

ANADARKO PETROLEUM CORP

Project: Weld County, CO (UTM-NAD83)
 Site: MAE J 14-8HZ
 Well: MAE J 8-9HZ
 Wellbore: OH
 Design: OH

20' KB + 5083' GE @ 5103.00usft



Azimuths to True North
 Magnetic North: 8.08°

Magnetic Field
 Strength: 51928.6nT
 Dip Angle: 66.49°
 Date: 9/19/2019
 Model: IGRF2015

PROJECT DETAILS: Weld County, CO (UTM-NAD83)

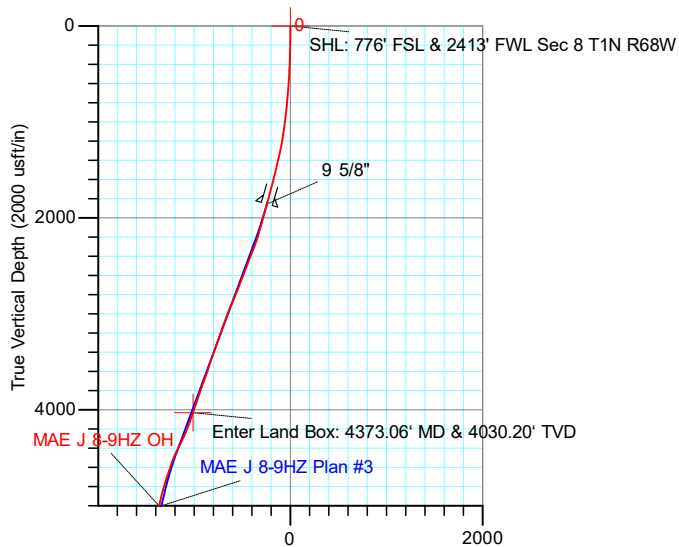
Geodetic System: Universal Transverse Mercator (US Survey Feet)
 Datum: North American Datum 1983
 Ellipsoid: GRS 1980
 Zone: Zone 13N (108 W to 102 W)



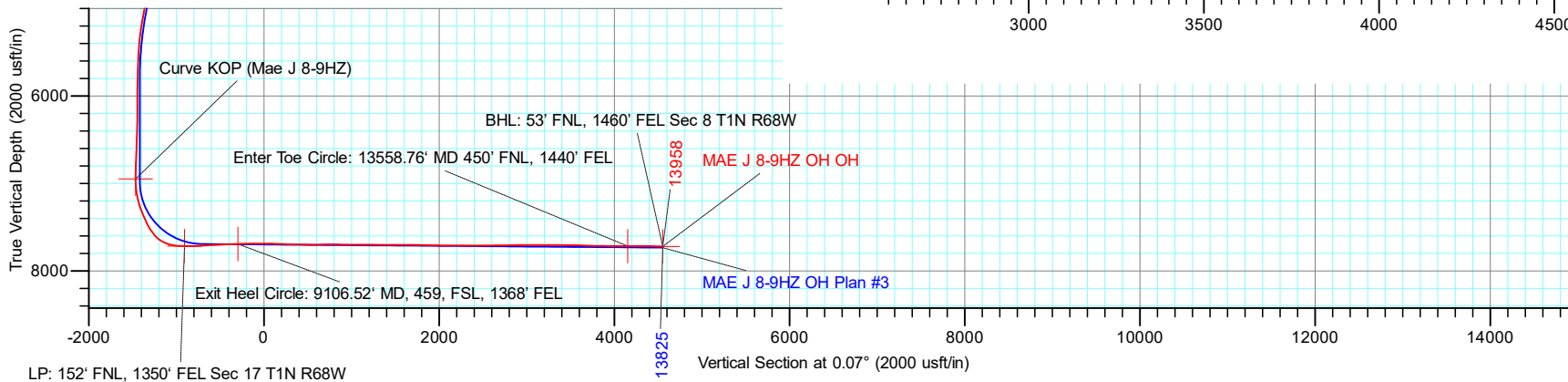
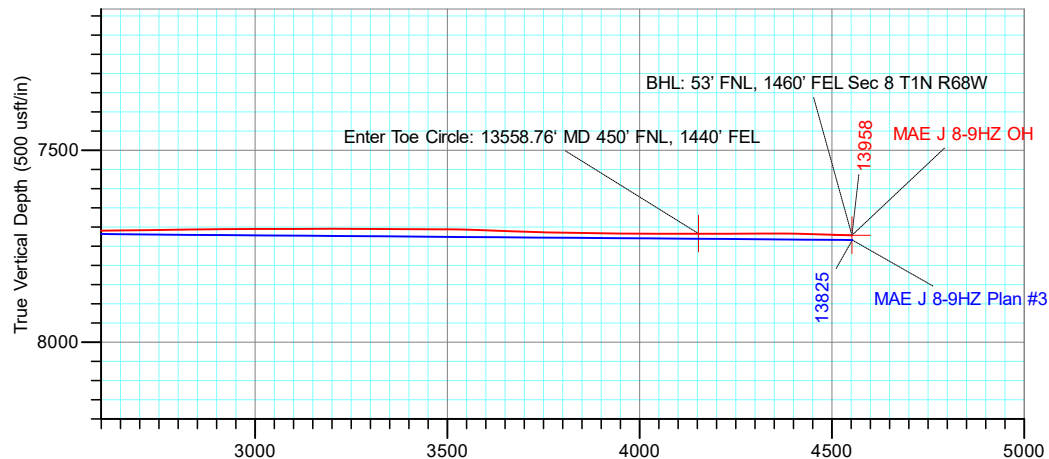
1N-68W-8

