

# **ANADARKO PETROLEUM CORP**

**WELD COUNTY (NAD 83)**

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

**GRACIE 24-1HZ - Slot GRACIE 24-1HZ**

**JOB # 2018-418-461**

**29 July, 2018**

**Survey: FINAL SURVEYS**





Project: WELD COUNTY (NAD 83)  
 Site: SE SW SEC 24 T2N R66W 6th P.M.  
 Well: GRACIE 24-1HZ  
 Wellbore: JOB # 2018-418-461  
 Design: FINAL SURVEYS

ANNOTATIONS

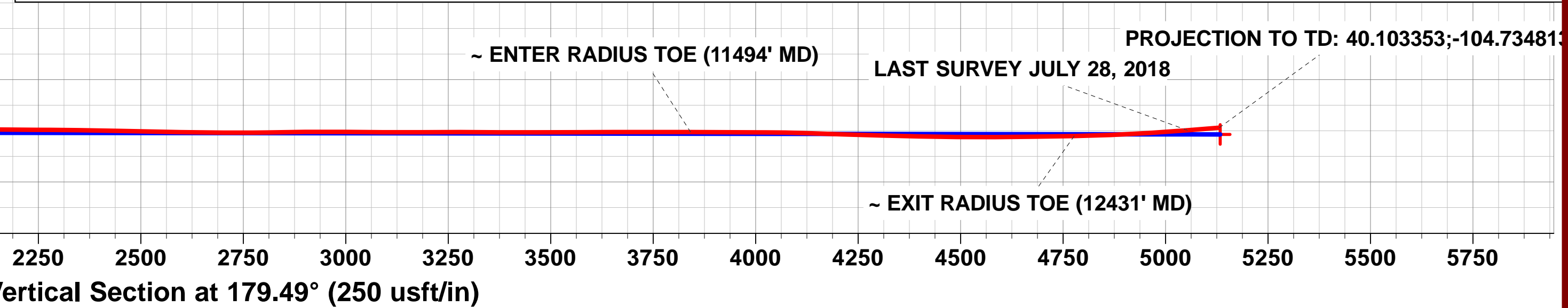
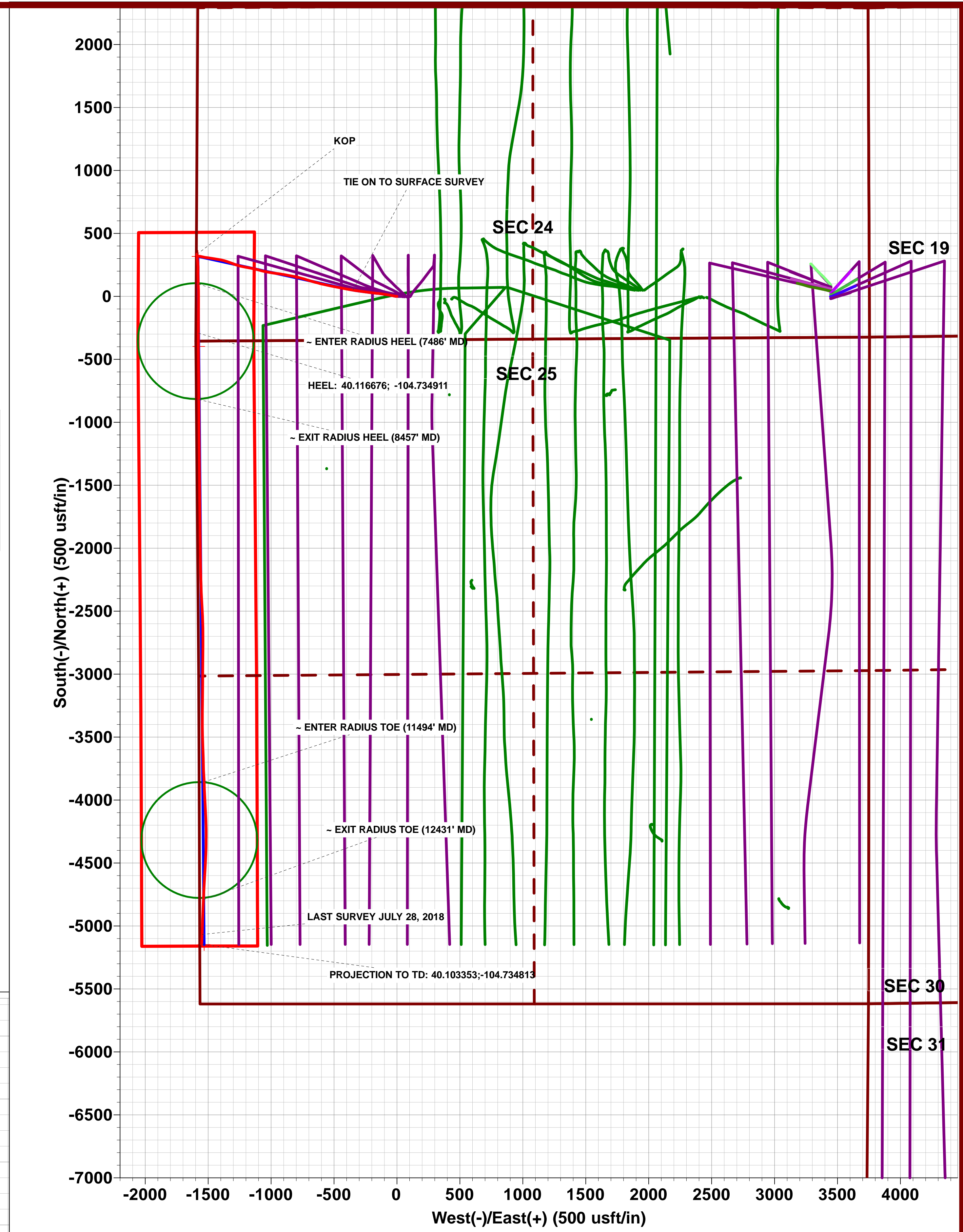
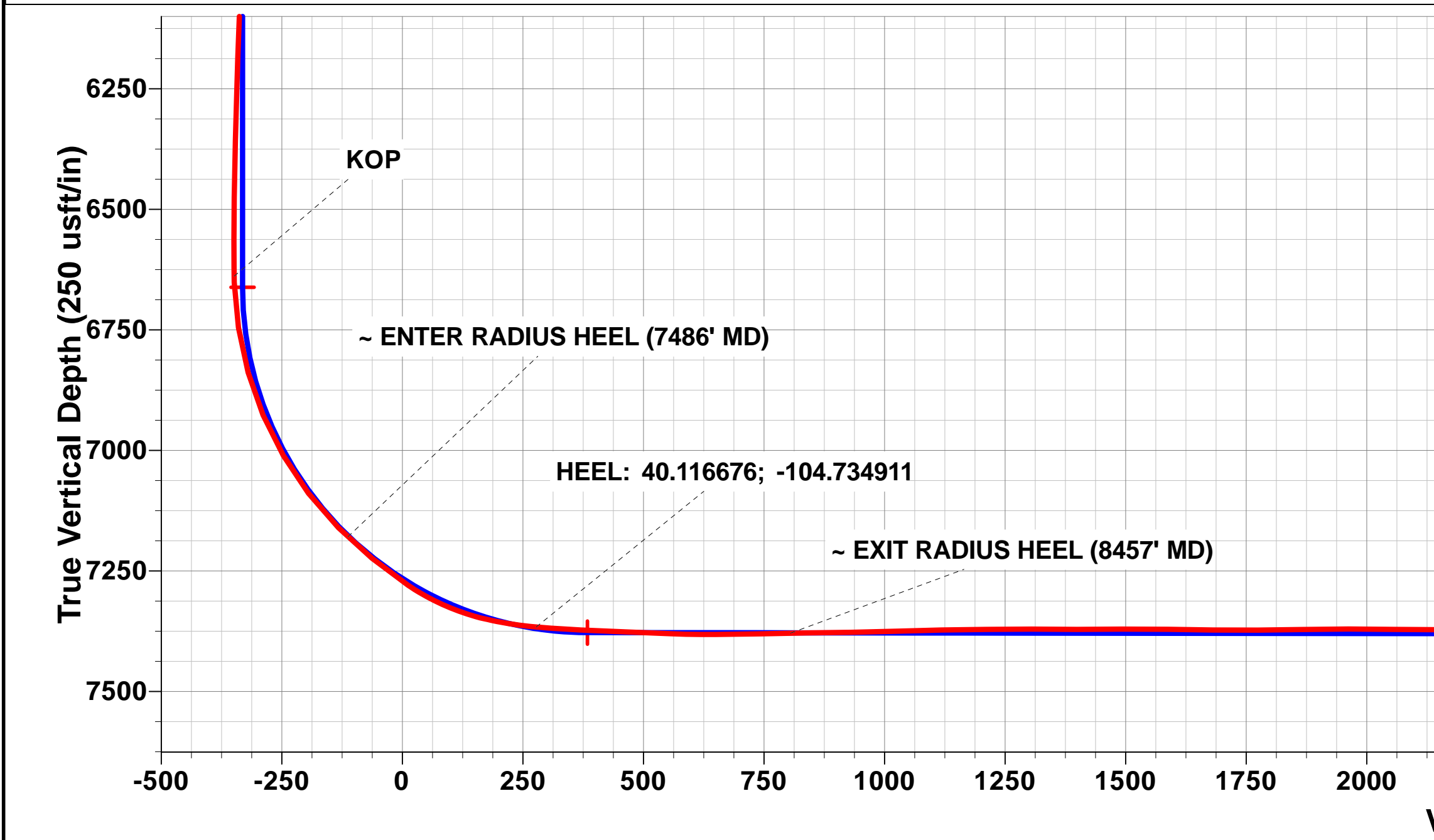
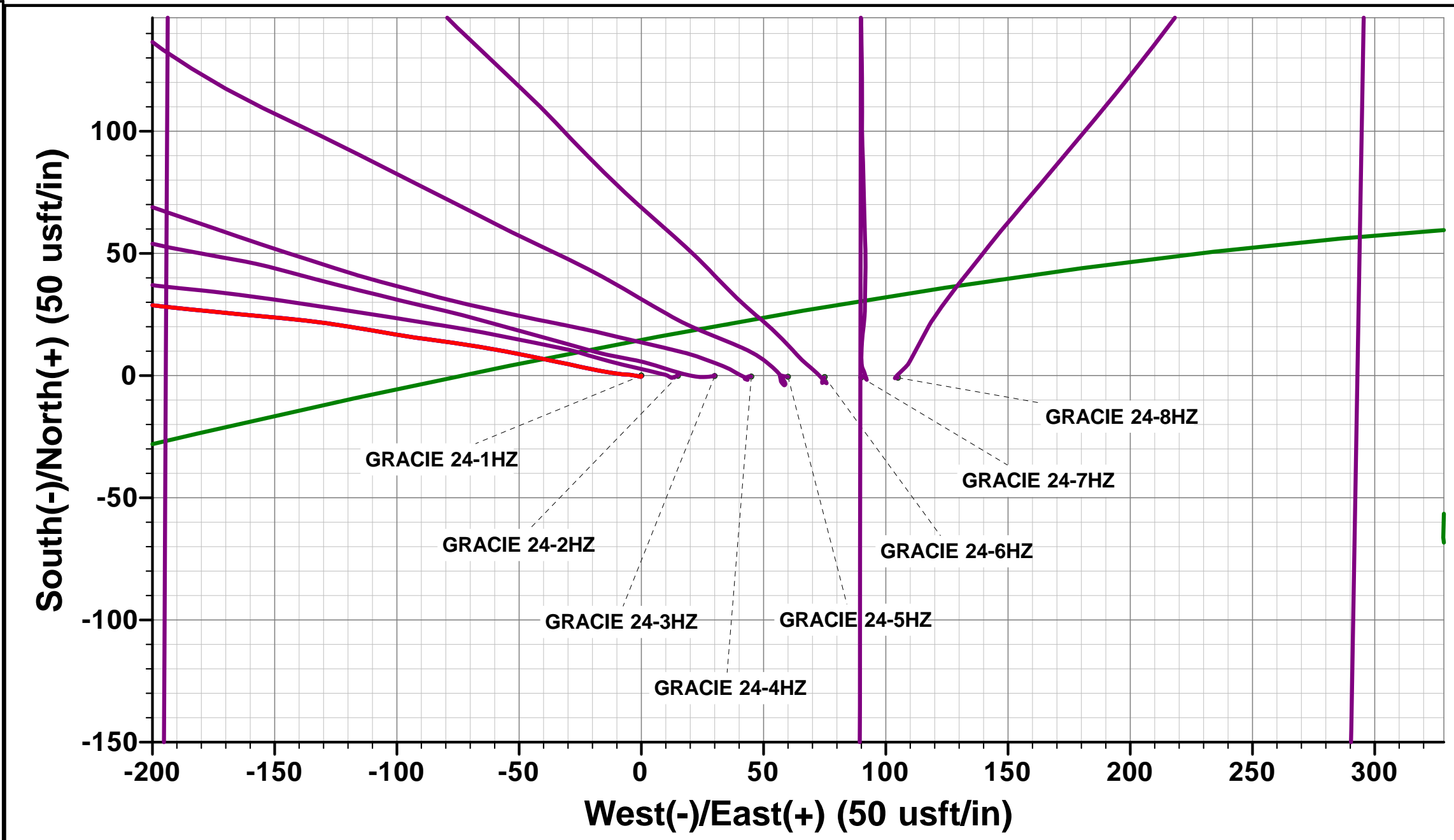
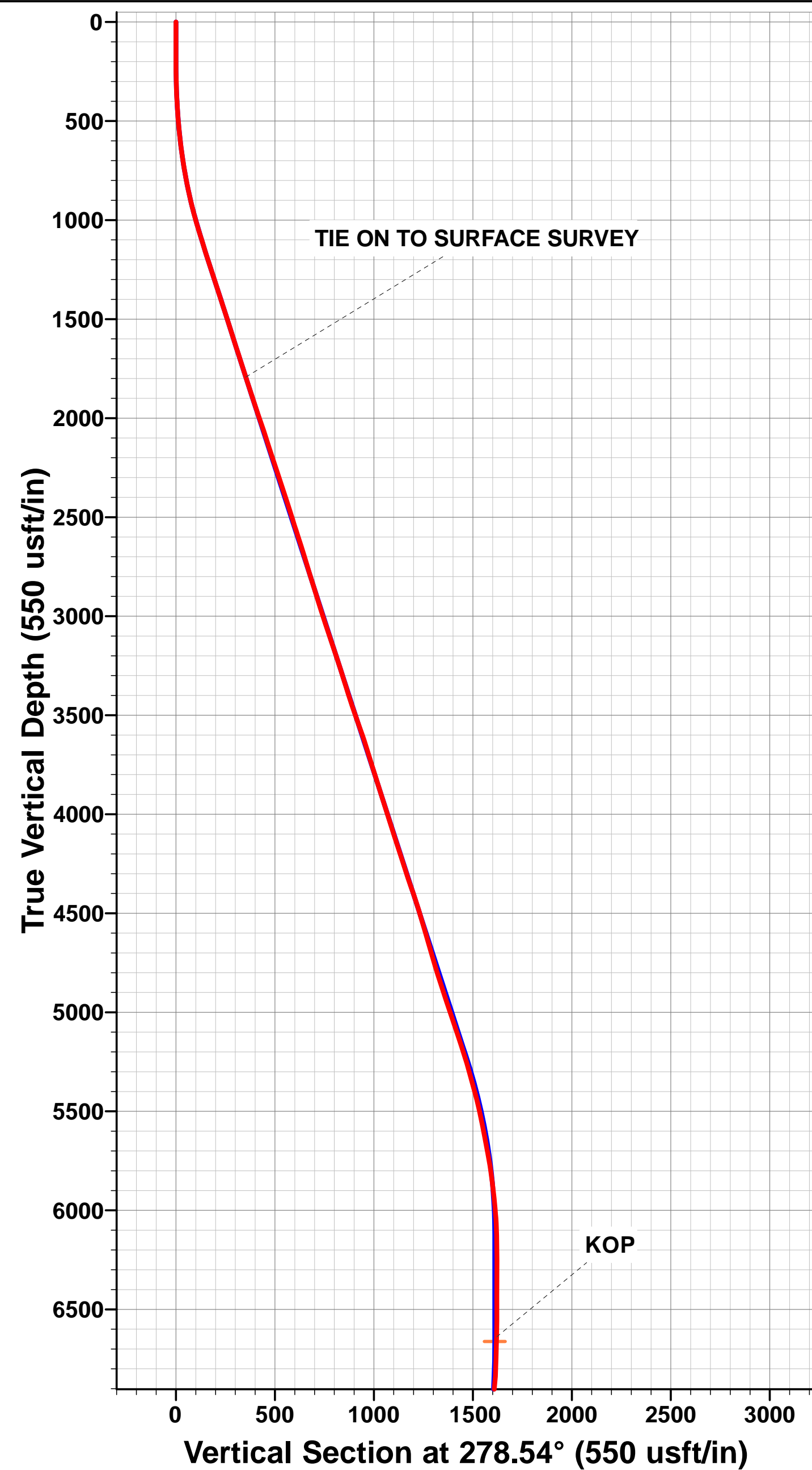
TVD	MD	Inc	Azi	+N/-S	+E/-W	VSec	Departure	Annotation
1792.8	1841.0	18.02	279.49	49.9	-348.8	-53.0	353.2	TIE ON TO SURFACE SURVEY
6639.0	6880.0	1.57	144.39	334.8	-1587.6	-348.9	1639.0	KOP
7179.4	7486.0	46.56	177.33	98.9	-1578.4	-112.9	1876.2	~ ENTER RADIUS HEEL (7486' MD)
7366.3	7929.0	84.94	180.41	-291.6	-1577.7	277.5	2266.1	HEEL: 40.116676; -104.734911
7379.2	8457.0	91.00	179.80	-819.1	-1573.8	805.1	2793.7	~ ENTER RADIUS HEEL (8457' MD)
7378.4	11494.0	89.95	176.49	-3855.1	-1531.7	3841.3	5830.4	~ ENTER RADIUS TOE (11494' MD)
7388.1	12431.0	91.09	182.40	-4791.0	-1537.2	4777.1	6767.3	~ EXIT RADIUS TOE (12431' MD)
7373.8	12708.0	94.62	181.92	-5067.4	-1547.9	5053.4	7043.9	LAST SURVEY JULY 28, 2018
7367.6	12786.0	94.62	181.92	-5145.1	-1550.5	5131.1	7121.6	PROJECTION TO TD: 40.103353;-104.734813

