

ANADARKO PETROLEUM CORP

Project: Weld County, CO (UTM-NAD83)
 Site: Windsock 15-21HZ
 Well: Windsock 21-5HZ
 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)



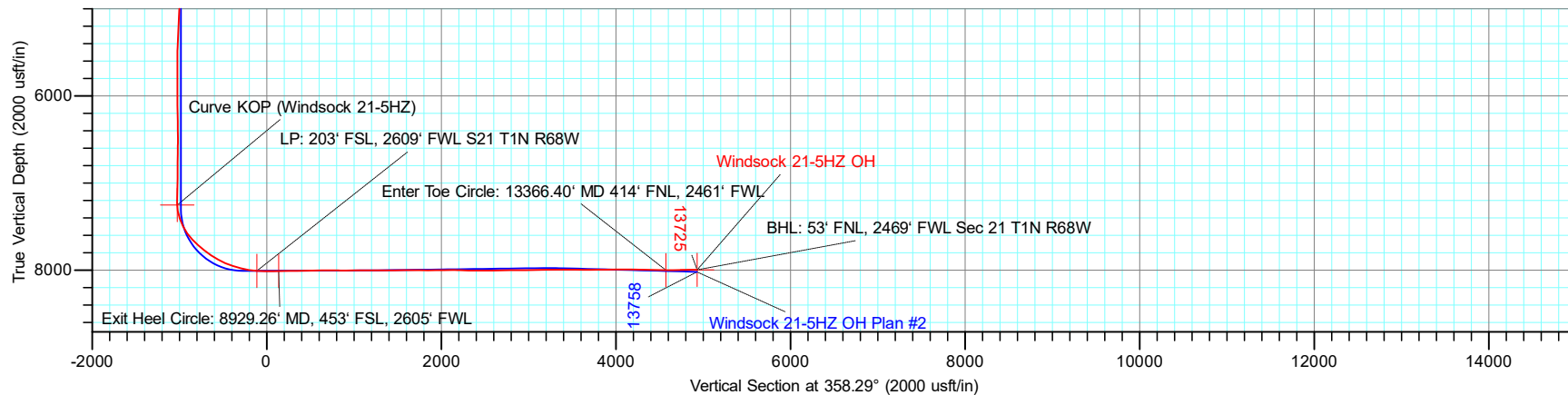
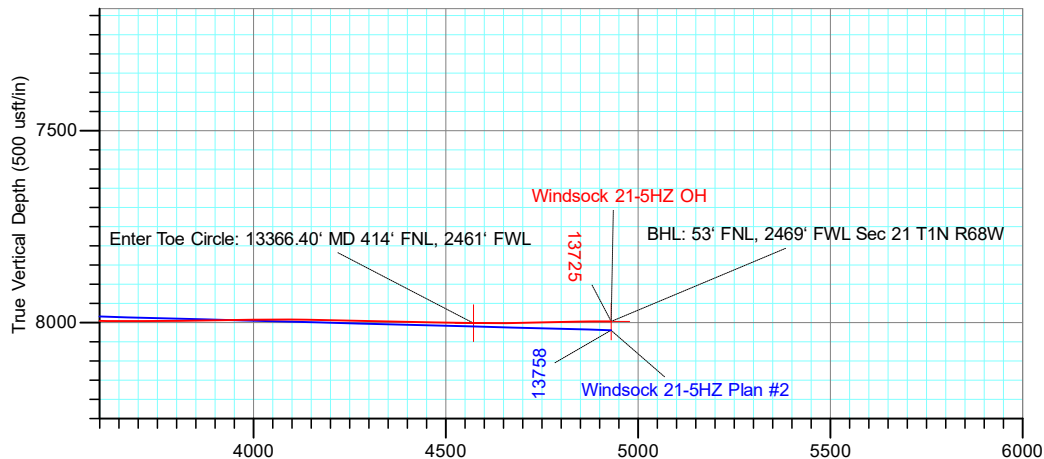
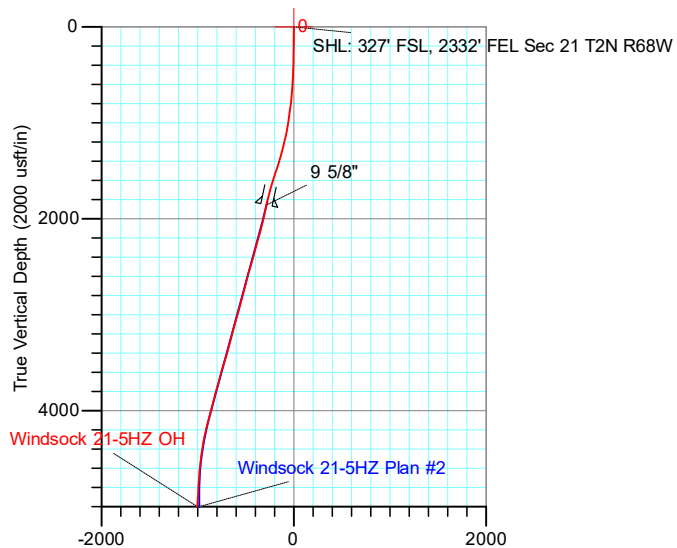
1N-68W-21

