

ANADARKO PETROLEUM CORP

Project: WELD COUNTY (NAD 83)
Site: Cleland 11-15HZ
Well: Cleland 15-5HZ
Wellbore: OH
Design: OH



Azimuths to True North
Magnetic North: 8.06°

Magnetic Field
Strength: 51920.1nT
Dip Angle: 66.48°
Date: 10/8/2019
Model: IGRF2015

PROJECT DETAILS: WELD COUNTY (NAD 83)

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

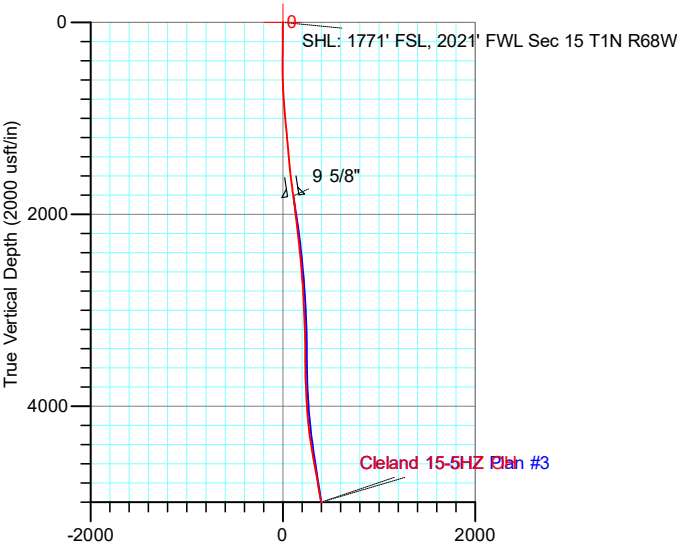


1N-68W-15

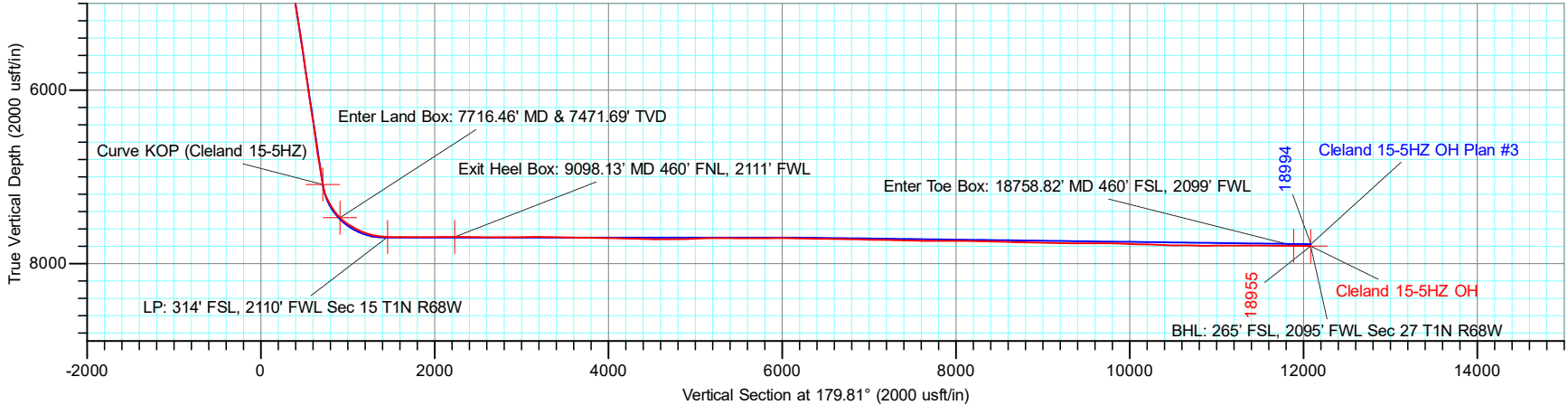
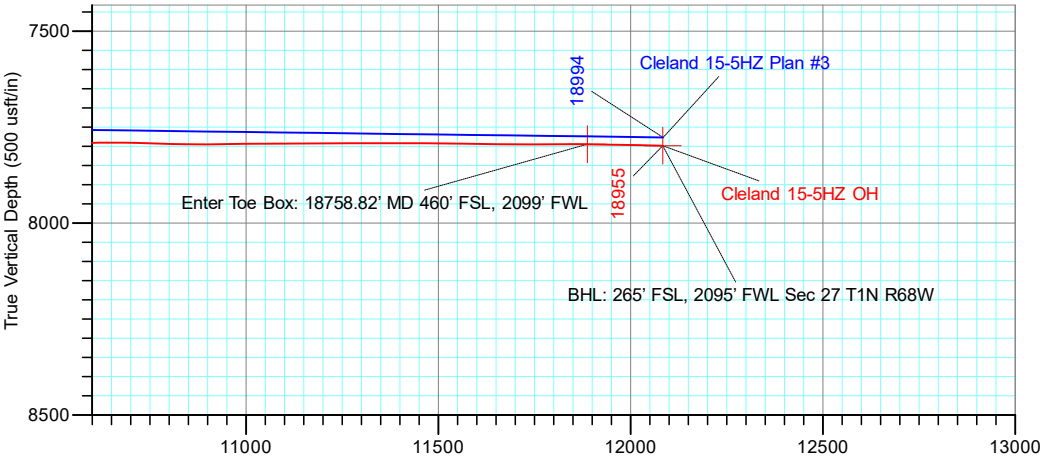
20' KB + 5152' GE @ 5172.00usft

