

ANADARKO PETROLEUM CORP

WELD COUNTY (NAD 83)

SE SW SEC 24 T2N R66W 6th P.M.

GRACIE 24-5HZ

JOB # 2018-422-461

10 August, 2018

Survey: FINAL SURVEYS





Project: WELD COUNTY (NAD 83)
 Site: SE SW SEC 24 T2N R66W 6th P.M.
 Well: GRACIE 24-5HZ
 Wellbore: JOB # 2018-422-461
 Design: FINAL SURVEYS

ANNOTATIONS

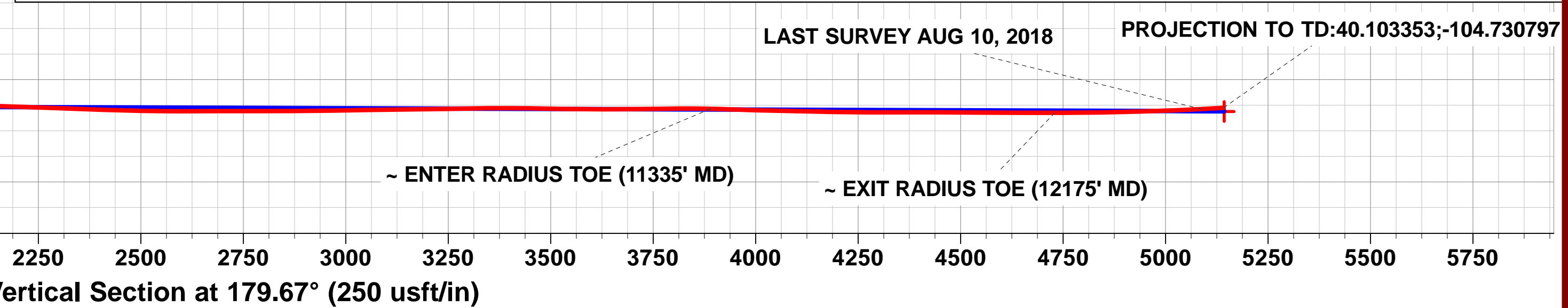
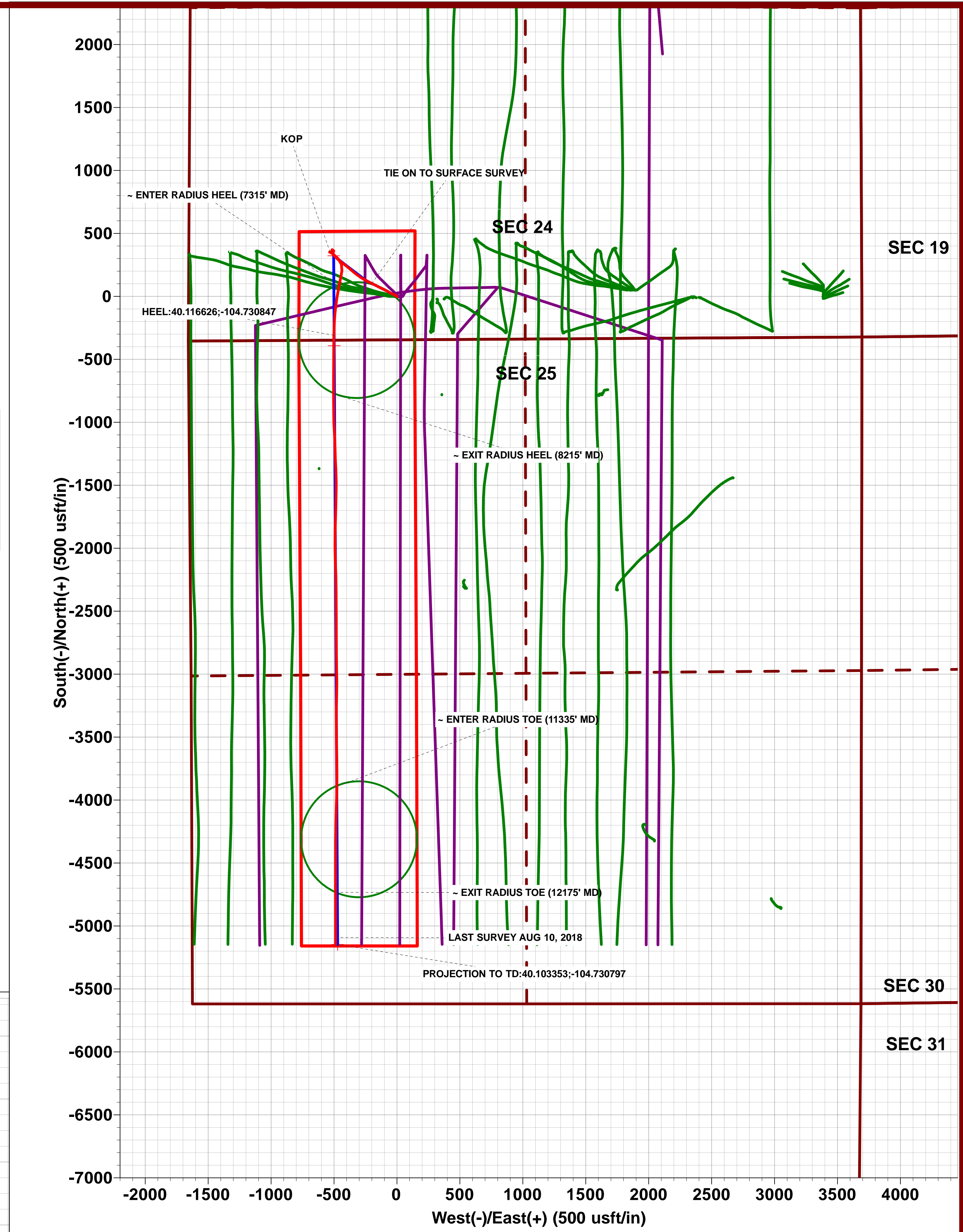
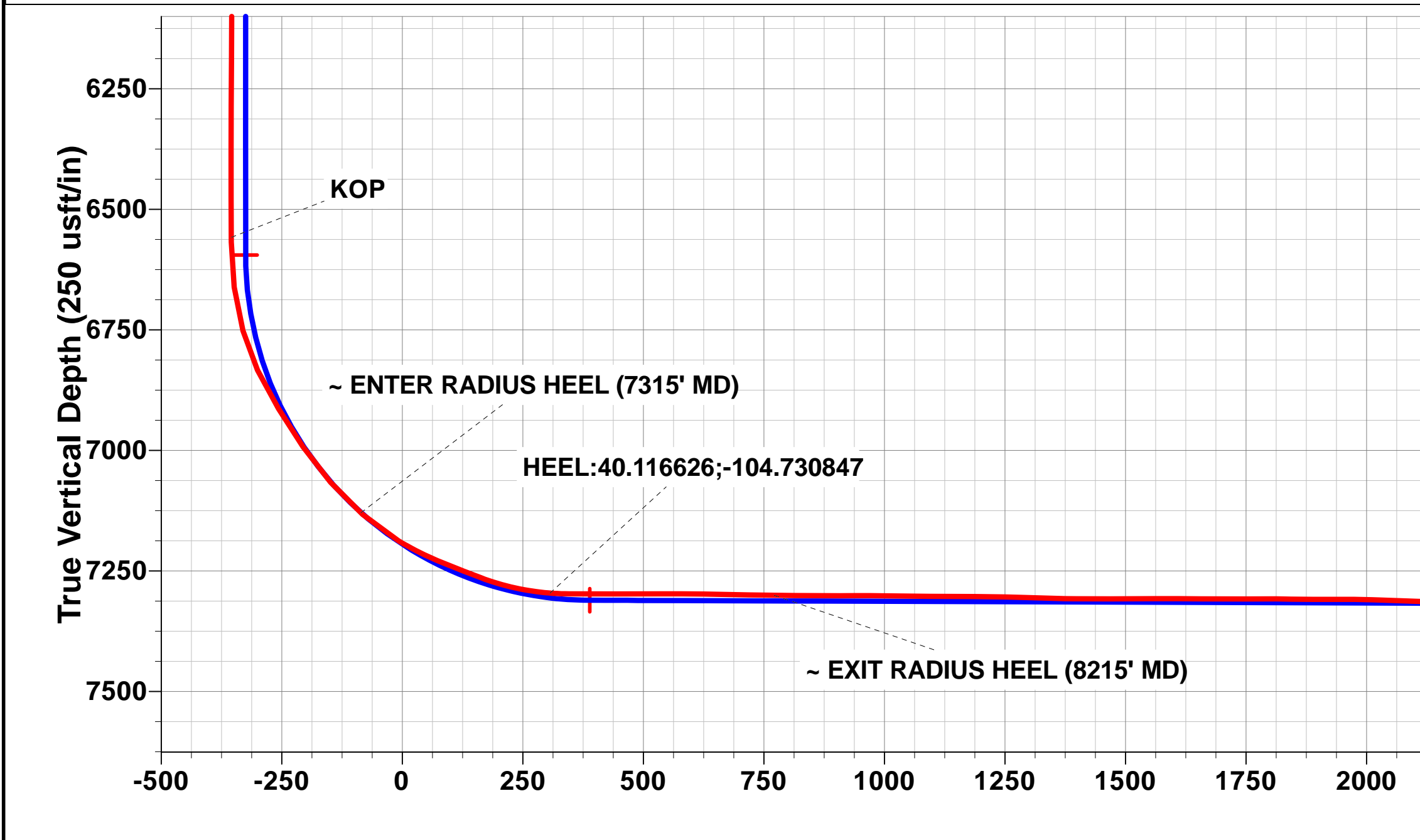