20' KB + 5222' GE @ 5242.00usft

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
BHL: 53' FNL, 2469' FWL Sec 21 T1N R68W	7997.01	4916.11	-540.32	40.043766	-105.009391
Curve KOP (Windsock 21-5HZ)	7252.58	-1037.56	-379.99	40.027416	-105.008817
Enter Toe Circle: 13366.40' MD 414' FNL, 2461' FWL	8001.62	4557.79	-549.74	40.042782	-105.009424
Exit Heel Circle: 8929.26' MD, 453' FSL, 2605' FWL	8010.79	124.39	-427.26	40.030607	-105.008986
LP: 203' FSL, 2609' FWL S21 T1N R68W	8009.21	-125.73	-422.37	40.029920	-105.008969
SHL: 327' FSL, 2332' FEL Sec 21 T2N R68W	0.00	0.00	0.00	40.030265	-105.007460

ACTUAL LINE CALLS
SHL: 327' FSL, 2332' FEL Sec 21 T2N R68W
HEEL: 203' FSL, 2609' FWL S21 T1N R68W
BHL: 53' FNL, 2469' FWL Sec 21 T1N R68W



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

Design: OH (Windsock 21-5HZ/OH)
 Windsock 15-21HZ
 Created By: Dustin Ault
 Date: 15:17, February 20 2020
 Approved: _____ Date: _____

ANADARKO PETROLEUM CORP

Project: Weld County, CO (UTM-NAD83)
 Site: Windsock 15-21HZ
 Well: Windsock 21-5HZ
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Azimuths to True North
 Magnetic North: 8.05°

Magnetic Field
 Strength: 51893.2nT
 Dip Angle: 66.46°
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 Geodetic System: Universal Transverse Mercator (US Survey Feet)
 Datum: North American Datum 1983
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 Zone: Zone 13N (108 W to 102 W)