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
BHL: 265' FSL, 2095' FWL Sec 27 T1N R68W	7798.62	-12083.37	109.97	40.015615	-104.991581
Curve KOP (Cleland 15-5HZ)	7089.38	-714.12	-42.34	40.046825	-104.992125
Enter Land Box: 7716.46' MD & 7471.69' TVD	7471.69	-910.61	21.31	40.046285	-104.991898
Enter Toe Box: 18758.82' MD 460' FSL, 2099' FWL	7794.99	-11887.24	111.57	40.016154	-104.991576
Exit Heel Box: 9098.13' MD 460' FNL, 2111' FWL	7693.69	-2230.78	93.48	40.042661	-104.991640
LP: 314' FSL, 2110' FWL Sec 15 T1N R68W	7693.10	-1457.78	92.64	40.044783	-104.991643
SHL: 1771' FSL, 2021' FWL Sec 15 T1N R68W	0.00	0.00	0.00	40.048785	-104.991974



ACTUAL LINE CALLS
SHL: 1771' FSL, 2021' FWL Sec 15 T1N R68W
HEEL: 314' FSL, 2110' FWL Sec 15 T1N R68W
BHL: 265' FSL, 2095' FWL Sec 27 T1N R68W



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

Design: OH (Cleland 15-5HZ/OH)
Created By: Micah Ault
Date: 11:36, January 08 2020
Approved: _____

ANADARKO PETROLEUM CORP

Project: WELD COUNTY (NAD 83)
 Site: Cleland 11-15HZ
 Well: Cleland 15-5HZ
 Wellbore: OH
 Design: OH



Azimuths to True North
 Magnetic North: 8.06°

Magnetic Field
 Strength: 51920.1nT
 Dip Angle: 66.48°
 Date: 10/8/2019
 Model: IGRF2015

PROJECT DETAILS: WELD COUNTY (NAD 83)
 Geodetic System: Universal Transverse Mercator (US Survey Feet)
 Datum: North American Datum 1983
 Ellipsoid: GRS 1980
 Zone: Zone 13N (108 W to 102 W)

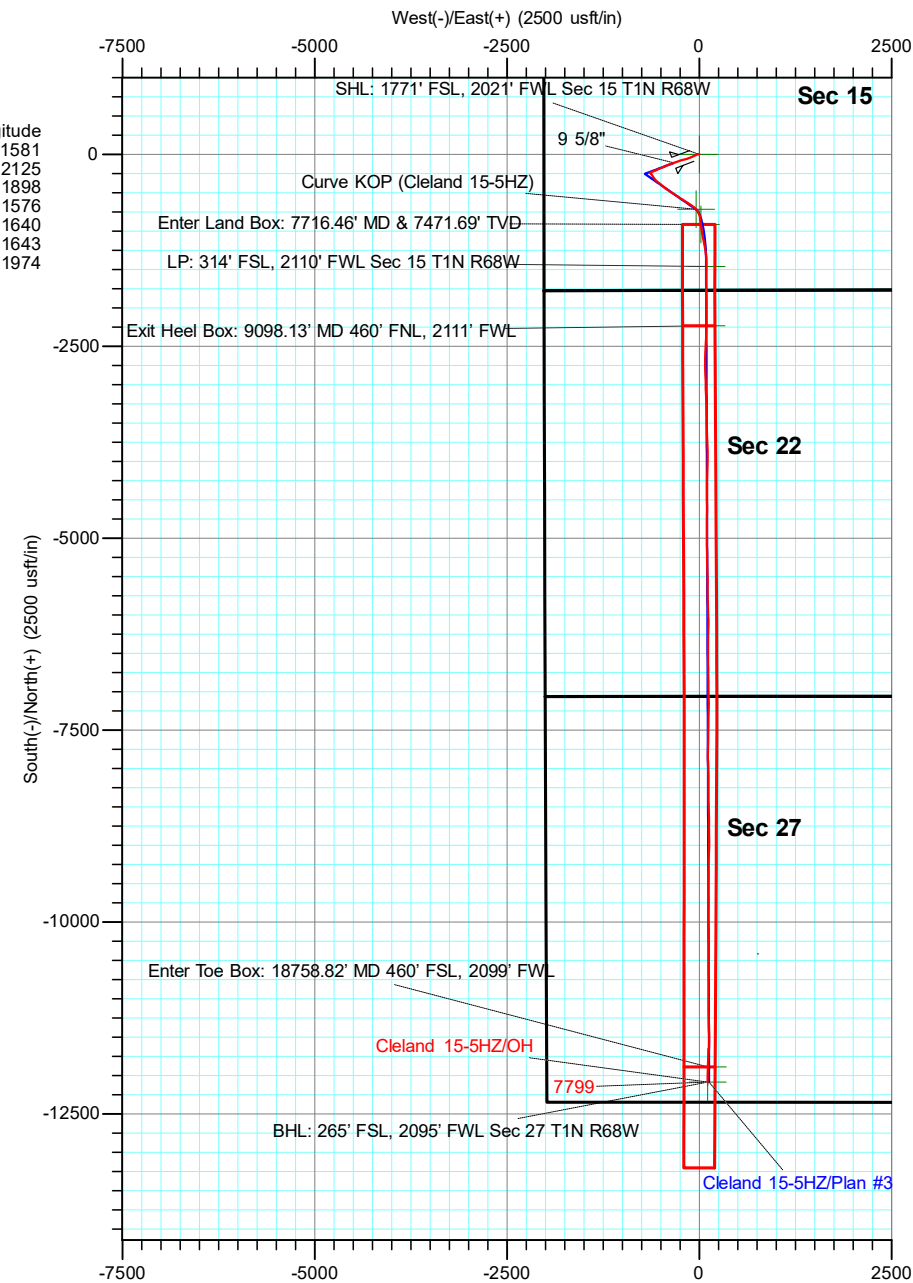
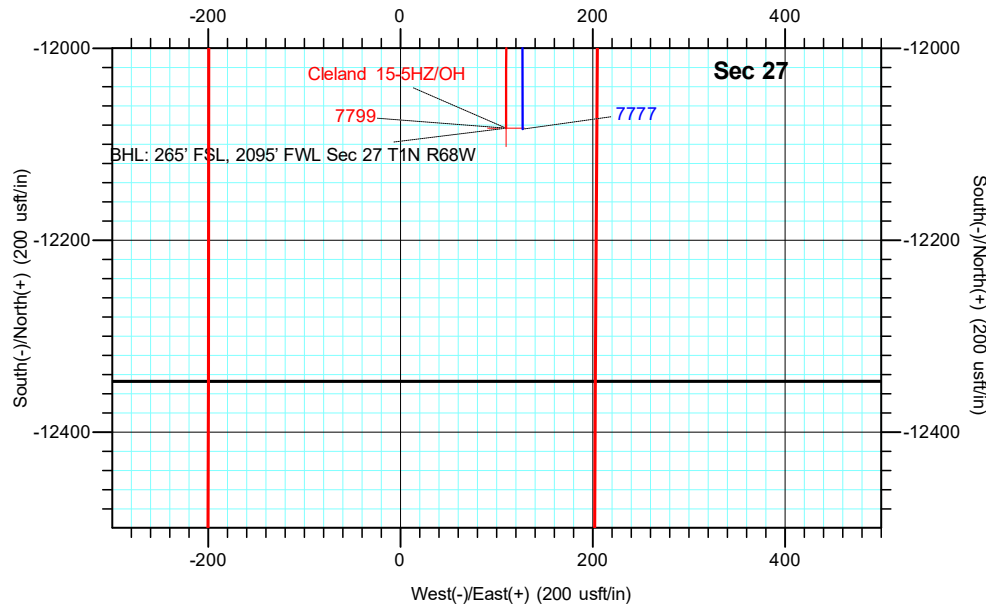


DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
BHL: 265' FSL, 2095' FWL Sec 27 T1N R68W	7798.62	-12083.37	109.97	14532419.71	1642773.76	40.015615	-104.991581
Curve KOP (Cleland 15-5HZ)	7089.38	-714.12	-42.34	14543784.40	1642620.49	40.046825	-104.992125
Enter Land Box: 7716.46' MD & 7471.69' TVD	7471.69	-910.61	21.31	14543588.00	1642684.13	40.046285	-104.991898
Enter Toe Box: 18758.82' MD 460' FSL, 2099' FWL	7794.99	-11887.24	111.57	14532615.76	1642775.35	40.016154	-104.991576
Exit Heel Box: 9098.13' MD 460' FNL, 2111' FWL	7693.69	-2230.78	93.48	14542268.36	1642756.39	40.042661	-104.991640
LP: 314' FSL, 2110' FWL Sec 15 T1N R68W	7693.10	-1457.78	92.64	14543041.05	1642755.48	40.044783	-104.991643
SHL: 1771' FSL, 2021' FWL Sec 15 T1N R68W	0.00	0.00	0.00	14544498.24	1642662.75	40.048785	-104.991974

ACTUAL LINE CALLS

SHL: 1771' FSL, 2021' FWL Sec 15 T1N R68W
HEEL: 314' FSL, 2110' FWL Sec 15 T1N R68W
BHL: 265' FSL, 2095' FWL Sec 27 T1N R68W



TOTAL DIRECTIONAL SERVICES LLC
 671 Academy Ct, Windsor, CO 80550
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 Cleland 11-15HZ
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ANADARKO PETROLEUM CORP

WELD COUNTY (NAD 83)

Cleland 11-15HZ

Cleland 15-5HZ

OH

Design: OH

Standard Survey Report

08 January, 2020



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Cleland 15-5HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	20' KB + 5152' GE @ 5172.00usft
Site:	Cleland 11-15HZ	MD Reference:	20' KB + 5152' GE @ 5172.00usft
Well:	Cleland 15-5HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.15 Single User Db

Project	WELD COUNTY (NAD 83)		
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)		Using geodetic scale factor

Site	Cleland 11-15HZ		
Site Position:		Northing:	14,544,455.99 usft
From:	Map	Easting:	1,642,620.22 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	40.048669
		Longitude:	-104.992126
		Grid Convergence:	0.01 °

Well	Cleland 15-5HZ		
Well Position	+N/-S	0.00 usft	Northing: 14,544,498.24 usft
	+E/-W	0.00 usft	Easting: 1,642,662.75 usft
Position Uncertainty	3.28 usft	Wellhead Elevation:	usft
		Latitude:	40.048785
		Longitude:	-104.991974
		Ground Level:	5,152.00 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2015	10/8/2019	8.06
			Dip Angle (°)
			66.48
			Field Strength (nT)
			51,920.12375276

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)
	0.00	0.00	0.00
			Direction (°)
			179.81

Survey Program	Date	1/8/2020	
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
131.00	1,871.00	Survey #1 - Surface (OH)	APC_ISCWSA REV 2 MWD+ Fixed:v2:crustal field declination
1,943.00	18,894.00	Survey #2 (OH)	APC_ISCWSA REV 2 MWD+ Fixed:v2:crustal field declination
18,955.00	18,955.00	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: 1771' FSL, 2021' FWL Sec 15 T1N R68W - SHL (Cleland 15-5HZ)									
131.00	1.14	47.96	130.99	0.87	0.97	-0.87	0.87	0.87	0.00
226.00	0.18	278.06	225.99	1.53	1.52	-1.52	1.33	-1.01	-136.74
321.00	1.98	284.39	320.96	1.96	-0.22	-1.96	1.90	1.89	6.66
416.00	3.38	276.57	415.86	2.68	-4.59	-2.70	1.52	1.47	-8.23
511.00	4.35	268.04	510.64	2.88	-10.97	-2.92	1.18	1.02	-8.98
606.00	6.59	256.79	605.21	1.51	-19.88	-1.58	2.60	2.36	-11.84
701.00	8.57	248.33	699.37	-2.35	-31.77	2.24	2.39	2.08	-8.91