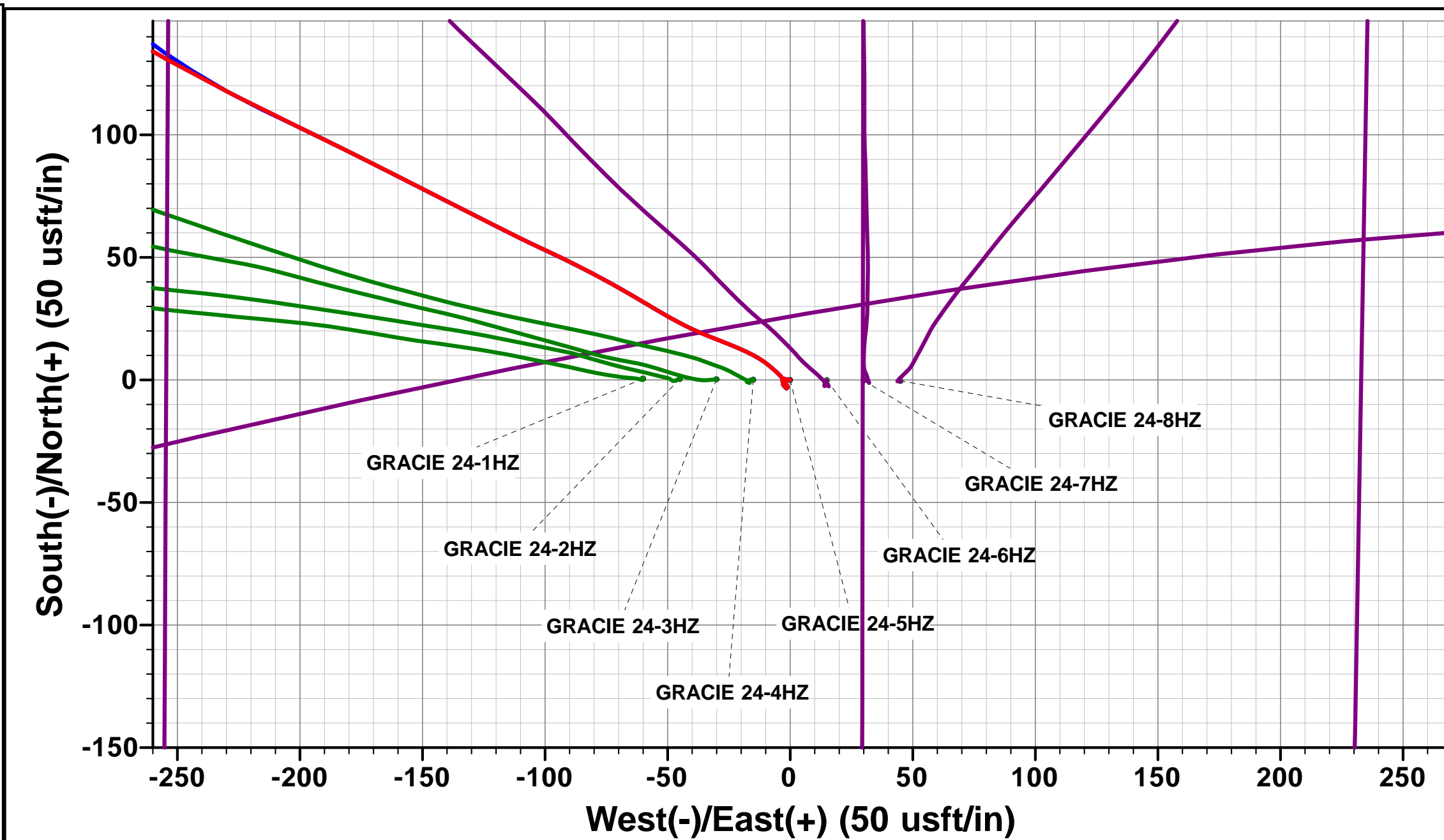
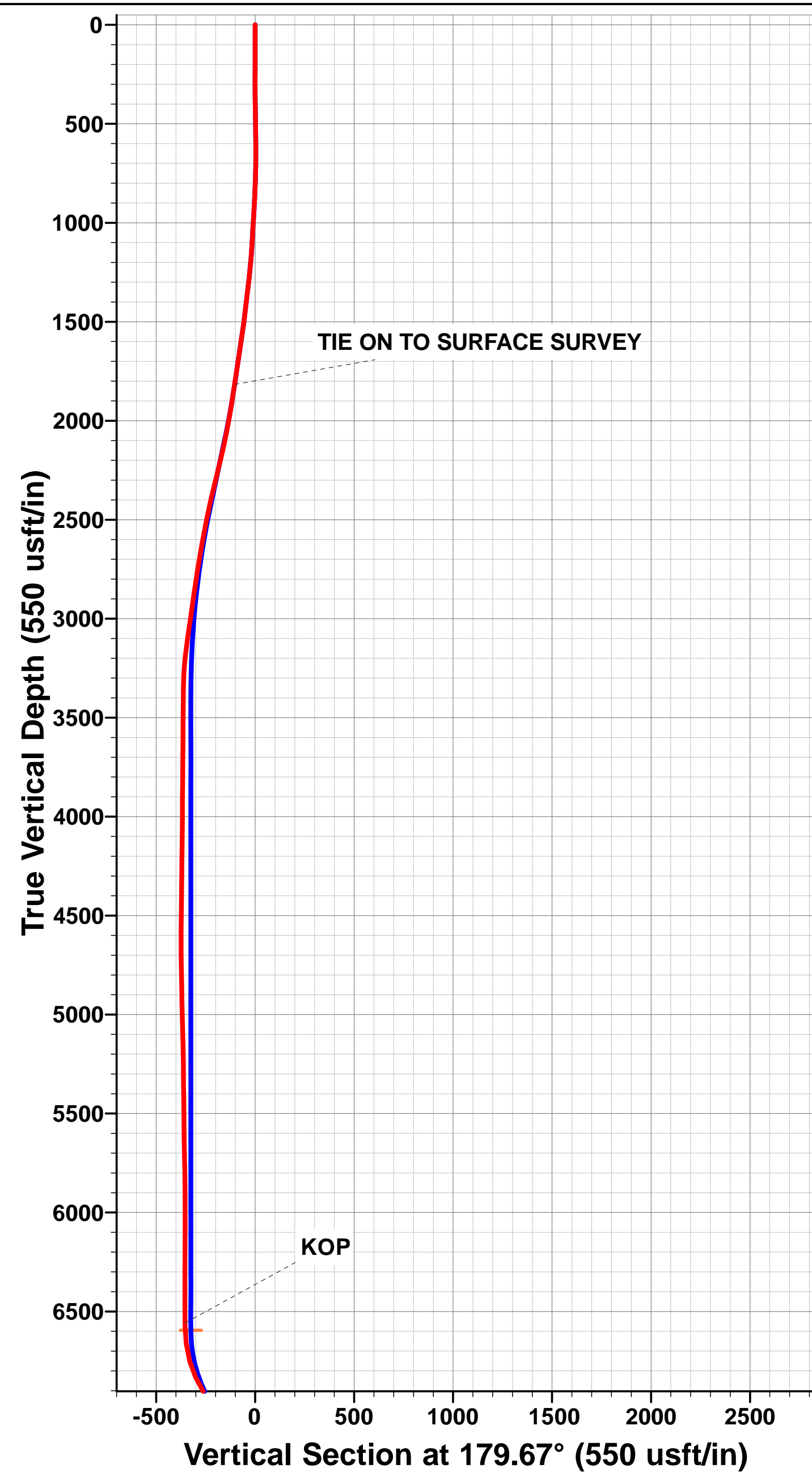
TVD	MD	Inc	Azi	+N-S	+E-W	VSec	Departure	Annotation
1816.5	1845.0	19.03	295.66	102.6	-199.4	-103.8	234.7	TIE ON TO SURFACE SURVEY
6558.4	6650.0	2.60	103.27	351.6	-531.4	-354.7	713.3	KOP
7129.6	7315.0	48.42	190.84	83.3	-459.8	-85.9	1024.1	~ ENTER RADIUS HEEL (7315' MD)
7296.1	7750.0	85.70	181.34	-309.3	-501.0	306.4	1419.5	HEEL:40.116626;-104.730847
7300.6	8215.0	89.14	179.82	-774.2	-503.4	771.3	1884.2	~ EXIT RADIUS HEEL (8215' MD)
7321.4	11335.0	88.64	181.16	-3893.0	-477.3	3890.2	5003.8	~ ENTER RADIUS TOE (11335' MD)
7331.2	12175.0	90.09	180.13	-4732.8	-487.0	4729.9	5843.6	~ EXIT RADIUS TOE (12175' MD)
7322.0	12533.0	93.19	180.16	-5090.6	-487.2	5087.7	6201.5	LAST SURVEY AUG 10, 2018
7319.0	12587.0	93.19	180.16	-5144.5	-487.3	5141.6	6255.4	PROJECTION TO TD:40.103353;-104.730797