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
BHL: 53' FNL, 1460' FEL Sec 8 T1N R68W	7721.80	4550.42	1560.91	40.072878	-105.023022
Curve KOP (Mae J 8-9HZ)	6949.52	-1467.20	1579.98	40.056353	-105.022956
Enter Land Box: 4373.06' MD & 4030.20' TVD	4030.20	-1012.75	1133.49	40.057601	-105.024551
Enter Toe Circle: 13558.76' MD 450' FNL, 1440' FEL	7717.49	4151.48	1573.75	40.071782	-105.022977
Exit Heel Circle: 9106.52' MD, 459, FSL, 1368' FEL	7692.07	-298.49	1557.64	40.059562	-105.023035
LP: 152' FNL, 1350' FEL Sec 17 T1N R68W	7717.18	-908.23	1567.91	40.057888	-105.022999
SHL: 776' FSL & 2413' FWL Sec 8 T1N R68W	0.00	0.00	0.00	40.060382	-105.028602



ACTUAL LINE CALLS
SHL: 776' FSL & 2413' FWL Sec 8 T1N R68W
HEEL: 152' FNL, 1350' FEL Sec 17 T1N R68W
BHL: 53' FNL, 1460' FEL Sec 8 T1N R68W



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

Design: OH (MAE J 8-9HZ/OH)
 MAE J 14-8HZ
 Created By: Dustin Ault
 Date: _____
 Approved: _____
 Date: 13:56, April 01 2020
 Date: _____

ANADARKO PETROLEUM CORP

Project: Weld County, CO (UTM-NAD83)
 Site: MAE J 14-8HZ
 Well: MAE J 8-9HZ
 Wellbore: OH
 Design: OH

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)



Azimuths to True North
 Magnetic North: 8.08°

Magnetic Field
 Strength: 51928.6nT
 Dip Angle: 66.49°
 Date: 9/19/2019
 Model: IGRF2015



