

ANADARKO PETROLEUM CORP

WELD COUNTY (NAD 83)

SW SW SEC. 13 T1N R67W 6th P.M.

QUARTER CIRCLE 24-1HZ

JOB # 2018-201-461 SIDETRACK

15 May, 2018

Survey: FINAL SURVEYS - SIDETRACK





Project: WELD COUNTY (NAD 83)
Site: SW SW SEC. 13 T1N R67W 6th P.M.
Well: QUARTER CIRCLE 24-1HZ
Wellbore: JOB # 2018-201-461 SIDETRACK
Design: FINAL SURVEYS - SIDETRACK

ANNOTATIONS

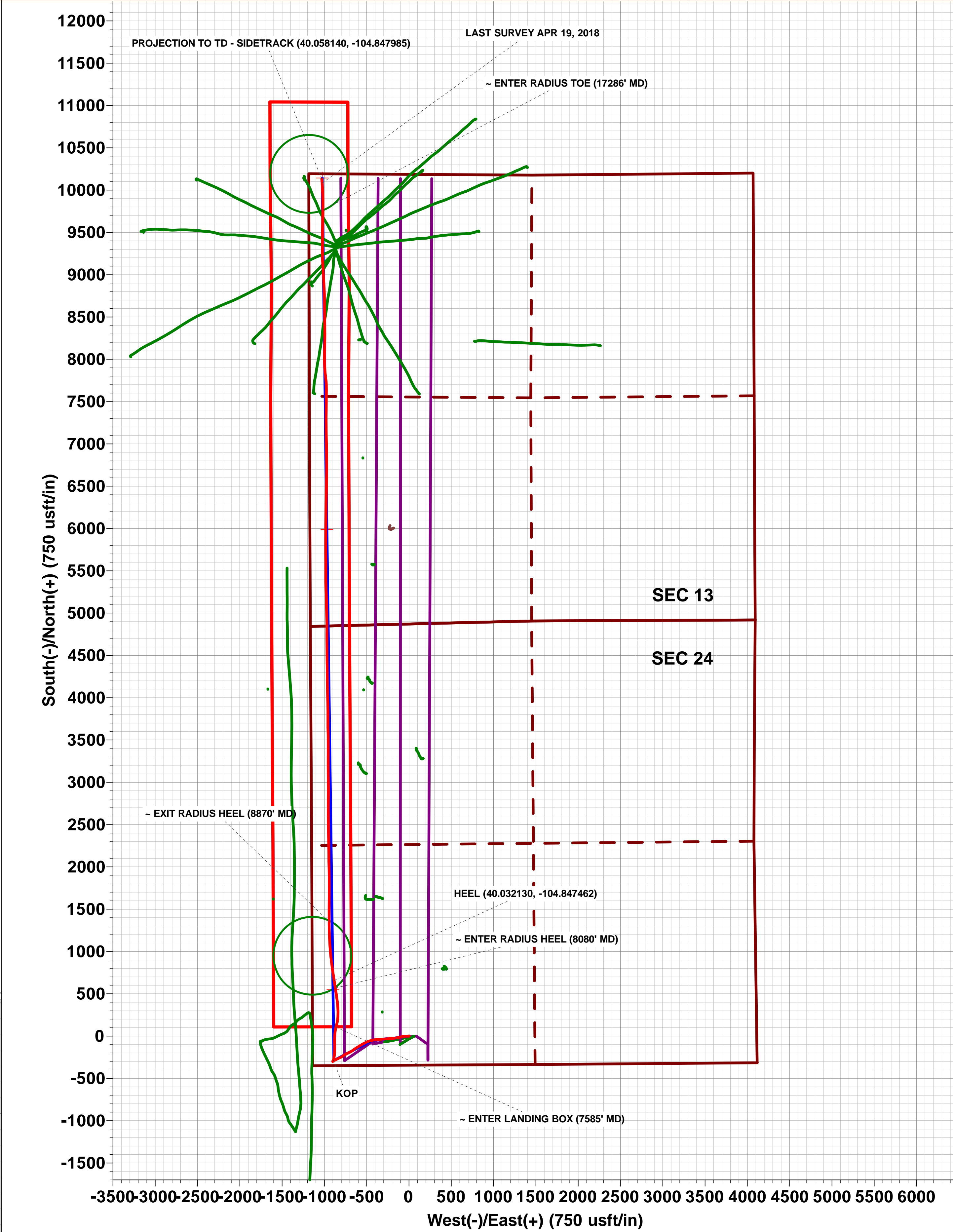
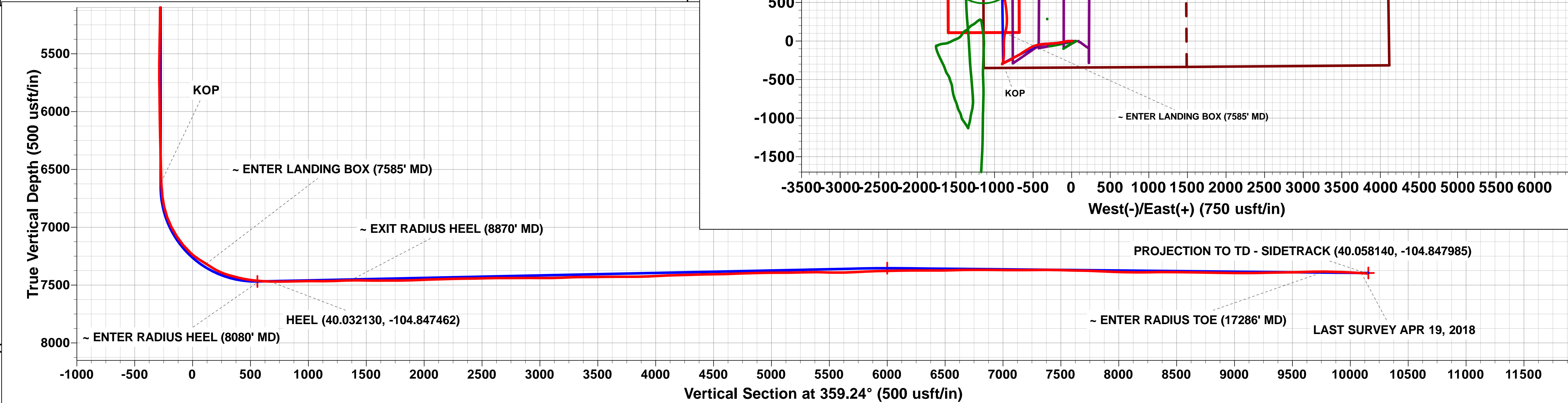
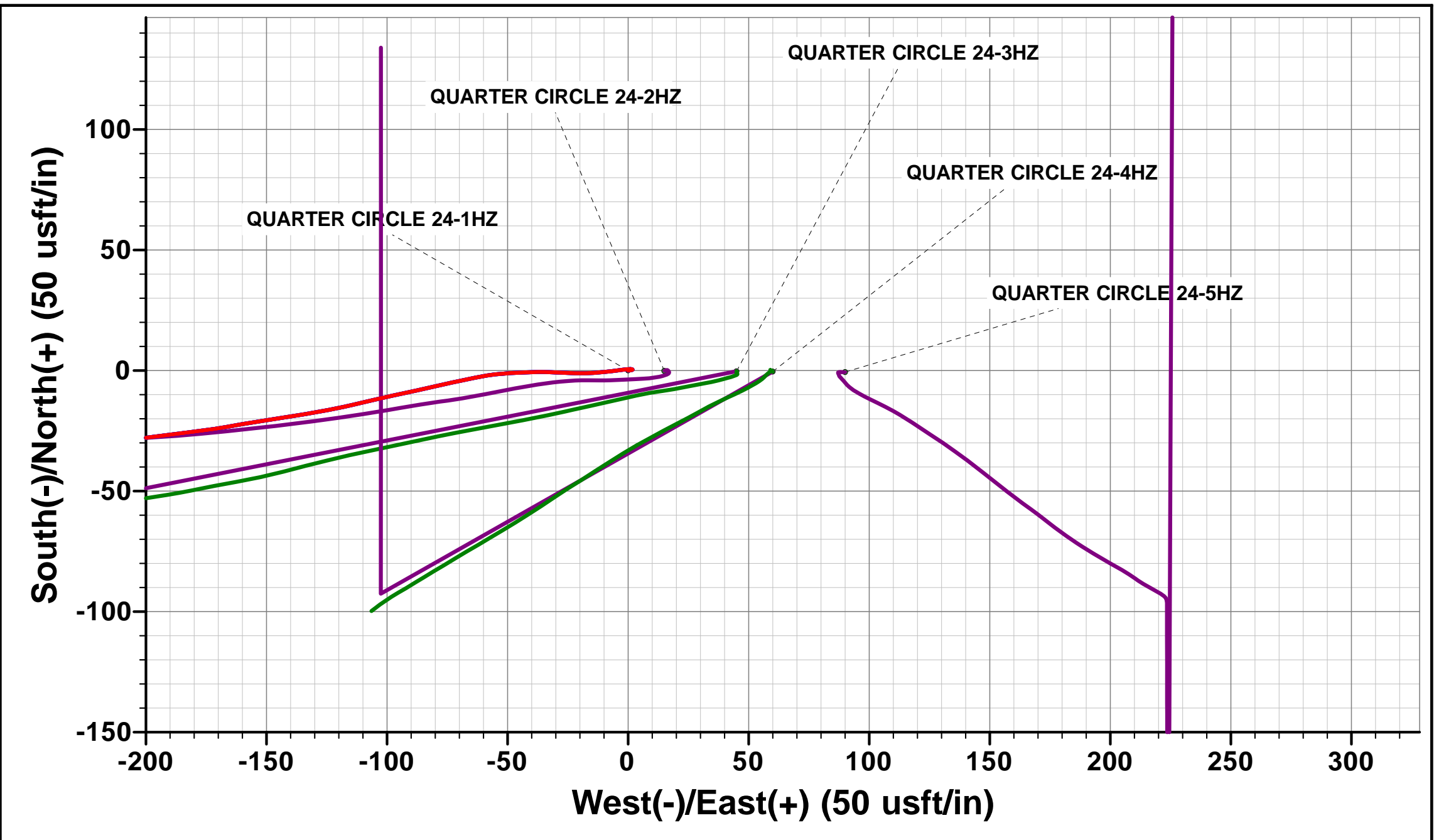
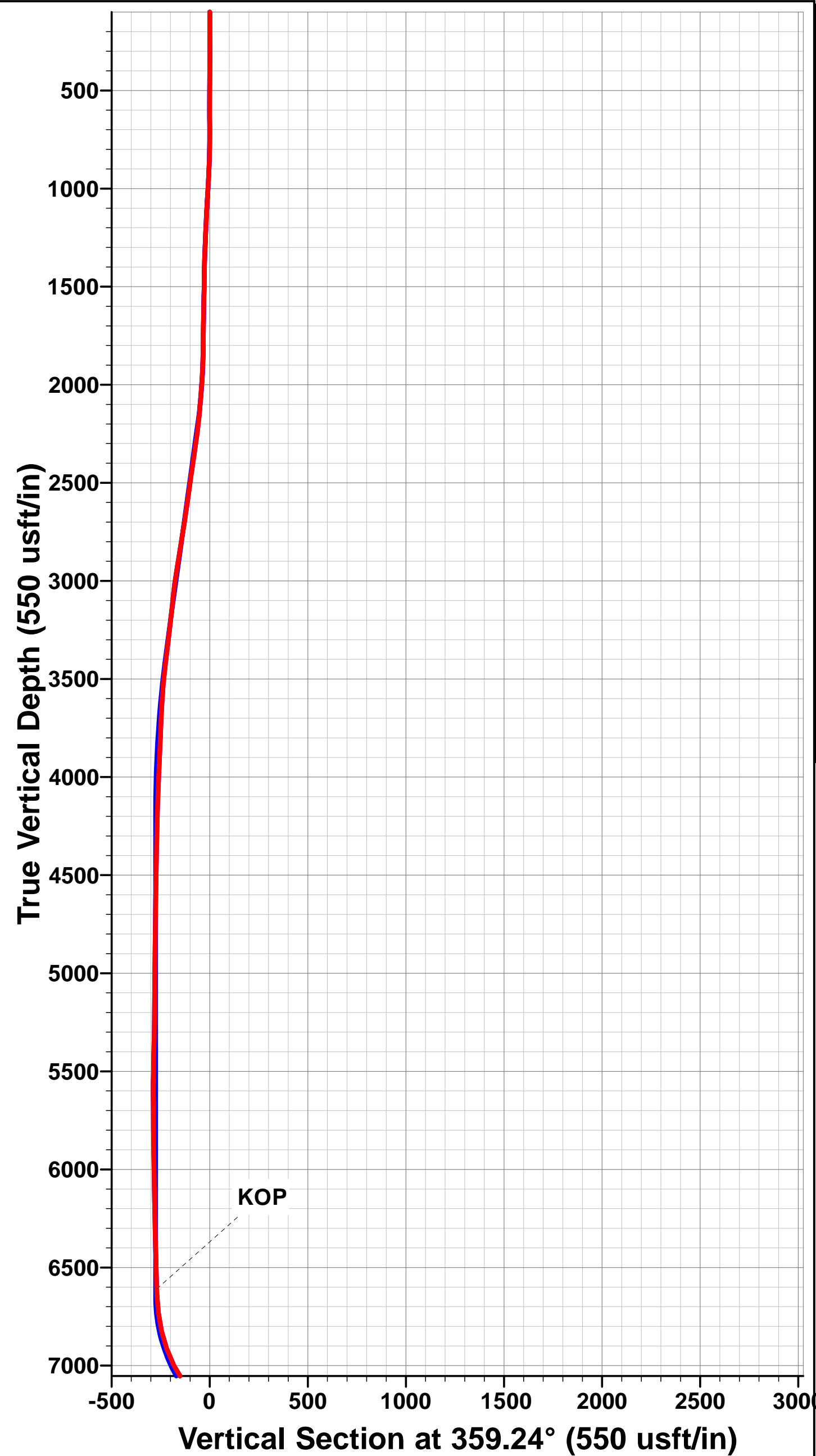
TVD	MD	Inc	Azi	+N/-S	+E/-W	VSect	Departure	Annotation
6609.7	6737.0	2.13	10.34	-282.0	-893.6	-270.1	996.7	KOP
7279.3	7513.0	57.90	5.60	45.1	-874.2	56.7	1325.7	TIE ON TO OH SURVEYS
7316.6	7584.7	58.48	14.21	105.2	-863.0	116.7	1386.8	~ ENTER LANDING BOX (7585' MD)
7464.7	8080.0	85.67	350.69	567.2	-870.9	578.7	1853.4	~ ENTER RADIUS HEEL (8080' MD)
7469.4	8171.0	88.42	351.27	656.9	-885.1	668.6	1944.3	HEEL (40.032130, -104.847462)
7459.3	8870.1	90.88	359.89	1352.5	-943.3	1364.9	2643.2	~ EXIT RADIUS HEEL (8870' MD)
7383.8	17286.0	89.36	0.66	9764.0	-1018.2	9776.7	11056.8	~ ENTER RADIUS TOE (17286' MD)
7396.8	17605.0	86.46	355.44	10082.5	-1027.2	10095.2	11375.5	LAST SURVEY APR 19, 2018
7399.9	17655.0	86.46	355.44	10132.2	-1031.2	10145.0	11425.4	PROJECTION TO TD - SIDETRACK (40.058140, -104.847985)