AS DRILLED LOCAL COORDINATES:

SHL: 346ft FSL & 1595ft FWL Sec 24  
 HEEL: 63.4ft FNL & 20ft FWL Sec 24  
 BHL: 474ft FSL & 15ft FWL Sec 25

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
BHL - GRACIE 24-1HZ (P2)	7384.0	-5147.2	-1531.7	40° 6' 12.048 N	104° 44' 5.082 W
HEEL - GRACIE 24-1HZ (P2)	7378.0	-398.0	-1574.3	40° 6' 58.980 N	104° 44' 5.634 W
KOP - GRACIE 24-1HZ (P2)	6661.8	317.3	-1580.7	40° 7' 6.049 N	104° 44' 5.717 W



# Survey Report



<b>Company:</b>	ANADARKO PETROLEUM CORP	<b>Local Co-ordinate Reference:</b>	Well GRACIE 24-1HZ - Slot GRACIE 24-1HZ
<b>Project:</b>	WELD COUNTY (NAD 83)	<b>TVD Reference:</b>	KB 20' @ 5103.0usft (PD461)
<b>Site:</b>	SE SW SEC 24 T2N R66W 6th P.M.	<b>MD Reference:</b>	KB 20' @ 5103.0usft (PD461)
<b>Well:</b>	GRACIE 24-1HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	JOB # 2018-418-461	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL SURVEYS	<b>Database:</b>	EOG RESOURCES