DESIGN TARGET DETAILS

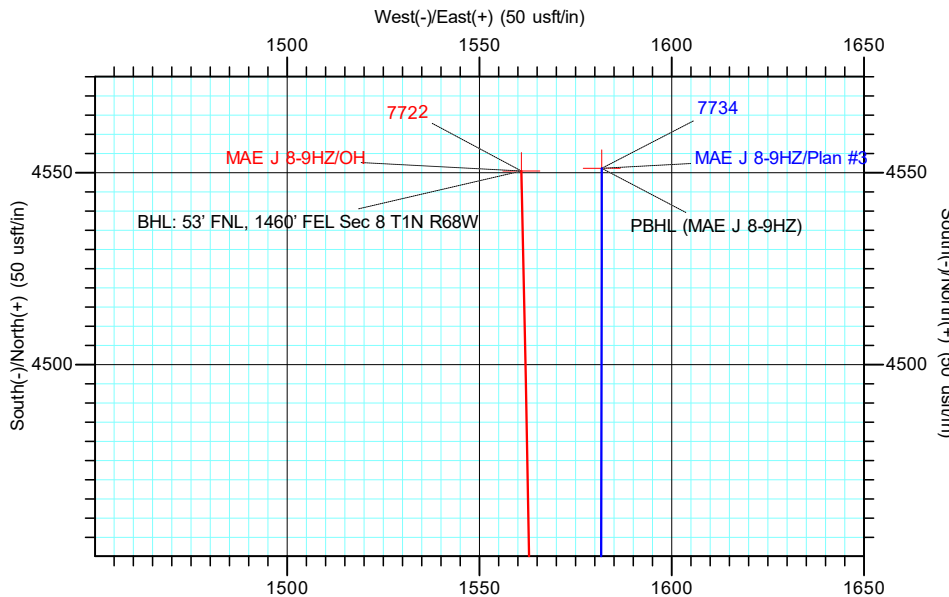
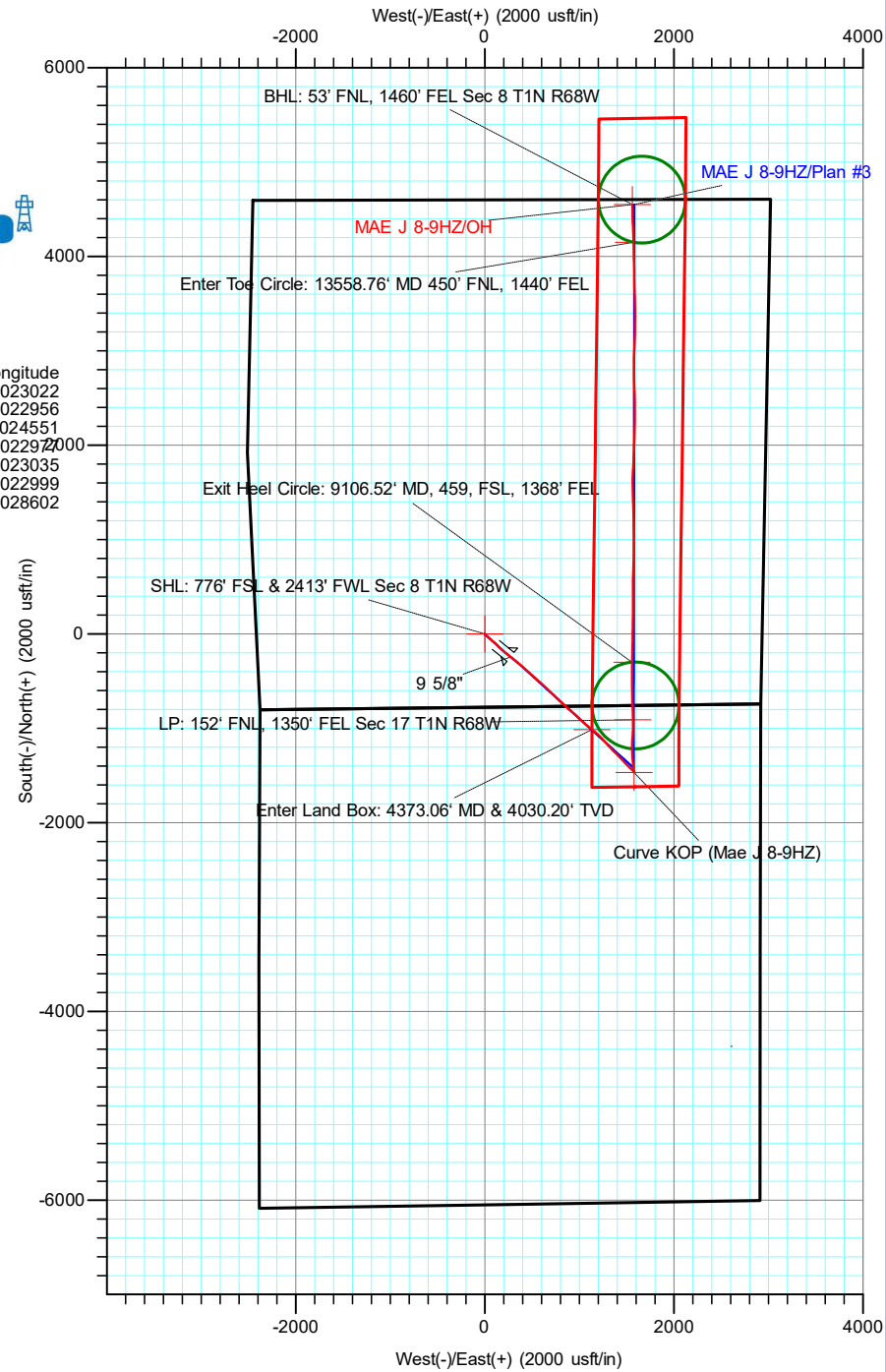
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
BHL: 53' FNL, 1460' FEL Sec 8 T1N R68W	7721.80	4550.42	1560.91	14553272.32	1633976.08	40.072878	-105.023022
Curve KOP (Mae J 8-9HZ)	6949.52	-1467.20	1579.98	14547254.69	1633993.22	40.056353	-105.022956
Enter Land Box: 4373.06' MD & 4030.20' TVD	4030.20	-1012.75	1133.49	14547709.29	1633546.87	40.057601	-105.024551
Enter Toe Circle: 13558.76' MD 450' FNL, 1440' FEL	7717.49	4151.48	1573.75	14552873.37	1633988.79	40.071782	-105.022972
Exit Heel Circle: 9106.52' MD, 459, FSL, 1368' FEL	7692.07	-298.49	1557.64	14548423.41	1633971.25	40.059562	-105.023035
LP: 152' FNL, 1350' FEL Sec 17 T1N R68W	7717.18	-908.23	1567.91	14547813.67	1633981.33	40.057888	-105.022999
SHL: 776' FSL & 2413' FWL Sec 8 T1N R68W	0.00	0.00	0.00	14548722.40	1632413.71	40.060382	-105.028602

ACTUAL LINE CALLS

SHL: 776' FSL & 2413' FWL Sec 8 T1N R68W

HEEL: 152' FNL, 1350' FEL Sec 17 T1N R68W

BHL: 53' FNL, 1460' FEL Sec 8 T1N R68W



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

Design: OH (MAE J 8-9HZ/OH)
 MAE J 14-8HZ
 Created By: Dustin Ault
 Date: 13:59, April 01 2020
 Approved: _____
 Date: _____

ANADARKO PETROLEUM CORP

Weld County, CO (UTM-NAD83)