AS DRILLED LOCAL COORDINATES:

SHL: 344ft FSL & 1141ft FWL Sec 24
HEEL: 1421.2ft FSL & 255.1ft FWL Sec 24
BHL: 390.8ft FNL & 221.3ft FWL Sec 24

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
QUARTER CIRCLE 24-1HZ BHL (P2)	7396.0	10143.0	-1025.5	40° 3' 29.412 N	104° 50' 52.670 W
QUARTER CIRCLE 24-1HZ HEEL (P2)	7469.0	547.9	-898.5	40° 1' 54.590 N	104° 50' 51.033 W



Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well QUARTER CIRCLE 24-1HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	KB 20' @ 4961.0usft (PD461)
Site:	SW SW SEC. 13 T1N R67W 6th P.M.	MD Reference:	KB 20' @ 4961.0usft (PD461)
Well:	QUARTER CIRCLE 24-1HZ	North Reference:	True
Wellbore:	JOB # 2018-201-461 SIDETRACK	Survey Calculation Method:	Minimum Curvature
Design:	FINAL SURVEYS - SIDETRACK	Database:	EOG RESOURCES

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	SW SW SEC. 13 T1N R67W 6th P.M.				
Site Position:		Northing:	14,537,814.76 usft	Latitude:	40° 1' 49.176 N
From:	Lat/Long	Easting:	1,684,001.16 usft	Longitude:	104° 50' 39.482 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	0.10 °

Well	QUARTER CIRCLE 24-1HZ					
Well Position	+N/-S	0.0 usft	Northing:	14,537,814.76 usft	Latitude:	40° 1' 49.176 N
	+E/-W	0.0 usft	Easting:	1,684,001.16 usft	Longitude:	104° 50' 39.482 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,941.0 usft

Wellbore	JOB # 2018-201-461 SIDETRACK				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/04/2018	8.13	66.53	52,097

Design	FINAL SURVEYS - SIDETRACK				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	359.24	

Survey Program	Date	15/05/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
126.0	17,655.0	FINAL SURVEYS - SIDETRACK (JOB # 2	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	4,961.0	0.0	0.0	0.0	0.00	0.00	0.00
126.0	0.88	83.82	126.0	4,835.0	0.1	1.0	0.1	0.70	0.70	0.00
158.0	0.79	67.74	158.0	4,803.0	0.2	1.4	0.2	0.78	-0.28	-50.25
190.0	0.44	78.37	190.0	4,771.0	0.3	1.7	0.3	1.15	-1.09	33.22
222.0	0.13	354.79	222.0	4,739.0	0.4	1.9	0.4	1.39	-0.97	-261.19
253.0	0.35	299.60	253.0	4,708.0	0.5	1.8	0.4	0.95	0.71	-178.03
285.0	0.66	289.49	285.0	4,676.0	0.6	1.5	0.6	1.00	0.97	-31.59
316.0	1.32	272.09	316.0	4,645.0	0.6	1.0	0.6	2.32	2.13	-56.13
348.0	2.20	264.18	348.0	4,613.0	0.6	0.0	0.6	2.85	2.75	-24.72
379.0	2.59	264.35	378.9	4,582.1	0.5	-1.3	0.5	1.26	1.26	0.55
411.0	3.56	263.12	410.9	4,550.1	0.3	-3.0	0.3	3.04	3.03	-3.84
442.0	4.22	261.19	441.8	4,519.2	0.0	-5.1	0.1	2.17	2.13	-6.23
474.0	4.35	263.38	473.7	4,487.3	-0.3	-7.4	-0.2	0.65	0.41	6.84

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well QUARTER CIRCLE 24-1HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	KB 20' @ 4961.0usft (PD461)
Site:	SW SW SEC. 13 T1N R67W 6th P.M.	MD Reference:	KB 20' @ 4961.0usft (PD461)
Well:	QUARTER CIRCLE 24-1HZ	North Reference:	True
Wellbore:	JOB # 2018-201-461 SIDETRACK	Survey Calculation Method:	Minimum Curvature
Design:	FINAL SURVEYS - SIDETRACK	Database:	EOG RESOURCES