DESIGN TARGET DETAILS

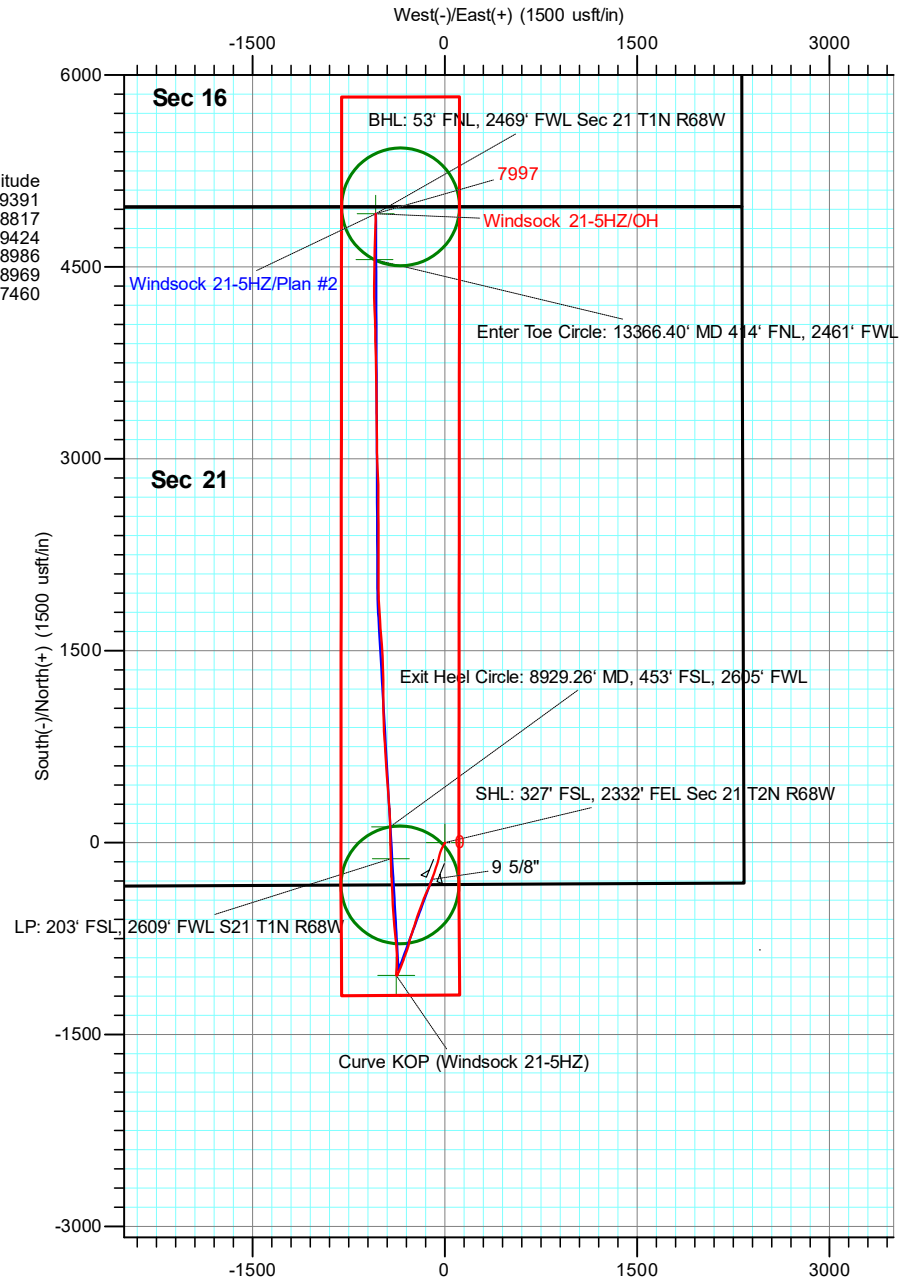
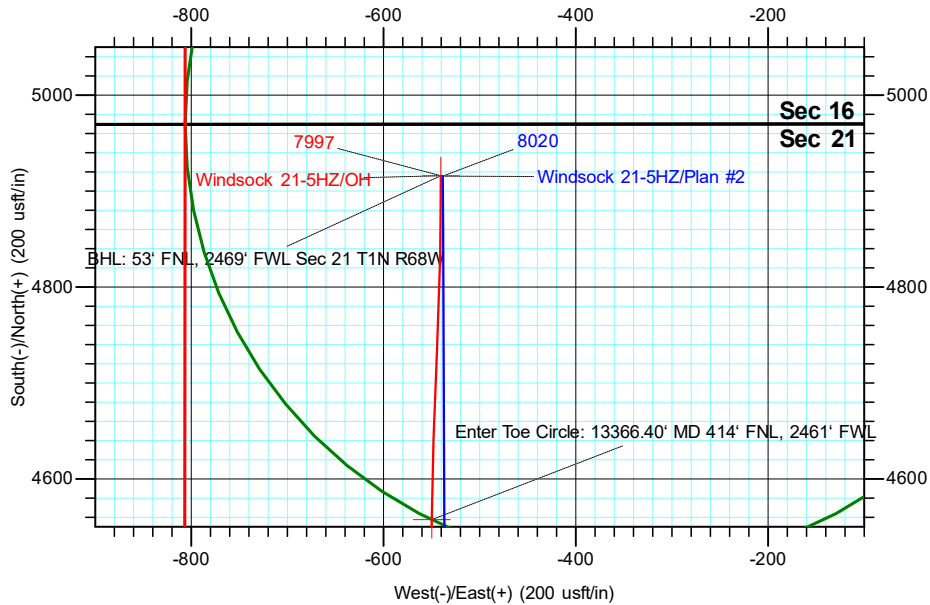
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
BHL: 53' FNL, 2469' FWL Sec 21 T1N R68W	7997.01	4916.11	-540.32	14542670.47	1637788.50	40.043766	-105.009391
Curve KOP (Windsock 21-5HZ)	7252.58	-1037.56	-379.99	14536716.78	1637948.33	40.027416	-105.008817
Enter Toe Circle: 13366.40' MD 414' FNL, 2461' FWL	8001.62	4557.79	-549.74	14542312.15	1637779.05	40.042782	-105.009424
Exit Heel Circle: 8929.26' MD, 453' FSL, 2605' FWL	8010.79	124.39	-427.26	14537878.74	1637901.16	40.030607	-105.008986
LP: 203' FSL, 2609' FWL S21 T1N R68W	8009.21	-125.73	-422.37	14537628.62	1637906.03	40.029920	-105.008969
SHL: 327' FSL, 2332' FEL Sec 21 T2N R68W	0.00	0.00	0.00	14537754.31	1638328.41	40.030265	-105.007460

