

ANADARKO PETROLEUM CORP

WELD COUNTY (NAD 83)

SW SE SEC. 25 T2N R66W 6th P.M.

GRACIE 24-12HZ

JOB # 2018-388-461

15 July, 2018

Survey: FINAL SURVEYS





Project: WELD COUNTY (NAD 83)
 Site: SW SE SEC. 25 T2N R66W 6th P.M.
 Well: GRACIE 24-12HZ
 Wellbore: JOB # 2018-388-461
 Design: FINAL SURVEYS

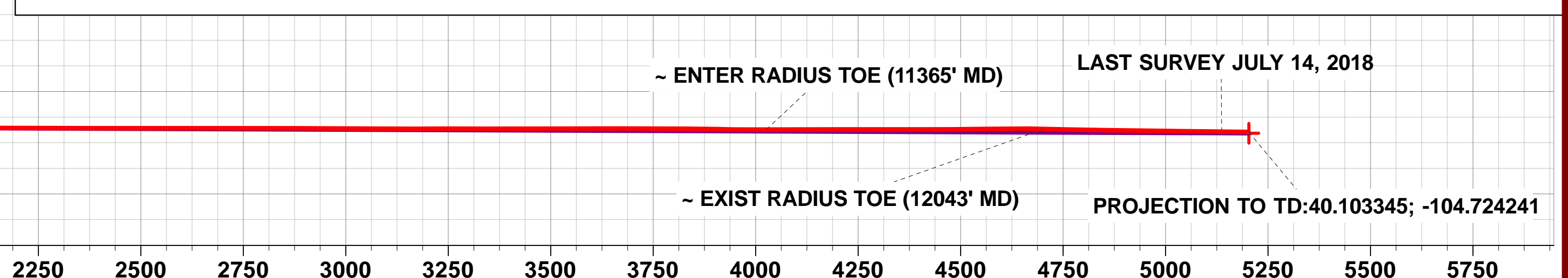