MAE J 14-8HZ

MAE J 8-9HZ

OH

Design: OH

Standard Survey Report

01 April, 2020

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well MAE J 8-9HZ
Project:	Weld County, CO (UTM-NAD83)	TVD Reference:	20' KB + 5083' GE @ 5103.00usft
Site:	MAE J 14-8HZ	MD Reference:	20' KB + 5083' GE @ 5103.00usft
Well:	MAE J 8-9HZ	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	MAE J 14-8HZ				
Site Position:		Northing:	14,548,842.20 usft	Latitude:	40.060711
From:	Map	Easting:	1,632,414.30 usft	Longitude:	-105.028600
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.02 °

Well	MAE J 8-9HZ					
Well Position	+N/-S	0.00 usft	Northing:	14,548,722.40 usft	Latitude:	40.060382
	+E/-W	0.00 usft	Easting:	1,632,413.71 usft	Longitude:	-105.028602
Position Uncertainty		3.28 usft	Wellhead Elevation:	usft	Ground Level:	5,083.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	9/19/2019	8.08	66.49	51,928.62676336

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	0.07	

Survey Program	Date	4/1/2020			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
131.00	1,892.00	Survey #1 - Surface MWD (OH)	APC_ISCWSA REV 2 MWD	Fixed:v2:standard declination	
2,026.00	13,904.00	Survey #2 - MWD+IFR (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	
13,958.00	13,958.00	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: 776' FSL & 2413' FWL Sec 8 T1N R68W - SHL (MAE J 8-9HZ)										
131.00	0.57	270.87	131.00	0.01	-0.65	0.01	0.44	0.44	0.00	
226.00	1.27	167.25	225.99	-1.01	-0.89	-1.01	1.59	0.74	-109.07	
321.00	1.93	150.99	320.95	-3.44	0.12	-3.44	0.84	0.69	-17.12	
416.00	3.30	140.88	415.85	-6.96	2.62	-6.95	1.52	1.44	-10.64	
511.00	5.27	128.40	510.58	-11.79	7.76	-11.78	2.28	2.07	-13.14	
606.00	6.94	124.01	605.04	-17.71	15.94	-17.69	1.82	1.76	-4.62	
701.00	7.12	128.40	699.33	-24.58	25.31	-24.55	0.60	0.19	4.62	

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well MAE J 8-9HZ
Project:	Weld County, CO (UTM-NAD83)	TVD Reference:	20' KB + 5083' GE @ 5103.00usft
Site:	MAE J 14-8HZ	MD Reference:	20' KB + 5083' GE @ 5103.00usft
Well:	MAE J 8-9HZ	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	8.31	133.41	793.47	-32.95	34.91	-32.91	1.44	1.25	5.27	
892.00	9.62	132.18	888.29	-43.11	45.90	-43.05	1.38	1.36	-1.28	
986.00	10.11	132.18	980.90	-53.92	57.83	-53.85	0.52	0.52	0.00	
1,081.00	11.95	130.86	1,074.14	-65.95	71.45	-65.87	1.95	1.94	-1.39	
1,176.00	13.40	129.81	1,166.83	-79.44	87.35	-79.33	1.55	1.53	-1.11	
1,271.00	17.01	132.80	1,258.49	-95.93	106.00	-95.80	3.89	3.80	3.15	
1,367.00	17.89	133.76	1,350.07	-115.67	126.96	-115.52	0.96	0.92	1.00	
1,462.00	18.81	133.06	1,440.24	-136.22	148.69	-136.04	1.00	0.97	-0.74	
1,557.00	19.38	132.45	1,530.01	-157.32	171.51	-157.11	0.64	0.60	-0.64	
1,653.00	21.14	132.62	1,620.07	-179.79	196.00	-179.55	1.83	1.83	0.18	
1,747.00	22.63	128.40	1,707.30	-202.50	222.65	-202.23	2.30	1.59	-4.49	
1,842.00	23.47	128.05	1,794.71	-225.52	251.87	-225.21	0.90	0.88	-0.37	
1,892.00	25.14	129.19	1,840.28	-238.37	267.94	-238.04	3.47	3.34	2.28	
1,910.00	24.87	129.14	1,856.59	-243.17	273.84	-242.84	1.49	-1.49	-0.27	
9 5/8"										
2,026.00	23.15	128.81	1,962.55	-272.86	310.53	-272.48	1.49	-1.49	-0.29	
2,118.00	22.61	129.38	2,047.31	-295.42	338.30	-295.00	0.63	-0.59	0.62	
2,211.00	24.28	129.30	2,132.63	-318.87	366.91	-318.42	1.80	1.80	-0.09	
2,306.00	26.56	130.99	2,218.43	-345.18	398.06	-344.69	2.52	2.40	1.78	
2,400.00	29.66	131.54	2,301.33	-374.39	431.34	-373.87	3.31	3.30	0.59	
2,493.00	30.86	131.31	2,381.66	-405.40	466.48	-404.83	1.30	1.29	-0.25	
2,585.00	30.59	132.42	2,460.74	-436.77	501.49	-436.15	0.68	-0.29	1.21	
2,679.00	30.20	131.33	2,541.82	-468.51	536.90	-467.86	0.72	-0.41	-1.16	
2,772.00	29.80	131.69	2,622.36	-499.33	571.72	-498.63	0.47	-0.43	0.39	
2,865.00	30.00	132.19	2,702.98	-530.32	606.20	-529.57	0.34	0.22	0.54	
2,959.00	31.09	132.34	2,783.94	-562.45	641.56	-561.66	1.16	1.16	0.16	
3,054.00	31.71	134.63	2,865.03	-596.51	677.46	-595.68	1.42	0.65	2.41	
3,149.00	30.15	134.95	2,946.52	-630.91	712.11	-630.03	1.65	-1.64	0.34	
3,244.00	28.79	132.94	3,029.23	-663.35	745.74	-662.43	1.77	-1.43	-2.12	
3,337.00	27.43	134.01	3,111.25	-693.49	777.55	-692.54	1.56	-1.46	1.15	
3,429.00	27.49	132.65	3,192.89	-722.60	808.41	-721.61	0.68	0.07	-1.48	
3,523.00	28.05	132.32	3,276.06	-752.18	840.70	-751.15	0.62	0.60	-0.35	
3,617.00	28.66	133.06	3,358.79	-782.45	873.52	-781.38	0.75	0.65	0.79	
3,711.00	27.14	129.38	3,441.86	-811.44	906.56	-810.34	2.44	-1.62	-3.91	
3,804.00	26.30	130.37	3,524.93	-838.25	938.66	-837.10	1.02	-0.90	1.06	
3,898.00	27.43	133.87	3,608.79	-866.74	970.13	-865.56	2.07	1.20	3.72	
3,992.00	28.00	133.81	3,692.01	-897.02	1,001.66	-895.80	0.61	0.61	-0.06	
4,086.00	26.76	134.07	3,775.47	-927.02	1,032.79	-925.76	1.33	-1.32	0.28	
4,178.00	26.56	131.30	3,857.70	-955.00	1,063.13	-953.70	1.37	-0.22	-3.01	
4,272.00	27.90	129.52	3,941.28	-982.87	1,095.88	-981.53	1.67	1.43	-1.89	
4,364.00	28.78	127.60	4,022.25	-1,010.08	1,130.04	-1,008.70	1.38	0.96	-2.09	
4,373.07	28.80	127.75	4,030.20	-1,012.75	1,133.49	-1,011.36	0.80	0.17	1.62	
Enter Land Box: 4373.06' MD & 4030.20' TVD										
4,457.00	28.95	129.10	4,103.70	-1,037.93	1,165.24	-1,036.51	0.80	0.18	1.61	