PROPOSED LOCAL COORDINATES:

SHL: 345ft FSL & 1655ft FWL Sec 24
 HEEL: 39.32ft FSL & 1156.41ft FWL Sec 24
 BHL: 473.47ft FSL & 1139.37ft FWL Sec 25

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N-S	+E-W	Latitude	Longitude
BHL - GRACIE 24-5HZ (P2)	7328.0	-5146.0	-470.7	40° 6' 12.055 N	104° 43' 50.656 W
HEEL - GRACIE 24-5HZ (P2)	7311.0	-391.6	-498.4	40° 6' 59.039 N	104° 43' 51.013 W
KOP - GRACIE 24-5HZ (P2)	6594.8	322.1	-502.5	40° 7' 6.092 N	104° 43' 51.067 W



Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-5HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	KB 20' @ 5103.0usft (PD 461)
Site:	SE SW SEC 24 T2N R66W 6th P.M.	MD Reference:	KB 20' @ 5103.0usft (PD 461)
Well:	GRACIE 24-5HZ	North Reference:	True
Wellbore:	JOB # 2018-422-461	Survey Calculation Method:	Minimum Curvature
Design:	FINAL SURVEYS	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 SE SW SEC 24 T2N R66W 6th P.M.			
Site Position:		Northing:	14,569,626.93 usft
From:	Lat/Long	Easting:	1,716,104.98 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"
		Latitude:	40° 7' 2.914 N
		Longitude:	104° 43' 45.370 W
		Grid Convergence:	0.17 °

Well GRACIE 24-5HZ			
Well Position	+N/-S	0.0 usft	Northing: 14,569,626.61 usft
	+E/-W	0.0 usft	Easting: 1,716,164.93 usft
			Latitude: 40° 7' 2.909 N
			Longitude: 104° 43' 44.598 W
Position Uncertainty		0.0 usft	Wellhead Elevation: usft
			Ground Level: 5,083.0 usft

Wellbore JOB # 2018-422-461					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	17/07/2018	8.05	66.61	52,124

Design FINAL SURVEYS					
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	179.67	

Survey Program		Date	10/08/2018
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
131.0	12,587.0	FINAL SURVEYS (JOB # 2018-422-461)	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	5,103.0	0.0	0.0	0.0	0.00	0.00	0.00
131.0	0.62	285.20	131.0	4,972.0	0.2	-0.7	-0.2	0.47	0.47	0.00
163.0	0.75	264.37	163.0	4,940.0	0.2	-1.1	-0.2	0.87	0.41	-65.09
195.0	0.83	281.86	195.0	4,908.0	0.2	-1.5	-0.2	0.79	0.25	54.66
227.0	0.79	281.07	227.0	4,876.0	0.3	-1.9	-0.3	0.13	-0.12	-2.47
258.0	1.10	287.66	258.0	4,845.0	0.5	-2.4	-0.5	1.06	1.00	21.26
290.0	0.70	274.65	290.0	4,813.0	0.6	-2.9	-0.6	1.40	-1.25	-40.66
321.0	0.62	225.17	321.0	4,782.0	0.5	-3.2	-0.5	1.80	-0.26	-159.61
353.0	0.75	166.72	353.0	4,750.0	0.1	-3.3	-0.2	2.12	0.41	-182.66
385.0	0.75	157.67	385.0	4,718.0	-0.3	-3.2	0.2	0.37	0.00	-28.28
417.0	0.70	177.36	417.0	4,686.0	-0.6	-3.1	0.6	0.79	-0.16	61.53
448.0	1.19	173.93	448.0	4,655.0	-1.2	-3.0	1.1	1.59	1.58	-11.06
480.0	1.10	160.39	480.0	4,623.0	-1.8	-2.9	1.8	0.89	-0.28	-42.31