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Cleland 15-5HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	20' KB + 5152' GE @ 5172.00usft
Site:	Cleland 11-15HZ	MD Reference:	20' KB + 5152' GE @ 5172.00usft
Well:	Cleland 15-5HZ	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)
797.00	10.41	245.36	794.06	-8.61	-46.30	8.45	1.98	1.92	-3.09
892.00	10.63	244.75	887.46	-15.92	-62.02	15.72	0.26	0.23	-0.64
986.00	12.04	244.93	979.62	-23.77	-78.75	23.51	1.50	1.50	0.19
1,081.00	13.01	246.51	1,072.36	-32.24	-97.53	31.91	1.08	1.02	1.66
1,176.00	13.05	247.12	1,164.92	-40.67	-117.22	40.28	0.15	0.04	0.64
1,271.00	15.47	249.76	1,256.98	-49.22	-138.99	48.76	2.64	2.55	2.78
1,367.00	18.63	254.86	1,348.76	-57.66	-165.81	57.11	3.64	3.29	5.31
1,463.00	20.52	255.68	1,439.21	-65.83	-196.92	65.17	1.99	1.97	0.85
1,558.00	20.04	253.27	1,528.32	-74.63	-228.64	73.87	1.01	-0.51	-2.54
1,653.00	20.57	250.73	1,617.42	-84.82	-259.99	83.96	1.08	0.56	-2.67
1,747.00	21.09	252.04	1,705.27	-95.49	-291.66	94.52	0.74	0.55	1.39
1,842.00	22.98	249.67	1,793.33	-107.20	-325.32	106.12	2.20	1.99	-2.49
1,859.00	23.70	249.39	1,808.94	-109.56	-331.62	108.46	4.26	4.21	-1.65
9 5/8"									
1,871.00	24.20	249.20	1,819.91	-111.28	-336.18	110.17	4.26	4.21	-1.57
1,943.00	20.07	251.10	1,886.59	-120.53	-361.68	119.33	5.82	-5.74	2.64
2,037.00	18.74	249.04	1,975.25	-131.15	-391.04	129.86	1.59	-1.41	-2.19
2,132.00	17.68	248.00	2,065.49	-142.02	-418.66	140.63	1.17	-1.12	-1.09
2,226.00	16.79	247.22	2,155.27	-152.62	-444.42	151.15	0.98	-0.95	-0.83
2,319.00	15.87	246.47	2,244.51	-162.90	-468.46	161.34	1.01	-0.99	-0.81
2,412.00	14.69	246.47	2,334.22	-172.68	-490.93	171.05	1.27	-1.27	0.00
2,507.00	13.55	246.56	2,426.35	-181.92	-512.19	180.22	1.20	-1.20	0.09
2,599.00	12.61	246.65	2,515.96	-190.19	-531.29	188.42	1.02	-1.02	0.10
2,692.00	11.49	245.61	2,606.91	-198.04	-549.05	196.21	1.23	-1.20	-1.12
2,785.00	10.36	243.34	2,698.23	-205.61	-564.96	203.74	1.30	-1.22	-2.44
2,879.00	8.24	246.51	2,790.99	-212.09	-578.69	210.17	2.32	-2.26	3.37
2,972.00	7.60	248.38	2,883.10	-217.01	-590.52	215.05	0.74	-0.69	2.01
3,065.00	6.99	247.55	2,975.35	-221.44	-601.47	219.45	0.67	-0.66	-0.89
3,158.00	6.30	245.72	3,067.72	-225.70	-611.35	223.67	0.78	-0.74	-1.97
3,250.00	5.61	245.75	3,159.22	-229.62	-620.05	227.57	0.75	-0.75	0.03
3,343.00	4.96	251.59	3,251.83	-232.76	-628.01	230.68	0.91	-0.70	6.28
3,438.00	3.61	252.71	3,346.56	-234.95	-634.77	232.84	1.42	-1.42	1.18
3,530.00	2.10	270.20	3,438.45	-235.80	-639.22	233.68	1.88	-1.64	19.01
3,622.00	0.76	307.23	3,530.42	-235.43	-641.39	233.30	1.70	-1.46	40.25
3,717.00	1.39	190.53	3,625.41	-236.18	-642.10	234.05	1.96	0.66	-122.84
3,810.00	2.80	145.32	3,718.35	-239.15	-641.01	237.03	2.23	1.52	-48.61
3,902.00	3.90	135.88	3,810.19	-243.25	-637.56	241.13	1.33	1.20	-10.26
3,996.00	3.37	138.23	3,904.00	-247.60	-633.49	245.50	0.59	-0.56	2.50
4,090.00	4.66	139.15	3,997.77	-252.55	-629.15	250.47	1.37	1.37	0.98
4,184.00	5.91	136.15	4,091.37	-258.93	-623.30	256.86	1.36	1.33	-3.19
4,277.00	7.51	142.74	4,183.73	-267.22	-616.31	265.18	1.91	1.72	7.09
4,372.00	8.57	144.89	4,277.79	-277.95	-608.48	275.93	1.16	1.12	2.26
4,465.00	10.16	150.47	4,369.55	-290.76	-600.45	288.77	1.97	1.71	6.00

