

ANADARKO PETROLEUM CORP

WELD COUNTY (NAD 83)

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

GRACIE 24-2HZ

JOB # 2018-419-461

01 August, 2018

Survey: FINAL SURVEYS





Project: WELD COUNTY (NAD 83)
 Site: SE SW SEC 24 T2N R66W 6th P.M.
 Well: GRACIE 24-2HZ
 Wellbore: JOB # 2018-419-461
 Design: FINAL SURVEYS

ANNOTATIONS

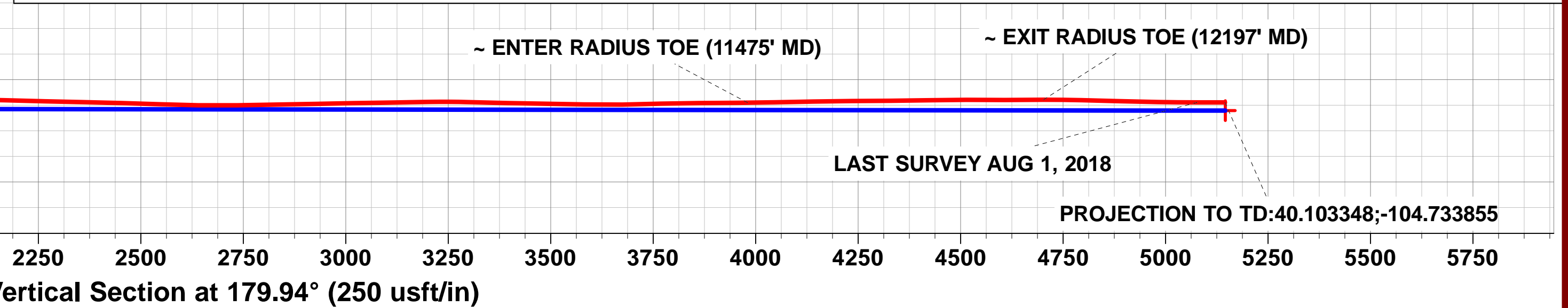
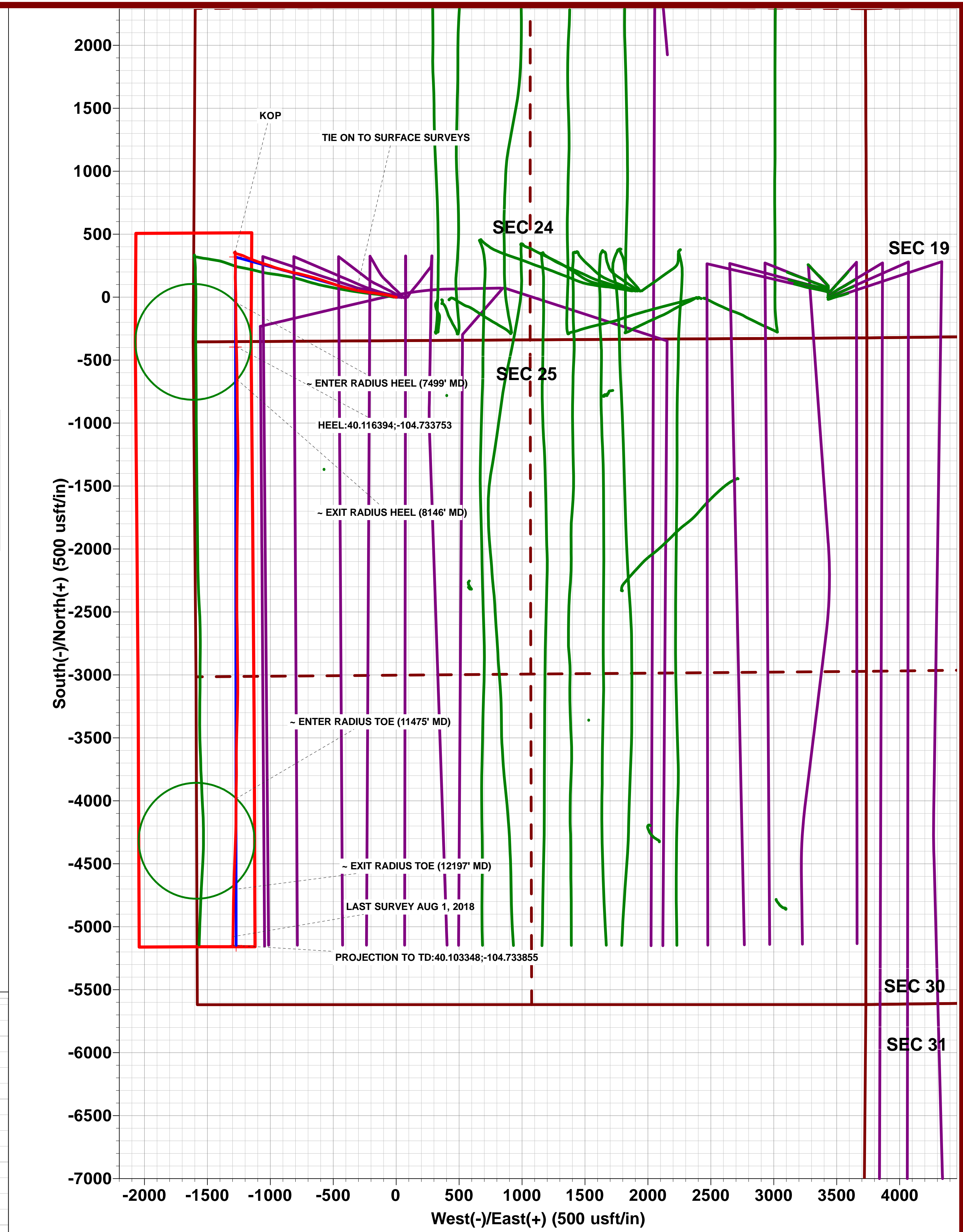
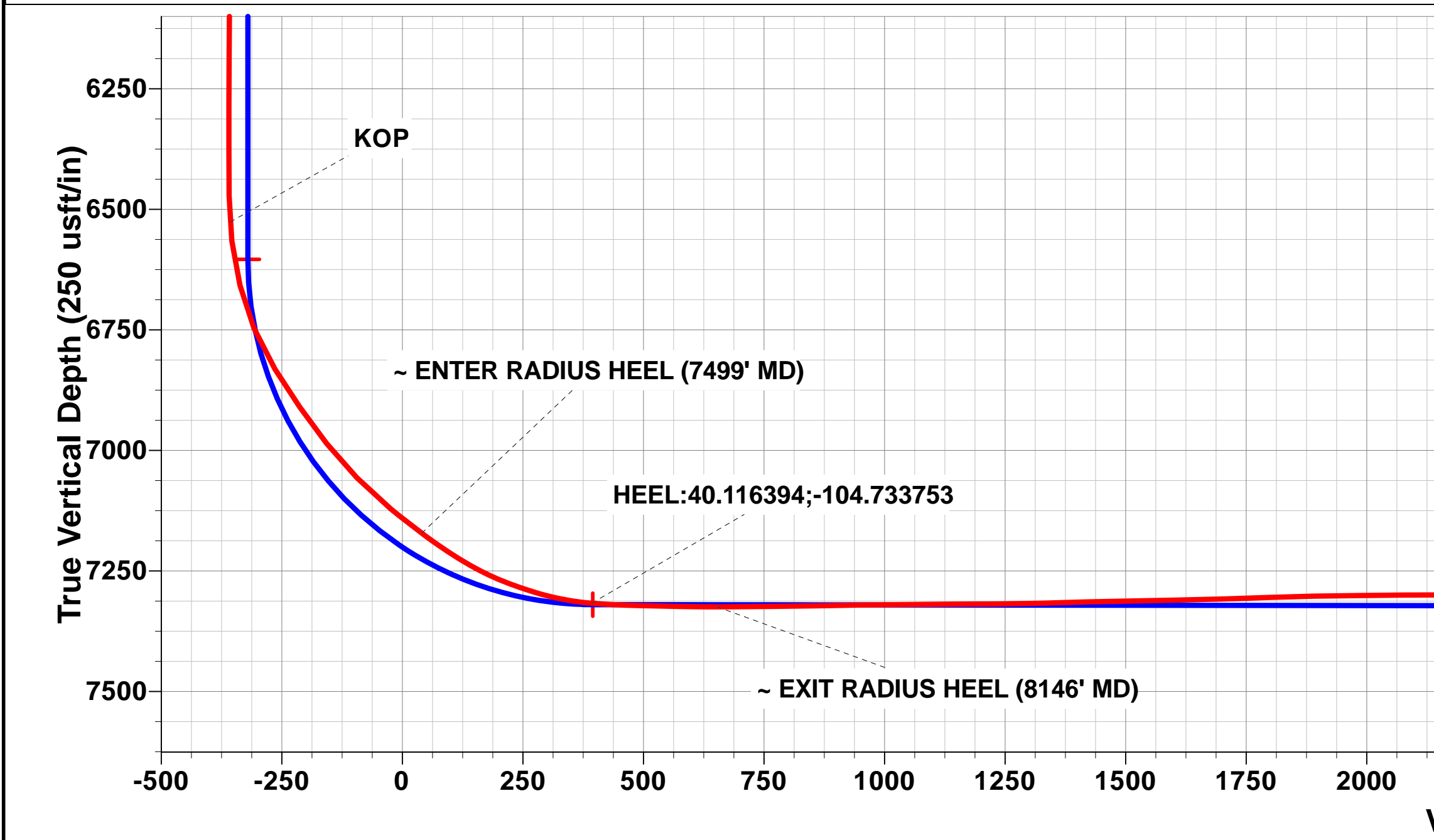