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Site:	MAE J 14-8HZ	MD Reference:	20' KB + 5083' GE @ 5103.00usft
Well:	MAE J 8-9HZ	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	30.23	131.49	4,184.57	-1,067.64	1,200.25	-1,066.17	1.87	1.38	2.57
4,643.00	31.88	137.18	4,264.26	-1,101.17	1,234.49	-1,099.66	3.62	1.77	6.12
4,736.00	33.09	139.36	4,342.71	-1,138.45	1,267.72	-1,136.90	1.81	1.30	2.34
4,830.00	33.91	138.20	4,421.09	-1,177.47	1,301.91	-1,175.88	1.11	0.87	-1.23
4,924.00	28.78	137.29	4,501.35	-1,213.67	1,334.75	-1,212.04	5.48	-5.46	-0.97
5,018.00	25.92	133.72	4,584.84	-1,244.51	1,364.96	-1,242.84	3.51	-3.04	-3.80
5,111.00	26.44	134.92	4,668.30	-1,273.17	1,394.31	-1,271.47	0.80	0.56	1.29
5,231.00	22.06	135.85	4,777.68	-1,308.23	1,428.94	-1,306.48	3.66	-3.65	0.78
5,324.00	20.31	137.13	4,864.39	-1,332.59	1,452.09	-1,330.81	1.95	-1.88	1.38
5,417.00	17.36	137.26	4,952.40	-1,354.61	1,472.49	-1,352.81	3.17	-3.17	0.14
5,510.00	14.09	138.98	5,041.91	-1,373.35	1,489.34	-1,371.53	3.55	-3.52	1.85
5,603.00	14.04	133.94	5,132.13	-1,389.72	1,504.89	-1,387.88	1.32	-0.05	-5.42
5,696.00	12.23	133.58	5,222.69	-1,404.34	1,520.15	-1,402.48	1.95	-1.95	-0.39
5,790.00	9.45	135.51	5,315.00	-1,416.71	1,532.78	-1,414.83	2.98	-2.96	2.05
5,883.00	6.89	133.52	5,407.05	-1,426.00	1,542.17	-1,424.11	2.77	-2.75	-2.14
5,975.00	4.99	129.89	5,498.55	-1,432.36	1,549.24	-1,430.47	2.10	-2.07	-3.95
6,068.00	3.74	128.46	5,591.28	-1,436.84	1,554.72	-1,434.94	1.35	-1.34	-1.54
6,162.00	2.85	129.35	5,685.13	-1,440.23	1,558.93	-1,438.33	0.95	-0.95	0.95
6,254.00	2.14	126.27	5,777.04	-1,442.70	1,562.08	-1,440.79	0.79	-0.77	-3.35
6,347.00	1.94	126.04	5,869.98	-1,444.65	1,564.76	-1,442.74	0.22	-0.22	-0.25
6,441.00	1.65	116.89	5,963.93	-1,446.20	1,567.25	-1,444.28	0.43	-0.31	-9.73
6,534.00	1.24	104.62	6,056.90	-1,447.06	1,569.42	-1,445.14	0.55	-0.44	-13.19
6,628.00	1.09	95.75	6,150.88	-1,447.41	1,571.29	-1,445.49	0.25	-0.16	-9.44
6,720.00	0.81	90.56	6,242.87	-1,447.50	1,572.81	-1,445.58	0.32	-0.30	-5.64
6,813.00	2.31	140.06	6,335.84	-1,448.94	1,574.67	-1,447.02	2.03	1.61	53.23
6,906.00	2.08	153.30	6,428.77	-1,451.89	1,576.64	-1,449.96	0.60	-0.25	14.24
6,999.00	1.80	165.17	6,521.72	-1,454.81	1,577.77	-1,452.88	0.53	-0.30	12.76
7,093.00	1.80	167.46	6,615.67	-1,457.68	1,578.47	-1,455.75	0.08	0.00	2.44
7,185.00	1.86	174.55	6,707.62	-1,460.57	1,578.92	-1,458.64	0.25	0.07	7.71
7,279.00	1.75	173.40	6,801.58	-1,463.52	1,579.23	-1,461.59	0.12	-0.12	-1.22
7,373.00	1.69	166.99	6,895.53	-1,466.29	1,579.71	-1,464.36	0.21	-0.06	-6.82
7,427.00	0.33	143.80	6,949.52	-1,467.20	1,579.98	-1,465.26	2.57	-2.51	-42.95
Curve KOP (Mae J 8-9HZ)									
7,468.00	0.78	4.18	6,990.52	-1,467.01	1,580.07	-1,465.08	2.57	1.09	-340.50
7,562.00	8.01	359.38	7,084.19	-1,459.82	1,580.05	-1,457.89	7.69	7.69	-5.11
7,654.00	13.12	347.26	7,174.61	-1,443.21	1,577.67	-1,441.28	6.03	5.55	-13.17
7,748.00	18.04	351.14	7,265.13	-1,418.41	1,573.08	-1,416.48	5.35	5.23	4.13
7,842.00	23.02	352.87	7,353.13	-1,385.77	1,568.55	-1,383.85	5.34	5.30	1.84
7,935.00	25.79	355.27	7,437.81	-1,347.55	1,564.62	-1,345.64	3.16	2.98	2.58
7,978.00	28.59	356.45	7,476.06	-1,327.96	1,563.22	-1,326.05	6.63	6.51	2.74
8,029.00	30.46	357.04	7,520.43	-1,302.87	1,561.79	-1,300.96	3.71	3.67	1.16
8,122.00	40.94	356.12	7,595.85	-1,248.77	1,558.50	-1,246.87	11.28	11.27	-0.99
8,170.00	50.15	357.74	7,629.44	-1,214.60	1,556.71	-1,212.70	19.34	19.19	3.38