ACTUAL LINE CALLS

SHL: 327' FSL, 2332' FEL Sec 21 T2N R68W

HEEL: 203' FSL, 2609' FWL S21 T1N R68W

BHL: 53' FNL, 2469' FWL Sec 21 T1N R68W



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

Design: OH (Windsock 21-5HZ/OH)
 Windsock 15-21HZ
 Created By: Dustin Ault
 Date: _____
 Approved: _____
 Date: 15:19, February 20 2020



ANADARKO PETROLEUM CORP

Weld County, CO (UTM-NAD83)

Windsock 15-21HZ

Windsock 21-5HZ

OH

Design: OH

Standard Survey Report

20 February, 2020



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Windsock 21-5HZ
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 21-5HZ	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 21-5HZ					
Well Position	+N/-S	0.00 usft	Northing:	14,537,754.31 usft	Latitude:	40.030265
	+E/-W	0.00 usft	Easting:	1,638,328.41 usft	Longitude:	-105.007460
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	51,893.22758637

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	358.29	

Survey Program	Date	2/20/2020			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
130.00	1,855.00	Survey #1 - Surface (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	
1,929.00	13,670.00	Survey #2 (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	
13,725.00	13,725.00	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	0.00
SHL (Windsock 21-5HZ) - SHL: 327' FSL, 2332' FEL Sec 21 T2N R68W										
130.00	0.70	147.71	130.00	-0.67	0.42	-0.68	0.54	0.54	0.00	
225.00	0.97	162.83	224.99	-1.93	0.97	-1.96	0.36	0.28	15.92	
320.00	0.53	217.93	319.98	-3.05	0.94	-3.07	0.84	-0.46	58.00	
415.00	1.85	215.21	414.96	-4.64	-0.22	-4.64	1.39	1.39	-2.86	
510.00	3.12	216.09	509.87	-7.99	-2.62	-7.90	1.34	1.34	0.93	
606.00	4.57	217.41	605.65	-13.14	-6.49	-12.94	1.51	1.51	1.38	
701.00	6.02	210.29	700.24	-20.44	-11.30	-20.10	1.67	1.53	-7.49	