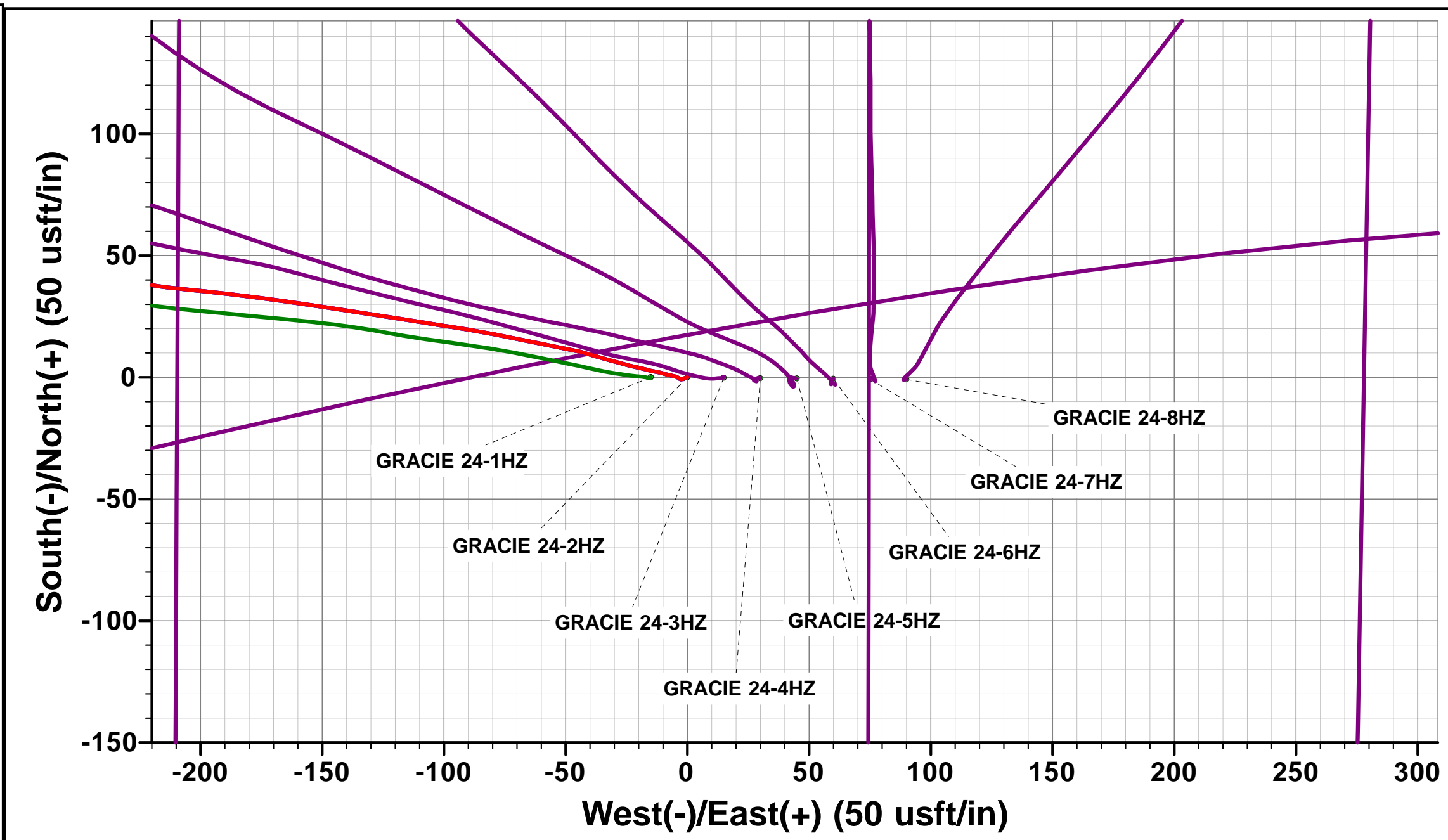
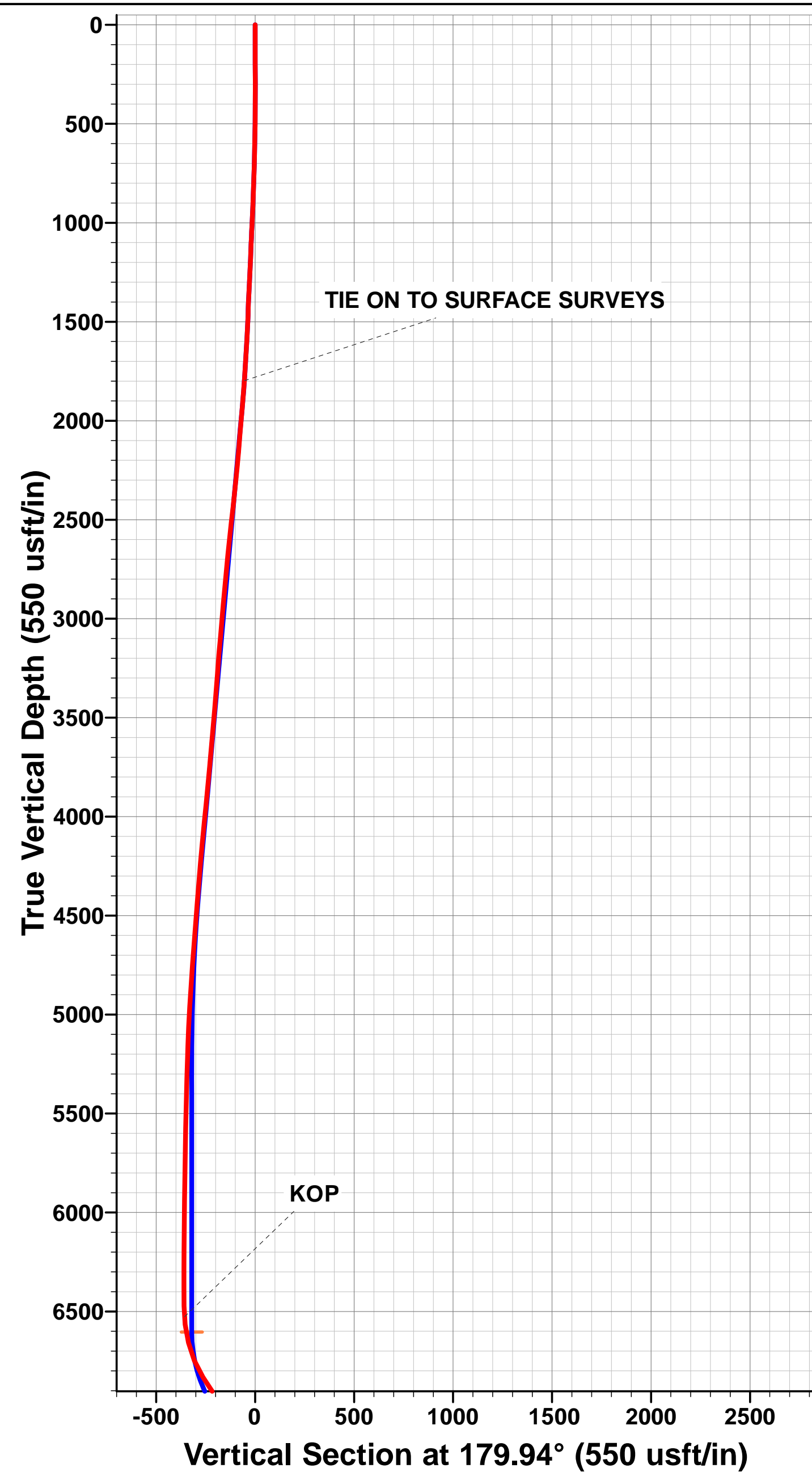
TVD	MD	Inc	Azi	+N-S	+E-W	VSec	Departure	Annotation
1797.6	1841.0	19.34	281.68	54.2	-314.4	-54.5	319.9	TIE ON TO SURFACE SURVEYS
6526.5	6717.0	4.07	184.60	355.9	-1280.2	-357.2	1353.5	KOP
7171.8	7499.0	53.31	180.41	-41.4	-1274.0	40.0	1750.0	~ ENTER RADIUS HEEL (7499' MD)
7317.2	7886.0	85.45	178.87	-394.2	-1268.9	392.9	2102.7	HEEL:40.116394;-104.733753
7324.7	8146.0	90.02	179.22	-654.0	-1264.1	652.7	2362.6	~ EXIT RADIUS HEEL (8146' MD)
7306.7	11475.0	90.55	180.42	-3982.0	-1271.9	3980.7	5690.9	~ ENTER RADIUS TOE (11475' MD)
7299.5	12197.0	90.23	181.71	-4703.6	-1290.9	4702.3	6412.9	~ EXIT RADIUS TOE (12197' MD)
7305.8	12572.0	89.95	180.72	-5078.5	-1296.7	5077.2	6787.8	LAST SURVEY AUG 1, 2018
7305.9	12640.0	89.95	180.72	-5146.5	-1297.6	5145.2	6855.8	PROJECTION TO TD:40.103348;-104.733855