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well MAE J 8-9HZ
Project:	Weld County, CO (UTM-NAD83)	TVD Reference:	20' KB + 5083' GE @ 5103.00usft
Site:	MAE J 14-8HZ	MD Reference:	20' KB + 5083' GE @ 5103.00usft
Well:	MAE J 8-9HZ	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)	
8,215.00	58.15	0.21	7,655.77	-1,178.16	1,556.10	-1,176.26	18.32	17.78	5.49	
8,262.00	65.80	5.79	7,677.85	-1,136.79	1,558.34	-1,134.88	19.35	16.28	11.87	
8,310.00	72.40	4.78	7,694.97	-1,092.16	1,562.46	-1,090.25	13.89	13.75	-2.10	
8,357.00	80.58	1.55	7,705.94	-1,046.58	1,564.96	-1,044.66	18.64	17.40	-6.87	
8,403.00	83.97	2.56	7,712.12	-1,001.03	1,566.59	-999.12	7.68	7.37	2.20	
8,496.00	89.79	359.08	7,717.18	-908.23	1,567.91	-906.31	7.29	6.26	-3.74	
LP: 152' FNL, 1350' FEL Sec 17 T1N R68W										
8,589.00	91.35	357.21	7,716.26	-815.29	1,564.90	-813.38	2.62	1.68	-2.01	
8,682.00	93.49	357.69	7,712.33	-722.47	1,560.77	-720.57	2.36	2.30	0.52	
8,696.00	93.39	358.02	7,711.49	-708.51	1,560.24	-706.60	2.43	-0.72	2.32	
Heel (MAE J 8-9HZ)										
8,775.00	92.82	359.85	7,707.21	-629.64	1,558.77	-627.74	2.43	-0.72	2.32	
8,869.00	93.34	358.88	7,702.16	-535.79	1,557.73	-533.88	1.17	0.55	-1.03	
8,963.00	91.75	0.56	7,697.99	-441.89	1,557.28	-439.98	2.46	-1.69	1.79	
9,055.00	92.95	359.76	7,694.21	-349.97	1,557.53	-348.06	1.57	1.30	-0.87	
9,106.52	91.83	0.47	7,692.07	-298.49	1,557.64	-296.59	2.57	-2.17	1.38	
Exit Heel Circle: 9106.52' MD, 459, FSL, 1368' FEL										
9,149.00	90.91	1.06	7,691.05	-256.03	1,558.21	-254.12	2.57	-2.17	1.38	
9,242.00	90.61	2.11	7,689.82	-163.07	1,560.78	-161.17	1.17	-0.32	1.13	
9,336.00	89.54	0.91	7,689.69	-69.11	1,563.26	-67.20	1.71	-1.14	-1.28	
9,432.00	90.50	359.94	7,689.66	26.89	1,563.97	28.80	1.42	1.00	-1.01	
9,525.00	88.33	1.24	7,690.61	119.87	1,564.93	121.78	2.72	-2.33	1.40	
9,619.00	88.09	0.60	7,693.54	213.81	1,566.43	215.72	0.73	-0.26	-0.68	
9,711.00	87.32	359.71	7,697.23	305.73	1,566.68	307.65	1.28	-0.84	-0.97	
9,805.00	89.32	0.47	7,699.98	399.69	1,566.83	401.60	2.28	2.13	0.81	
9,899.00	88.54	359.62	7,701.74	493.67	1,566.90	495.58	1.23	-0.83	-0.90	
9,993.00	90.93	1.37	7,702.17	587.66	1,567.72	589.57	3.15	2.54	1.86	
10,087.00	92.19	2.08	7,699.62	681.58	1,570.54	683.49	1.54	1.34	0.76	
10,181.00	90.53	3.41	7,697.38	775.44	1,575.05	777.36	2.26	-1.77	1.41	
10,273.00	87.18	1.04	7,699.22	867.33	1,578.62	869.26	4.46	-3.64	-2.58	
10,365.00	89.42	359.82	7,701.95	959.28	1,579.31	961.21	2.77	2.43	-1.33	
10,459.00	91.11	358.80	7,701.52	1,053.27	1,578.17	1,055.19	2.10	1.80	-1.09	
10,551.00	89.45	358.35	7,701.07	1,145.23	1,575.89	1,147.16	1.87	-1.80	-0.49	
10,645.00	89.58	358.18	7,701.86	1,239.19	1,573.04	1,241.11	0.23	0.14	-0.18	
10,737.00	89.67	358.11	7,702.47	1,331.14	1,570.06	1,333.05	0.12	0.10	-0.08	
10,829.00	89.79	358.17	7,702.90	1,423.09	1,567.08	1,425.00	0.15	0.13	0.07	
10,922.00	89.75	358.15	7,703.27	1,516.04	1,564.09	1,517.95	0.05	-0.04	-0.02	
11,015.00	90.69	0.09	7,702.92	1,609.02	1,562.66	1,610.93	2.32	1.01	2.09	
11,108.00	89.12	3.42	7,703.07	1,701.96	1,565.51	1,703.87	3.96	-1.69	3.58	
11,201.00	88.86	2.94	7,704.71	1,794.80	1,570.67	1,796.72	0.59	-0.28	-0.52	
11,295.00	87.89	2.01	7,707.37	1,888.67	1,574.73	1,890.60	1.43	-1.03	-0.99	
11,387.00	88.88	2.94	7,709.97	1,980.55	1,578.70	1,982.48	1.48	1.08	1.01	
11,482.00	89.91	1.77	7,710.97	2,075.46	1,582.60	2,077.39	1.64	1.08	-1.23	
11,576.00	90.28	1.15	7,710.82	2,169.43	1,585.00	2,171.37	0.77	0.39	-0.66	