<b>Project</b>	WELD COUNTY (NAD 83)		
<b>Map System:</b>	Universal Transverse Mercator (US Survey Feet)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Zone 13N (108 W to 102 W)	Using geodetic scale factor	

<b>Site</b>	SE SW SEC 24 T2N R66W 6th P.M.				
<b>Site Position:</b>		<b>Northing:</b>	14,569,626.93 usft	<b>Latitude:</b>	40° 7' 2.914 N
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,716,104.98 usft	<b>Longitude:</b>	104° 43' 45.370 W
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16"	<b>Grid Convergence:</b>	0.17 °

<b>Well</b>	GRACIE 24-1HZ - Slot GRACIE 24-1HZ					
<b>Well Position</b>	<b>+N/-S</b>	0.0 usft	<b>Northing:</b>	14,569,626.92 usft	<b>Latitude:</b>	40° 7' 2.914 N
	<b>+E/-W</b>	0.0 usft	<b>Easting:</b>	1,716,104.95 usft	<b>Longitude:</b>	104° 43' 45.370 W
<b>Position Uncertainty</b>		0.0 usft	<b>Wellhead Elevation:</b>	usft	<b>Ground Level:</b>	5,083.0 usft

<b>Wellbore</b>	JOB # 2018-418-461				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	17/07/2018	8.05	66.61	52,124

<b>Design</b>	FINAL SURVEYS				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>		<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
		0.0	0.0	0.0	179.49

<b>Survey Program</b>	<b>Date</b>	29/07/2018			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
131.0	12,786.0	FINAL SURVEYS (JOB # 2018-418-461)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	

<b>Survey</b>											
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>Subsea Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
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	192.30	131.0	4,972.0	-0.3	-0.1	0.3	0.20	0.20	0.00	
163.0	0.18	123.57	163.0	4,940.0	-0.4	0.0	0.4	0.80	-0.25	-214.78	
195.0	0.26	249.52	195.0	4,908.0	-0.4	-0.1	0.4	1.23	0.25	393.59	
227.0	0.26	243.80	227.0	4,876.0	-0.5	-0.2	0.5	0.08	0.00	-17.87	
258.0	0.97	289.07	258.0	4,845.0	-0.4	-0.5	0.4	2.61	2.29	146.03	
290.0	1.32	285.02	290.0	4,813.0	-0.3	-1.1	0.3	1.12	1.09	-12.66	
321.0	1.32	275.62	321.0	4,782.0	-0.1	-1.8	0.1	0.70	0.00	-30.32	
353.0	1.98	283.97	353.0	4,750.0	0.0	-2.7	-0.1	2.19	2.06	26.09	
385.0	2.94	275.79	384.9	4,718.1	0.3	-4.1	-0.3	3.19	3.00	-25.56	
417.0	3.52	274.21	416.9	4,686.1	0.4	-5.9	-0.5	1.83	1.81	-4.94	
448.0	3.87	276.32	447.8	4,655.2	0.6	-7.9	-0.7	1.21	1.13	6.81	
480.0	4.61	278.43	479.7	4,623.3	0.9	-10.2	-1.0	2.36	2.31	6.59	