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Windsock 21-5HZ
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 21-5HZ	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	7.73	207.12	794.55	-30.43	-16.72	-29.92	1.84	1.80	-3.34	
892.00	8.70	204.49	889.57	-42.79	-22.68	-42.09	1.08	1.01	-2.74	
987.00	9.36	203.87	983.39	-56.39	-28.78	-55.51	0.70	0.69	-0.65	
1,082.00	10.77	198.42	1,076.93	-71.88	-34.71	-70.81	1.79	1.48	-5.74	
1,177.00	14.11	194.82	1,169.69	-91.50	-40.48	-90.25	3.61	3.52	-3.79	
1,273.00	14.19	193.24	1,262.77	-114.27	-46.17	-112.84	0.41	0.08	-1.65	
1,368.00	16.83	194.82	1,354.31	-138.90	-52.35	-137.28	2.81	2.78	1.66	
1,463.00	19.03	198.51	1,444.69	-166.89	-60.79	-165.00	2.61	2.32	3.88	
1,558.00	19.07	197.89	1,534.49	-196.34	-70.47	-194.15	0.22	0.04	-0.65	
1,653.00	18.02	197.28	1,624.55	-225.14	-79.61	-222.67	1.12	-1.11	-0.64	
1,748.00	16.44	199.74	1,715.29	-251.83	-88.51	-249.08	1.83	-1.66	2.59	
1,844.00	14.19	199.83	1,807.87	-275.69	-97.09	-272.67	2.34	-2.34	0.09	
1,855.00	13.93	202.29	1,818.54	-278.18	-98.05	-275.13	5.92	-2.36	22.36	
1,895.00	13.31	201.90	1,857.42	-286.91	-101.60	-283.75	1.56	-1.54	-0.99	
9 5/8"										
1,929.00	12.79	201.53	1,890.54	-294.04	-104.44	-290.79	1.56	-1.54	-1.07	
2,021.00	14.09	199.64	1,980.02	-314.06	-111.94	-310.58	1.49	1.41	-2.05	
2,114.00	15.32	202.34	2,069.97	-336.09	-120.41	-332.35	1.51	1.32	2.90	
2,207.00	17.24	204.15	2,159.24	-360.03	-130.72	-355.97	2.14	2.06	1.95	
2,300.00	17.76	204.49	2,247.93	-385.51	-142.24	-381.10	0.57	0.56	0.37	
2,393.00	16.17	203.55	2,336.88	-410.29	-153.30	-405.54	1.73	-1.71	-1.01	
2,485.00	17.03	201.42	2,425.05	-434.58	-163.33	-429.51	1.14	0.93	-2.32	
2,579.00	17.76	200.23	2,514.75	-460.85	-173.32	-455.47	0.86	0.78	-1.27	
2,671.00	15.88	198.86	2,602.81	-485.93	-182.24	-480.27	2.09	-2.04	-1.49	
2,765.00	15.51	201.77	2,693.31	-509.77	-191.06	-503.84	0.93	-0.39	3.10	
2,858.00	15.64	200.51	2,782.89	-533.06	-200.06	-526.85	0.39	0.14	-1.35	
2,952.00	16.21	198.37	2,873.29	-557.38	-208.64	-550.90	0.87	0.61	-2.28	
3,046.00	16.47	199.92	2,963.49	-582.36	-217.31	-575.61	0.54	0.28	1.65	
3,140.00	16.45	198.14	3,053.64	-607.53	-226.00	-600.52	0.54	-0.02	-1.89	
3,233.00	15.84	194.94	3,142.97	-632.31	-233.37	-625.06	1.16	-0.66	-3.44	
3,327.00	15.60	198.33	3,233.46	-656.70	-240.65	-649.23	1.01	-0.26	3.61	
3,420.00	15.79	199.06	3,322.99	-680.53	-248.72	-672.81	0.29	0.20	0.78	
3,513.00	17.26	196.67	3,412.15	-705.71	-256.81	-697.73	1.74	1.58	-2.57	
3,607.00	17.80	199.41	3,501.78	-732.62	-265.58	-724.37	1.05	0.57	2.91	
3,699.00	17.10	196.45	3,589.55	-758.86	-274.09	-750.34	1.23	-0.76	-3.22	
3,792.00	15.63	188.93	3,678.79	-784.35	-279.90	-775.65	2.77	-1.58	-8.09	
3,888.00	16.05	195.34	3,771.15	-809.93	-285.42	-801.05	1.87	0.44	6.68	
3,981.00	15.11	200.59	3,860.74	-833.68	-293.09	-824.56	1.82	-1.01	5.65	
4,074.00	16.10	199.74	3,950.31	-857.16	-301.70	-847.78	1.09	1.06	-0.91	
4,167.00	15.80	200.20	4,039.73	-881.18	-310.43	-871.52	0.35	-0.32	0.49	
4,262.00	15.42	198.98	4,131.23	-905.26	-319.00	-895.34	0.53	-0.40	-1.28	
4,356.00	14.28	200.32	4,222.08	-927.95	-327.10	-917.78	1.27	-1.21	1.43	
4,451.00	11.42	200.85	4,314.70	-947.73	-334.51	-937.33	3.01	-3.01	0.56	