Survey Report



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Site:	SE SW SEC 24 T2N R66W 6th P.M.	MD Reference:	KB 20' @ 5103.0usft (PD 461)
Well:	GRACIE 24-5HZ	North Reference:	True
Wellbore:	JOB # 2018-422-461	Survey Calculation Method:	Minimum Curvature
Design:	FINAL SURVEYS	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)
511.0	0.53	146.60	511.0	4,592.0	-2.2	-2.7	2.2	1.93	-1.84	-44.48
543.0	0.74	130.86	543.0	4,560.0	-2.4	-2.5	2.4	0.85	0.66	-49.19
575.0	0.83	145.54	575.0	4,528.0	-2.8	-2.2	2.7	0.69	0.28	45.87
606.0	0.88	144.57	605.9	4,497.1	-3.1	-1.9	3.1	0.17	0.16	-3.13
638.0	0.75	111.26	637.9	4,465.1	-3.4	-1.6	3.4	1.51	-0.41	-104.09
670.0	0.66	48.95	669.9	4,433.1	-3.4	-1.3	3.4	2.29	-0.28	-194.72
702.0	0.97	9.66	701.9	4,401.1	-3.0	-1.1	3.0	1.94	0.97	-122.78
734.0	1.23	336.70	733.9	4,369.1	-2.4	-1.2	2.4	2.10	0.81	-103.00
765.0	2.02	332.66	764.9	4,338.1	-1.6	-1.6	1.6	2.57	2.55	-13.03
797.0	2.50	320.44	796.9	4,306.1	-0.6	-2.3	0.6	2.12	1.50	-38.19
829.0	2.81	325.37	828.9	4,274.1	0.6	-3.1	-0.6	1.20	0.97	15.41
860.0	3.21	316.66	859.8	4,243.2	1.9	-4.2	-1.9	1.96	1.29	-28.10
892.0	4.17	312.09	891.8	4,211.2	3.3	-5.7	-3.3	3.14	3.00	-14.28
924.0	5.23	311.13	923.6	4,179.4	5.0	-7.6	-5.1	3.32	3.31	-3.00
955.0	6.28	306.03	954.5	4,148.5	7.0	-10.0	-7.0	3.76	3.39	-16.45
987.0	6.68	302.07	986.3	4,116.7	9.0	-13.0	-9.1	1.87	1.25	-12.37
1,018.0	7.43	295.48	1,017.1	4,085.9	10.8	-16.4	-10.9	3.56	2.42	-21.26
1,050.0	7.82	293.37	1,048.8	4,054.2	12.6	-20.2	-12.7	1.50	1.22	-6.59
1,082.0	8.44	292.41	1,080.4	4,022.6	14.3	-24.4	-14.5	1.98	1.94	-3.00
1,114.0	9.23	292.23	1,112.1	3,990.9	16.2	-29.0	-16.3	2.47	2.47	-0.56
1,145.0	9.54	291.88	1,142.7	3,960.3	18.1	-33.6	-18.3	1.02	1.00	-1.13
1,177.0	10.24	293.29	1,174.2	3,928.8	20.2	-38.7	-20.4	2.31	2.19	4.41
1,209.0	10.85	297.86	1,205.6	3,897.4	22.7	-44.0	-23.0	3.23	1.91	14.28
1,240.0	11.47	299.35	1,236.0	3,867.0	25.6	-49.3	-25.9	2.21	2.00	4.81
1,272.0	12.39	299.61	1,267.4	3,835.6	28.9	-55.0	-29.2	2.88	2.87	0.81
1,304.0	12.79	301.11	1,298.6	3,804.4	32.4	-61.0	-32.7	1.61	1.25	4.69
1,335.0	12.96	300.58	1,328.8	3,774.2	35.9	-67.0	-36.3	0.67	0.55	-1.71
1,367.0	13.80	298.73	1,359.9	3,743.1	39.6	-73.4	-40.0	2.95	2.62	-5.78
1,398.0	14.55	297.59	1,390.0	3,713.0	43.2	-80.1	-43.6	2.58	2.42	-3.68
1,430.0	15.21	296.54	1,420.9	3,682.1	46.9	-87.4	-47.4	2.23	2.06	-3.28
1,461.0	15.25	295.22	1,450.8	3,652.2	50.5	-94.7	-51.0	1.13	0.13	-4.26
1,493.0	15.78	295.22	1,481.7	3,621.3	54.1	-102.5	-54.7	1.66	1.66	0.00
1,525.0	16.74	296.54	1,512.4	3,590.6	58.0	-110.5	-58.7	3.21	3.00	4.12
1,556.0	17.14	296.92	1,542.0	3,561.0	62.1	-118.6	-62.8	1.34	1.29	1.23
1,588.0	17.75	296.89	1,572.6	3,530.4	66.4	-127.2	-67.2	1.91	1.91	-0.09
1,620.0	18.19	296.36	1,603.0	3,500.0	70.8	-136.0	-71.6	1.47	1.37	-1.66
1,652.0	18.76	297.15	1,633.4	3,469.6	75.4	-145.0	-76.2	1.95	1.78	2.47
1,684.0	18.94	296.89	1,663.6	3,439.4	80.1	-154.3	-81.0	0.62	0.56	-0.81
1,715.0	17.97	296.98	1,693.1	3,409.9	84.6	-163.0	-85.5	3.13	-3.13	0.29
1,746.0	17.75	296.98	1,722.6	3,380.4	88.9	-171.5	-89.9	0.71	-0.71	0.00
1,778.0	18.15	296.10	1,753.0	3,350.0	93.3	-180.3	-94.3	1.51	1.25	-2.75
1,810.0	18.46	296.19	1,783.4	3,319.6	97.7	-189.3	-98.8	0.97	0.97	0.28
TIE ON TO SURFACE SURVEY										
1,845.0	19.03	295.66	1,816.5	3,286.5	102.6	-199.4	-103.8	1.70	1.63	-1.51
1,939.0	19.27	297.09	1,905.3	3,197.7	116.3	-227.1	-117.6	0.56	0.26	1.52
2,033.0	19.78	299.00	1,993.9	3,109.1	131.1	-254.8	-132.6	0.87	0.54	2.03
2,127.0	20.04	302.67	2,082.3	3,020.7	147.5	-282.3	-149.1	1.36	0.28	3.90
2,220.0	21.94	307.70	2,169.1	2,933.9	166.7	-309.4	-168.5	2.81	2.04	5.41
2,314.0	20.86	306.83	2,256.7	2,846.3	187.5	-336.7	-189.4	1.20	-1.15	-0.93
2,409.0	20.62	311.06	2,345.5	2,757.5	208.6	-362.9	-210.7	1.60	-0.25	4.45
2,504.0	19.14	309.79	2,434.8	2,668.2	229.6	-387.4	-231.8	1.62	-1.56	-1.34
2,598.0	17.23	308.21	2,524.1	2,578.9	248.1	-410.2	-250.4	2.10	-2.03	-1.68
2,691.0	16.08	306.13	2,613.2	2,489.8	264.2	-431.5	-266.7	1.39	-1.24	-2.24