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Cleland 15-5HZ
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Site:	Cleland 11-15HZ	MD Reference:	20' KB + 5152' GE @ 5172.00usft
Well:	Cleland 15-5HZ	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)
4,559.00	11.41	143.44	4,461.89	-305.44	-590.82	303.48	1.93	1.33	-7.48
4,652.00	13.52	139.22	4,552.70	-321.07	-578.24	319.15	2.47	2.27	-4.54
4,746.00	14.22	136.31	4,643.96	-337.74	-563.09	335.87	1.05	0.74	-3.10
4,840.00	15.60	130.34	4,734.80	-354.27	-545.48	352.46	2.19	1.47	-6.35
4,933.00	13.62	129.80	4,824.79	-369.37	-527.53	367.62	2.13	-2.13	-0.58
5,028.00	15.38	130.29	4,916.76	-384.68	-509.33	382.99	1.86	1.85	0.52
5,122.00	15.89	128.71	5,007.28	-400.79	-489.78	399.16	0.71	0.54	-1.68
5,239.00	12.95	130.02	5,120.58	-419.24	-467.23	417.69	2.53	-2.51	1.12
5,333.00	14.82	123.95	5,211.83	-432.73	-449.19	431.24	2.52	1.99	-6.46
5,427.00	15.75	128.41	5,302.51	-447.37	-429.22	445.94	1.59	0.99	4.74
5,519.00	14.05	127.71	5,391.41	-461.96	-410.60	460.59	1.86	-1.85	-0.76
5,614.00	14.47	123.95	5,483.49	-475.64	-391.63	474.34	1.07	0.44	-3.96
5,709.00	14.48	122.03	5,575.47	-488.57	-371.72	487.33	0.51	0.01	-2.02
5,802.00	13.62	120.25	5,665.69	-500.25	-352.40	499.08	1.03	-0.92	-1.91
5,896.00	14.77	123.24	5,756.82	-512.40	-332.82	511.29	1.45	1.22	3.18
5,989.00	15.88	125.93	5,846.51	-526.36	-312.60	525.32	1.42	1.19	2.89
6,083.00	12.61	121.46	5,937.61	-539.27	-293.43	538.29	3.67	-3.48	-4.76
6,177.00	15.67	124.10	6,028.76	-551.74	-274.16	550.83	3.33	3.26	2.81
6,271.00	14.58	121.84	6,119.50	-565.10	-253.60	564.26	1.32	-1.16	-2.40
6,364.00	15.42	120.38	6,209.33	-577.53	-232.99	576.75	0.99	0.90	-1.57
6,457.00	15.89	127.87	6,298.89	-591.60	-212.27	590.89	2.23	0.51	8.05
6,552.00	16.26	122.57	6,390.18	-606.74	-190.79	606.11	1.59	0.39	-5.58
6,646.00	14.21	117.69	6,480.87	-619.19	-169.48	618.63	2.57	-2.18	-5.19
6,739.00	14.07	122.54	6,571.06	-630.58	-149.84	630.08	1.28	-0.15	5.22
6,833.00	14.04	123.96	6,662.25	-643.09	-130.75	642.65	0.37	-0.03	1.51
6,926.00	15.55	129.42	6,752.16	-657.31	-111.77	656.94	2.21	1.62	5.87
7,019.00	15.70	124.95	6,841.73	-672.43	-91.82	672.13	1.30	0.16	-4.81
7,112.00	14.35	127.95	6,931.55	-686.73	-72.42	686.49	1.67	-1.45	3.23
7,206.00	14.47	133.57	7,022.60	-701.99	-54.72	701.80	1.49	0.13	5.98
7,275.00	14.64	135.22	7,089.38	-714.12	-42.34	713.98	0.65	0.24	2.40
Curve KOP (Cleland 15-5HZ)									
7,299.00	14.70	135.79	7,112.60	-718.46	-38.08	718.33	0.65	0.26	2.36
7,393.00	23.53	145.89	7,201.35	-742.60	-19.20	742.53	10.00	9.39	10.74
7,488.00	29.64	158.89	7,286.34	-780.28	-0.07	780.27	8.85	6.43	13.68
7,581.00	33.07	174.35	7,365.88	-827.07	10.73	827.10	9.37	3.69	16.62
7,675.00	40.26	171.94	7,441.23	-882.74	17.53	882.80	7.80	7.65	-2.56
7,716.46	45.20	172.57	7,471.68	-910.61	21.31	910.68	11.95	11.91	1.52
Enter Land Box: 7716.46' MD & 7471.69' TVD									
7,767.00	51.22	173.21	7,505.35	-947.99	25.96	948.07	11.95	11.92	1.26
7,859.00	58.65	169.92	7,558.17	-1,022.39	37.09	1,022.51	8.59	8.08	-3.58
7,951.00	62.72	168.69	7,603.21	-1,101.19	51.99	1,101.36	4.57	4.42	-1.34
8,046.00	69.57	170.34	7,641.61	-1,186.58	67.76	1,186.80	7.38	7.21	1.74
8,138.00	76.21	170.19	7,668.66	-1,273.19	82.62	1,273.46	7.22	7.22	-0.16
8,231.00	83.85	178.07	7,684.77	-1,364.17	91.90	1,364.47	11.71	8.22	8.47

