25
5,108.00	18.98	237.28	4,736.60	-941.64	-1,463.98	-946.23	2.30	-2.29	0.32
5,225.00	16.98	233.35	4,847.89	-962.12	-1,493.69	-966.81	2.00	-1.71	-3.36
5,319.00	15.98	229.60	4,938.03	-978.70	-1,514.56	-983.45	1.55	-1.06	-3.99
5,412.00	16.31	234.61	5,027.36	-994.56	-1,534.96	-999.38	1.54	0.35	5.39
5,506.00	13.74	235.77	5,118.14	-1,008.49	-1,554.95	-1,013.37	2.75	-2.73	1.23
5,598.00	11.08	235.37	5,207.99	-1,019.66	-1,571.26	-1,024.59	2.89	-2.89	-0.43
5,692.00	9.39	233.83	5,300.49	-1,029.32	-1,584.88	-1,034.29	1.82	-1.80	-1.64
5,786.00	7.34	234.52	5,393.48	-1,037.33	-1,595.97	-1,042.34	2.18	-2.18	0.73
5,879.00	5.45	247.52	5,485.90	-1,042.47	-1,604.89	-1,047.50	2.55	-2.03	13.98
5,973.00	2.64	272.97	5,579.67	-1,044.06	-1,611.17	-1,049.12	3.48	-2.99	27.07
6,068.00	0.91	302.37	5,674.62	-1,043.55	-1,614.00	-1,048.61	2.00	-1.82	30.95
6,161.00	0.97	322.83	5,767.61	-1,042.52	-1,615.10	-1,047.59	0.36	0.06	22.00
6,254.00	0.45	55.79	5,860.60	-1,041.69	-1,615.27	-1,046.76	1.17	-0.56	99.96
6,348.00	0.73	18.62	5,954.60	-1,040.92	-1,614.77	-1,045.98	0.49	0.30	-39.54
6,442.00	1.64	138.68	6,048.58	-1,041.36	-1,613.69	-1,046.42	2.24	0.97	127.72
6,535.00	1.17	140.49	6,141.56	-1,043.09	-1,612.21	-1,048.15	0.51	-0.51	1.95
6,629.00	0.84	115.76	6,235.54	-1,044.13	-1,610.98	-1,049.19	0.57	-0.35	-26.31
6,722.00	0.82	86.38	6,328.53	-1,044.38	-1,609.70	-1,049.44	0.45	-0.02	-31.59
6,815.00	0.86	69.81	6,421.52	-1,044.10	-1,608.38	-1,049.15	0.26	0.04	-17.82
6,910.00	0.95	53.82	6,516.51	-1,043.39	-1,607.08	-1,048.43	0.28	0.09	-16.83
7,003.00	0.97	45.02	6,609.50	-1,042.38	-1,605.90	-1,047.42	0.16	0.02	-9.46
7,096.00	1.01	39.77	6,702.48	-1,041.19	-1,604.82	-1,046.23	0.11	0.04	-5.65
7,190.00	0.85	164.04	6,796.48	-1,041.23	-1,604.10	-1,046.26	1.75	-0.17	132.20
7,283.00	0.38	136.07	6,889.47	-1,042.11	-1,603.69	-1,047.14	0.59	-0.51	-30.08
7,377.00	0.57	76.19	6,983.47	-1,042.22	-1,603.02	-1,047.26	0.53	0.20	-63.70
7,470.00	0.65	50.12	7,076.47	-1,041.78	-1,602.17	-1,046.80	0.31	0.09	-28.03
7,525.00	3.22	357.83	7,131.43	-1,040.03	-1,601.99	-1,045.06	5.22	4.68	-95.07
Curve KOP (Windsock 21-3HZ)									
7,563.00	5.19	353.90	7,169.33	-1,037.25	-1,602.21	-1,042.28	5.22	5.17	-10.35
7,657.00	16.67	353.28	7,261.47	-1,019.58	-1,604.25	-1,024.61	12.21	12.21	-0.66
7,750.00	22.29	354.62	7,349.11	-988.74	-1,607.46	-993.79	6.06	6.04	1.44
7,844.00	28.19	359.64	7,434.11	-948.75	-1,609.28	-953.80	6.67	6.28	5.34
7,938.00	34.12	358.45	7,514.51	-900.15	-1,610.13	-905.21	6.34	6.31	-1.27
8,032.00	38.70	359.11	7,590.15	-844.39	-1,611.30	-849.44	4.89	4.87	0.70
8,124.00	48.32	0.48	7,656.79	-781.12	-1,611.46	-786.18	10.51	10.46	1.49
8,216.00	55.00	359.54	7,713.83	-709.01	-1,611.47	-714.07	7.30	7.26	-1.02
8,311.00	61.07	359.64	7,764.10	-628.45	-1,612.05	-633.51	6.39	6.39	0.11
8,405.00	67.17	1.55	7,805.11	-543.93	-1,611.13	-548.99	6.74	6.49	2.03