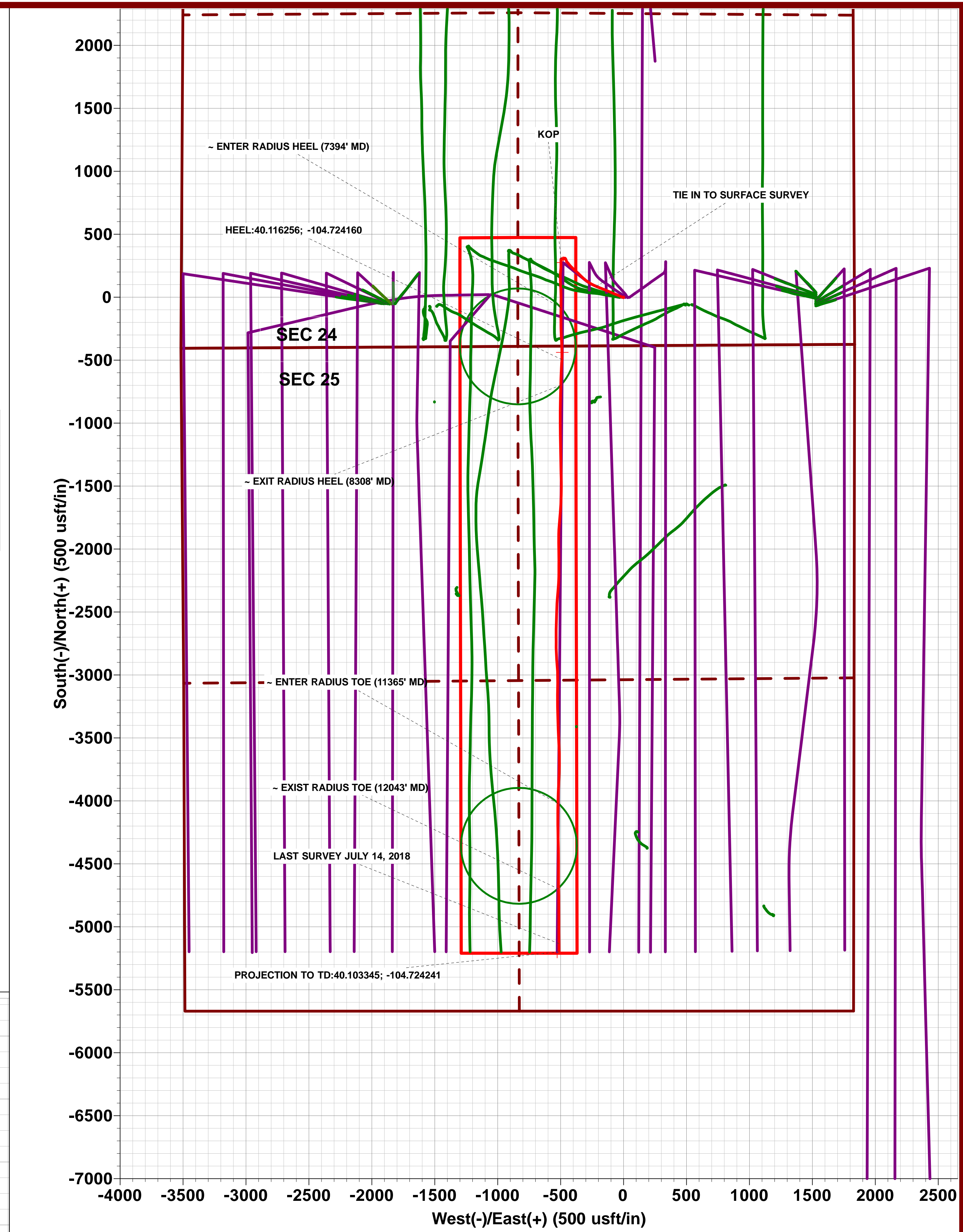
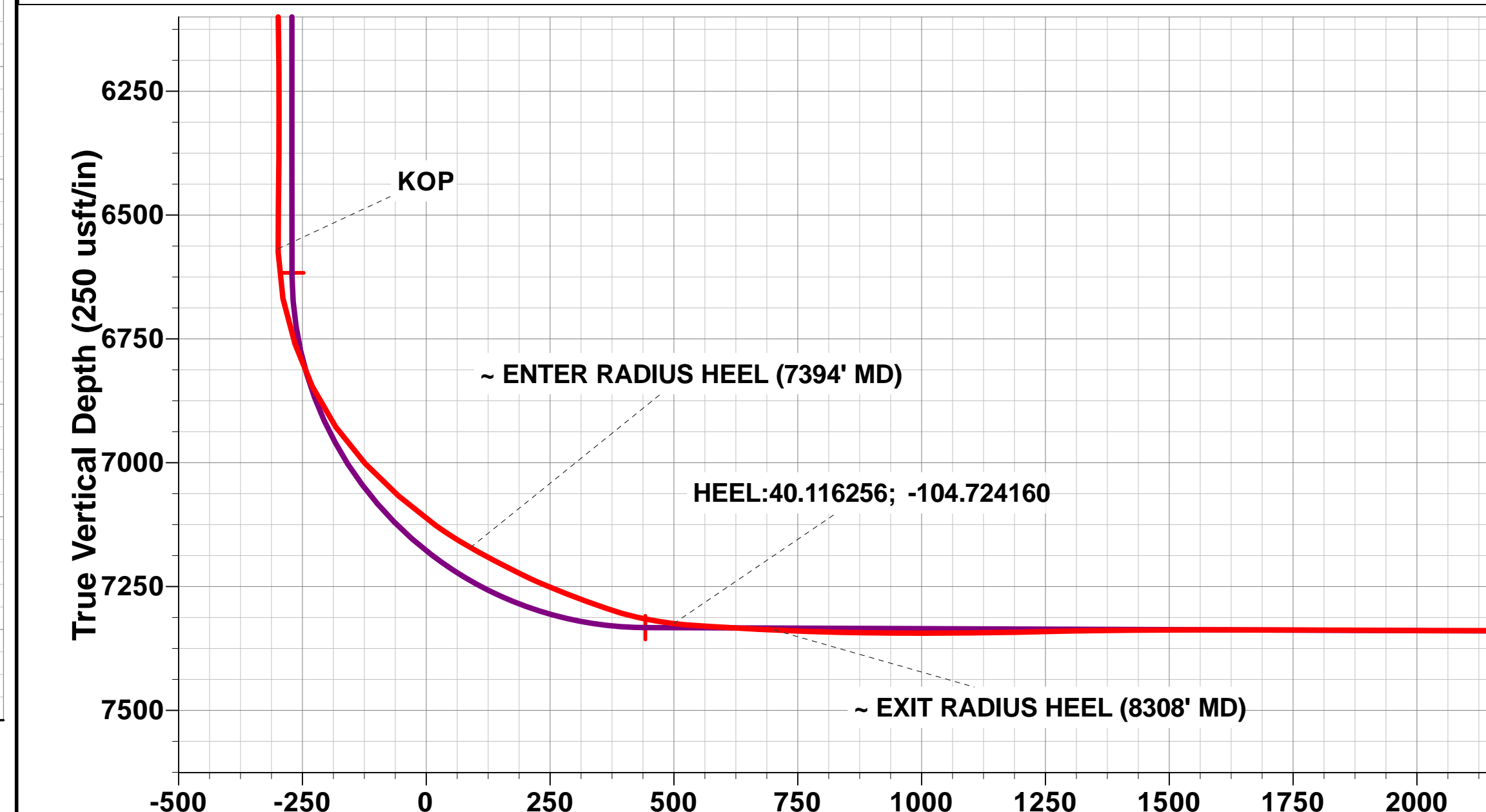
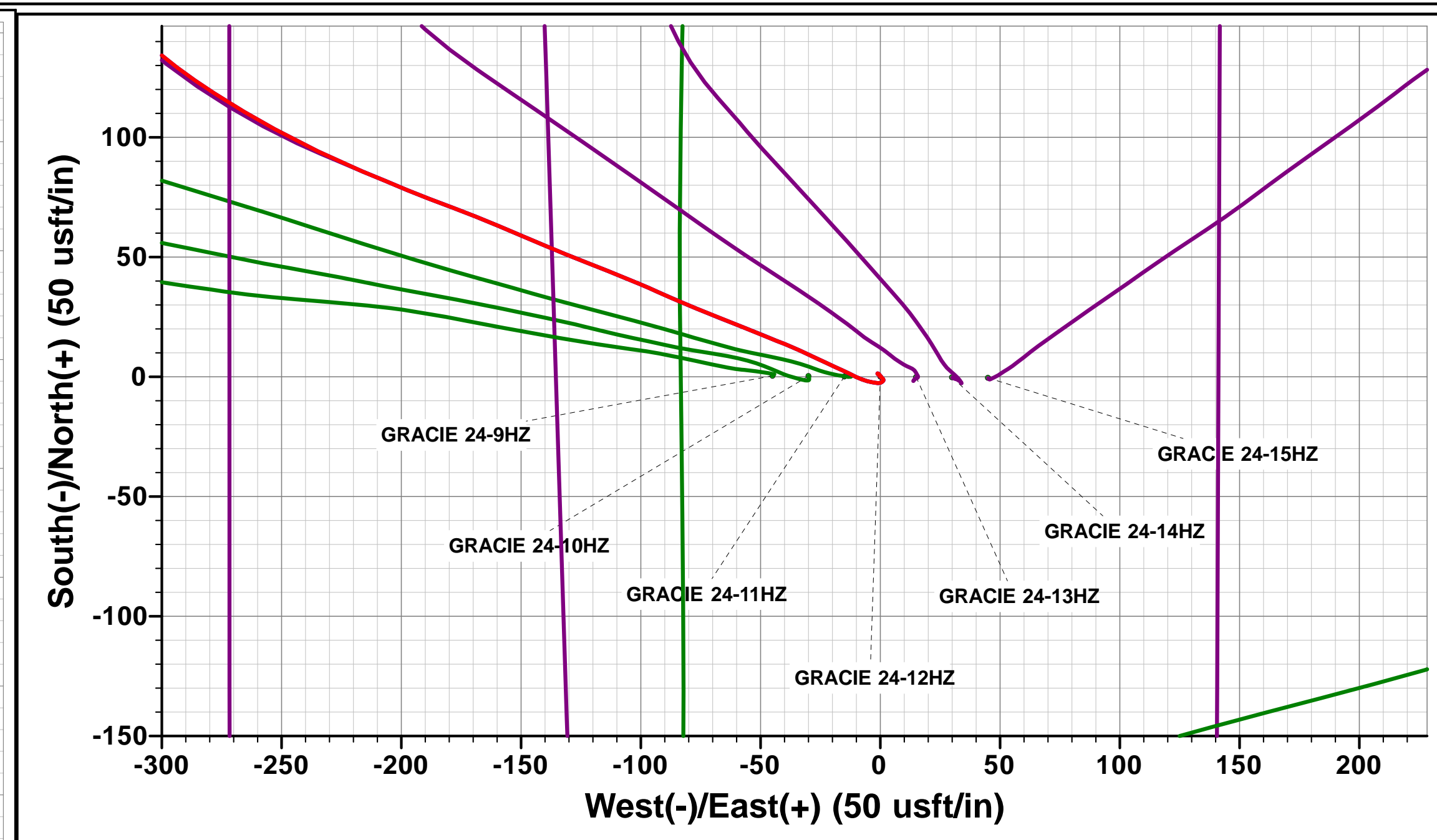
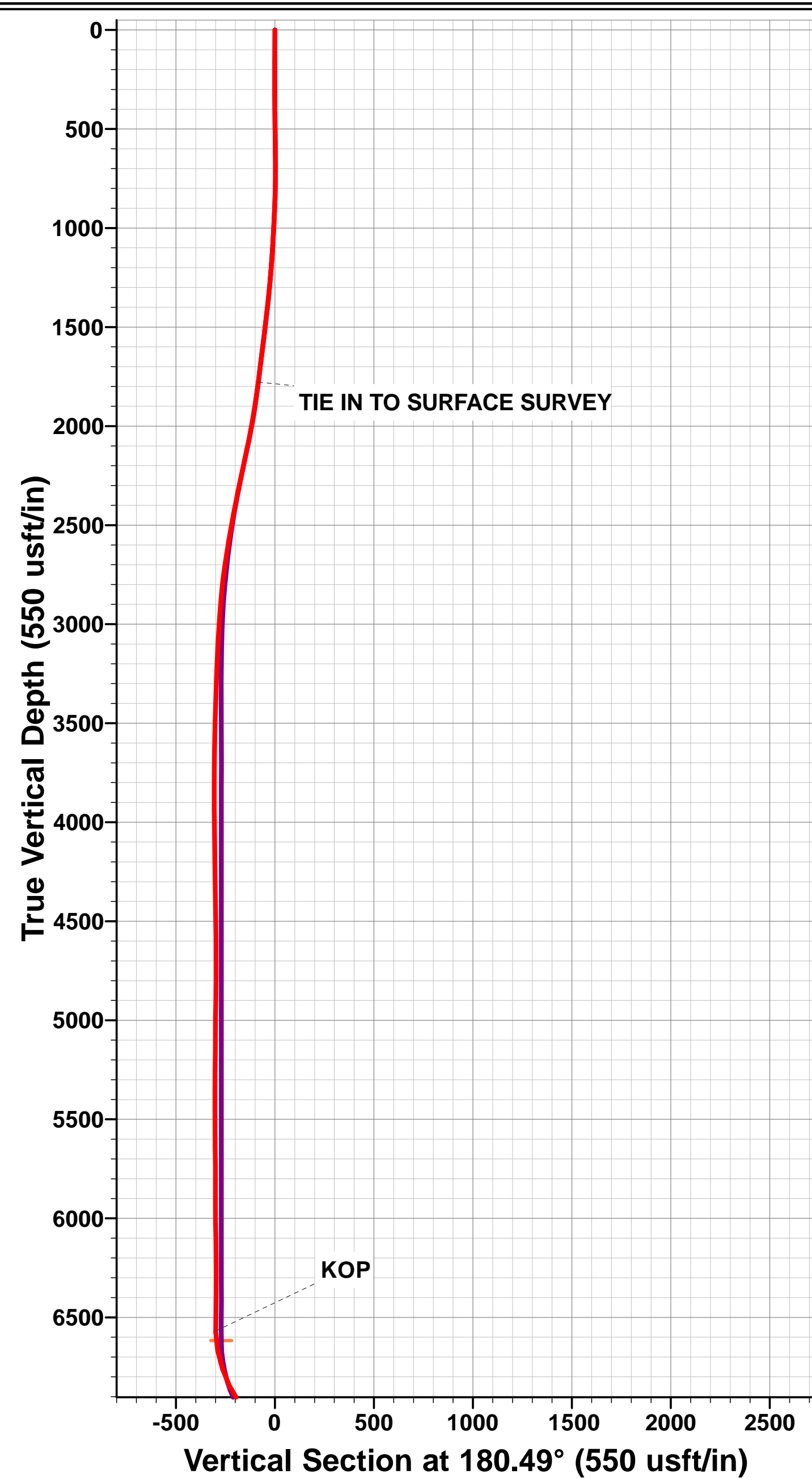
ANNOTATIONS										
TVD	MD	Inc	Azi	+N/-S	+E/-W	VSec	Departure	Annotation		
1777.6	1808.0	18.81	292.93	85.8	-216.2	-83.9	241.6	TIE IN TO SURFACE SURVEY		
6568.3	6643.0	0.79	240.96	303.3	-496.8	-299.0	631.1	KOP		
7171.4	7394.3	60.48	180.82	-85.0	-496.9	89.3	1020.6	~ ENTER RADIUS HEEL (7394' MD)		
7324.9	7835.0	83.06	182.13	-495.2	-490.3	499.3	1430.9	HEEL:40.116256; -104.724160		
7337.6	8038.0	87.01	181.60	-697.6	-498.5	701.8	1633.3	~ EXIT RADIUS HEEL (8308' MD)		
7343.1	11365.0	90.33	181.18	-4021.8	-521.3	4026.1	4960.1	~ ENTER RADIUS TOE (11365' MD)		
7341.6	12043.0	88.85	178.99	-4699.7	-516.0	4703.9	5638.0	~ EXIST RADIUS TOE (12043' MD)		
7348.1	12476.0	89.31	179.68	-5132.6	-513.3	5136.8	6071.0	LAST SURVEY JULY 14, 2018		
7348.9	12542.0	89.31	179.68	-5198.6	-512.9	5202.8	6137.0	PROJECTION TO TD:40.103345; -104.724241		