AS DRILLED LOCAL COORDINATES:

SHL: 346ft FSL & 1610ft FWL Sec 24
 HEEL: 41ft FNL & 343.6ft FWL Sec 25
 BHL: 472.6ft FSL & 283ft FWL Sec 25

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N-S	+E-W	Latitude	Longitude
BHL - GRACIE 24-2HZ (P2)	7326.0	-5147.1	-1271.8	40° 6' 12.048 N	104° 44' 1.544 W
HEEL - GRACIE 24-2HZ (P2)	7320.0	-396.2	-1276.5	40° 6' 58.997 N	104° 44' 1.608 W
KOP - GRACIE 24-2HZ (P2)	6603.8	319.1	-1277.3	40° 7' 6.066 N	104° 44' 1.618 W



Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-2HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	KB 20' @ 5103.0usft (PD461)
Site:	SE SW SEC 24 T2N R66W 6th P.M.	MD Reference:	KB 20' @ 5103.0usft (PD461)
Well:	GRACIE 24-2HZ	North Reference:	True
Wellbore:	JOB # 2018-419-461	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	Latitude:	40° 7' 2.914 N
From:	Lat/Long	Easting:	1,716,104.98 usft	Longitude:	104° 43' 45.370 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	0.17 °

Well	GRACIE 24-2HZ					
Well Position	+N/-S	0.0 usft	Northing:	14,569,626.88 usft	Latitude:	40° 7' 2.913 N
	+E/-W	0.0 usft	Easting:	1,716,119.96 usft	Longitude:	104° 43' 45.177 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	5,083.0 usft

Wellbore	JOB # 2018-419-461				
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	179.94

Survey Program	Date	01/08/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
131.0	12,640.0	FINAL SURVEYS (JOB # 2018-419-461)	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	0.26	278.08	131.0	4,972.0	0.0	-0.3	0.0	0.20	0.20	0.00
163.0	0.35	237.48	163.0	4,940.0	0.0	-0.4	0.0	0.71	0.28	-126.87
195.0	0.57	234.49	195.0	4,908.0	-0.1	-0.7	0.1	0.69	0.69	-9.34
227.0	0.48	260.24	227.0	4,876.0	-0.3	-0.9	0.3	0.78	-0.28	80.47
258.0	0.88	252.42	258.0	4,845.0	-0.4	-1.3	0.4	1.32	1.29	-25.23
290.0	0.88	236.86	290.0	4,813.0	-0.6	-1.7	0.6	0.74	0.00	-48.62
321.0	1.01	249.60	321.0	4,782.0	-0.8	-2.2	0.8	0.79	0.42	41.10
353.0	0.83	289.33	353.0	4,750.0	-0.8	-2.7	0.8	2.02	-0.56	124.16
385.0	1.01	296.19	385.0	4,718.0	-0.6	-3.1	0.6	0.66	0.56	21.44
417.0	1.14	309.02	417.0	4,686.0	-0.3	-3.6	0.3	0.85	0.41	40.09
448.0	1.71	296.54	448.0	4,655.0	0.1	-4.3	-0.1	2.08	1.84	-40.26
480.0	1.98	282.21	479.9	4,623.1	0.4	-5.2	-0.5	1.66	0.84	-44.78