# Survey Report



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<b>Project:</b>	WELD COUNTY (NAD 83)	<b>TDV Reference:</b>	KB 20' @ 5103.0usft (PD461)
<b>Site:</b>	SE SW SEC 24 T2N R66W 6th P.M.	<b>MD Reference:</b>	KB 20' @ 5103.0usft (PD461)
<b>Well:</b>	GRACIE 24-1HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	JOB # 2018-418-461	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL SURVEYS	<b>Database:</b>	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	4.79	279.75	510.6	4,592.4	1.3	-12.7	-1.4	0.68	0.58	4.26
543.0	5.27	277.46	542.5	4,560.5	1.7	-15.5	-1.9	1.63	1.50	-7.16
575.0	5.71	282.21	574.4	4,528.6	2.2	-18.5	-2.4	1.98	1.37	14.84
606.0	6.42	281.07	605.2	4,497.8	2.9	-21.7	-3.1	2.32	2.29	-3.68
638.0	7.34	283.53	637.0	4,466.0	3.7	-25.5	-4.0	3.02	2.87	7.69
670.0	8.39	281.42	668.7	4,434.3	4.7	-29.7	-4.9	3.40	3.28	-6.59
702.0	9.14	281.33	700.3	4,402.7	5.6	-34.5	-5.9	2.34	2.34	-0.28
734.0	9.67	282.65	731.9	4,371.1	6.7	-39.6	-7.1	1.79	1.66	4.12
765.0	10.28	280.80	762.4	4,340.6	7.8	-44.9	-8.2	2.22	1.97	-5.97
797.0	10.63	281.42	793.9	4,309.1	8.9	-50.6	-9.4	1.15	1.09	1.94
829.0	11.38	280.45	825.3	4,277.7	10.1	-56.6	-10.6	2.41	2.34	-3.03
860.0	12.04	280.54	855.6	4,247.4	11.2	-62.8	-11.8	2.13	2.13	0.29
892.0	12.44	278.26	886.9	4,216.1	12.3	-69.5	-13.0	1.96	1.25	-7.12
924.0	13.54	278.08	918.1	4,184.9	13.4	-76.6	-14.0	3.44	3.44	-0.56
955.0	14.85	278.08	948.1	4,154.9	14.4	-84.1	-15.2	4.23	4.23	0.00
987.0	15.95	277.82	979.0	4,124.0	15.6	-92.5	-16.4	3.44	3.44	-0.81
1,018.0	16.52	280.01	1,008.7	4,094.3	16.9	-101.1	-17.8	2.70	1.84	7.06
1,050.0	16.96	279.66	1,039.4	4,063.6	18.5	-110.2	-19.5	1.41	1.37	-1.09
1,082.0	16.96	279.13	1,070.0	4,033.0	20.0	-119.4	-21.1	0.48	0.00	-1.66
1,114.0	16.83	278.08	1,100.6	4,002.4	21.4	-128.6	-22.6	1.04	-0.41	-3.28
1,145.0	16.92	276.23	1,130.3	3,972.7	22.6	-137.5	-23.8	1.76	0.29	-5.97
1,177.0	17.23	275.36	1,160.9	3,942.1	23.5	-146.8	-24.8	1.26	0.97	-2.72
1,209.0	17.67	275.18	1,191.4	3,911.6	24.4	-156.4	-25.8	1.39	1.37	-0.56
1,240.0	18.06	275.79	1,220.9	3,882.1	25.3	-165.9	-26.8	1.40	1.26	1.97
1,272.0	18.15	275.71	1,251.3	3,851.7	26.3	-175.8	-27.9	0.29	0.28	-0.25
1,304.0	18.40	275.27	1,281.7	3,821.3	27.2	-185.7	-28.9	0.89	0.78	-1.37
1,335.0	18.41	276.50	1,311.1	3,791.9	28.3	-195.5	-30.0	1.25	0.03	3.97
1,367.0	18.19	276.94	1,341.5	3,761.5	29.4	-205.5	-31.3	0.81	-0.69	1.37
1,398.0	17.80	279.13	1,371.0	3,732.0	30.8	-214.9	-32.7	2.52	-1.26	7.06
1,430.0	17.93	277.55	1,401.4	3,701.6	32.2	-224.7	-34.2	1.57	0.41	-4.94
1,461.0	18.24	279.31	1,430.9	3,672.1	33.6	-234.2	-35.7	2.03	1.00	5.68
1,493.0	18.11	277.55	1,461.3	3,641.7	35.1	-244.0	-37.2	1.76	-0.41	-5.50
1,525.0	17.62	277.11	1,491.8	3,611.2	36.3	-253.8	-38.6	1.59	-1.53	-1.37
1,556.0	17.14	277.11	1,521.3	3,581.7	37.5	-263.0	-39.8	1.55	-1.55	0.00
1,588.0	17.23	276.59	1,551.9	3,551.1	38.6	-272.4	-41.0	0.56	0.28	-1.62
1,652.0	17.71	278.08	1,613.0	3,490.0	41.0	-291.4	-43.6	1.03	0.75	2.33
1,684.0	18.24	277.46	1,643.4	3,459.6	42.4	-301.2	-45.1	1.76	1.66	-1.94
1,715.0	18.59	278.17	1,672.8	3,430.2	43.7	-310.9	-46.5	1.34	1.13	2.29
1,746.0	17.84	279.40	1,702.3	3,400.7	45.2	-320.5	-48.0	2.72	-2.42	3.97
1,778.0	17.31	279.13	1,732.8	3,370.2	46.7	-330.0	-49.7	1.68	-1.66	-0.84
1,810.0	17.58	279.84	1,763.3	3,339.7	48.3	-339.5	-51.3	1.07	0.84	2.22
<b>TIE ON TO SURFACE SURVEY</b>										
<b>1,841.0</b>	<b>18.02</b>	<b>279.49</b>	<b>1,792.8</b>	<b>3,310.2</b>	<b>49.9</b>	<b>-348.8</b>	<b>-53.0</b>	<b>1.46</b>	<b>1.42</b>	<b>-1.13</b>
1,939.0	18.20	278.95	1,886.0	3,217.0	54.8	-378.9	-58.2	0.25	0.18	-0.55
2,033.0	19.02	281.27	1,975.0	3,128.0	60.1	-408.4	-63.7	1.18	0.87	2.47
2,128.0	18.46	281.14	2,065.0	3,038.0	66.0	-438.3	-69.9	0.59	-0.59	-0.14
2,221.0	17.65	281.22	2,153.4	2,949.6	71.6	-466.6	-75.7	0.87	-0.87	0.09
2,315.0	18.86	281.21	2,242.7	2,860.3	77.3	-495.5	-81.7	1.29	1.29	-0.01
2,409.0	17.73	280.09	2,331.9	2,771.1	82.8	-524.5	-87.4	1.26	-1.20	-1.19
2,504.0	18.62	283.53	2,422.2	2,680.8	88.9	-553.5	-93.8	1.47	0.94	3.62
2,598.0	17.05	281.50	2,511.7	2,591.3	95.1	-581.6	-100.3	1.80	-1.67	-2.16
2,692.0	18.61	285.81	2,601.2	2,501.8	102.0	-609.5	-107.4	2.17	1.66	4.59
2,784.0	16.84	284.42	2,688.8	2,414.2	109.3	-636.6	-114.9	1.98	-1.92	-1.51