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-5HZ
Project:	WELD COUNTY (NAD 83)	TD Reference:	KB 20' @ 5103.0usft (PD 461)
Site:	SE SW SEC 24 T2N R66W 6th P.M.	MD Reference:	KB 20' @ 5103.0usft (PD 461)
Well:	GRACIE 24-5HZ	North Reference:	True
Wellbore:	JOB # 2018-422-461	Survey Calculation Method:	Minimum Curvature
Design:	FINAL SURVEYS	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)	
2,784.0	15.21	310.68	2,702.8	2,400.2	279.7	-451.1	-282.3	1.62	-0.94	4.89	
2,877.0	13.26	308.47	2,792.9	2,310.1	294.3	-468.7	-297.0	2.18	-2.10	-2.38	
2,970.0	11.82	313.49	2,883.7	2,219.3	307.5	-484.0	-310.3	1.94	-1.55	5.40	
3,064.0	10.26	323.28	2,976.0	2,127.0	320.8	-496.0	-323.7	2.59	-1.66	10.41	
3,158.0	8.69	337.69	3,068.7	2,034.3	334.1	-503.7	-337.0	3.01	-1.67	15.33	
3,252.0	7.58	359.04	3,161.8	1,941.2	346.9	-506.5	-349.8	3.40	-1.18	22.71	
3,347.0	4.04	34.32	3,256.3	1,846.7	355.9	-504.7	-358.8	5.13	-3.73	37.14	
3,442.0	1.08	35.21	3,351.2	1,751.8	359.4	-502.3	-362.3	3.12	-3.12	0.94	
3,536.0	0.62	359.62	3,445.2	1,657.8	360.7	-501.8	-363.5	0.72	-0.49	-37.86	
3,629.0	0.31	327.99	3,538.2	1,564.8	361.4	-501.9	-364.3	0.42	-0.33	-34.01	
3,722.0	0.60	318.57	3,631.2	1,471.8	361.9	-502.4	-364.8	0.32	0.31	-10.13	
3,815.0	0.91	311.55	3,724.2	1,378.8	362.8	-503.2	-365.7	0.35	0.33	-7.55	
3,909.0	1.55	291.49	3,818.2	1,284.8	363.8	-505.0	-366.7	0.81	0.68	-21.34	
4,003.0	1.22	279.74	3,912.1	1,190.9	364.4	-507.2	-367.3	0.46	-0.35	-12.50	
4,097.0	1.04	288.43	4,006.1	1,096.9	364.8	-508.9	-367.8	0.26	-0.19	9.24	
4,191.0	1.20	308.08	4,100.1	1,002.9	365.7	-510.5	-368.6	0.44	0.17	20.90	
4,285.0	0.72	329.79	4,194.1	908.9	366.8	-511.6	-369.8	0.63	-0.51	23.10	
4,379.0	0.80	322.75	4,288.1	814.9	367.9	-512.3	-370.8	0.13	0.09	-7.49	
4,473.0	0.86	328.90	4,382.1	720.9	369.0	-513.1	-371.9	0.11	0.06	6.54	
4,565.0	0.81	322.28	4,474.1	628.9	370.1	-513.8	-373.1	0.12	-0.05	-7.20	
4,658.0	1.10	317.13	4,567.0	536.0	371.3	-514.8	-374.2	0.32	0.31	-5.54	
4,752.0	0.87	145.82	4,661.0	442.0	371.3	-515.0	-374.3	2.09	-0.24	-182.24	
4,845.0	0.88	139.84	4,754.0	349.0	370.2	-514.2	-373.2	0.10	0.01	-6.43	
4,939.0	1.87	129.88	4,848.0	255.0	368.7	-512.5	-371.6	1.08	1.05	-10.60	
5,033.0	1.60	145.97	4,942.0	161.0	366.6	-510.6	-369.5	0.59	-0.29	17.12	
5,127.0	1.41	170.70	5,035.9	67.1	364.4	-509.7	-367.3	0.71	-0.20	26.31	
5,246.0	1.65	216.10	5,154.9	-51.9	361.5	-510.5	-364.5	1.01	0.20	38.15	
5,341.0	1.42	241.52	5,249.8	-146.8	359.9	-512.3	-362.8	0.75	-0.24	26.76	
5,433.0	1.24	249.54	5,341.8	-238.8	359.0	-514.3	-361.9	0.28	-0.20	8.72	
5,528.0	1.49	247.51	5,436.8	-333.8	358.2	-516.4	-361.1	0.27	0.26	-2.14	
5,623.0	1.94	243.00	5,531.8	-428.8	357.0	-518.9	-359.9	0.49	0.47	-4.75	
5,717.0	2.18	244.45	5,625.7	-522.7	355.5	-522.0	-358.5	0.26	0.26	1.54	
5,812.0	2.88	249.78	5,720.6	-617.6	353.9	-525.8	-356.9	0.78	0.74	5.61	
5,906.0	2.70	245.48	5,814.5	-711.5	352.1	-530.1	-355.2	0.29	-0.19	-4.57	
6,001.0	1.85	253.22	5,909.4	-806.4	350.8	-533.6	-353.8	0.95	-0.89	8.15	
6,096.0	0.36	49.46	6,004.4	-901.4	350.5	-534.8	-353.6	2.30	-1.57	164.46	
6,190.0	0.20	342.16	6,098.4	-995.4	350.9	-534.6	-353.9	0.36	-0.17	-71.60	
6,284.0	0.41	316.88	6,192.4	-1,089.4	351.3	-534.9	-354.3	0.26	0.22	-26.89	
6,378.0	0.24	19.39	6,286.4	-1,183.4	351.7	-535.1	-354.8	0.39	-0.18	66.50	
6,472.0	0.50	76.89	6,380.4	-1,277.4	352.0	-534.6	-355.0	0.45	0.28	61.17	
6,566.0	0.62	88.67	6,474.4	-1,371.4	352.1	-533.7	-355.1	0.18	0.13	12.53	
KOP											
6,650.0	2.60	103.27	6,558.4	-1,455.4	351.6	-531.4	-354.7	2.39	2.36	17.39	
6,660.0	2.84	103.65	6,568.3	-1,465.3	351.5	-530.9	-354.6	2.39	2.38	3.76	
6,754.0	11.40	125.99	6,661.5	-1,558.5	345.5	-521.1	-348.5	9.40	9.11	23.77	
6,849.0	24.16	128.45	6,751.8	-1,648.8	327.8	-498.2	-330.7	13.45	13.43	2.59	
6,942.0	32.50	136.82	6,833.6	-1,730.6	297.7	-466.1	-300.4	9.91	8.97	9.00	
7,037.0	32.99	162.64	6,913.9	-1,810.9	254.2	-440.8	-256.7	14.62	0.52	27.18	
7,131.0	34.34	188.59	6,992.6	-1,889.6	203.3	-437.1	-205.8	15.28	1.44	27.61	
7,225.0	42.21	191.52	7,066.3	-1,963.3	146.0	-447.4	-148.6	8.59	8.37	3.12	
- ENTER RADIUS HEEL (7315' MD)											
7,315.0	48.42	190.84	7,129.6	-2,026.6	83.3	-459.8	-85.9	6.93	6.91	-0.75	
7,320.0	48.77	190.81	7,132.9	-2,029.9	79.6	-460.5	-82.3	6.93	6.91	-0.67	