AS DRILLED LOCAL COORDINATES:

SHL: 385ft FSL & 1834ft FEL Sec 24
 HEEL: 107ft FNL & 2325.5ft FEL Sec 25
 BHL: 470.5ft FSL & 2340.1ft FEL Sec 25

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
BHL - GRACIE 24-12HZ (P2)	7352.0	-5199.1	-527.8	40° 6' 12.038 N	104° 43' 27.458 W
HEEL - GRACIE 24-12HZ (P2)	7333.0	-438.2	-486.7	40° 6' 59.086 N	104° 43' 26.930 W
KOP - GRACIE 24-12HZ (P3)	6616.8	275.1	-480.5	40° 7' 6.135 N	104° 43' 26.852 W



Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-12HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	KB 20' @ 5075.0usft (PD 461)
Site:	SW SE SEC. 25 T2N R66W 6th P.M.	MD Reference:	KB 20' @ 5075.0usft (PD 461)
Well:	GRACIE 24-12HZ	North Reference:	True
Wellbore:	JOB # 2018-388-461	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	SW SE SEC. 25 T2N R66W 6th P.M.				
Site Position:		Northing:	14,569,683.89 usft	Latitude:	40° 7' 3.420 N
From:	Lat/Long	Easting:	1,717,978.33 usft	Longitude:	104° 43' 21.245 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	0.18 °

Well	GRACIE 24-12HZ					
Well Position	+N/-S	0.0 usft	Northing:	14,569,683.63 usft	Latitude:	40° 7' 3.416 N
	+E/-W	0.0 usft	Easting:	1,718,023.30 usft	Longitude:	104° 43' 20.666 W
Position Uncertainty	0.0 usft		Wellhead Elevation:	usft	Ground Level:	5,055.0 usft

Wellbore	JOB # 2018-388-461				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	06/06/2018	8.06	66.61	52,137

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	180.49	

Survey Program	Date	15/07/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
129.0	12,542.0	FINAL SURVEYS (JOB # 2018-388-461)	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	5,075.0	0.0	0.0	0.0	0.00	0.00	0.00	
129.0	0.70	320.79	129.0	4,946.0	0.6	-0.5	-0.6	0.54	0.54	0.00	
161.0	0.83	314.29	161.0	4,914.0	0.9	-0.8	-0.9	0.49	0.41	-20.31	
193.0	0.57	309.37	193.0	4,882.0	1.2	-1.1	-1.2	0.83	-0.81	-15.37	
224.0	0.22	3.25	224.0	4,851.0	1.3	-1.2	-1.3	1.53	-1.13	173.81	
256.0	0.26	84.46	256.0	4,819.0	1.4	-1.1	-1.4	0.98	0.12	253.78	
288.0	0.48	113.11	288.0	4,787.0	1.4	-0.9	-1.4	0.88	0.69	89.53	
319.0	0.57	114.69	319.0	4,756.0	1.3	-0.7	-1.2	0.29	0.29	5.10	
351.0	0.83	151.17	351.0	4,724.0	1.0	-0.4	-1.0	1.57	0.81	114.00	
383.0	0.48	127.35	383.0	4,692.0	0.7	-0.2	-0.7	1.36	-1.09	-74.44	
415.0	0.92	150.46	415.0	4,660.0	0.4	0.0	-0.4	1.61	1.37	72.22	
478.0	0.79	132.71	478.0	4,597.0	-0.3	0.6	0.3	0.47	-0.21	-28.17	
509.0	1.27	137.46	509.0	4,566.0	-0.7	1.0	0.7	1.57	1.55	15.32	