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well MAE J 8-9HZ
Project:	Weld County, CO (UTM-NAD83)	TVD Reference:	20' KB + 5083' GE @ 5103.00usft
Site:	MAE J 14-8HZ	MD Reference:	20' KB + 5083' GE @ 5103.00usft
Well:	MAE J 8-9HZ	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)	
11,670.00	90.16	0.75	7,710.45	2,263.42	1,586.55	2,265.35	0.44	-0.13	-0.43	
11,764.00	89.84	0.12	7,710.45	2,357.41	1,587.27	2,359.35	0.75	-0.34	-0.67	
11,857.00	89.99	359.27	7,710.59	2,450.41	1,586.77	2,452.35	0.93	0.16	-0.91	
11,950.00	90.36	358.58	7,710.31	2,543.39	1,585.03	2,545.33	0.84	0.40	-0.74	
12,044.00	90.73	357.19	7,709.41	2,637.32	1,581.56	2,639.25	1.53	0.39	-1.48	
12,138.00	90.39	359.99	7,708.49	2,731.28	1,579.25	2,733.21	3.00	-0.36	2.98	
12,232.00	91.54	359.73	7,706.91	2,825.27	1,579.02	2,827.19	1.25	1.22	-0.28	
12,325.00	89.95	1.28	7,705.70	2,918.25	1,579.84	2,920.18	2.39	-1.71	1.67	
12,417.00	90.33	1.21	7,705.48	3,010.23	1,581.84	3,012.16	0.42	0.41	-0.08	
12,510.00	90.23	2.08	7,705.02	3,103.19	1,584.51	3,105.12	0.94	-0.11	0.94	
12,605.00	89.97	2.18	7,704.86	3,198.12	1,588.04	3,200.06	0.29	-0.27	0.11	
12,698.00	89.60	0.21	7,705.21	3,291.09	1,589.98	3,293.03	2.16	-0.40	-2.12	
12,792.00	89.58	359.89	7,705.88	3,385.09	1,590.06	3,387.03	0.34	-0.02	-0.34	
12,885.00	90.08	359.36	7,706.16	3,478.09	1,589.45	3,480.03	0.78	0.54	-0.57	
12,977.00	87.92	358.07	7,707.76	3,570.04	1,587.39	3,571.98	2.73	-2.35	-1.40	
13,071.00	87.75	357.73	7,711.31	3,663.91	1,583.94	3,665.85	0.40	-0.18	-0.36	
13,165.00	88.76	359.71	7,714.17	3,757.84	1,581.85	3,759.77	2.36	1.07	2.11	
13,259.00	89.21	359.08	7,715.84	3,851.82	1,580.85	3,853.75	0.82	0.48	-0.67	
13,353.00	89.32	358.66	7,717.05	3,945.79	1,579.00	3,947.72	0.46	0.12	-0.45	
13,446.00	89.94	358.76	7,717.65	4,038.77	1,576.91	4,040.69	0.68	0.67	0.11	
13,538.00	90.19	358.17	7,717.54	4,130.73	1,574.44	4,132.65	0.70	0.27	-0.64	
13,558.76	90.08	358.01	7,717.49	4,151.48	1,573.75	4,153.40	0.94	-0.52	-0.78	
Enter Toe Circle: 13558.76' MD 450' FNL, 1440' FEL										
13,632.00	89.70	357.44	7,717.63	4,224.66	1,570.84	4,226.58	0.94	-0.52	-0.78	
13,727.00	90.67	357.17	7,717.33	4,319.56	1,566.38	4,321.47	1.06	1.02	-0.28	
13,820.00	88.78	359.29	7,717.77	4,412.50	1,563.50	4,414.41	3.05	-2.03	2.28	
13,904.00	88.13	358.76	7,720.04	4,496.46	1,562.07	4,498.36	1.00	-0.77	-0.63	
13,958.00	88.13	358.76	7,721.80	4,550.42	1,560.91	4,552.32	0.00	0.00	0.00	
BHL: 53' FNL, 1460' FEL Sec 8 T1N R68W - PBHL (MAE J 8-9HZ)										