Survey Report



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Project:	WELD COUNTY (NAD 83)	TD Reference:	KB 20' @ 5103.0usft (PD461)
Site:	SE SW SEC 24 T2N R66W 6th P.M.	MD Reference:	KB 20' @ 5103.0usft (PD461)
Well:	GRACIE 24-2HZ	North Reference:	True
Wellbore:	JOB # 2018-419-461	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	2.72	283.27	510.9	4,592.1	0.7	-6.5	-0.7	2.39	2.39	3.42
543.0	2.86	283.00	542.9	4,560.1	1.1	-8.0	-1.1	0.44	0.44	-0.84
575.0	3.47	287.75	574.8	4,528.2	1.6	-9.7	-1.6	2.07	1.91	14.84
606.0	3.96	281.60	605.8	4,497.2	2.1	-11.6	-2.1	2.04	1.58	-19.84
638.0	4.53	280.54	637.7	4,465.3	2.5	-14.0	-2.5	1.80	1.78	-3.31
670.0	5.58	285.20	669.6	4,433.4	3.2	-16.7	-3.2	3.52	3.28	14.56
702.0	6.59	282.65	701.4	4,401.6	4.0	-20.0	-4.0	3.27	3.16	-7.97
734.0	7.08	284.23	733.1	4,369.9	4.8	-23.7	-4.9	1.64	1.53	4.94
765.0	7.95	285.29	763.9	4,339.1	5.9	-27.6	-5.9	2.84	2.81	3.42
797.0	8.31	285.02	795.6	4,307.4	7.1	-32.0	-7.1	1.13	1.12	-0.84
829.0	8.88	286.52	827.2	4,275.8	8.4	-36.6	-8.4	1.91	1.78	4.69
860.0	9.58	286.61	857.8	4,245.2	9.8	-41.4	-9.8	2.26	2.26	0.29
892.0	10.28	281.77	889.3	4,213.7	11.1	-46.7	-11.2	3.40	2.19	-15.12
924.0	11.21	281.60	920.8	4,182.2	12.3	-52.6	-12.4	2.91	2.91	-0.53
955.0	11.56	280.72	951.1	4,151.9	13.5	-58.6	-13.6	1.26	1.13	-2.84
987.0	12.26	281.42	982.5	4,120.5	14.8	-65.0	-14.9	2.23	2.19	2.19
1,018.0	12.35	281.77	1,012.7	4,090.3	16.1	-71.5	-16.2	0.38	0.29	1.13
1,050.0	12.96	281.16	1,044.0	4,059.0	17.5	-78.4	-17.6	1.95	1.91	-1.91
1,082.0	13.84	279.75	1,075.1	4,027.9	18.9	-85.7	-18.9	2.93	2.75	-4.41
1,114.0	14.19	278.87	1,106.1	3,996.9	20.1	-93.3	-20.2	1.28	1.09	-2.75
1,145.0	14.59	278.96	1,136.2	3,966.8	21.3	-100.9	-21.4	1.29	1.29	0.29
1,177.0	15.12	279.31	1,167.1	3,935.9	22.6	-109.0	-22.7	1.68	1.66	1.09
1,209.0	15.95	278.96	1,197.9	3,905.1	24.0	-117.5	-24.1	2.61	2.59	-1.09
1,240.0	16.04	278.52	1,227.7	3,875.3	25.3	-125.9	-25.4	0.49	0.29	-1.42
1,272.0	16.92	279.40	1,258.4	3,844.6	26.7	-134.9	-26.8	2.86	2.75	2.75
1,304.0	18.24	278.17	1,288.9	3,814.1	28.1	-144.5	-28.3	4.29	4.12	-3.84
1,335.0	18.81	278.87	1,318.3	3,784.7	29.6	-154.2	-29.8	1.97	1.84	2.26
1,367.0	19.16	278.08	1,348.6	3,754.4	31.1	-164.5	-31.3	1.36	1.09	-2.47
1,398.0	19.20	277.11	1,377.9	3,725.1	32.5	-174.6	-32.7	1.04	0.13	-3.13
1,430.0	18.19	277.38	1,408.2	3,694.8	33.8	-184.8	-34.0	3.17	-3.16	0.84
1,461.0	17.58	276.15	1,437.7	3,665.3	34.9	-194.2	-35.1	2.31	-1.97	-3.97
1,493.0	17.45	275.18	1,468.2	3,634.8	35.9	-203.8	-36.1	1.00	-0.41	-3.03
1,525.0	17.75	277.38	1,498.7	3,604.3	36.9	-213.4	-37.1	2.28	0.94	6.87
1,556.0	18.19	280.37	1,528.2	3,574.8	38.4	-222.9	-38.6	3.30	1.42	9.65
1,588.0	18.59	279.57	1,558.5	3,544.5	40.1	-232.8	-40.4	1.48	1.25	-2.50
1,620.0	18.90	279.22	1,588.8	3,514.2	41.8	-243.0	-42.1	1.03	0.97	-1.09
1,652.0	19.16	279.57	1,619.1	3,483.9	43.5	-253.2	-43.8	0.89	0.81	1.09
1,684.0	19.60	278.08	1,649.3	3,453.7	45.1	-263.7	-45.4	2.07	1.37	-4.66
1,715.0	19.73	279.40	1,678.5	3,424.5	46.7	-274.0	-47.0	1.49	0.42	4.26
1,746.0	19.07	279.84	1,707.7	3,395.3	48.5	-284.2	-48.8	2.18	-2.13	1.42
1,778.0	18.51	281.42	1,738.0	3,365.0	50.4	-294.3	-50.7	2.36	-1.75	4.94
1,810.0	18.94	280.19	1,768.3	3,334.7	52.3	-304.4	-52.6	1.82	1.34	-3.84
TIE ON TO SURFACE SURVEYS										
1,841.0	19.34	281.68	1,797.6	3,305.4	54.2	-314.4	-54.5	2.04	1.29	4.81
1,939.0	19.42	284.25	1,890.1	3,212.9	61.5	-346.1	-61.9	0.87	0.08	2.62
2,033.0	19.27	284.34	1,978.7	3,124.3	69.2	-376.3	-69.6	0.16	-0.16	0.10
2,128.0	18.48	283.47	2,068.6	3,034.4	76.6	-406.1	-77.0	0.88	-0.83	-0.92
2,221.0	17.56	283.76	2,157.1	2,945.9	83.4	-434.0	-83.8	0.99	-0.99	0.31
2,315.0	18.39	289.21	2,246.5	2,856.5	91.6	-461.8	-92.1	1.99	0.88	5.80
2,409.0	17.07	288.57	2,336.0	2,767.0	100.9	-488.9	-101.4	1.42	-1.40	-0.68
2,504.0	17.40	290.88	2,426.8	2,676.2	110.4	-515.4	-110.9	0.80	0.35	2.43
2,598.0	18.55	288.75	2,516.2	2,586.8	120.2	-542.7	-120.8	1.41	1.22	-2.27
2,692.0	19.51	288.44	2,605.0	2,498.0	130.0	-571.7	-130.6	1.03	1.02	-0.33