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-5HZ
Project:	WELD COUNTY (NAD 83)	TDV Reference:	KB 20' @ 5103.0usft (PD 461)
Site:	SE SW SEC 24 T2N R66W 6th P.M.	MD Reference:	KB 20' @ 5103.0usft (PD 461)
Well:	GRACIE 24-5HZ	North Reference:	True
Wellbore:	JOB # 2018-422-461	Survey Calculation Method:	Minimum Curvature
Design:	FINAL SURVEYS	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)
7,414.0	59.34	189.68	7,188.0	-2,085.0	4.8	-474.0	-7.6	11.29	11.24	-1.20
7,509.0	67.92	187.11	7,230.1	-2,127.1	-79.3	-486.3	76.5	9.35	9.03	-2.71
7,603.0	69.37	183.82	7,264.4	-2,161.4	-166.4	-494.7	163.6	3.61	1.54	-3.50
7,696.0	79.63	182.23	7,289.2	-2,186.2	-255.8	-499.3	252.9	11.15	11.03	-1.71
HEEL:40.116626;-104.730847										
7,750.0	85.70	181.34	7,296.1	-2,193.1	-309.3	-501.0	306.4	11.35	11.23	-1.65
7,790.0	90.19	180.69	7,297.5	-2,194.5	-349.3	-501.7	346.4	11.35	11.24	-1.62
7,884.0	89.50	180.12	7,297.8	-2,194.8	-443.3	-502.4	440.4	0.95	-0.73	-0.61
7,977.0	90.65	180.22	7,297.7	-2,194.7	-536.3	-502.7	533.4	1.24	1.24	0.11
8,070.0	88.78	180.32	7,298.1	-2,195.1	-629.3	-503.1	626.3	2.01	-2.01	0.11
8,164.0	89.16	180.08	7,299.8	-2,196.8	-723.2	-503.4	720.3	0.48	0.40	-0.26
~ EXIT RADIUS HEEL (8215' MD)										
8,215.0	89.14	179.82	7,300.6	-2,197.6	-774.2	-503.4	771.3	0.51	-0.04	-0.51
8,258.0	89.12	179.60	7,301.2	-2,198.2	-817.2	-503.2	814.3	0.51	-0.04	-0.51
8,351.0	90.52	179.86	7,301.5	-2,198.5	-910.2	-502.7	907.3	1.53	1.51	0.28
8,445.0	89.16	177.48	7,301.8	-2,198.8	-1,004.2	-500.5	1,001.3	2.92	-1.45	-2.53
8,539.0	89.50	176.66	7,302.9	-2,199.9	-1,098.1	-495.7	1,095.2	0.94	0.36	-0.87
8,632.0	89.88	179.06	7,303.4	-2,200.4	-1,191.0	-492.3	1,188.1	2.61	0.41	2.58
8,725.0	88.18	177.69	7,305.0	-2,202.0	-1,283.9	-489.6	1,281.1	2.35	-1.83	-1.47
8,819.0	88.70	177.26	7,307.5	-2,204.5	-1,377.8	-485.5	1,375.0	0.72	0.55	-0.46
8,913.0	90.56	179.62	7,308.1	-2,205.1	-1,471.8	-482.9	1,469.0	3.20	1.98	2.51
9,006.0	90.19	180.65	7,307.5	-2,204.5	-1,564.8	-483.1	1,561.9	1.18	-0.40	1.11
9,101.0	89.01	181.77	7,308.2	-2,205.2	-1,659.7	-485.2	1,656.9	1.71	-1.24	1.18
9,195.0	90.86	181.99	7,308.3	-2,205.3	-1,753.7	-488.2	1,750.8	1.98	1.97	0.23
9,288.0	88.83	180.54	7,308.5	-2,205.5	-1,846.6	-490.3	1,843.8	2.68	-2.18	-1.56
9,381.0	90.39	181.35	7,309.2	-2,206.2	-1,939.6	-491.8	1,936.8	1.89	1.68	0.87
9,475.0	87.88	178.01	7,310.6	-2,207.6	-2,033.6	-491.3	2,030.7	4.44	-2.67	-3.55
9,569.0	88.02	177.98	7,314.0	-2,211.0	-2,127.5	-488.0	2,124.6	0.15	0.15	-0.03
9,662.0	88.07	178.39	7,317.1	-2,214.1	-2,220.4	-485.1	2,217.5	0.44	0.05	0.44
9,757.0	87.89	179.27	7,320.5	-2,217.5	-2,315.3	-483.1	2,312.5	0.94	-0.19	0.93
9,852.0	88.14	179.44	7,323.8	-2,220.8	-2,410.2	-482.1	2,407.4	0.32	0.26	0.18
9,944.0	88.74	180.03	7,326.3	-2,223.3	-2,502.2	-481.6	2,499.4	0.91	0.65	0.64
10,038.0	90.06	180.63	7,327.3	-2,224.3	-2,596.2	-482.2	2,593.4	1.54	1.40	0.64
10,133.0	90.03	179.47	7,327.2	-2,224.2	-2,691.2	-482.3	2,688.4	1.22	-0.03	-1.22
10,228.0	89.93	179.09	7,327.2	-2,224.2	-2,786.2	-481.1	2,783.4	0.41	-0.11	-0.40
10,321.0	90.45	179.25	7,326.9	-2,223.9	-2,879.2	-479.7	2,876.4	0.59	0.56	0.17
10,415.0	90.95	179.32	7,325.8	-2,222.8	-2,973.1	-478.5	2,970.3	0.54	0.53	0.07
10,509.0	90.94	179.94	7,324.2	-2,221.2	-3,067.1	-477.9	3,064.3	0.66	-0.01	0.66
10,604.0	90.57	181.27	7,323.0	-2,220.0	-3,162.1	-478.9	3,159.3	1.45	-0.39	1.40
10,698.0	91.07	181.02	7,321.6	-2,218.6	-3,256.1	-480.8	3,253.3	0.59	0.53	-0.27
10,793.0	90.91	179.67	7,320.0	-2,217.0	-3,351.1	-481.4	3,348.2	1.43	-0.17	-1.42
10,888.0	88.77	179.39	7,320.2	-2,217.2	-3,446.1	-480.6	3,443.2	2.27	-2.25	-0.29
10,981.0	89.20	179.62	7,321.9	-2,218.9	-3,539.0	-479.8	3,536.2	0.52	0.46	0.25
11,074.0	89.98	179.32	7,322.5	-2,219.5	-3,632.0	-478.9	3,629.2	0.90	0.84	-0.32
11,167.0	90.69	178.82	7,322.0	-2,219.0	-3,725.0	-477.4	3,722.2	0.93	0.76	-0.54
11,261.0	90.59	180.08	7,321.0	-2,218.0	-3,819.0	-476.5	3,816.2	1.34	-0.11	1.34
~ ENTER RADIUS TOE (11335' MD)										
11,335.0	88.64	181.16	7,321.4	-2,218.4	-3,893.0	-477.3	3,890.2	3.01	-2.63	1.46
11,354.0	88.14	181.44	7,322.0	-2,219.0	-3,912.0	-477.8	3,909.2	3.01	-2.63	1.46
11,446.0	88.26	181.30	7,324.9	-2,221.9	-4,003.9	-480.0	4,001.1	0.20	0.13	-0.15
11,539.0	88.93	181.49	7,327.2	-2,224.2	-4,096.9	-482.2	4,094.0	0.75	0.72	0.20
11,634.0	88.80	181.25	7,329.0	-2,226.0	-4,191.8	-484.5	4,189.0	0.29	-0.14	-0.25
11,728.0	89.74	180.53	7,330.2	-2,227.2	-4,285.8	-486.0	4,282.9	1.26	1.00	-0.77