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
505.0	4.70	265.32	504.6	4,456.4	-0.6	-9.9	-0.4	1.23	1.13	6.26
537.0	5.45	264.88	536.5	4,424.5	-0.8	-12.7	-0.6	2.35	2.34	-1.37
569.0	5.76	268.13	568.4	4,392.6	-1.0	-15.8	-0.8	1.39	0.97	10.16
601.0	6.46	269.62	600.2	4,360.8	-1.1	-19.2	-0.8	2.24	2.19	4.66
633.0	7.25	270.50	631.9	4,329.1	-1.1	-23.0	-0.8	2.49	2.47	2.75
664.0	8.22	273.67	662.7	4,298.3	-0.9	-27.2	-0.5	3.42	3.13	10.23
696.0	9.10	272.44	694.3	4,266.7	-0.6	-32.0	-0.2	2.81	2.75	-3.84
728.0	9.93	269.19	725.9	4,235.1	-0.6	-37.3	-0.1	3.09	2.59	-10.16
760.0	10.59	267.08	757.3	4,203.7	-0.8	-43.0	-0.2	2.37	2.06	-6.59
791.0	11.16	267.52	787.8	4,173.2	-1.0	-48.8	-0.4	1.86	1.84	1.42
823.0	11.73	263.38	819.2	4,141.8	-1.6	-55.2	-0.8	3.12	1.78	-12.94
855.0	12.22	258.46	850.5	4,110.5	-2.6	-61.7	-1.8	3.54	1.53	-15.37
887.0	12.66	258.64	881.7	4,079.3	-4.0	-68.5	-3.1	1.38	1.37	0.56
918.0	12.92	256.79	911.9	4,049.1	-5.4	-75.2	-4.4	1.56	0.84	-5.97
950.0	13.40	257.76	943.1	4,017.9	-7.0	-82.3	-5.9	1.65	1.50	3.03
982.0	14.59	257.76	974.1	3,986.9	-8.7	-89.8	-7.5	3.72	3.72	0.00
1,014.0	15.42	257.76	1,005.1	3,955.9	-10.4	-97.9	-9.1	2.59	2.59	0.00
1,045.0	15.47	256.53	1,034.9	3,926.1	-12.3	-106.0	-10.9	1.07	0.16	-3.97
1,077.0	16.26	257.14	1,065.7	3,895.3	-14.3	-114.5	-12.7	2.52	2.47	1.91
1,109.0	17.09	258.90	1,096.4	3,864.6	-16.2	-123.5	-14.5	3.04	2.59	5.50
1,140.0	17.62	260.22	1,126.0	3,835.0	-17.8	-132.6	-16.1	2.13	1.71	4.26
1,172.0	17.71	261.63	1,156.5	3,804.5	-19.4	-142.2	-17.5	1.37	0.28	4.41
1,204.0	17.71	260.75	1,186.9	3,774.1	-20.9	-151.8	-18.8	0.84	0.00	-2.75
1,236.0	18.06	259.52	1,217.4	3,743.6	-22.5	-161.5	-20.4	1.61	1.09	-3.84
1,268.0	18.94	262.07	1,247.7	3,713.3	-24.2	-171.5	-21.9	3.74	2.75	7.97
1,299.0	19.12	262.59	1,277.0	3,684.0	-25.5	-181.5	-23.1	0.80	0.58	1.68
1,363.0	18.54	263.30	1,337.6	3,623.4	-28.1	-202.0	-25.4	0.97	-0.91	1.11
1,394.0	17.89	264.00	1,367.1	3,593.9	-29.1	-211.6	-26.3	2.21	-2.10	2.26
1,426.0	17.75	263.56	1,397.5	3,563.5	-30.2	-221.4	-27.2	0.61	-0.44	-1.37
1,458.0	17.67	266.55	1,428.0	3,533.0	-31.0	-231.1	-28.0	2.85	-0.25	9.34
1,490.0	18.06	267.78	1,458.5	3,502.5	-31.5	-240.9	-28.3	1.70	1.22	3.84
1,521.0	18.15	267.60	1,487.9	3,473.1	-31.9	-250.5	-28.6	0.34	0.29	-0.58
1,553.0	18.33	267.08	1,518.3	3,442.7	-32.4	-260.5	-28.9	0.76	0.56	-1.62
1,584.0	18.46	265.58	1,547.7	3,413.3	-33.0	-270.3	-29.4	1.58	0.42	-4.84
1,616.0	18.90	266.02	1,578.1	3,382.9	-33.7	-280.5	-30.0	1.44	1.37	1.37
1,648.0	19.29	266.02	1,608.3	3,352.7	-34.5	-290.9	-30.6	1.22	1.22	0.00
1,680.0	18.41	265.58	1,638.6	3,322.4	-35.2	-301.2	-31.2	2.79	-2.75	-1.37
1,711.0	17.75	266.81	1,668.0	3,293.0	-35.9	-310.8	-31.7	2.46	-2.13	3.97
1,743.0	17.75	266.55	1,698.5	3,262.5	-36.4	-320.6	-32.2	0.25	0.00	-0.81
1,807.0	17.14	268.04	1,759.6	3,201.4	-37.3	-339.7	-32.8	1.18	-0.95	2.33
1,829.0	16.96	268.04	1,780.6	3,180.4	-37.6	-346.2	-33.0	0.82	-0.82	0.00
1,878.0	18.09	265.61	1,827.3	3,133.7	-38.4	-360.9	-33.6	2.75	2.31	-4.96
1,946.0	19.70	262.70	1,891.7	3,069.3	-40.6	-382.8	-35.6	2.74	2.37	-4.28
2,039.0	19.60	259.50	1,979.3	2,981.7	-45.5	-413.7	-40.0	1.16	-0.11	-3.44
2,132.0	19.30	257.50	2,067.0	2,894.0	-51.7	-444.0	-45.8	0.79	-0.32	-2.15
2,226.0	18.70	251.10	2,155.8	2,805.2	-59.9	-473.5	-53.6	2.31	-0.64	-6.81
2,318.0	18.10	246.90	2,243.1	2,717.9	-70.3	-500.6	-63.6	1.58	-0.65	-4.57
2,414.0	17.60	241.20	2,334.5	2,626.5	-83.1	-527.0	-76.1	1.89	-0.52	-5.94
2,507.0	16.20	239.10	2,423.5	2,537.5	-96.6	-550.5	-89.3	1.64	-1.51	-2.26
2,601.0	15.00	238.30	2,514.0	2,447.0	-109.7	-572.1	-102.1	1.30	-1.28	-0.85
2,694.0	15.90	239.80	2,603.7	2,357.3	-122.4	-593.3	-114.5	1.06	0.97	1.61
2,787.0	16.90	238.00	2,692.9	2,268.1	-136.0	-615.8	-127.8	1.21	1.08	-1.94
2,882.0	16.00	236.10	2,784.0	2,177.0	-150.6	-638.4	-142.1	1.10	-0.95	-2.00

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well QUARTER CIRCLE 24-1HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	KB 20' @ 4961.0usft (PD461)
Site:	SW SW SEC. 13 T1N R67W 6th P.M.	MD Reference:	KB 20' @ 4961.0usft (PD461)
Well:	QUARTER CIRCLE 24-1HZ	North Reference:	True
Wellbore:	JOB # 2018-201-461 SIDETRACK	Survey Calculation Method:	Minimum Curvature
Design:	FINAL SURVEYS - SIDETRACK	Database:	EOG RESOURCES