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well MAE J 8-9HZ
Project:	Weld County, CO (UTM-NAD83)	TVD Reference:	20' KB + 5083' GE @ 5103.00usft
Site:	MAE J 14-8HZ	MD Reference:	20' KB + 5083' GE @ 5103.00usft
Well:	MAE J 8-9HZ	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: 776' FSL & 2413' F - actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	14,548,722.40	1,632,413.71	40.060382	-105.028602	
Enter Land Box: 4373.00 - actual wellpath hits target center - Point	0.00	0.00	4,030.20	-1,012.75	1,133.49	14,547,709.28	1,633,546.87	40.057601	-105.024551	
Curve KOP (Mae J 8-9H) - actual wellpath hits target center - Point	0.00	0.00	6,949.52	-1,467.20	1,579.98	14,547,254.69	1,633,993.22	40.056353	-105.022956	
Exit Heel Circle: 9106.52 - actual wellpath hits target center - Point	0.00	0.00	7,692.07	-298.49	1,557.64	14,548,423.40	1,633,971.25	40.059562	-105.023035	
LP: 152' FNL, 1350' FEL - actual wellpath hits target center - Point	0.00	0.00	7,717.18	-908.23	1,567.91	14,547,813.66	1,633,981.32	40.057888	-105.022999	
Enter Toe Circle: 13558. - actual wellpath hits target center - Point	0.00	0.00	7,717.49	4,151.48	1,573.75	14,552,873.37	1,633,988.79	40.071783	-105.022977	
BHL: 53' FNL, 1460' FEL - actual wellpath misses target center by 0.01usft at 13958.00usft MD (7721.80 TVD, 4550.42 N, 1560.91 E) - Point	0.00	0.00	7,721.80	4,550.42	1,560.91	14,553,272.31	1,633,976.08	40.072878	-105.023023	

Casing Points						
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")		
1,910.00	1,856.59	9 5/8"	9-5/8	13-1/2		

Checked By: _____ Approved By: _____ Date: _____