# Survey Report



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<b>Well:</b>	GRACIE 24-1HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	JOB # 2018-418-461	<b>Survey Calculation Method:</b>	Minimum Curvature
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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)
2,877.0	17.37	284.18	2,777.7	2,325.3	116.0	-663.1	-121.9	0.57	0.57	-0.26
2,971.0	17.12	287.03	2,867.5	2,235.5	123.5	-689.9	-129.7	0.94	-0.27	3.03
3,064.0	17.60	288.03	2,956.2	2,146.8	131.9	-716.3	-138.3	0.61	0.52	1.08
3,158.0	19.05	285.80	3,045.5	2,057.5	140.5	-744.6	-147.1	1.71	1.54	-2.37
3,252.0	18.11	284.94	3,134.6	1,968.4	148.4	-773.5	-155.3	1.04	-1.00	-0.91
3,347.0	18.79	281.44	3,224.7	1,878.3	155.2	-802.8	-162.4	1.37	0.72	-3.68
3,442.0	17.02	280.36	3,315.1	1,787.9	160.8	-831.4	-168.2	1.90	-1.86	-1.14
3,537.0	18.06	280.49	3,405.7	1,697.3	166.0	-859.6	-173.6	1.10	1.09	0.14
3,630.0	18.69	281.32	3,493.9	1,609.1	171.5	-888.4	-179.4	0.73	0.68	0.89
3,723.0	20.01	278.75	3,581.7	1,521.3	176.9	-918.7	-185.0	1.69	1.42	-2.76
3,815.0	16.86	277.28	3,668.9	1,434.1	180.9	-947.5	-189.4	3.46	-3.42	-1.60
3,909.0	17.24	278.00	3,758.8	1,344.2	184.6	-974.8	-193.3	0.46	0.40	0.77
4,003.0	17.54	278.41	3,848.5	1,254.5	188.6	-1,002.6	-197.5	0.34	0.32	0.44
4,097.0	17.91	280.90	3,938.0	1,165.0	193.4	-1,030.8	-202.6	0.90	0.39	2.65
4,191.0	17.65	283.89	4,027.6	1,075.4	199.6	-1,058.9	-209.0	1.01	-0.28	3.18
4,311.0	17.74	285.58	4,141.9	961.1	208.9	-1,094.1	-218.6	0.43	0.07	1.41
4,405.0	18.68	282.73	4,231.2	871.8	216.0	-1,122.6	-226.0	1.38	1.00	-3.03
4,499.0	18.01	281.05	4,320.4	782.6	222.1	-1,151.6	-232.4	0.91	-0.71	-1.79
4,592.0	19.39	281.35	4,408.5	694.5	227.9	-1,180.8	-238.4	1.49	1.48	0.32
4,684.0	16.74	280.98	4,495.9	607.1	233.4	-1,208.8	-244.2	2.88	-2.88	-0.40
4,778.0	16.04	281.10	4,586.1	516.9	238.5	-1,234.8	-249.5	0.75	-0.74	0.13
4,870.0	16.42	287.68	4,674.5	428.5	244.9	-1,259.7	-256.1	2.04	0.41	7.15
4,965.0	16.94	288.79	4,765.5	337.5	253.5	-1,285.6	-264.9	0.64	0.55	1.17
5,059.0	18.23	290.58	4,855.1	247.9	263.0	-1,312.3	-274.7	1.49	1.37	1.90
5,153.0	19.16	289.72	4,944.1	158.9	273.4	-1,340.6	-285.3	1.03	0.99	-0.91
5,248.0	18.40	285.94	5,034.1	68.9	282.8	-1,369.7	-295.0	1.51	-0.80	-3.98
5,342.0	18.64	280.39	5,123.2	-20.2	289.6	-1,398.8	-302.0	1.89	0.26	-5.90
5,436.0	17.61	279.19	5,212.5	-109.5	294.6	-1,427.6	-307.2	1.17	-1.10	-1.28
5,529.0	15.38	278.86	5,301.7	-198.7	298.7	-1,453.6	-311.6	2.40	-2.40	-0.35
5,624.0	15.40	280.91	5,393.3	-290.3	303.0	-1,478.5	-316.2	0.57	0.02	2.16
5,761.0	11.60	274.87	5,526.5	-423.5	307.6	-1,510.1	-321.1	2.95	-2.77	-4.41
5,856.0	10.90	283.06	5,619.7	-516.7	310.5	-1,528.3	-324.1	1.83	-0.74	8.62
5,950.0	10.74	281.30	5,712.0	-609.0	314.2	-1,545.6	-328.0	0.39	-0.17	-1.87
6,045.0	8.14	279.66	5,805.7	-702.7	317.1	-1,560.9	-331.0	2.75	-2.74	-1.73
6,139.0	6.58	276.19	5,898.9	-795.9	318.8	-1,572.8	-332.8	1.72	-1.66	-3.69
6,234.0	5.32	288.35	5,993.4	-890.4	320.7	-1,582.4	-334.8	1.87	-1.33	12.80
6,329.0	2.83	316.34	6,088.2	-985.2	323.8	-1,588.2	-337.9	3.28	-2.62	29.46
6,423.0	1.89	356.86	6,182.1	-1,079.1	327.1	-1,589.9	-341.2	1.98	-1.00	43.11
6,516.0	1.70	7.59	6,275.1	-1,172.1	330.0	-1,589.8	-344.1	0.41	-0.20	11.54
6,610.0	1.29	19.11	6,369.0	-1,266.0	332.3	-1,589.3	-346.5	0.54	-0.44	12.26
6,705.0	1.00	11.15	6,464.0	-1,361.0	334.2	-1,588.8	-348.3	0.35	-0.31	-8.38
6,798.0	0.51	23.86	6,557.0	-1,454.0	335.3	-1,588.4	-349.5	0.55	-0.53	13.67
<b>KOP</b>										
<b>6,880.0</b>	<b>1.57</b>	<b>144.39</b>	<b>6,639.0</b>	<b>-1,536.0</b>	<b>334.8</b>	<b>-1,587.6</b>	<b>-348.9</b>	<b>2.29</b>	<b>1.29</b>	<b>146.99</b>
6,893.0	1.86	146.54	6,652.0	-1,549.0	334.4	-1,587.4	-348.5	2.28	2.23	16.54
6,987.0	9.15	179.64	6,745.5	-1,642.5	325.7	-1,586.5	-339.8	8.15	7.76	35.21
7,082.0	15.13	177.16	6,838.3	-1,735.3	305.7	-1,585.9	-319.8	6.32	6.29	-2.61
7,176.0	23.48	172.78	6,927.0	-1,824.0	274.8	-1,582.9	-288.9	9.01	8.88	-4.66
7,270.0	29.95	179.69	7,010.9	-1,907.9	232.7	-1,580.4	-246.8	7.62	6.88	7.35
7,364.0	37.38	181.12	7,089.1	-1,986.1	180.7	-1,580.8	-194.7	7.95	7.90	1.52
7,459.0	44.99	176.61	7,160.6	-2,057.6	118.2	-1,579.4	-132.3	8.59	8.01	-4.75
<b>~ ENTER RADIUS HEEL (7486' MD)</b>										
<b>7,486.0</b>	<b>46.56</b>	<b>177.33</b>	<b>7,179.4</b>	<b>-2,076.4</b>	<b>98.9</b>	<b>-1,578.4</b>	<b>-112.9</b>	<b>6.11</b>	<b>5.80</b>	<b>2.66</b>