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Windsock 21-3HZ
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 21-3HZ	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)	
8,497.00	73.12	0.33	7,836.35	-457.45	-1,609.73	-462.50	6.59	6.47	-1.33	
8,591.00	80.12	359.44	7,858.09	-366.06	-1,609.93	-371.12	7.50	7.45	-0.95	
8,662.36	87.43	359.90	7,865.82	-295.17	-1,610.33	-300.22	10.27	10.25	0.65	
Heel (Windsock 21-3HZ)										
8,684.00	89.65	0.04	7,866.37	-273.54	-1,610.34	-278.60	10.27	10.25	0.64	
LP: 84' FSL, 1401' FWL S21 T1N R68W										
8,777.00	89.43	0.54	7,867.12	-180.54	-1,609.87	-185.60	0.59	-0.24	0.54	
8,869.00	89.62	0.72	7,867.88	-88.55	-1,608.86	-93.61	0.28	0.21	0.20	
8,963.00	88.56	0.40	7,869.37	5.43	-1,607.94	0.38	1.18	-1.13	-0.34	
9,056.72	89.84	0.53	7,870.68	99.14	-1,607.18	94.09	1.37	1.36	0.14	
Exit Heel Box: 9056.72' MD, 454' FSL, 1404' FWL										
9,057.00	89.84	0.53	7,870.68	99.42	-1,607.18	94.37	1.37	1.36	0.14	
9,152.00	89.97	359.89	7,870.84	194.42	-1,606.83	189.37	0.69	0.14	-0.67	
9,245.00	90.01	358.76	7,870.86	287.41	-1,607.93	282.35	1.22	0.04	-1.22	
9,339.00	92.86	1.89	7,868.50	381.36	-1,607.39	376.30	4.50	3.03	3.33	
9,432.00	92.46	2.20	7,864.19	474.20	-1,604.08	469.15	0.54	-0.43	0.33	
9,525.00	90.99	1.78	7,861.39	567.09	-1,600.85	562.06	1.64	-1.58	-0.45	
9,617.00	90.29	0.65	7,860.36	659.07	-1,598.90	654.04	1.44	-0.76	-1.23	
9,710.00	91.09	1.08	7,859.24	752.05	-1,597.50	747.03	0.98	0.86	0.46	
9,803.00	91.93	1.09	7,856.79	845.00	-1,595.74	839.98	0.90	0.90	0.01	
9,898.00	90.10	0.23	7,855.11	939.97	-1,594.64	934.96	2.13	-1.93	-0.91	
9,992.00	89.38	359.73	7,855.53	1,033.97	-1,594.68	1,028.96	0.93	-0.77	-0.53	
10,086.00	89.67	359.72	7,856.31	1,127.97	-1,595.13	1,122.95	0.31	0.31	-0.01	
10,179.00	90.37	359.69	7,856.28	1,220.96	-1,595.61	1,215.94	0.75	0.75	-0.03	
10,272.00	91.13	359.65	7,855.06	1,313.95	-1,596.14	1,308.93	0.82	0.82	-0.04	
10,364.00	88.75	359.90	7,855.16	1,405.95	-1,596.50	1,400.92	2.60	-2.59	0.27	
10,458.00	89.60	359.35	7,856.51	1,499.93	-1,597.12	1,494.91	1.08	0.90	-0.59	
10,552.00	90.50	359.70	7,856.43	1,593.93	-1,597.90	1,588.90	1.03	0.96	0.37	
10,646.00	91.66	0.44	7,854.66	1,687.91	-1,597.78	1,682.88	1.46	1.23	0.79	
10,739.00	90.17	0.12	7,853.17	1,780.89	-1,597.33	1,775.87	1.64	-1.60	-0.34	
10,832.00	88.49	359.68	7,854.26	1,873.88	-1,597.49	1,868.86	1.87	-1.81	-0.47	
10,927.00	88.51	359.57	7,856.75	1,968.85	-1,598.11	1,963.82	0.12	0.02	-0.12	
11,019.00	88.22	0.19	7,859.37	2,060.81	-1,598.30	2,055.78	0.74	-0.32	0.67	
11,113.00	88.16	0.81	7,862.34	2,154.76	-1,597.48	2,149.73	0.66	-0.06	0.66	
11,206.00	88.39	1.51	7,865.14	2,247.70	-1,595.60	2,242.67	0.79	0.25	0.75	
11,301.00	87.92	2.01	7,868.20	2,342.60	-1,592.69	2,337.59	0.72	-0.49	0.53	