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Well:	Windsock 21-5HZ	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)	
4,544.00	9.27	202.32	4,406.18	-963.27	-340.64	-952.67	2.33	-2.31	1.58	
4,730.00	6.33	202.88	4,590.44	-986.58	-350.31	-975.68	1.58	-1.58	0.30	
4,822.00	4.89	200.04	4,681.99	-994.93	-353.63	-983.94	1.59	-1.57	-3.09	
4,914.00	3.93	202.50	4,773.72	-1,001.53	-356.18	-990.46	1.06	-1.04	2.67	
5,008.00	3.43	205.08	4,867.53	-1,007.05	-358.60	-995.90	0.56	-0.53	2.74	
5,100.00	2.94	207.43	4,959.38	-1,011.64	-360.86	-1,000.42	0.55	-0.53	2.55	
5,220.00	2.66	214.47	5,079.24	-1,016.67	-363.85	-1,005.36	0.37	-0.23	5.87	
5,313.00	2.84	199.98	5,172.14	-1,020.61	-365.86	-1,009.24	0.77	0.19	-15.58	
5,406.00	2.89	218.90	5,265.02	-1,024.60	-368.12	-1,013.16	1.01	0.05	20.34	
5,499.00	2.57	177.47	5,357.92	-1,028.51	-369.50	-1,017.03	2.10	-0.34	-44.55	
5,593.00	2.40	182.41	5,451.84	-1,032.58	-369.49	-1,021.10	0.29	-0.18	5.26	
5,685.00	0.26	179.95	5,543.81	-1,034.72	-369.57	-1,023.23	2.33	-2.33	-2.67	
5,779.00	0.47	234.34	5,637.80	-1,035.15	-369.88	-1,023.65	0.41	0.22	57.86	
5,874.00	0.50	271.27	5,732.80	-1,035.37	-370.61	-1,023.85	0.32	0.03	38.87	
5,966.00	0.58	287.65	5,824.80	-1,035.22	-371.46	-1,023.68	0.19	0.09	17.80	
6,060.00	0.53	305.56	5,918.79	-1,034.82	-372.27	-1,023.25	0.19	-0.05	19.05	
6,155.00	0.52	304.92	6,013.79	-1,034.32	-372.98	-1,022.73	0.01	-0.01	-0.67	
6,249.00	0.57	312.51	6,107.78	-1,033.76	-373.67	-1,022.15	0.09	0.05	8.07	
6,341.00	0.81	337.76	6,199.78	-1,032.85	-374.26	-1,021.22	0.42	0.26	27.45	
6,435.00	0.90	354.92	6,293.77	-1,031.50	-374.57	-1,019.86	0.29	0.10	18.26	
6,529.00	0.87	29.91	6,387.76	-1,030.15	-374.28	-1,018.52	0.57	-0.03	37.22	
6,622.00	0.93	319.60	6,480.75	-1,028.96	-374.42	-1,017.33	1.12	0.06	-75.60	
6,716.00	1.97	145.74	6,574.73	-1,029.71	-374.00	-1,018.10	3.08	1.11	-184.96	
6,809.00	0.65	155.66	6,667.71	-1,031.52	-372.89	-1,019.93	1.43	-1.42	10.67	
6,902.00	0.34	257.16	6,760.71	-1,032.06	-372.94	-1,020.47	0.85	-0.33	109.14	
6,997.00	0.74	278.24	6,855.70	-1,032.03	-373.82	-1,020.42	0.46	0.42	22.19	
7,090.00	0.99	200.34	6,948.69	-1,032.70	-374.69	-1,021.06	1.19	0.27	-83.76	
7,183.00	1.52	195.17	7,041.67	-1,034.64	-375.30	-1,022.98	0.58	0.57	-5.56	
7,278.00	1.44	234.97	7,136.64	-1,036.55	-376.60	-1,024.85	1.06	-0.08	41.89	
7,370.00	2.26	250.12	7,228.59	-1,037.83	-379.26	-1,026.05	1.03	0.89	16.47	
7,393.97	2.46	326.12	7,252.55	-1,037.56	-379.99	-1,025.76	12.14	0.84	317.01	
Curve KOP (Windsock 21-5HZ)										
7,464.00	10.29	4.70	7,322.11	-1,030.06	-380.31	-1,018.26	12.14	11.18	55.10	
7,557.00	19.49	7.47	7,411.89	-1,006.35	-377.61	-994.63	9.92	9.89	2.98	
7,650.00	25.33	1.66	7,497.84	-971.05	-375.01	-959.42	6.71	6.28	-6.25	
7,744.00	35.94	359.88	7,578.61	-923.22	-374.49	-911.64	11.33	11.29	-1.89	
7,838.00	43.07	357.82	7,651.09	-863.49	-375.77	-851.89	7.71	7.59	-2.19	
7,931.00	48.74	354.89	7,715.79	-796.88	-380.09	-785.18	6.50	6.10	-3.15	
8,025.00	52.01	354.11	7,775.73	-724.82	-387.04	-712.95	3.54	3.48	-0.83	
8,119.00	56.09	354.92	7,830.90	-649.09	-394.30	-637.03	4.40	4.34	0.86	
8,212.00	61.26	354.76	7,879.24	-569.99	-401.45	-557.76	5.56	5.56	-0.17	
8,304.00	65.94	357.67	7,920.14	-487.80	-406.84	-475.44	5.82	5.09	3.16	
8,398.00	72.28	357.85	7,953.64	-400.09	-410.27	-387.67	6.75	6.74	0.19	
8,492.00	75.27	356.50	7,979.90	-309.96	-414.73	-297.44	3.47	3.18	-1.44	