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Cleland 15-5HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	20' KB + 5152' GE @ 5172.00usft
Site:	Cleland 11-15HZ	MD Reference:	20' KB + 5152' GE @ 5172.00usft
Well:	Cleland 15-5HZ	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)	
8,291.61	85.23	179.98	7,690.54	-1,424.49	92.93	1,424.79	3.88	2.27	3.15	
Heel (Cleland 15-5HZ)										
8,325.00	85.99	181.03	7,693.10	-1,457.78	92.64	1,458.08	3.88	2.28	3.14	
LP: 314' FSL, 2110' FWL Sec 15 T1N R68W										
8,419.00	90.23	180.18	7,696.20	-1,551.70	91.64	1,552.00	4.60	4.51	-0.90	
8,512.00	90.21	180.16	7,695.84	-1,644.70	91.37	1,645.00	0.03	-0.02	-0.02	
8,605.00	90.59	180.64	7,695.19	-1,737.70	90.72	1,737.99	0.66	0.41	0.52	
8,699.00	89.89	179.00	7,694.80	-1,831.69	91.01	1,831.98	1.90	-0.74	-1.74	
8,793.00	90.20	178.95	7,694.72	-1,925.68	92.70	1,925.97	0.33	0.33	-0.05	
8,887.00	90.32	179.31	7,694.30	-2,019.67	94.12	2,019.97	0.40	0.13	0.38	
8,980.00	90.29	179.89	7,693.80	-2,112.66	94.77	2,112.96	0.62	-0.03	0.62	
9,074.00	89.91	181.08	7,693.64	-2,206.66	93.98	2,206.96	1.33	-0.40	1.27	
9,098.13	89.86	181.28	7,693.69	-2,230.78	93.48	2,231.08	0.85	-0.22	0.82	
Exit Heel Box: 9098.13' MD 460' FNL, 2111' FWL										
9,167.00	89.71	181.84	7,693.95	-2,299.62	91.61	2,299.92	0.85	-0.22	0.82	
9,261.00	89.38	182.36	7,694.69	-2,393.56	88.16	2,393.84	0.66	-0.35	0.55	
9,356.00	89.29	183.07	7,695.80	-2,488.44	83.66	2,488.71	0.75	-0.09	0.75	
9,448.00	89.94	181.61	7,696.41	-2,580.36	79.91	2,580.61	1.74	0.71	-1.59	
9,541.00	90.10	181.97	7,696.38	-2,673.32	77.00	2,673.56	0.42	0.17	0.39	
9,634.00	89.67	178.16	7,696.57	-2,766.30	76.90	2,766.54	4.12	-0.46	-4.10	
9,727.00	89.81	178.17	7,696.99	-2,859.25	79.87	2,859.50	0.15	0.15	0.01	
9,820.00	90.57	178.49	7,696.68	-2,952.21	82.59	2,952.47	0.89	0.82	0.34	
9,912.00	91.63	178.66	7,694.92	-3,044.16	84.87	3,044.43	1.17	1.15	0.18	
10,006.00	89.74	177.81	7,693.79	-3,138.11	87.77	3,138.38	2.20	-2.01	-0.90	
10,098.00	90.20	177.88	7,693.84	-3,230.04	91.23	3,230.33	0.51	0.50	0.08	
10,192.00	88.52	178.94	7,694.89	-3,323.99	93.84	3,324.29	2.11	-1.79	1.13	
10,285.00	88.79	178.95	7,697.07	-3,416.95	95.55	3,417.25	0.29	0.29	0.01	
10,377.00	88.80	178.83	7,699.01	-3,508.92	97.33	3,509.22	0.13	0.01	-0.13	
10,471.00	89.01	178.50	7,700.80	-3,602.87	99.52	3,603.18	0.42	0.22	-0.35	
10,565.00	89.14	178.12	7,702.32	-3,696.82	102.29	3,697.14	0.43	0.14	-0.40	
10,657.00	89.44	177.62	7,703.46	-3,788.75	105.71	3,789.08	0.63	0.33	-0.54	
10,751.00	88.95	179.84	7,704.78	-3,882.71	107.79	3,883.05	2.42	-0.52	2.36	
10,843.00	89.40	179.22	7,706.11	-3,974.70	108.55	3,975.03	0.83	0.49	-0.67	
10,937.00	88.32	182.23	7,707.98	-4,068.66	107.36	4,068.99	3.40	-1.15	3.20	
11,030.00	88.75	181.30	7,710.36	-4,161.58	104.50	4,161.91	1.10	0.46	-1.00	
11,124.00	88.44	181.21	7,712.66	-4,255.53	102.44	4,255.85	0.34	-0.33	-0.10	
11,218.00	88.49	180.66	7,715.18	-4,349.49	100.90	4,349.80	0.59	0.05	-0.59	
11,311.00	88.34	180.16	7,717.75	-4,442.45	100.24	4,442.75	0.56	-0.16	-0.54	
11,405.00	88.61	179.90	7,720.25	-4,536.41	100.19	4,536.72	0.40	0.29	-0.28	
11,498.00	91.93	179.97	7,719.81	-4,629.40	100.29	4,629.71	3.57	3.57	0.08	
11,592.00	89.94	180.66	7,718.28	-4,723.38	99.78	4,723.69	2.24	-2.12	0.73	
11,687.00	90.21	179.87	7,718.16	-4,818.38	99.34	4,818.68	0.88	0.28	-0.83	
11,782.00	92.24	179.76	7,716.13	-4,913.35	99.65	4,913.65	2.14	2.14	-0.12	
11,876.00	91.62	180.42	7,712.96	-5,007.30	99.50	5,007.60	0.96	-0.66	0.70	