11,393.00	89.08	3.07	7,870.61	2,434.48	-1,588.61	2,429.48	1.71	1.26	1.15	
11,486.00	88.51	3.23	7,872.56	2,527.32	-1,583.50	2,522.33	0.64	-0.61	0.17	
11,580.00	90.92	1.90	7,873.03	2,621.21	-1,579.30	2,616.24	2.93	2.56	-1.41	
11,673.00	91.24	1.57	7,871.28	2,714.15	-1,576.48	2,709.19	0.49	0.34	-0.35	
11,768.00	91.58	359.97	7,868.94	2,809.11	-1,575.20	2,804.15	1.72	0.36	-1.68	
11,860.00	91.43	0.15	7,866.52	2,901.08	-1,575.11	2,896.12	0.25	-0.16	0.20	
11,952.00	91.30	359.91	7,864.33	2,993.06	-1,575.06	2,988.09	0.30	-0.14	-0.26	
12,046.00	91.03	359.66	7,862.42	3,087.03	-1,575.41	3,082.07	0.39	-0.29	-0.27	

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Windsock 21-3HZ
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 21-3HZ	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)
12,140.00	90.83	359.08	7,860.90	3,181.02	-1,576.45	3,176.05	0.65	-0.21	-0.62
12,233.00	90.53	358.92	7,859.79	3,274.00	-1,578.07	3,269.02	0.37	-0.32	-0.17
12,326.00	90.93	358.48	7,858.61	3,366.96	-1,580.18	3,361.98	0.64	0.43	-0.47
12,420.00	90.81	359.39	7,857.18	3,460.94	-1,581.92	3,455.95	0.98	-0.13	0.97
12,515.00	91.06	0.97	7,855.63	3,555.92	-1,581.63	3,550.93	1.68	0.26	1.66
12,610.00	88.35	0.50	7,856.12	3,650.90	-1,580.41	3,645.92	2.90	-2.85	-0.49
12,704.00	88.74	0.73	7,858.51	3,744.87	-1,579.40	3,739.88	0.48	0.41	0.24
12,799.00	88.82	0.63	7,860.53	3,839.84	-1,578.27	3,834.86	0.13	0.08	-0.11
12,892.00	88.74	0.32	7,862.51	3,932.81	-1,577.50	3,927.84	0.34	-0.09	-0.33
12,986.00	89.42	0.37	7,864.02	4,026.80	-1,576.94	4,021.82	0.73	0.72	0.05
13,080.00	89.30	0.01	7,865.07	4,120.79	-1,576.62	4,115.82	0.40	-0.13	-0.38
13,175.00	88.95	359.52	7,866.52	4,215.78	-1,577.01	4,210.80	0.63	-0.37	-0.52
13,269.00	89.74	359.19	7,867.59	4,309.77	-1,578.07	4,304.79	0.91	0.84	-0.35
13,363.00	90.21	359.05	7,867.63	4,403.75	-1,579.51	4,398.77	0.52	0.50	-0.15
13,456.00	91.42	359.70	7,866.31	4,496.74	-1,580.53	4,491.75	1.48	1.30	0.70
13,551.00	89.24	357.42	7,865.76	4,591.69	-1,582.92	4,586.70	3.32	-2.29	-2.40
13,646.00	90.84	358.41	7,865.70	4,686.63	-1,586.37	4,681.62	1.98	1.68	1.04
13,741.00	88.89	358.39	7,865.92	4,781.59	-1,589.03	4,776.57	2.05	-2.05	-0.02
13,836.00	89.05	358.02	7,867.63	4,876.52	-1,592.00	4,871.50	0.42	0.17	-0.39
13,929.00	89.45	359.71	7,868.85	4,969.49	-1,593.84	4,964.46	1.87	0.43	1.82
14,022.00	88.60	356.14	7,870.43	5,062.40	-1,597.21	5,057.36	3.95	-0.91	-3.84
14,115.00	89.08	353.37	7,872.31	5,154.99	-1,605.71	5,149.92	3.02	0.52	-2.98
14,209.00	91.88	356.23	7,871.52	5,248.58	-1,614.23	5,243.48	4.26	2.98	3.04
14,303.00	93.43	357.50	7,867.17	5,342.33	-1,619.36	5,337.22	2.13	1.65	1.35
14,355.68	93.00	358.34	7,864.22	5,394.89	-1,621.27	5,389.77	1.78	-0.82	1.59
TGT 1 (Windsock 21-3HZ)									
14,397.00	92.66	358.99	7,862.18	5,436.15	-1,622.23	5,431.03	1.78	-0.82	1.58
14,490.00	91.45	1.46	7,858.84	5,529.08	-1,621.87	5,523.96	2.96	-1.30	2.66