Survey Report



<b>Company:</b>	ANADARKO PETROLEUM CORP	<b>Local Co-ordinate Reference:</b>	Well GRACIE 24-1HZ - Slot GRACIE 24-1HZ
<b>Project:</b>	WELD COUNTY (NAD 83)	<b>TDV Reference:</b>	KB 20' @ 5103.0usft (PD461)
<b>Site:</b>	SE SW SEC 24 T2N R66W 6th P.M.	<b>MD Reference:</b>	KB 20' @ 5103.0usft (PD461)
<b>Well:</b>	GRACIE 24-1HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	JOB # 2018-418-461	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL SURVEYS	<b>Database:</b>	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)
7,553.0	50.46	178.96	7,223.8	-2,120.8	48.7	-1,576.8	-62.8	6.11	5.83	2.44
7,647.0	55.97	180.12	7,280.0	-2,177.0	-26.5	-1,576.2	12.5	5.94	5.86	1.23
7,740.0	66.99	180.49	7,324.4	-2,221.4	-108.1	-1,576.7	94.1	11.85	11.85	0.40
7,835.0	78.32	180.20	7,352.6	-2,249.6	-198.6	-1,577.2	184.6	11.93	11.93	-0.31
<b>HEEL: 40.116676; -104.734911</b>										
<b>7,929.0</b>	<b>84.94</b>	<b>180.41</b>	<b>7,366.3</b>	<b>-2,263.3</b>	<b>-291.6</b>	<b>-1,577.7</b>	<b>277.5</b>	<b>7.05</b>	<b>7.04</b>	<b>0.22</b>
8,022.0	87.28	179.44	7,372.6	-2,269.6	-384.4	-1,577.6	370.3	2.72	2.52	-1.04
8,115.0	87.74	179.56	7,376.7	-2,273.7	-477.3	-1,576.8	463.2	0.51	0.49	0.13
8,209.0	87.73	179.06	7,380.4	-2,277.4	-571.2	-1,575.6	557.1	0.53	-0.01	-0.53
8,302.0	90.29	179.68	7,382.0	-2,279.0	-664.2	-1,574.6	650.1	2.83	2.75	0.67
8,396.0	91.47	179.68	7,380.5	-2,277.5	-758.1	-1,574.1	744.1	1.26	1.26	0.00
<b>~ EXIT RADIUS HEEL (8457' MD)</b>										
<b>8,457.0</b>	<b>91.00</b>	<b>179.80</b>	<b>7,379.2</b>	<b>-2,276.2</b>	<b>-819.1</b>	<b>-1,573.8</b>	<b>805.1</b>	<b>0.79</b>	<b>-0.76</b>	<b>0.19</b>
8,489.0	90.76	179.86	7,378.7	-2,275.7	-851.1	-1,573.7	837.1	0.79	-0.76	0.19
8,583.0	90.76	179.86	7,377.5	-2,274.5	-945.1	-1,573.5	931.1	0.00	0.00	0.00
8,677.0	92.15	178.88	7,375.1	-2,272.1	-1,039.1	-1,572.5	1,025.0	1.81	1.48	-1.04
8,770.0	90.97	179.45	7,372.6	-2,269.6	-1,132.0	-1,571.1	1,118.0	1.41	-1.27	0.61
8,863.0	90.57	179.93	7,371.3	-2,268.3	-1,225.0	-1,570.6	1,211.0	0.67	-0.43	0.52
8,957.0	89.97	179.60	7,370.9	-2,267.9	-1,319.0	-1,570.2	1,305.0	0.73	-0.64	-0.35
9,051.0	89.40	179.45	7,371.4	-2,268.4	-1,413.0	-1,569.4	1,399.0	0.63	-0.61	-0.16
9,145.0	91.09	178.97	7,371.0	-2,268.0	-1,507.0	-1,568.1	1,493.0	1.87	1.80	-0.51
9,240.0	88.72	179.13	7,371.2	-2,268.2	-1,602.0	-1,566.6	1,588.0	2.50	-2.49	0.17
9,333.0	89.59	179.92	7,372.5	-2,269.5	-1,695.0	-1,565.8	1,681.0	1.26	0.94	0.85
9,426.0	89.94	179.33	7,372.9	-2,269.9	-1,788.0	-1,565.2	1,774.0	0.74	0.38	-0.63
9,520.0	91.50	178.88	7,371.7	-2,268.7	-1,881.9	-1,563.7	1,867.9	1.73	1.66	-0.48
9,614.0	89.83	179.73	7,370.6	-2,267.6	-1,975.9	-1,562.6	1,961.9	1.99	-1.78	0.90
9,707.0	89.24	179.41	7,371.4	-2,268.4	-2,068.9	-1,561.9	2,054.9	0.72	-0.63	-0.34
9,801.0	89.96	178.56	7,372.0	-2,269.0	-2,162.9	-1,560.2	2,148.9	1.19	0.77	-0.90
9,896.0	88.98	178.36	7,372.9	-2,269.9	-2,257.9	-1,557.7	2,243.9	1.05	-1.03	-0.21
9,989.0	89.85	177.90	7,373.9	-2,270.9	-2,350.8	-1,554.6	2,336.9	1.06	0.94	-0.49
10,083.0	88.64	176.45	7,375.1	-2,272.1	-2,444.7	-1,550.0	2,430.8	2.01	-1.29	-1.54
10,177.0	89.26	177.07	7,376.8	-2,273.8	-2,538.5	-1,544.7	2,524.7	0.93	0.66	0.66
10,272.0	88.60	179.70	7,378.6	-2,275.6	-2,633.4	-1,542.0	2,619.6	2.85	-0.69	2.77
10,366.0	89.76	179.64	7,380.0	-2,277.0	-2,727.4	-1,541.5	2,713.6	1.24	1.23	-0.06
10,460.0	91.08	180.81	7,379.3	-2,276.3	-2,821.4	-1,541.8	2,807.6	1.88	1.40	1.24
10,553.0	90.62	180.35	7,377.9	-2,274.9	-2,914.4	-1,542.8	2,900.6	0.70	-0.49	-0.49
10,648.0	89.37	180.10	7,377.9	-2,274.9	-3,009.4	-1,543.1	2,995.5	1.34	-1.32	-0.26
10,742.0	89.63	180.30	7,378.7	-2,275.7	-3,103.4	-1,543.5	3,089.5	0.35	0.28	0.21
10,837.0	90.41	181.03	7,378.7	-2,275.7	-3,198.4	-1,544.6	3,184.5	1.12	0.82	0.77
10,932.0	89.81	180.64	7,378.5	-2,275.5	-3,293.4	-1,546.0	3,279.5	0.75	-0.63	-0.41
11,026.0	89.59	179.36	7,379.0	-2,276.0	-3,387.4	-1,546.0	3,373.5	1.38	-0.23	-1.36
11,118.0	90.47	179.78	7,378.9	-2,275.9	-3,479.4	-1,545.3	3,465.5	1.06	0.96	0.46
11,212.0	89.89	176.56	7,378.6	-2,275.6	-3,573.3	-1,542.3	3,559.4	3.48	-0.62	-3.43
11,306.0	90.35	179.29	7,378.4	-2,275.4	-3,667.2	-1,538.9	3,653.4	2.95	0.49	2.90
11,399.0	89.86	177.85	7,378.3	-2,275.3	-3,760.2	-1,536.5	3,746.4	1.64	-0.53	-1.55
11,491.0	89.95	176.41	7,378.4	-2,275.4	-3,852.1	-1,531.9	3,838.3	1.57	0.10	-1.57
<b>~ ENTER RADIUS TOE (11494' MD)</b>										
<b>11,494.0</b>	<b>89.95</b>	<b>176.49</b>	<b>7,378.4</b>	<b>-2,275.4</b>	<b>-3,855.1</b>	<b>-1,531.7</b>	<b>3,841.3</b>	<b>2.83</b>	<b>-0.11</b>	<b>2.83</b>
11,583.0	89.85	179.01	7,378.6	-2,275.6	-3,944.0	-1,528.3	3,930.2	2.83	-0.11	2.83
11,678.0	89.58	175.75	7,379.1	-2,276.1	-4,038.9	-1,523.9	4,025.2	3.44	-0.28	-3.43
11,773.0	88.35	177.27	7,380.8	-2,277.8	-4,133.7	-1,518.1	4,120.0	2.06	-1.29	1.60
11,865.0	87.88	180.32	7,383.8	-2,280.8	-4,225.6	-1,516.2	4,212.0	3.35	-0.51	3.32
11,958.0	88.54	179.64	7,386.7	-2,283.7	-4,318.6	-1,516.2	4,304.9	1.02	0.71	-0.73