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Cleland 15-5HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	20' KB + 5152' GE @ 5172.00usft
Site:	Cleland 11-15HZ	MD Reference:	20' KB + 5152' GE @ 5172.00usft
Well:	Cleland 15-5HZ	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)
11,969.00	92.10	179.66	7,709.94	-5,100.25	99.43	5,100.55	0.97	0.52	-0.82
12,062.00	90.94	178.76	7,707.47	-5,193.20	100.71	5,193.51	1.58	-1.25	-0.97
12,155.00	90.30	179.27	7,706.47	-5,286.18	102.31	5,286.49	0.88	-0.69	0.55
12,249.00	89.21	178.65	7,706.87	-5,380.16	104.02	5,380.48	1.33	-1.16	-0.66
12,342.00	88.97	177.85	7,708.35	-5,473.11	106.86	5,473.43	0.90	-0.26	-0.86
12,435.00	89.67	179.94	7,709.45	-5,566.08	108.65	5,566.41	2.37	0.75	2.25
12,528.00	89.83	179.91	7,709.86	-5,659.08	108.77	5,659.41	0.18	0.17	-0.03
12,620.00	90.39	179.35	7,709.68	-5,751.08	109.37	5,751.41	0.86	0.61	-0.61
12,713.00	90.65	178.83	7,708.84	-5,844.06	110.84	5,844.39	0.63	0.28	-0.56
12,806.00	90.97	178.31	7,707.52	-5,937.02	113.17	5,937.36	0.66	0.34	-0.56
12,899.00	88.98	177.25	7,707.56	-6,029.94	116.77	6,030.30	2.42	-2.14	-1.14
12,968.44	88.73	180.33	7,708.95	-6,099.35	118.24	6,099.71	4.45	-0.36	4.43
6100' VS TGT (Cleland 15-5HZ)									
12,994.00	88.64	181.46	7,709.54	-6,124.90	117.84	6,125.25	4.45	-0.36	4.43
13,088.00	88.91	180.87	7,711.55	-6,218.86	115.93	6,219.21	0.69	0.29	-0.63
13,182.00	89.31	180.59	7,713.01	-6,312.84	114.73	6,313.18	0.52	0.43	-0.30
13,275.00	89.22	180.15	7,714.20	-6,405.83	114.13	6,406.17	0.48	-0.10	-0.47
13,368.00	88.73	179.62	7,715.86	-6,498.81	114.31	6,499.15	0.78	-0.53	-0.57
13,462.00	89.44	180.04	7,717.36	-6,592.80	114.59	6,593.14	0.88	0.76	0.45
13,556.00	89.97	178.73	7,717.85	-6,686.79	115.60	6,687.13	1.50	0.56	-1.39
13,650.00	88.46	179.52	7,719.14	-6,780.76	117.04	6,781.12	1.81	-1.61	0.84
13,745.00	88.17	179.18	7,721.93	-6,875.72	118.12	6,876.07	0.47	-0.31	-0.36
13,840.00	88.83	178.77	7,724.42	-6,970.67	119.81	6,971.03	0.82	0.69	-0.43
13,933.00	88.72	178.06	7,726.40	-7,063.61	122.39	7,063.98	0.77	-0.12	-0.76
14,027.00	89.47	181.47	7,727.89	-7,157.58	122.77	7,157.95	3.71	0.80	3.63
14,121.00	88.97	181.00	7,729.17	-7,251.55	120.75	7,251.91	0.73	-0.53	-0.50
14,215.00	87.93	180.38	7,731.71	-7,345.51	119.61	7,345.87	1.29	-1.11	-0.66
14,307.00	89.07	181.10	7,734.12	-7,437.47	118.43	7,437.82	1.47	1.24	0.78
14,400.00	88.66	181.04	7,735.96	-7,530.43	116.69	7,530.78	0.45	-0.44	-0.06
14,494.00	88.21	180.58	7,738.53	-7,624.39	115.36	7,624.73	0.68	-0.48	-0.49
14,588.00	90.67	181.48	7,739.45	-7,718.36	113.67	7,718.70	2.79	2.62	0.96
14,681.00	90.37	180.74	7,738.60	-7,811.34	111.87	7,811.67	0.86	-0.32	-0.80
14,775.00	89.76	178.21	7,738.50	-7,905.33	112.73	7,905.66	2.77	-0.65	-2.69
14,870.00	89.66	178.11	7,738.98	-8,000.28	115.78	8,000.62	0.15	-0.11	-0.11
14,963.00	89.52	178.95	7,739.64	-8,093.24	118.17	8,093.59	0.92	-0.15	0.90
15,055.00	89.22	180.19	7,740.65	-8,185.23	118.86	8,185.58	1.39	-0.33	1.35
15,150.00	88.95	179.77	7,742.17	-8,280.22	118.89	8,280.57	0.53	-0.28	-0.44
15,243.00	88.63	179.75	7,744.14	-8,373.20	119.28	8,373.55	0.34	-0.34	-0.02
15,336.00	88.15	178.68	7,746.75	-8,466.15	120.55	8,466.51	1.26	-0.52	-1.15
15,431.00	88.21	178.60	7,749.77	-8,561.08	122.81	8,561.44	0.11	0.06	-0.08
15,525.00	88.32	177.95	7,752.61	-8,654.99	125.64	8,655.36	0.70	0.12	-0.69
15,619.00	89.27	180.62	7,754.59	-8,748.95	126.81	8,749.33	3.01	1.01	2.84
15,712.00	88.75	179.61	7,756.20	-8,841.94	126.62	8,842.31	1.22	-0.56	-1.09