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,976.0	16.10	234.50	2,874.3	2,086.7	-165.4	-659.7	-156.6	0.48	0.11	-1.70
3,071.0	16.50	236.70	2,965.5	1,995.5	-180.5	-681.7	-171.4	0.77	0.42	2.32
3,165.0	15.00	246.60	3,056.0	1,905.0	-192.6	-704.1	-183.3	3.27	-1.60	10.53
3,260.0	15.20	244.50	3,147.7	1,813.3	-202.9	-726.6	-193.2	0.61	0.21	-2.21
3,355.0	14.60	241.30	3,239.5	1,721.5	-214.0	-748.3	-204.0	1.07	-0.63	-3.37
3,449.0	12.90	237.70	3,330.8	1,630.2	-225.3	-767.6	-215.1	2.02	-1.81	-3.83
3,543.0	11.20	233.10	3,422.8	1,538.2	-236.4	-783.8	-226.0	2.08	-1.81	-4.89
3,637.0	10.20	238.30	3,515.1	1,445.9	-246.2	-798.1	-235.6	1.48	-1.06	5.53
3,732.0	8.60	245.90	3,608.9	1,352.1	-253.5	-811.8	-242.8	2.13	-1.68	8.00
3,827.0	7.40	249.50	3,702.9	1,258.1	-258.6	-824.0	-247.6	1.37	-1.26	3.79
3,921.0	6.00	246.20	3,796.3	1,164.7	-262.7	-834.2	-251.6	1.54	-1.49	-3.51
4,015.0	5.40	240.50	3,889.8	1,071.2	-266.8	-842.5	-255.7	0.88	-0.64	-6.06
4,110.0	4.50	237.30	3,984.5	976.5	-271.1	-849.5	-259.8	0.99	-0.95	-3.37
4,203.0	4.30	241.20	4,077.2	883.8	-274.7	-855.7	-263.3	0.39	-0.22	4.19
4,298.0	4.20	247.20	4,171.9	789.1	-277.8	-862.0	-266.3	0.48	-0.11	6.32
4,392.0	3.70	246.30	4,265.7	695.3	-280.3	-867.9	-268.8	0.54	-0.53	-0.96
4,485.0	3.70	247.80	4,358.5	602.5	-282.7	-873.5	-271.1	0.10	0.00	1.61
4,579.0	2.70	254.70	4,452.4	508.6	-284.4	-878.4	-272.7	1.14	-1.06	7.34
4,674.0	2.80	252.40	4,547.3	413.7	-285.7	-882.8	-274.0	0.16	0.11	-2.42
4,768.0	1.60	231.00	4,641.2	319.8	-287.2	-886.0	-275.4	1.53	-1.28	-22.77
4,862.0	1.40	220.70	4,735.2	225.8	-288.9	-887.8	-277.1	0.36	-0.21	-10.96
4,957.0	1.10	237.80	4,830.1	130.9	-290.3	-889.3	-278.5	0.50	-0.32	18.00
5,052.0	1.20	248.40	4,925.1	35.9	-291.1	-891.0	-279.3	0.25	0.11	11.16
5,147.0	1.00	248.40	5,020.1	-59.1	-291.8	-892.7	-279.9	0.21	-0.21	0.00
5,265.0	1.30	248.30	5,138.1	-177.1	-292.7	-894.9	-280.8	0.25	0.25	-0.08
5,358.0	1.40	240.10	5,231.1	-270.1	-293.6	-896.8	-281.7	0.23	0.11	-8.82
5,453.0	1.40	207.30	5,326.0	-365.0	-295.2	-898.4	-283.3	0.83	0.00	-34.53
5,548.0	1.30	214.20	5,421.0	-460.0	-297.2	-899.5	-285.2	0.20	-0.11	7.26
5,642.0	1.40	216.40	5,515.0	-554.0	-299.0	-900.8	-287.0	0.12	0.11	2.34
5,737.0	0.10	147.10	5,610.0	-649.0	-300.0	-901.4	-288.0	1.44	-1.37	-72.95
5,830.0	0.70	46.70	5,703.0	-742.0	-299.7	-901.0	-287.7	0.78	0.65	-107.96
5,924.0	1.00	40.70	5,797.0	-836.0	-298.6	-900.0	-286.7	0.33	0.32	-6.38
6,017.0	1.10	37.60	5,889.9	-928.9	-297.3	-899.0	-285.4	0.12	0.11	-3.33
6,110.0	1.00	37.20	5,982.9	-1,021.9	-296.0	-897.9	-284.0	0.11	-0.11	-0.43
6,203.0	1.00	34.20	6,075.9	-1,114.9	-294.6	-897.0	-282.7	0.06	0.00	-3.23
6,298.0	1.30	27.90	6,170.9	-1,209.9	-293.0	-896.0	-281.1	0.34	0.32	-6.63
6,390.0	1.50	20.80	6,262.9	-1,301.9	-291.0	-895.1	-279.1	0.29	0.22	-7.72
6,484.0	1.50	15.90	6,356.8	-1,395.8	-288.6	-894.3	-276.7	0.14	0.00	-5.21
6,578.0	1.50	3.90	6,450.8	-1,489.8	-286.2	-893.9	-274.3	0.33	0.00	-12.77
6,672.0	1.30	1.10	6,544.8	-1,583.8	-283.9	-893.8	-272.0	0.22	-0.21	-2.98
KOP										
6,737.0	2.13	10.34	6,609.7	-1,648.7	-282.0	-893.6	-270.1	1.34	1.28	14.22
6,765.0	2.50	12.40	6,637.7	-1,676.7	-280.9	-893.3	-269.0	1.35	1.32	7.36
6,859.0	7.00	21.20	6,731.4	-1,770.4	-273.5	-890.8	-261.7	4.84	4.79	9.36
6,952.0	13.30	10.30	6,822.9	-1,861.9	-257.7	-886.9	-245.9	7.05	6.77	-11.72
7,045.0	19.50	10.20	6,912.1	-1,951.1	-231.9	-882.2	-220.2	6.67	6.67	-0.11
7,139.0	27.10	1.40	6,998.3	-2,037.3	-195.0	-878.9	-183.3	8.87	8.09	-9.36
7,232.0	32.70	359.50	7,078.9	-2,117.9	-148.6	-878.6	-137.0	6.11	6.02	-2.04
7,327.0	39.90	358.20	7,155.5	-2,194.5	-92.5	-879.8	-80.8	7.62	7.58	-1.37
7,421.0	47.30	2.30	7,223.5	-2,262.5	-27.7	-879.3	-16.0	8.42	7.87	4.36
TIE ON TO OH SURVEYS										
7,513.0	57.90	5.60	7,279.3	-2,318.3	45.1	-874.2	56.7	11.87	11.52	3.59
7,550.0	58.97	11.05	7,298.7	-2,337.7	76.3	-869.6	87.8	12.88	2.89	14.73