Survey Report



<b>Company:</b>	ANADARKO PETROLEUM CORP	<b>Local Co-ordinate Reference:</b>	Well GRACIE 24-1HZ - Slot GRACIE 24-1HZ
<b>Project:</b>	WELD COUNTY (NAD 83)	<b>TVD Reference:</b>	KB 20' @ 5103.0usft (PD461)
<b>Site:</b>	SE SW SEC 24 T2N R66W 6th P.M.	<b>MD Reference:</b>	KB 20' @ 5103.0usft (PD461)
<b>Well:</b>	GRACIE 24-1HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	JOB # 2018-418-461	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL SURVEYS	<b>Database:</b>	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)
12,052.0	88.77	182.35	7,388.9	-2,285.9	-4,412.5	-1,517.8	4,398.8	2.89	0.24	2.88
12,145.0	89.35	182.94	7,390.4	-2,287.4	-4,505.4	-1,522.1	4,491.7	0.89	0.62	0.63
12,238.0	90.36	183.44	7,390.7	-2,287.7	-4,598.3	-1,527.3	4,584.5	1.21	1.09	0.54
12,333.0	90.83	183.00	7,389.7	-2,286.7	-4,693.1	-1,532.6	4,679.3	0.68	0.49	-0.46
12,428.0	91.05	182.40	7,388.1	-2,285.1	-4,788.0	-1,537.1	4,774.1	0.67	0.23	-0.63
<b>~ EXIT RADIUS TOE (12431' MD)</b>										
<b>12,431.0</b>	<b>91.09</b>	<b>182.40</b>	<b>7,388.1</b>	<b>-2,285.1</b>	<b>-4,791.0</b>	<b>-1,537.2</b>	<b>4,777.1</b>	<b>1.45</b>	<b>1.45</b>	<b>-0.05</b>
12,521.0	92.40	182.35	7,385.3	-2,282.3	-4,880.9	-1,540.9	4,867.0	1.45	1.45	-0.05
12,614.0	93.53	182.17	7,380.5	-2,277.5	-4,973.7	-1,544.6	4,959.7	1.23	1.22	-0.19
<b>LAST SURVEY JULY 28, 2018</b>										
<b>12,708.0</b>	<b>94.62</b>	<b>181.92</b>	<b>7,373.8</b>	<b>-2,270.8</b>	<b>-5,067.4</b>	<b>-1,547.9</b>	<b>5,053.4</b>	<b>1.19</b>	<b>1.16</b>	<b>-0.27</b>
<b>PROJECTION TO TD: 40.103353;-104.734813</b>										
<b>12,786.0</b>	<b>94.62</b>	<b>181.92</b>	<b>7,367.6</b>	<b>-2,264.6</b>	<b>-5,145.1</b>	<b>-1,550.5</b>	<b>5,131.1</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

Survey Report



<b>Company:</b>	ANADARKO PETROLEUM CORP	<b>Local Co-ordinate Reference:</b>	Well GRACIE 24-1HZ - Slot GRACIE 24-1HZ
<b>Project:</b>	WELD COUNTY (NAD 83)	<b>TVD Reference:</b>	KB 20' @ 5103.0usft (PD461)
<b>Site:</b>	SE SW SEC 24 T2N R66W 6th P.M.	<b>MD Reference:</b>	KB 20' @ 5103.0usft (PD461)
<b>Well:</b>	GRACIE 24-1HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	JOB # 2018-418-461	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL SURVEYS	<b>Database:</b>	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										
KOP - GRACIE 24-1HZ - survey misses target center by 18.0usft at 6904.4usft MD (6663.4 TVD, 334.0 N, -1587.2 E) - Point	0.00	0.00	6,661.8	317.3	-1,580.7	14,569,939.28	1,714,523.93	40° 7' 6.049 N	104° 44' 5.717 W	
HEEL - GRACIE 24-1HZ - survey misses target center by 21.4usft at 8043.5usft MD (7373.6 TVD, -405.8 N, -1577.4 E) - Point	0.00	0.00	7,389.0	-405.3	-1,592.2	14,569,216.92	1,714,514.57	40° 6' 58.908 N	104° 44' 5.865 W	
BHL - GRACIE 24-1HZ ( - survey misses target center by 25.1usft at 12786.0usft MD (7367.6 TVD, -5145.1 N, -1550.5 E) - Point	0.00	0.00	7,384.0	-5,147.2	-1,531.7	14,564,477.07	1,714,589.51	40° 6' 12.048 N	104° 44' 5.082 W	
HEEL - GRACIE 24-1HZ - survey misses target center by 16.0usft at 8036.4usft MD (7373.3 TVD, -398.7 N, -1577.4 E) - Point	0.00	0.00	7,389.0	-398.0	-1,574.3	14,569,224.29	1,714,532.47	40° 6' 58.980 N	104° 44' 5.634 W	
KOP - GRACIE 24-1HZ - survey misses target center by 86.1usft at 7012.3usft MD (6770.5 TVD, 321.3 N, -1586.5 E) - Point	0.00	0.00	6,752.4	237.4	-1,580.0	14,569,859.39	1,714,524.88	40° 7' 5.259 N	104° 44' 5.708 W	
HEEL - GRACIE 24-1HZ - survey misses target center by 5.7usft at 8035.9usft MD (7373.3 TVD, -398.2 N, -1577.4 E) - Point	0.00	0.00	7,378.0	-398.0	-1,574.3	14,569,224.29	1,714,532.47	40° 6' 58.980 N	104° 44' 5.634 W	
BHL - GRACIE 24-1HZ - survey misses target center by 35.8usft at 12785.1usft MD (7367.6 TVD, -5144.1 N, -1550.5 E) - Point	0.00	0.00	7,398.0	-5,147.2	-1,531.7	14,564,477.07	1,714,589.51	40° 6' 12.048 N	104° 44' 5.082 W	

Survey Annotations					
Measured Depth	Vertical Depth	Local Coordinates		Comment	
(usft)	(usft)	+N/-S (usft)	+E/-W (usft)		
1,841.0	1,792.8	49.9	-348.8	TIE ON TO SURFACE SURVEY	
6,880.0	6,639.0	334.8	-1,587.6	KOP	
7,486.0	7,179.4	98.9	-1,578.4	~ ENTER RADIUS HEEL (7486' MD)	
7,929.0	7,366.3	-291.6	-1,577.7	HEEL: 40.116676; -104.734911	
8,457.0	7,379.2	-819.1	-1,573.8	~ EXIT RADIUS HEEL (8457' MD)	
11,494.0	7,378.4	-3,855.1	-1,531.7	~ ENTER RADIUS TOE (11494' MD)	
12,431.0	7,388.1	-4,791.0	-1,537.2	~ EXIT RADIUS TOE (12431' MD)	
12,708.0	7,373.8	-5,067.4	-1,547.9	LAST SURVEY JULY 28, 2018	
12,786.0	7,367.6	-5,145.1	-1,550.5	PROJECTION TO TD: 40.103353;-104.734813	

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_