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Windsock 21-5HZ
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 21-5HZ	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)	
8,530.64	77.71	356.96	7,988.93	-272.45	-416.87	-259.89	6.43	6.32	1.20	
Heel (Windsock 21-5HZ)										
8,584.00	81.09	357.59	7,998.74	-220.07	-419.36	-207.45	6.43	6.33	1.17	
8,679.00	86.25	358.75	8,009.21	-125.73	-422.37	-113.07	5.57	5.43	1.22	
LP: 203' FSL, 2609' FWL S21 T1N R68W										
8,771.00	89.42	358.84	8,012.69	-33.83	-424.30	-21.15	3.45	3.45	0.10	
8,864.00	91.22	359.20	8,012.17	59.16	-425.89	71.84	1.97	1.94	0.39	
8,929.26	91.21	358.39	8,010.79	124.39	-427.26	137.08	1.24	-0.02	-1.24	
Exit Heel Circle: 8929.26' MD, 453' FSL, 2605' FWL										
8,956.00	91.20	358.06	8,010.22	151.11	-428.09	163.81	1.24	-0.02	-1.24	
9,050.00	90.67	357.02	8,008.69	245.01	-432.12	257.79	1.24	-0.56	-1.11	
9,144.00	89.67	355.09	8,008.41	338.78	-438.59	351.71	2.31	-1.06	-2.05	
9,239.00	91.16	355.67	8,007.72	433.46	-446.24	446.59	1.68	1.57	0.61	
9,332.00	91.82	355.59	8,005.31	526.16	-453.33	539.45	0.71	0.71	-0.09	
9,426.00	91.12	356.73	8,002.89	619.92	-459.62	633.36	1.42	-0.74	1.21	
9,519.00	89.86	356.90	8,002.10	712.77	-464.79	726.32	1.37	-1.35	0.18	
9,612.00	88.37	355.43	8,003.54	805.54	-471.00	819.24	2.25	-1.60	-1.58	
9,704.00	90.54	358.74	8,004.41	897.40	-475.68	911.20	4.30	2.36	3.60	
9,797.00	90.71	357.91	8,003.40	990.36	-478.40	1,004.19	0.91	0.18	-0.89	
9,890.00	90.10	359.72	8,002.74	1,083.33	-480.32	1,097.18	2.05	-0.66	1.95	
9,985.00	89.45	0.23	8,003.11	1,178.33	-480.36	1,192.14	0.87	-0.68	0.54	
10,079.00	90.01	359.26	8,003.55	1,272.32	-480.78	1,286.11	1.19	0.60	-1.03	
10,173.00	90.24	357.90	8,003.35	1,366.29	-483.11	1,380.10	1.47	0.24	-1.45	
10,267.00	90.87	358.03	8,002.44	1,460.23	-486.45	1,474.10	0.68	0.67	0.14	
10,359.00	89.92	355.01	8,001.80	1,552.05	-492.03	1,566.04	3.44	-1.03	-3.28	
10,451.00	90.39	355.08	8,001.56	1,643.70	-499.98	1,657.89	0.52	0.51	0.08	
10,545.00	89.53	356.99	8,001.62	1,737.47	-506.48	1,751.81	2.23	-0.91	2.03	
10,639.00	89.63	356.06	8,002.31	1,831.29	-512.18	1,845.76	1.00	0.11	-0.99	
10,733.00	91.16	358.70	8,001.66	1,925.18	-516.47	1,939.74	3.25	1.63	2.81	
10,826.00	90.71	0.08	8,000.14	2,018.16	-517.46	2,032.71	1.56	-0.48	1.48	
10,919.00	89.91	0.44	7,999.64	2,111.16	-517.04	2,125.65	0.94	-0.86	0.39	
11,014.00	87.92	359.47	8,001.44	2,206.14	-517.12	2,220.59	2.33	-2.09	-1.02	
11,107.00	88.63	359.85	8,004.24	2,299.09	-517.67	2,313.52	0.87	0.76	0.41	
11,200.00	89.23	359.78	8,005.98	2,392.08	-517.97	2,406.47	0.65	0.65	-0.08	
11,293.00	90.89	359.90	8,005.88	2,485.07	-518.23	2,499.43	1.79	1.78	0.13	
11,388.00	91.22	359.49	8,004.13	2,580.05	-518.73	2,594.38	0.55	0.35	-0.43	
11,480.00	90.68	0.25	8,002.60	2,672.04	-518.94	2,686.34	1.01	-0.59	0.83	
11,573.00	90.72	359.61	8,001.47	2,765.03	-519.05	2,779.29	0.69	0.04	-0.69	
11,667.00	90.52	357.33	8,000.45	2,858.99	-521.56	2,873.28	2.43	-0.21	-2.43	
11,760.00	89.97	356.97	8,000.05	2,951.87	-526.19	2,966.26	0.71	-0.59	-0.39	
11,855.00	90.81	359.15	7,999.41	3,046.81	-529.40	3,061.25	2.46	0.88	2.29	
11,948.00	91.53	359.56	7,997.51	3,139.78	-530.45	3,154.21	0.89	0.77	0.44	
12,133.00	89.94	359.44	7,995.13	3,324.75	-532.07	3,339.15	0.86	-0.86	-0.06	
12,227.00	90.26	359.48	7,994.97	3,418.75	-532.95	3,433.13	0.34	0.34	0.04	