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well QUARTER CIRCLE 24-1HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	KB 20' @ 4961.0usft (PD461)
Site:	SW SW SEC. 13 T1N R67W 6th P.M.	MD Reference:	KB 20' @ 4961.0usft (PD461)
Well:	QUARTER CIRCLE 24-1HZ	North Reference:	True
Wellbore:	JOB # 2018-201-461 SIDETRACK	Survey Calculation Method:	Minimum Curvature
Design:	FINAL SURVEYS - SIDETRACK	Database:	EOG RESOURCES

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,560.0	59.30	12.50	7,303.8	-2,342.8	84.7	-867.8	96.2	12.88	3.30	14.50
~ ENTER LANDING BOX (7585' MD)										
7,584.7	58.48	14.21	7,316.6	-2,355.6	105.2	-863.0	116.7	6.77	-3.30	6.90
7,606.0	57.80	15.70	7,327.8	-2,366.8	122.7	-858.3	134.1	6.77	-3.21	7.02
7,653.0	59.40	12.20	7,352.3	-2,391.3	161.6	-848.6	172.9	7.21	3.40	-7.45
7,700.0	62.60	5.80	7,375.1	-2,414.1	202.2	-842.2	213.4	13.71	6.81	-13.62
7,794.0	73.10	358.90	7,410.5	-2,449.5	289.0	-838.9	300.1	13.07	11.17	-7.34
7,889.0	76.60	353.70	7,435.4	-2,474.4	380.5	-844.8	391.6	6.44	3.68	-5.47
7,983.0	81.10	352.00	7,453.6	-2,492.6	471.9	-856.3	483.3	5.11	4.79	-1.81
8,076.0	85.55	350.66	7,464.4	-2,503.4	563.2	-870.2	574.7	4.99	4.78	-1.44
~ ENTER RADIUS HEEL (8080' MD)										
8,080.0	85.67	350.69	7,464.7	-2,503.7	567.2	-870.9	578.7	3.09	3.02	0.64
HEEL (40.032130, -104.847462)										
8,171.0	88.42	351.27	7,469.4	-2,508.4	656.9	-885.1	668.6	3.09	3.02	0.64
8,263.0	90.49	351.55	7,470.2	-2,509.2	747.9	-898.9	759.7	2.27	2.25	0.30
8,356.0	91.82	352.74	7,468.4	-2,507.4	840.0	-911.6	852.0	1.92	1.43	1.28
8,450.0	90.91	354.21	7,466.1	-2,505.1	933.3	-922.3	945.5	1.84	-0.97	1.56
8,542.0	89.59	354.88	7,465.7	-2,504.7	1,024.9	-931.0	1,037.2	1.61	-1.43	0.73
8,636.0	89.45	356.92	7,466.5	-2,505.5	1,118.7	-937.7	1,131.0	2.18	-0.15	2.17
8,730.0	92.65	358.36	7,464.8	-2,503.8	1,212.6	-941.6	1,224.9	3.73	3.40	1.53
8,825.0	92.43	359.72	7,460.6	-2,499.6	1,307.5	-943.2	1,319.8	1.45	-0.23	1.43
~ EXIT RADIUS HEEL (8870' MD)										
8,870.1	90.88	359.89	7,459.3	-2,498.3	1,352.5	-943.3	1,364.9	3.46	-3.44	0.37
8,920.0	89.16	0.07	7,459.3	-2,498.3	1,402.4	-943.4	1,414.8	3.46	-3.44	0.37
9,013.0	88.70	359.42	7,461.0	-2,500.0	1,495.4	-943.8	1,507.8	0.86	-0.49	-0.70
9,106.0	90.31	359.69	7,461.8	-2,500.8	1,588.4	-944.5	1,600.8	1.76	1.73	0.29
9,200.0	90.42	0.98	7,461.2	-2,500.2	1,682.4	-943.9	1,694.8	1.38	0.12	1.37
9,293.0	89.72	359.92	7,461.1	-2,500.1	1,775.4	-943.2	1,787.7	1.37	-0.75	-1.14
9,388.0	92.46	0.14	7,459.3	-2,498.3	1,870.4	-943.2	1,882.7	2.89	2.88	0.23
9,483.0	92.52	358.21	7,455.1	-2,494.1	1,965.3	-944.5	1,977.6	2.03	0.06	-2.03
9,577.0	91.32	359.18	7,452.0	-2,491.0	2,059.2	-946.7	2,071.6	1.64	-1.28	1.03
9,670.0	92.27	359.89	7,449.1	-2,488.1	2,152.1	-947.4	2,164.5	1.28	1.02	0.76
9,764.0	91.43	359.37	7,446.0	-2,485.0	2,246.1	-948.0	2,258.5	1.05	-0.89	-0.55
9,859.0	89.93	358.86	7,444.9	-2,483.9	2,341.1	-949.5	2,353.4	1.67	-1.58	-0.54
9,953.0	91.68	358.52	7,443.6	-2,482.6	2,435.0	-951.6	2,447.4	1.90	1.86	-0.36
10,046.0	91.19	359.09	7,441.3	-2,480.3	2,528.0	-953.6	2,540.4	0.81	-0.53	0.61
10,139.0	90.49	0.53	7,439.9	-2,478.9	2,621.0	-953.9	2,633.4	1.72	-0.75	1.55
10,232.0	89.85	0.11	7,439.6	-2,478.6	2,714.0	-953.4	2,726.4	0.82	-0.69	-0.45
10,326.0	90.46	0.27	7,439.4	-2,478.4	2,808.0	-953.1	2,820.4	0.67	0.65	0.17
10,420.0	90.11	359.85	7,438.9	-2,477.9	2,902.0	-953.0	2,914.3	0.58	-0.37	-0.45
10,514.0	89.31	359.47	7,439.4	-2,478.4	2,996.0	-953.5	3,008.3	0.94	-0.85	-0.40
10,606.0	90.70	359.44	7,439.4	-2,478.4	3,087.9	-954.4	3,100.3	1.51	1.51	-0.03
10,700.0	93.32	359.34	7,436.1	-2,475.1	3,181.9	-955.4	3,194.3	2.79	2.79	-0.11
10,794.0	91.65	359.60	7,432.0	-2,471.0	3,275.8	-956.3	3,288.2	1.80	-1.78	0.28
10,886.0	89.94	0.80	7,430.7	-2,469.7	3,367.8	-955.9	3,380.1	2.27	-1.86	1.30
10,980.0	90.70	0.56	7,430.2	-2,469.2	3,461.8	-954.8	3,474.1	0.85	0.81	-0.26
11,073.0	90.74	358.37	7,429.0	-2,468.0	3,554.7	-955.7	3,567.1	2.36	0.04	-2.35
11,165.0	90.21	359.25	7,428.3	-2,467.3	3,646.7	-957.6	3,659.1	1.12	-0.58	0.96
11,258.0	89.99	0.55	7,428.1	-2,467.1	3,739.7	-957.8	3,752.1	1.42	-0.24	1.40
11,350.0	90.45	359.30	7,427.8	-2,466.8	3,831.7	-957.9	3,844.1	1.45	0.50	-1.36
11,444.0	92.62	358.90	7,425.2	-2,464.2	3,925.7	-959.4	3,938.0	2.35	2.31	-0.43
11,537.0	93.01	358.68	7,420.7	-2,459.7	4,018.5	-961.3	4,030.9	0.48	0.42	-0.24
11,631.0	92.16	359.26	7,416.4	-2,455.4	4,112.4	-963.0	4,124.8	1.09	-0.90	0.62