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-5HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	KB 20' @ 5103.0usft (PD 461)
Site:	SE SW SEC 24 T2N R66W 6th P.M.	MD Reference:	KB 20' @ 5103.0usft (PD 461)
Well:	GRACIE 24-5HZ	North Reference:	True
Wellbore:	JOB # 2018-422-461	Survey Calculation Method:	Minimum Curvature
Design:	FINAL SURVEYS	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)
11,821.0	90.64	180.86	7,329.9	-2,226.9	-4,378.8	-487.1	4,375.9	1.03	0.97	0.35
11,914.0	89.11	179.35	7,330.1	-2,227.1	-4,471.8	-487.3	4,468.9	2.31	-1.65	-1.62
12,007.0	89.87	180.37	7,331.0	-2,228.0	-4,564.8	-487.0	4,561.9	1.37	0.82	1.10
12,101.0	89.89	179.72	7,331.2	-2,228.2	-4,658.8	-487.1	4,655.9	0.69	0.02	-0.69
- EXIT RADIUS TOE (12175' MD)										
12,175.0	90.09	180.13	7,331.2	-2,228.2	-4,732.8	-487.0	4,729.9	0.62	0.27	0.56
12,194.0	90.14	180.24	7,331.1	-2,228.1	-4,751.8	-487.1	4,748.9	0.62	0.27	0.56
12,288.0	90.84	179.85	7,330.3	-2,227.3	-4,845.8	-487.2	4,842.9	0.85	0.74	-0.41
12,383.0	91.83	180.11	7,328.1	-2,225.1	-4,940.7	-487.1	4,937.9	1.08	1.04	0.27
12,476.0	92.30	179.93	7,324.8	-2,221.8	-5,033.7	-487.1	5,030.8	0.54	0.51	-0.19
LAST SURVEY AUG 10, 2018										
12,533.0	93.19	180.16	7,322.0	-2,219.0	-5,090.6	-487.2	5,087.7	1.61	1.56	0.40
PROJECTION TO TD:40.103353;-104.730797										
12,587.0	93.19	180.16	7,319.0	-2,216.0	-5,144.5	-487.3	5,141.6	0.00	0.00	0.00

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-5HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	KB 20' @ 5103.0usft (PD 461)
Site:	SE SW SEC 24 T2N R66W 6th P.M.	MD Reference:	KB 20' @ 5103.0usft (PD 461)
Well:	GRACIE 24-5HZ	North Reference:	True
Wellbore:	JOB # 2018-422-461	Survey Calculation Method:	Minimum Curvature
Design:	FINAL SURVEYS	Database:	EOG RESOURCES

Targets										
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)			
- Shape										
HEEL - GRACIE 24-5HZ - survey misses target center by 14.0usft at 7832.4usft MD (7297.5 TVD, -391.6 N, -502.1 E) - Point	0.00	0.00	7,311.0	-391.6	-498.4	14,569,233.62	1,715,667.90	40° 6' 59.039 N	104° 43' 51.013 W	
KOP - GRACIE 24-5HZ - survey misses target center by 39.1usft at 6691.2usft MD (6599.4 TVD, 350.6 N, -528.9 E) - Point	0.00	0.00	6,594.8	322.1	-502.5	14,569,947.01	1,715,661.62	40° 7' 6.092 N	104° 43' 51.067 W	
BHL - GRACIE 24-5HZ - survey misses target center by 19.0usft at 12587.0usft MD (7319.0 TVD, -5144.5 N, -487.3 E) - Point	0.00	0.00	7,328.0	-5,146.0	-470.7	14,564,481.22	1,715,710.08	40° 6' 12.055 N	104° 43' 50.656 W	
HEEL - GRACIE 24-5HZ - survey misses target center by 14.0usft at 7832.4usft MD (7297.5 TVD, -391.6 N, -502.1 E) - Point	0.00	0.00	7,311.0	-391.6	-498.4	14,569,233.62	1,715,667.90	40° 6' 59.039 N	104° 43' 51.013 W	
KOP - GRACIE 24-5HZ - survey misses target center by 100.8usft at 6790.1usft MD (6696.6 TVD, 340.4 N, -514.2 E) - Point	0.00	0.00	6,674.4	242.8	-502.1	14,569,867.74	1,715,662.32	40° 7' 5.308 N	104° 43' 51.061 W	
BHL - GRACIE 24-5HZ (- survey misses target center by 19.0usft at 12587.0usft MD (7319.0 TVD, -5144.5 N, -487.3 E) - Point	0.00	0.00	7,328.0	-5,146.0	-470.7	14,564,481.22	1,715,710.08	40° 6' 12.055 N	104° 43' 50.656 W	

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
1,845.0	1,816.5	102.6	-199.4	TIE ON TO SURFACE SURVEY	
6,650.0	6,558.4	351.6	-531.4	KOP	
7,315.0	7,129.6	83.3	-459.8	~ ENTER RADIUS HEEL (7315' MD)	
7,750.0	7,296.1	-309.3	-501.0	HEEL:40.116626;-104.730847	
8,215.0	7,300.6	-774.2	-503.4	~ EXIT RADIUS HEEL (8215' MD)	
11,335.0	7,321.4	-3,893.0	-477.3	~ ENTER RADIUS TOE (11335' MD)	
12,175.0	7,331.2	-4,732.8	-487.0	~ EXIT RADIUS TOE (12175' MD)	
12,533.0	7,322.0	-5,090.6	-487.2	LAST SURVEY AUG 10, 2018	
12,587.0	7,319.0	-5,144.5	-487.3	PROJECTION TO TD:40.103353;-104.730797	

Checked By: _____ Approved By: _____ Date: _____