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Cleland 15-5HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	20' KB + 5152' GE @ 5172.00usft
Site:	Cleland 11-15HZ	MD Reference:	20' KB + 5152' GE @ 5172.00usft
Well:	Cleland 15-5HZ	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)	
15,806.00	87.86	178.76	7,758.98	-8,935.89	127.96	8,936.26	1.31	-0.95	-0.90	
15,899.00	88.55	181.67	7,761.89	-9,028.83	127.61	9,029.20	3.21	0.74	3.13	
15,992.00	89.32	181.70	7,763.62	-9,121.77	124.87	9,122.14	0.83	0.83	0.03	
16,084.00	88.76	181.51	7,765.16	-9,213.72	122.30	9,214.08	0.64	-0.61	-0.21	
16,177.00	89.66	181.15	7,766.44	-9,306.69	120.14	9,307.03	1.04	0.97	-0.39	
16,272.00	89.63	181.15	7,767.03	-9,401.67	118.23	9,402.01	0.03	-0.03	0.00	
16,365.00	89.68	179.86	7,767.59	-9,494.66	117.41	9,495.00	1.39	0.05	-1.39	
16,458.00	89.95	180.19	7,767.89	-9,587.66	117.37	9,587.99	0.46	0.29	0.35	
16,552.00	90.31	179.04	7,767.68	-9,681.65	118.00	9,681.99	1.28	0.38	-1.22	
16,646.00	89.81	181.45	7,767.58	-9,775.65	117.60	9,775.98	2.62	-0.53	2.56	
16,739.00	87.92	180.20	7,769.42	-9,868.61	116.26	9,868.94	2.44	-2.03	-1.34	
16,833.00	87.52	180.19	7,773.16	-9,962.54	115.94	9,962.87	0.43	-0.43	-0.01	
16,927.00	88.58	179.52	7,776.36	-10,056.48	116.18	10,056.81	1.33	1.13	-0.71	
17,022.00	88.36	178.95	7,778.90	-10,151.44	117.45	10,151.77	0.64	-0.23	-0.60	
17,115.00	88.41	178.21	7,781.52	-10,244.37	119.75	10,244.71	0.80	0.05	-0.80	
17,209.00	87.58	180.18	7,784.81	-10,338.30	121.07	10,338.64	2.27	-0.88	2.10	
17,303.00	87.29	179.41	7,789.01	-10,432.20	121.41	10,432.55	0.87	-0.31	-0.82	
17,396.00	90.06	180.36	7,791.16	-10,525.17	121.59	10,525.51	3.15	2.98	1.02	
17,489.00	90.46	180.11	7,790.74	-10,618.17	121.21	10,618.51	0.51	0.43	-0.27	
17,583.00	88.65	178.98	7,791.47	-10,712.16	121.96	10,712.50	2.27	-1.93	-1.20	
17,678.00	88.12	180.74	7,794.15	-10,807.11	122.19	10,807.46	1.93	-0.56	1.85	
17,771.00	90.77	180.67	7,795.05	-10,900.09	121.05	10,900.44	2.85	2.85	-0.08	
17,866.00	90.73	180.50	7,793.81	-10,995.08	120.08	10,995.42	0.18	-0.04	-0.18	
17,959.00	90.16	179.59	7,793.08	-11,088.08	120.01	11,088.41	1.15	-0.61	-0.98	
18,053.00	90.43	179.12	7,792.60	-11,182.07	121.06	11,182.41	0.58	0.29	-0.50	
18,146.00	89.99	178.56	7,792.26	-11,275.05	122.95	11,275.39	0.77	-0.47	-0.60	
18,240.00	89.95	178.24	7,792.31	-11,369.01	125.57	11,369.37	0.34	-0.04	-0.34	
18,333.00	89.85	178.05	7,792.47	-11,461.96	128.58	11,462.33	0.23	-0.11	-0.20	
18,427.00	89.12	181.26	7,793.32	-11,555.94	129.15	11,556.31	3.50	-0.78	3.41	
18,521.00	89.08	183.02	7,794.79	-11,649.86	125.64	11,650.22	1.87	-0.04	1.87	
18,614.00	90.58	184.52	7,795.07	-11,742.66	119.52	11,742.99	2.28	1.61	1.61	
18,708.00	89.92	182.76	7,794.66	-11,836.46	113.56	11,836.77	2.00	-0.70	-1.87	
18,758.82	89.32	181.72	7,794.99	-11,887.24	111.57	11,887.55	2.36	-1.17	-2.04	
Enter Toe Box: 18758.82' MD 460' FSL, 2099' FWL										
18,800.00	88.84	180.88	7,795.65	-11,928.40	110.63	11,928.71	2.36	-1.17	-2.04	
18,894.00	88.93	179.97	7,797.48	-12,022.38	109.94	12,022.68	0.97	0.10	-0.97	
18,955.00	88.93	179.97	7,798.62	-12,083.37	109.97	12,083.67	0.00	0.00	0.00	
PBHL (Cleland 15-5HZ) - BHL: 265' FSL, 2095' FWL Sec 27 T1N R68W										

Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well Cleland 15-5HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	20' KB + 5152' GE @ 5172.00usft
Site:	Cleland 11-15HZ	MD Reference:	20' KB + 5152' GE @ 5172.00usft
Well:	Cleland 15-5HZ	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: 1771' FSL, 2021' F - actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	14,544,498.24	1,642,662.75	40.048785	-104.991974
Curve KOP (Cleland 15- - actual wellpath hits target center - Point	0.00	0.00	7,089.38	-714.12	-42.34	14,543,784.40	1,642,620.49	40.046825	-104.992126
Enter Land Box: 7716.4f - actual wellpath misses target center by 0.01usft at 7716.47usft MD (7471.68 TVD, -910.62 N, 21.31 E) - Point	0.00	0.00	7,471.69	-910.61	21.31	14,543,587.99	1,642,684.13	40.046285	-104.991898
LP: 314' FSL, 2110' FWL - actual wellpath hits target center - Point	0.00	0.00	7,693.10	-1,457.78	92.64	14,543,041.05	1,642,755.48	40.044783	-104.991643
Exit Heel Box: 9098.13' l - actual wellpath hits target center - Point	0.00	0.00	7,693.69	-2,230.78	93.48	14,542,268.36	1,642,756.39	40.042661	-104.991640
Enter Toe Box: 18758.8f - actual wellpath hits target center - Point	0.00	0.00	7,794.99	-11,887.24	111.57	14,532,615.77	1,642,775.34	40.016154	-104.991576
BHL: 265' FSL, 2095' FV - actual wellpath hits target center - Point	0.00	0.00	7,798.62	-12,083.37	109.97	14,532,419.72	1,642,773.76	40.015615	-104.991582

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
1,859.00	1,808.94	9 5/8"	9-5/8	12-1/4	

Checked By: _____	Approved By: _____	Date: _____
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