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well QUARTER CIRCLE 24-1HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	KB 20' @ 4961.0usft (PD461)
Site:	SW SW SEC. 13 T1N R67W 6th P.M.	MD Reference:	KB 20' @ 4961.0usft (PD461)
Well:	QUARTER CIRCLE 24-1HZ	North Reference:	True
Wellbore:	JOB # 2018-201-461 SIDETRACK	Survey Calculation Method:	Minimum Curvature
Design:	FINAL SURVEYS - SIDETRACK	Database:	EOG RESOURCES

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
11,725.0	91.19	359.22	7,413.7	-2,452.7	4,206.4	-964.3	4,218.8	1.03	-1.03	-0.04
11,819.0	91.92	358.87	7,411.1	-2,450.1	4,300.3	-965.8	4,312.7	0.86	0.78	-0.37
11,913.0	91.47	359.29	7,408.4	-2,447.4	4,394.3	-967.3	4,406.7	0.65	-0.48	0.45
12,007.0	90.21	359.43	7,407.0	-2,446.0	4,488.2	-968.4	4,500.7	1.35	-1.34	0.15
12,101.0	91.72	358.87	7,405.4	-2,444.4	4,582.2	-969.8	4,594.7	1.71	1.61	-0.60
12,195.0	92.65	0.11	7,401.8	-2,440.8	4,676.1	-970.6	4,688.6	1.65	0.99	1.32
12,288.0	91.92	0.74	7,398.1	-2,437.1	4,769.1	-969.9	4,781.5	1.04	-0.78	0.68
12,383.0	91.20	359.01	7,395.5	-2,434.5	4,864.0	-970.1	4,876.5	1.97	-0.76	-1.82
12,476.0	90.97	358.45	7,393.8	-2,432.8	4,957.0	-972.2	4,969.4	0.65	-0.25	-0.60
12,571.0	89.93	359.01	7,393.0	-2,432.0	5,052.0	-974.3	5,064.4	1.24	-1.09	0.59
12,663.0	90.56	358.87	7,392.6	-2,431.6	5,143.9	-976.0	5,156.4	0.70	0.68	-0.15
12,757.0	91.44	357.73	7,391.0	-2,430.0	5,237.9	-978.8	5,250.4	1.53	0.94	-1.21
12,850.0	90.90	358.63	7,389.1	-2,428.1	5,330.8	-981.7	5,343.4	1.13	-0.58	0.97
12,944.0	88.03	0.05	7,390.0	-2,429.0	5,424.8	-982.8	5,437.3	3.41	-3.05	1.51
13,038.0	89.03	359.99	7,392.4	-2,431.4	5,518.8	-982.8	5,531.3	1.07	1.06	-0.06
13,133.0	91.34	359.98	7,392.1	-2,431.1	5,613.7	-982.8	5,626.3	2.43	2.43	-0.01
13,226.0	93.23	359.62	7,388.3	-2,427.3	5,706.7	-983.1	5,719.2	2.07	2.03	-0.39
13,321.0	93.08	0.03	7,383.1	-2,422.1	5,801.5	-983.4	5,814.1	0.46	-0.16	0.43
13,414.0	91.26	0.17	7,379.6	-2,418.6	5,894.5	-983.3	5,907.0	1.96	-1.96	0.15
13,508.0	90.83	0.38	7,377.9	-2,416.9	5,988.4	-982.8	6,000.9	0.51	-0.46	0.22
13,602.0	91.48	0.59	7,376.0	-2,415.0	6,082.4	-982.0	6,094.9	0.73	0.69	0.22
13,696.0	89.90	0.35	7,374.9	-2,413.9	6,176.4	-981.2	6,188.9	1.70	-1.68	-0.26
13,791.0	90.62	1.25	7,374.4	-2,413.4	6,271.4	-979.9	6,283.8	1.21	0.76	0.95
13,885.0	89.78	0.97	7,374.1	-2,413.1	6,365.4	-978.1	6,377.8	0.94	-0.89	-0.30
13,979.0	90.17	0.69	7,374.1	-2,413.1	6,459.4	-976.7	6,471.7	0.51	0.41	-0.30
14,073.0	92.17	1.49	7,372.2	-2,411.2	6,553.3	-975.0	6,565.7	2.29	2.13	0.85
14,168.0	91.48	0.59	7,369.2	-2,408.2	6,648.3	-973.2	6,660.6	1.19	-0.73	-0.95
14,263.0	89.33	359.63	7,368.5	-2,407.5	6,743.2	-973.0	6,755.6	2.48	-2.26	-1.01
14,358.0	90.10	359.31	7,369.0	-2,408.0	6,838.2	-973.9	6,850.6	0.88	0.81	-0.34
14,452.0	89.10	359.11	7,369.7	-2,408.7	6,932.2	-975.2	6,944.6	1.08	-1.06	-0.21
14,546.0	89.34	359.13	7,370.9	-2,409.9	7,026.2	-976.7	7,038.5	0.26	0.26	0.02
14,640.0	91.13	359.21	7,370.5	-2,409.5	7,120.2	-978.0	7,132.5	1.91	1.90	0.09
14,734.0	89.52	359.24	7,370.0	-2,409.0	7,214.2	-979.3	7,226.5	1.71	-1.71	0.03
14,827.0	90.90	0.38	7,369.7	-2,408.7	7,307.2	-979.6	7,319.5	1.92	1.48	1.23
14,921.0	89.37	0.55	7,369.4	-2,408.4	7,401.2	-978.8	7,413.5	1.64	-1.63	0.18
15,015.0	88.29	0.48	7,371.4	-2,410.4	7,495.1	-978.0	7,507.5	1.15	-1.15	-0.07
15,109.0	88.63	0.63	7,373.9	-2,412.9	7,589.1	-977.1	7,601.4	0.40	0.36	0.16
15,203.0	88.94	359.09	7,375.9	-2,414.9	7,683.1	-977.3	7,695.4	1.67	0.33	-1.64
15,298.0	87.40	352.50	7,378.9	-2,417.9	7,777.7	-984.3	7,790.1	7.12	-1.62	-6.94
15,393.0	88.04	355.86	7,382.7	-2,421.7	7,872.1	-993.9	7,884.6	3.60	0.67	3.54
15,486.0	87.26	359.52	7,386.5	-2,425.5	7,965.0	-997.6	7,977.5	4.02	-0.84	3.94
15,580.0	89.22	0.67	7,389.4	-2,428.4	8,058.9	-997.5	8,071.4	2.42	2.09	1.22
15,674.0	89.64	0.70	7,390.3	-2,429.3	8,152.9	-996.4	8,165.4	0.45	0.45	0.03
15,768.0	91.27	0.70	7,389.6	-2,428.6	8,246.9	-995.2	8,259.4	1.73	1.73	0.00
15,860.0	90.77	359.99	7,388.0	-2,427.0	8,338.9	-994.7	8,351.3	0.94	-0.54	-0.77
15,953.0	89.09	359.29	7,388.1	-2,427.1	8,431.9	-995.2	8,444.3	1.96	-1.81	-0.75
16,048.0	89.93	358.87	7,388.9	-2,427.9	8,526.9	-996.8	8,539.3	0.99	0.88	-0.44
16,141.0	88.59	359.07	7,390.1	-2,429.1	8,619.8	-998.4	8,632.3	1.46	-1.44	0.22
16,236.0	88.68	358.88	7,392.3	-2,431.3	8,714.8	-1,000.1	8,727.3	0.22	0.09	-0.20
16,331.0	89.43	358.55	7,393.9	-2,432.9	8,809.8	-1,002.3	8,822.3	0.86	0.79	-0.35
16,425.0	89.62	356.70	7,394.7	-2,433.7	8,903.7	-1,006.2	8,916.2	1.98	0.20	-1.97
16,517.0	89.30	356.20	7,395.6	-2,434.6	8,995.5	-1,011.9	9,008.1	0.65	-0.35	-0.54
16,610.0	89.96	356.99	7,396.2	-2,435.2	9,088.3	-1,017.4	9,101.0	1.11	0.71	0.85