14,582.00	89.89	0.99	7,857.77	5,621.05	-1,619.90	5,615.93	1.77	-1.70	-0.51
14,677.00	90.22	0.62	7,857.67	5,716.04	-1,618.57	5,710.93	0.52	0.35	-0.39
14,772.00	90.45	0.19	7,857.12	5,811.04	-1,617.90	5,805.92	0.51	0.24	-0.45
14,864.00	89.85	0.37	7,856.88	5,903.03	-1,617.45	5,897.92	0.68	-0.65	0.20
14,956.00	89.72	359.25	7,857.22	5,995.03	-1,617.75	5,989.92	1.23	-0.14	-1.22
15,049.00	89.23	359.68	7,858.08	6,088.02	-1,618.62	6,082.91	0.70	-0.53	0.46
15,143.00	90.59	1.44	7,858.22	6,182.01	-1,617.70	6,176.90	2.37	1.45	1.87
15,237.00	88.18	356.73	7,859.23	6,275.96	-1,619.20	6,270.84	5.63	-2.56	-5.01
15,331.00	91.16	0.42	7,859.77	6,369.90	-1,621.54	6,364.78	5.05	3.17	3.93
15,423.00	90.33	1.41	7,858.58	6,461.88	-1,620.07	6,456.76	1.40	-0.90	1.08
15,517.00	90.19	2.08	7,858.15	6,555.84	-1,617.21	6,550.72	0.73	-0.15	0.71
15,611.00	91.16	3.02	7,857.04	6,649.74	-1,613.02	6,644.64	1.44	1.03	1.00
15,705.00	91.02	2.58	7,855.26	6,743.61	-1,608.43	6,738.52	0.49	-0.15	-0.47
15,799.00	90.57	1.69	7,853.95	6,837.53	-1,604.93	6,832.46	1.06	-0.48	-0.95
15,893.00	89.72	1.67	7,853.71	6,931.49	-1,602.18	6,926.42	0.90	-0.90	-0.02

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Windsock 21-3HZ
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 21-3HZ	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)
15,985.00	89.44	1.02	7,854.39	7,023.46	-1,600.02	7,018.40	0.77	-0.30	-0.71
16,078.00	89.11	0.62	7,855.57	7,116.44	-1,598.69	7,111.39	0.56	-0.35	-0.43
16,170.00	91.00	3.32	7,855.48	7,208.38	-1,595.52	7,203.33	3.58	2.05	2.93
16,264.00	89.64	1.98	7,854.95	7,302.27	-1,591.18	7,297.24	2.03	-1.45	-1.43
16,357.00	89.90	0.46	7,855.33	7,395.25	-1,589.20	7,390.22	1.66	0.28	-1.63
16,452.00	90.10	0.55	7,855.33	7,490.24	-1,588.36	7,485.21	0.23	0.21	0.09
16,545.00	92.42	359.80	7,853.28	7,583.21	-1,588.08	7,578.19	2.62	2.49	-0.81
16,639.00	92.35	1.50	7,849.37	7,677.12	-1,587.01	7,672.10	1.81	-0.07	1.81
16,731.00	91.07	2.09	7,846.62	7,769.03	-1,584.13	7,764.02	1.53	-1.39	0.64
16,824.00	91.74	0.96	7,844.34	7,861.97	-1,581.66	7,856.96	1.41	0.72	-1.22
16,917.00	90.46	1.73	7,842.56	7,954.92	-1,579.47	7,949.92	1.61	-1.38	0.83
17,011.00	91.15	0.66	7,841.24	8,048.89	-1,577.51	8,043.90	1.35	0.73	-1.14
17,105.00	90.52	1.36	7,839.87	8,142.87	-1,575.86	8,137.88	1.00	-0.67	0.74
17,200.00	89.91	2.68	7,839.51	8,237.80	-1,572.51	8,232.82	1.53	-0.64	1.39
17,293.00	89.66	1.98	7,839.86	8,330.73	-1,568.73	8,325.76	0.80	-0.27	-0.75
17,386.00	89.81	1.37	7,840.29	8,423.69	-1,566.01	8,418.72	0.68	0.16	-0.66
17,480.00	89.06	0.40	7,841.22	8,517.67	-1,564.56	8,512.71	1.30	-0.80	-1.03
17,576.00	88.02	359.61	7,843.66	8,613.63	-1,564.55	8,608.68	1.36	-1.08	-0.82
17,669.00	90.42	358.73	7,844.93	8,706.61	-1,565.90	8,701.65	2.75	2.58	-0.95
17,763.00	90.75	0.34	7,843.97	8,800.60	-1,566.66	8,795.63	1.75	0.35	1.71