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-2HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	KB 20' @ 5103.0usft (PD461)
Site:	SE SW SEC 24 T2N R66W 6th P.M.	MD Reference:	KB 20' @ 5103.0usft (PD461)
Well:	GRACIE 24-2HZ	North Reference:	True
Wellbore:	JOB # 2018-419-461	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	17.72	286.86	2,692.2	2,410.8	138.9	-599.7	-139.5	2.02	-1.95	-1.72
2,877.0	18.68	285.94	2,780.6	2,322.4	147.1	-627.6	-147.7	1.08	1.03	-0.99
2,971.0	19.18	285.55	2,869.5	2,233.5	155.4	-656.9	-156.0	0.55	0.53	-0.41
3,064.0	17.37	285.04	2,957.8	2,145.2	163.1	-685.1	-163.8	1.95	-1.95	-0.55
3,158.0	18.91	284.75	3,047.1	2,055.9	170.6	-713.3	-171.3	1.64	1.64	-0.31
3,252.0	20.24	284.44	3,135.7	1,967.3	178.5	-743.8	-179.3	1.42	1.41	-0.33
3,347.0	18.40	283.09	3,225.3	1,877.7	186.0	-774.3	-186.8	1.99	-1.94	-1.42
3,442.0	18.16	280.85	3,315.5	1,787.5	192.2	-803.5	-193.0	0.78	-0.25	-2.36
3,537.0	18.97	284.75	3,405.6	1,697.4	198.9	-833.0	-199.8	1.56	0.85	4.11
3,630.0	18.85	284.85	3,493.6	1,609.4	206.6	-862.1	-207.5	0.13	-0.13	0.11
3,723.0	19.38	285.77	3,581.4	1,521.6	214.6	-891.5	-215.6	0.66	0.57	0.99
3,815.0	16.33	284.63	3,669.0	1,434.0	222.1	-918.7	-223.0	3.34	-3.32	-1.24
3,909.0	16.62	287.46	3,759.1	1,343.9	229.4	-944.3	-230.4	0.91	0.31	3.01
4,003.0	17.05	288.23	3,849.1	1,253.9	237.8	-970.2	-238.8	0.52	0.46	0.82
4,097.0	17.62	290.21	3,938.8	1,164.2	247.0	-996.6	-248.0	0.87	0.61	2.11
4,191.0	17.20	286.30	4,028.5	1,074.5	255.8	-1,023.3	-256.9	1.32	-0.45	-4.16
4,311.0	16.66	289.69	4,143.3	959.7	266.6	-1,056.6	-267.7	0.94	-0.45	2.82
4,405.0	14.88	288.92	4,233.8	869.2	275.1	-1,080.7	-276.2	1.91	-1.89	-0.82
4,499.0	14.07	289.24	4,324.8	778.2	282.7	-1,102.9	-283.9	0.87	-0.86	0.34
4,592.0	12.93	289.98	4,415.2	687.8	290.0	-1,123.3	-291.2	1.24	-1.23	0.80
4,684.0	11.33	291.13	4,505.2	597.8	296.8	-1,141.4	-298.0	1.76	-1.74	1.25
4,778.0	11.93	292.07	4,597.3	505.7	303.8	-1,159.0	-305.0	0.67	0.64	1.00
4,870.0	10.98	292.59	4,687.4	415.6	310.7	-1,175.9	-311.9	1.04	-1.03	0.57
4,965.0	9.69	295.77	4,780.9	322.1	317.7	-1,191.5	-318.9	1.48	-1.36	3.35
5,059.0	8.90	294.56	4,873.6	229.4	324.1	-1,205.2	-325.4	0.87	-0.84	-1.29
5,153.0	8.68	293.74	4,966.5	136.5	330.0	-1,218.3	-331.3	0.27	-0.23	-0.87
5,248.0	8.38	287.30	5,060.5	42.5	334.9	-1,231.5	-336.2	1.05	-0.32	-6.78
5,342.0	7.59	283.07	5,153.6	-50.6	338.4	-1,244.1	-339.7	1.05	-0.84	-4.50
5,436.0	6.46	284.10	5,246.9	-143.9	341.1	-1,255.3	-342.4	1.21	-1.20	1.10
5,529.0	5.74	286.93	5,339.3	-236.3	343.7	-1,264.8	-345.0	0.84	-0.77	3.04
5,624.0	4.23	301.91	5,434.0	-331.0	346.9	-1,272.3	-348.3	2.09	-1.59	15.77
5,718.0	3.55	280.09	5,527.8	-424.8	349.3	-1,278.1	-350.6	1.72	-0.72	-23.21
5,813.0	1.70	295.97	5,622.7	-519.7	350.4	-1,282.3	-351.8	2.07	-1.95	16.72
5,908.0	2.00	292.13	5,717.6	-614.6	351.7	-1,285.1	-353.0	0.34	0.32	-4.04
6,002.0	1.69	40.26	5,811.6	-708.6	353.3	-1,285.7	-354.7	3.18	-0.33	115.03
6,097.0	1.19	50.94	5,906.6	-803.6	355.0	-1,284.0	-356.4	0.60	-0.53	11.24
6,191.0	1.15	46.91	6,000.5	-897.5	356.3	-1,282.6	-357.6	0.10	-0.04	-4.29
6,286.0	0.99	59.18	6,095.5	-992.5	357.4	-1,281.2	-358.7	0.29	-0.17	12.92
6,380.0	1.03	68.93	6,189.5	-1,086.5	358.1	-1,279.7	-359.4	0.19	0.04	10.37
6,473.0	0.11	83.31	6,282.5	-1,179.5	358.4	-1,278.8	-359.7	0.99	-0.99	15.46
6,567.0	0.28	230.53	6,376.5	-1,273.5	358.2	-1,278.9	-359.6	0.40	0.18	156.62
6,662.0	0.72	251.67	6,471.5	-1,368.5	357.9	-1,279.7	-359.3	0.49	0.46	22.25
KOP										
6,717.0	4.07	184.60	6,526.5	-1,423.5	355.9	-1,280.2	-357.2	7.00	6.10	-121.95
6,756.0	6.78	180.61	6,565.3	-1,462.3	352.2	-1,280.3	-353.5	7.00	6.94	-10.22
6,850.0	13.78	175.49	6,657.7	-1,554.7	335.4	-1,279.5	-336.8	7.50	7.45	-5.45
6,944.0	22.57	178.51	6,746.9	-1,643.9	306.2	-1,278.1	-307.5	9.40	9.35	3.21
7,039.0	31.59	177.61	6,831.4	-1,728.4	263.0	-1,276.6	-264.4	9.50	9.49	-0.95
7,133.0	34.77	183.23	6,910.1	-1,807.1	211.6	-1,277.1	-213.0	4.70	3.38	5.98
7,227.0	38.13	180.03	6,985.7	-1,882.7	155.8	-1,278.6	-157.2	4.11	3.57	-3.40
7,322.0	44.77	176.53	7,056.9	-1,953.9	93.0	-1,276.6	-94.4	7.40	6.99	-3.68
7,417.0	50.25	179.28	7,121.1	-2,018.1	23.1	-1,274.1	-24.4	6.15	5.77	2.89