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well QUARTER CIRCLE 24-1HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	KB 20' @ 4961.0usft (PD461)
Site:	SW SW SEC. 13 T1N R67W 6th P.M.	MD Reference:	KB 20' @ 4961.0usft (PD461)
Well:	QUARTER CIRCLE 24-1HZ	North Reference:	True
Wellbore:	JOB # 2018-201-461 SIDETRACK	Survey Calculation Method:	Minimum Curvature
Design:	FINAL SURVEYS - SIDETRACK	Database:	EOG RESOURCES

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
16,703.0	91.13	358.24	7,395.3	-2,434.3	9,181.2	-1,021.3	9,194.0	1.84	1.26	1.34
16,797.0	91.15	359.71	7,393.4	-2,432.4	9,275.2	-1,022.9	9,287.9	1.56	0.02	1.56
16,891.0	90.97	359.88	7,391.7	-2,430.7	9,369.2	-1,023.3	9,381.9	0.26	-0.19	0.18
16,985.0	90.56	1.04	7,390.4	-2,429.4	9,463.2	-1,022.5	9,475.9	1.31	-0.44	1.23
17,080.0	92.31	0.92	7,388.0	-2,427.0	9,558.1	-1,020.9	9,570.8	1.85	1.84	-0.13
17,173.0	91.68	0.61	7,384.8	-2,423.8	9,651.0	-1,019.7	9,663.7	0.75	-0.68	-0.33
17,268.0	89.66	0.81	7,383.7	-2,422.7	9,746.0	-1,018.5	9,758.7	2.14	-2.13	0.21
~ ENTER RADIUS TOE (17286' MD)										
17,286.0	89.36	0.66	7,383.8	-2,422.8	9,764.0	-1,018.2	9,776.7	1.88	-1.69	-0.83
17,362.0	88.07	0.03	7,385.5	-2,424.5	9,840.0	-1,017.8	9,852.6	1.88	-1.69	-0.83
17,456.0	87.76	358.33	7,389.0	-2,428.0	9,933.9	-1,019.1	9,946.6	1.84	-0.33	-1.81
17,550.0	86.70	356.50	7,393.5	-2,432.5	10,027.7	-1,023.4	10,040.4	2.25	-1.13	-1.95
LAST SURVEY APR 19, 2018										
17,605.0	86.46	355.44	7,396.8	-2,435.8	10,082.5	-1,027.2	10,095.2	1.97	-0.44	-1.93
PROJECTION TO TD - SIDETRACK (40.058140, -104.847985)										
17,655.0	86.46	355.44	7,399.9	-2,438.9	10,132.2	-1,031.2	10,145.0	0.00	0.00	0.00

Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
QUARTER CIRCLE 24- - hit/miss target - Shape	0.00	0.00	7,354.0	5,987.7	-970.6	14,543,798.33	1,683,020.52	40° 2' 48.348 N	104° 50' 51.962 W	
- survey misses target center by 26.9usft at 13507.7usft MD (7377.9 TVD, 5988.2 N, -982.8 E)										
- Point										
QUARTER CIRCLE 24- - hit/miss target - Shape	0.00	0.00	7,396.0	10,143.0	-1,025.5	14,547,951.95	1,682,958.38	40° 3' 29.412 N	104° 50' 52.670 W	
- survey misses target center by 12.8usft at 17655.0usft MD (7399.9 TVD, 10132.2 N, -1031.2 E)										
- Point										
QUARTER CIRCLE 24- - hit/miss target - Shape	0.00	0.00	7,469.0	547.9	-898.5	14,538,360.83	1,683,102.04	40° 1' 54.590 N	104° 50' 51.033 W	
- survey misses target center by 30.9usft at 8065.7usft MD (7463.5 TVD, 553.1 N, -868.6 E)										
- Point										

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
6,737.0	6,609.7	-282.0	-893.6	KOP	
7,513.0	7,279.3	45.1	-874.2	TIE ON TO OH SURVEYS	
7,584.7	7,316.6	105.2	-863.0	~ ENTER LANDING BOX (7585' MD)	
8,080.0	7,464.7	567.2	-870.9	~ ENTER RADIUS HEEL (8080' MD)	
8,171.0	7,469.4	656.9	-885.1	HEEL (40.032130, -104.847462)	
8,870.1	7,459.3	1,352.5	-943.3	~ EXIT RADIUS HEEL (8870' MD)	
17,286.0	7,383.8	9,764.0	-1,018.2	~ ENTER RADIUS TOE (17286' MD)	
17,605.0	7,396.8	10,082.5	-1,027.2	LAST SURVEY APR 19, 2018	
17,655.0	7,399.9	10,132.2	-1,031.2	PROJECTION TO TD - SIDETRACK (40.058140, -104.847985)	

Checked By: _____ Approved By: _____ Date: _____