17,857.00	91.81	359.59	7,841.87	8,894.57	-1,566.72	8,889.61	1.38	1.13	-0.80
17,953.00	89.87	0.72	7,840.46	8,990.55	-1,566.46	8,985.59	2.34	-2.02	1.18
18,046.00	90.23	359.69	7,840.38	9,083.55	-1,566.12	9,078.59	1.17	0.39	-1.11
18,140.00	88.29	356.28	7,841.59	9,177.47	-1,569.43	9,172.49	4.17	-2.06	-3.63
18,232.00	88.65	358.86	7,844.05	9,269.35	-1,573.33	9,264.36	2.83	0.39	2.80
18,325.00	91.13	0.86	7,844.23	9,362.33	-1,573.55	9,357.34	3.43	2.67	2.15
18,420.00	89.81	0.83	7,843.45	9,457.32	-1,572.15	9,452.33	1.39	-1.39	-0.03
18,512.00	89.93	359.85	7,843.66	9,549.31	-1,571.61	9,544.33	1.07	0.13	-1.07
18,606.00	90.06	359.17	7,843.67	9,643.31	-1,572.41	9,638.32	0.74	0.14	-0.72
18,700.00	88.57	0.43	7,844.79	9,737.30	-1,572.74	9,732.31	2.08	-1.59	1.34
18,725.31	88.68	0.14	7,845.40	9,762.60	-1,572.61	9,757.61	1.22	0.45	-1.13
Enter Toe Box: 18725.31' MD, 453' FNL, 1405' FWL									
18,793.00	88.99	359.38	7,846.77	9,830.28	-1,572.89	9,825.29	1.22	0.45	-1.13
18,886.00	90.16	0.16	7,847.46	9,923.27	-1,573.27	9,918.28	1.51	1.26	0.84
18,982.00	90.29	359.11	7,847.08	10,019.27	-1,573.88	10,014.27	1.10	0.14	-1.09
19,066.00	91.02	358.28	7,846.12	10,103.24	-1,575.79	10,098.24	1.32	0.87	-0.99
19,119.10	91.02	358.28	7,845.18	10,156.30	-1,577.38	10,151.30	0.00	0.00	0.00
PBHL (Windsock 21-3HZ)									
19,121.00	91.02	358.28	7,845.14	10,158.20	-1,577.44	10,153.19	0.00	0.00	0.00
BHL: 58' FNL, 1401' FWL Sec 16 T1N R68W									

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Windsock 21-3HZ
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 21-3HZ	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: 349' FSL, 2353' FE - actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	14,537,775.43	1,638,307.41	40.030323	-105.007535
Enter Land Box: 4390.21 - actual wellpath hits target center - Point	0.00	0.00	4,084.41	-788.77	-1,207.73	14,536,986.77	1,637,099.61	40.028157	-105.011850
Curve KOP (Windsock 2 - actual wellpath hits target center - Point	0.00	0.00	7,131.43	-1,040.03	-1,601.99	14,536,735.54	1,636,705.33	40.027467	-105.013258
BHL: 58' FNL, 1401' FW - actual wellpath hits target center - Point	0.00	0.00	7,845.14	10,158.20	-1,577.44	14,547,933.76	1,636,730.83	40.058219	-105.013173
Enter Toe Box: 18725.31 - actual wellpath hits target center - Point	0.00	0.00	7,845.40	9,762.60	-1,572.61	14,547,538.16	1,636,735.62	40.057133	-105.013155
LP: 84' FSL, 1401' FWL - actual wellpath hits target center - Point	0.00	0.00	7,866.37	-273.54	-1,610.34	14,537,502.03	1,636,697.04	40.029572	-105.013288
Exit Heel Box: 9056.72' - actual wellpath hits target center - Point	0.00	0.00	7,870.68	99.14	-1,607.18	14,537,874.71	1,636,700.23	40.030595	-105.013277

Checked By: _____	Approved By: _____	Date: _____
-------------------	--------------------	-------------