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-2HZ
Project:	WELD COUNTY (NAD 83)	TDV Reference:	KB 20' @ 5103.0usft (PD461)
Site:	SE SW SEC 24 T2N R66W 6th P.M.	MD Reference:	KB 20' @ 5103.0usft (PD461)
Well:	GRACIE 24-2HZ	North Reference:	True
Wellbore:	JOB # 2018-419-461	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)
~ ENTER RADIUS HEEL (7499' MD)										
7,499.0	53.31	180.41	7,171.8	-2,068.8	-41.4	-1,274.0	40.0	3.88	3.73	1.37
7,510.0	53.72	180.55	7,178.3	-2,075.3	-50.2	-1,274.0	48.9	3.88	3.74	1.31
7,604.0	58.83	179.05	7,230.5	-2,127.5	-128.3	-1,273.7	127.0	5.60	5.44	-1.60
7,698.0	68.33	180.18	7,272.3	-2,169.3	-212.4	-1,273.2	211.1	10.16	10.11	1.20
7,792.0	75.34	177.78	7,301.6	-2,198.6	-301.7	-1,271.6	300.3	7.84	7.46	-2.55
HEEL:40.116394;-104.733753										
7,886.0	85.45	178.87	7,317.2	-2,214.2	-394.2	-1,268.9	392.9	10.82	10.76	1.16
7,979.0	88.77	178.82	7,321.9	-2,218.9	-487.0	-1,267.0	485.7	3.57	3.57	-0.05
8,072.0	88.77	178.99	7,323.9	-2,220.9	-580.0	-1,265.2	578.7	0.18	0.00	0.18
~ EXIT RADIUS HEEL (8146' MD)										
8,146.0	90.02	179.22	7,324.7	-2,221.7	-654.0	-1,264.1	652.7	1.72	1.69	0.31
8,166.0	90.36	179.28	7,324.6	-2,221.6	-674.0	-1,263.8	672.7	1.72	1.69	0.31
8,259.0	90.73	179.46	7,323.7	-2,220.7	-767.0	-1,262.8	765.6	0.44	0.40	0.19
8,353.0	91.04	179.58	7,322.3	-2,219.3	-861.0	-1,262.0	859.6	0.35	0.33	0.13
8,447.0	90.62	179.10	7,320.9	-2,217.9	-954.9	-1,260.9	953.6	0.68	-0.45	-0.51
8,541.0	90.62	179.01	7,319.9	-2,216.9	-1,048.9	-1,259.4	1,047.6	0.10	0.00	-0.10
8,634.0	90.34	179.11	7,319.1	-2,216.1	-1,141.9	-1,257.8	1,140.6	0.32	-0.30	0.11
8,727.0	90.34	179.22	7,318.6	-2,215.6	-1,234.9	-1,256.5	1,233.6	0.12	0.00	0.12
8,821.0	91.37	181.12	7,317.2	-2,214.2	-1,328.9	-1,256.8	1,327.6	2.30	1.10	2.02
8,915.0	91.94	180.93	7,314.5	-2,211.5	-1,422.8	-1,258.4	1,421.5	0.64	0.61	-0.20
9,008.0	90.76	181.03	7,312.3	-2,209.3	-1,515.8	-1,260.0	1,514.5	1.27	-1.27	0.11
9,102.0	91.23	180.62	7,310.6	-2,207.6	-1,609.8	-1,261.4	1,608.4	0.66	0.50	-0.44
9,197.0	91.63	180.40	7,308.3	-2,205.3	-1,704.7	-1,262.2	1,703.4	0.48	0.42	-0.23
9,290.0	92.11	180.26	7,305.2	-2,202.2	-1,797.7	-1,262.8	1,796.4	0.54	0.52	-0.15
9,383.0	91.36	180.96	7,302.4	-2,199.4	-1,890.6	-1,263.8	1,889.3	1.10	-0.81	0.75
9,477.0	90.09	180.40	7,301.2	-2,198.2	-1,984.6	-1,264.9	1,983.3	1.48	-1.35	-0.60
9,571.0	91.11	180.31	7,300.2	-2,197.2	-2,078.6	-1,265.5	2,077.3	1.09	1.09	-0.10
9,664.0	88.46	180.03	7,300.6	-2,197.6	-2,171.6	-1,265.7	2,170.3	2.87	-2.85	-0.30
9,758.0	88.56	179.94	7,303.0	-2,200.0	-2,265.6	-1,265.7	2,264.2	0.14	0.11	-0.10
9,853.0	88.88	180.09	7,305.2	-2,202.2	-2,360.5	-1,265.7	2,359.2	0.37	0.34	0.16
9,947.0	88.32	179.66	7,307.5	-2,204.5	-2,454.5	-1,265.5	2,453.2	0.75	-0.60	-0.46
10,040.0	88.18	179.25	7,310.3	-2,207.3	-2,547.5	-1,264.6	2,546.1	0.47	-0.15	-0.44
10,134.0	88.75	178.73	7,312.8	-2,209.8	-2,641.4	-1,263.0	2,640.1	0.82	0.61	-0.55
10,229.0	91.26	179.81	7,312.8	-2,209.8	-2,736.4	-1,261.8	2,735.1	2.88	2.64	1.14
10,323.0	90.77	179.64	7,311.1	-2,208.1	-2,830.4	-1,261.3	2,829.1	0.55	-0.52	-0.18
10,417.0	91.05	179.24	7,309.6	-2,206.6	-2,924.4	-1,260.4	2,923.0	0.52	0.30	-0.43
10,511.0	91.31	178.65	7,307.7	-2,204.7	-3,018.3	-1,258.7	3,017.0	0.69	0.28	-0.63
10,605.0	90.60	181.22	7,306.1	-2,203.1	-3,112.3	-1,258.6	3,111.0	2.84	-0.76	2.73
10,699.0	91.16	180.46	7,304.7	-2,201.7	-3,206.3	-1,259.9	3,205.0	1.00	0.60	-0.81
10,794.0	88.32	181.99	7,305.1	-2,202.1	-3,301.2	-1,262.0	3,299.9	3.40	-2.99	1.61
10,889.0	88.89	181.63	7,307.4	-2,204.4	-3,396.2	-1,265.0	3,394.8	0.71	0.60	-0.38
10,983.0	89.04	181.30	7,309.1	-2,206.1	-3,490.1	-1,267.4	3,488.8	0.39	0.16	-0.35
11,076.0	88.82	180.94	7,310.9	-2,207.9	-3,583.1	-1,269.2	3,581.8	0.45	-0.24	-0.39
11,169.0	91.01	179.85	7,311.0	-2,208.0	-3,676.1	-1,269.8	3,674.7	2.63	2.35	-1.17
11,263.0	91.63	179.71	7,308.9	-2,205.9	-3,770.1	-1,269.5	3,768.7	0.68	0.66	-0.15
11,356.0	90.26	181.32	7,307.3	-2,204.3	-3,863.0	-1,270.3	3,861.7	2.27	-1.47	1.73
11,448.0	90.30	180.45	7,306.9	-2,203.9	-3,955.0	-1,271.7	3,953.7	0.95	0.04	-0.95
~ ENTER RADIUS TOE (11475' MD)										
11,475.0	90.55	180.42	7,306.7	-2,203.7	-3,982.0	-1,271.9	3,980.7	0.92	0.91	-0.12
11,541.0	91.15	180.34	7,305.7	-2,202.7	-4,048.0	-1,272.4	4,046.7	0.92	0.91	-0.12
11,635.0	91.37	180.01	7,303.6	-2,200.6	-4,142.0	-1,272.7	4,140.6	0.42	0.23	-0.35
11,730.0	90.04	182.02	7,302.5	-2,199.5	-4,237.0	-1,274.3	4,235.6	2.54	-1.40	2.12