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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 21-5HZ	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)	
12,320.00	89.11	359.45	7,995.48	3,511.74	-533.82	3,526.11	1.24	-1.24	-0.03	
12,413.00	89.64	358.88	7,996.50	3,604.73	-535.17	3,619.09	0.84	0.57	-0.61	
12,508.00	90.37	358.67	7,996.49	3,699.70	-537.21	3,714.09	0.80	0.77	-0.22	
12,602.00	90.62	358.60	7,995.68	3,793.67	-539.44	3,808.08	0.28	0.27	-0.07	
12,697.00	91.32	358.16	7,994.07	3,888.62	-542.13	3,903.07	0.87	0.74	-0.46	
12,791.00	90.45	0.23	7,992.62	3,982.59	-543.45	3,997.04	2.39	-0.93	2.20	
12,886.00	89.74	357.55	7,992.46	4,077.57	-545.29	4,092.02	2.92	-0.75	-2.82	
12,979.00	88.71	358.37	7,993.72	4,170.50	-548.60	4,185.01	1.42	-1.11	0.88	
13,073.00	89.08	357.92	7,995.53	4,264.43	-551.64	4,278.99	0.62	0.39	-0.48	
13,167.00	88.27	0.92	7,997.70	4,358.39	-552.59	4,372.94	3.30	-0.86	3.19	
13,262.00	89.06	0.97	7,999.92	4,453.35	-551.03	4,467.81	0.83	0.83	0.05	
13,357.00	89.06	0.48	8,001.47	4,548.33	-549.83	4,562.71	0.52	0.00	-0.52	
13,366.46	89.22	0.61	8,001.62	4,557.79	-549.74	4,572.16	2.15	1.64	1.39	
Enter Toe Circle: 13366.40' MD 414' FNL, 2461' FWL										
13,451.00	90.60	1.79	8,001.75	4,642.30	-547.96	4,656.59	2.15	1.64	1.39	
13,543.00	92.06	2.89	7,999.62	4,734.20	-544.21	4,748.33	1.99	1.59	1.20	
13,638.00	90.49	0.94	7,997.50	4,829.12	-541.04	4,843.11	2.63	-1.65	-2.05	
13,670.00	90.29	0.37	7,997.29	4,861.11	-540.67	4,875.08	1.89	-0.63	-1.78	
13,724.47	90.29	0.37	7,997.01	4,915.58	-540.32	4,929.51	0.00	0.00	0.00	
PBHL (Windsock 21-5HZ)										
13,725.00	90.29	0.37	7,997.01	4,916.11	-540.32	4,930.04	0.00	0.00	0.00	
BHL: 53' FNL, 2469' FWL Sec 21 T1N R68W										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
SHL: 327' FSL, 2332' FE - hit/miss target - Shape - Point	0.00	0.00	0.00	0.00	0.00	14,537,754.31	1,638,328.41	40.030265	-105.007460	
Curve KOP (Windsock 2) - actual wellpath hits target center - Point	0.00	0.00	7,252.58	-1,037.56	-379.99	14,536,716.79	1,637,948.33	40.027416	-105.008818	
BHL: 53' FNL, 2469' FW - actual wellpath misses target center by 0.01usft at 13725.00usft MD (7997.01 TVD, 4916.11 N, -540.32 E) - Point	0.00	0.00	7,997.01	4,916.11	-540.32	14,542,670.46	1,637,788.50	40.043766	-105.009391	
Enter Toe Circle: 13366. - actual wellpath hits target center - Point	0.00	0.00	8,001.62	4,557.79	-549.74	14,542,312.14	1,637,779.05	40.042782	-105.009424	
LP: 203' FSL, 2609' FWI - actual wellpath hits target center - Point	0.00	0.00	8,009.21	-125.73	-422.37	14,537,628.62	1,637,906.03	40.029920	-105.008969	
Exit Heel Circle: 8929.26 - actual wellpath hits target center - Point	0.00	0.00	8,010.79	124.39	-427.26	14,537,878.74	1,637,901.16	40.030607	-105.008987	

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Site:	Windsock 15-21HZ	MD Reference:	20' KB + 5222' GE @ 5242.00usft
Well:	Windsock 21-5HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.15 Single User Db

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)		Name	Casing Diameter (")	Hole Diameter (")
1,895.00	1,857.42	9 5/8"		9-5/8	13-1/2

Checked By: _____ Approved By: _____ Date: _____