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-2HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	KB 20' @ 5103.0usft (PD461)
Site:	SE SW SEC 24 T2N R66W 6th P.M.	MD Reference:	KB 20' @ 5103.0usft (PD461)
Well:	GRACIE 24-2HZ	North Reference:	True
Wellbore:	JOB # 2018-419-461	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)
11,823.0	90.64	182.17	7,301.9	-2,198.9	-4,329.9	-1,277.7	4,328.5	0.67	0.65	0.16
11,915.0	91.10	181.78	7,300.5	-2,197.5	-4,421.8	-1,280.9	4,420.5	0.66	0.50	-0.42
12,009.0	89.85	182.17	7,299.7	-2,196.7	-4,515.8	-1,284.2	4,514.4	1.39	-1.33	0.41
12,102.0	90.11	182.15	7,299.8	-2,196.8	-4,608.7	-1,287.7	4,607.3	0.28	0.28	-0.02
~ EXIT RADIUS TOE (12197' MD)										
12,197.0	90.23	181.71	7,299.5	-2,196.5	-4,703.6	-1,290.9	4,702.3	0.48	0.13	-0.46
12,290.0	88.54	180.79	7,300.5	-2,197.5	-4,796.6	-1,292.9	4,795.3	2.07	-1.82	-0.99
12,385.0	88.61	180.74	7,302.8	-2,199.8	-4,891.6	-1,294.2	4,890.2	0.09	0.07	-0.05
12,478.0	88.89	180.83	7,304.9	-2,201.9	-4,984.5	-1,295.4	4,983.2	0.32	0.30	0.10
LAST SURVEY AUG 1, 2018										
12,572.0	89.95	180.72	7,305.8	-2,202.8	-5,078.5	-1,296.7	5,077.2	1.13	1.13	-0.12
PROJECTION TO TD:40.103348;-104.733855										
12,640.0	89.95	180.72	7,305.9	-2,202.9	-5,146.5	-1,297.6	5,145.2	0.00	0.00	0.00

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-2HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	KB 20' @ 5103.0usft (PD461)
Site:	SE SW SEC 24 T2N R66W 6th P.M.	MD Reference:	KB 20' @ 5103.0usft (PD461)
Well:	GRACIE 24-2HZ	North Reference:	True
Wellbore:	JOB # 2018-419-461	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 24-2HZ - survey misses target center by 8.1usft at 7888.0usft MD (7317.4 TVD, -396.2 N, -1268.8 E) - Point	0.00	0.00	7,320.0	-396.2	-1,276.5	14,569,226.95	1,714,845.17	40° 6' 58.997 N	104° 44' 1.608 W	
KOP - GRACIE 24-2HZ - survey misses target center by 84.8usft at 6904.3usft MD (6709.8 TVD, 320.2 N, -1278.6 E) - Point	0.00	0.00	6,683.4	239.6	-1,277.2	14,569,862.53	1,714,842.56	40° 7' 5.281 N	104° 44' 1.617 W	
HEEL - GRACIE 24-2HZ - survey misses target center by 8.1usft at 7888.0usft MD (7317.4 TVD, -396.2 N, -1268.8 E) - Point	0.00	0.00	7,320.0	-396.2	-1,276.5	14,569,226.95	1,714,845.17	40° 6' 58.997 N	104° 44' 1.608 W	
BHL - GRACIE 24-2HZ - survey misses target center by 32.7usft at 12640.0usft MD (7305.9 TVD, -5146.5 N, -1297.6 E) - Point	0.00	0.00	7,326.0	-5,147.1	-1,271.8	14,564,477.96	1,714,864.32	40° 6' 12.048 N	104° 44' 1.544 W	
BHL - GRACIE 24-2HZ () - survey misses target center by 32.7usft at 12640.0usft MD (7305.9 TVD, -5146.5 N, -1297.6 E) - Point	0.00	0.00	7,326.0	-5,147.1	-1,271.8	14,564,477.96	1,714,864.32	40° 6' 12.048 N	104° 44' 1.544 W	
KOP - GRACIE 24-2HZ - survey misses target center by 27.2usft at 6799.8usft MD (6608.6 TVD, 345.8 N, -1280.1 E) - Point	0.00	0.00	6,603.8	319.1	-1,277.3	14,569,941.98	1,714,842.24	40° 7' 6.066 N	104° 44' 1.618 W	

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
1,841.0	1,797.6	54.2	-314.4	TIE ON TO SURFACE SURVEYS	
6,717.0	6,526.5	355.9	-1,280.2	KOP	
7,499.0	7,171.8	-41.4	-1,274.0	~ ENTER RADIUS HEEL (7499' MD)	
7,886.0	7,317.2	-394.2	-1,268.9	HEEL:40.116394;-104.733753	
8,146.0	7,324.7	-654.0	-1,264.1	~ EXIT RADIUS HEEL (8146' MD)	
11,475.0	7,306.7	-3,982.0	-1,271.9	~ ENTER RADIUS TOE (11475' MD)	
12,197.0	7,299.5	-4,703.6	-1,290.9	~ EXIT RADIUS TOE (12197' MD)	
12,572.0	7,305.8	-5,078.5	-1,296.7	LAST SURVEY AUG 1, 2018	
12,640.0	7,305.9	-5,146.5	-1,297.6	PROJECTION TO TD:40.103348;-104.733855	

Checked By: _____ Approved By: _____ Date: _____