Survey Report



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Site:	SW SE SEC. 25 T2N R66W 6th P.M.	MD Reference:	KB 20' @ 5075.0usft (PD 461)
Well:	GRACIE 24-12HZ	North Reference:	True
Wellbore:	JOB # 2018-388-461	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)	
541.0	0.62	147.56	541.0	4,534.0	-1.1	1.3	1.1	2.09	-2.03	31.56	
572.0	0.92	206.89	572.0	4,503.0	-1.5	1.3	1.5	2.60	0.97	191.39	
604.0	0.79	225.79	604.0	4,471.0	-1.9	1.0	1.9	0.96	-0.41	59.06	
636.0	1.05	239.50	636.0	4,439.0	-2.2	0.6	2.2	1.06	0.81	42.84	
668.0	1.58	248.46	667.9	4,407.1	-2.5	0.0	2.5	1.77	1.66	28.00	
700.0	1.85	274.04	699.9	4,375.1	-2.6	-1.0	2.6	2.51	0.84	79.94	
731.0	2.37	280.63	730.9	4,344.1	-2.5	-2.1	2.5	1.85	1.68	21.26	
763.0	2.86	279.05	762.9	4,312.1	-2.2	-3.5	2.3	1.55	1.53	-4.94	
795.0	3.87	285.38	794.8	4,280.2	-1.8	-5.4	1.9	3.36	3.16	19.78	
826.0	4.70	289.95	825.7	4,249.3	-1.1	-7.6	1.2	2.89	2.68	14.74	
858.0	5.41	295.22	857.6	4,217.4	0.0	-10.2	0.1	2.65	2.22	16.47	
890.0	5.89	297.06	889.5	4,185.5	1.4	-13.0	-1.3	1.60	1.50	5.75	
922.0	6.24	293.99	921.3	4,153.7	2.8	-16.0	-2.7	1.49	1.09	-9.59	
953.0	6.37	295.22	952.1	4,122.9	4.2	-19.1	-4.1	0.60	0.42	3.97	
984.0	6.59	294.78	982.9	4,092.1	5.7	-22.3	-5.5	0.73	0.71	-1.42	
1,016.0	6.99	295.39	1,014.7	4,060.3	7.3	-25.7	-7.1	1.27	1.25	1.91	
1,080.0	8.52	294.43	1,078.1	3,996.9	11.0	-33.6	-10.7	2.40	2.39	-1.50	
1,143.0	10.94	291.70	1,140.2	3,934.8	15.1	-43.4	-14.7	3.91	3.84	-4.33	
1,175.0	11.95	292.76	1,171.5	3,903.5	17.5	-49.2	-17.1	3.22	3.16	-3.31	
1,238.0	11.91	290.82	1,233.2	3,841.8	22.3	-61.3	-21.8	0.64	-0.06	-3.08	
1,270.0	12.48	291.79	1,264.4	3,810.6	24.8	-67.6	-24.2	1.89	1.78	3.03	
1,333.0	15.12	293.02	1,325.6	3,749.4	30.5	-81.5	-29.8	4.22	4.19	1.95	
1,365.0	14.98	293.99	1,356.5	3,718.5	33.8	-89.1	-33.1	0.90	-0.44	3.03	
1,396.0	15.64	293.46	1,386.4	3,688.6	37.1	-96.6	-36.3	2.18	2.13	-1.71	
1,427.0	17.23	292.23	1,416.2	3,658.8	40.5	-104.7	-39.6	5.25	5.13	-3.97	
1,459.0	17.53	291.62	1,446.7	3,628.3	44.1	-113.6	-43.1	1.10	0.94	-1.91	
1,491.0	17.97	291.79	1,477.2	3,597.8	47.7	-122.6	-46.7	1.38	1.37	0.53	
1,522.0	18.33	292.14	1,506.6	3,568.4	51.3	-131.6	-50.2	1.21	1.16	1.13	
1,554.0	18.50	292.85	1,537.0	3,538.0	55.2	-140.9	-54.0	0.88	0.53	2.22	
1,586.0	18.76	293.11	1,567.3	3,507.7	59.2	-150.4	-57.9	0.85	0.81	0.81	
1,617.0	18.81	293.02	1,596.7	3,478.3	63.1	-159.5	-61.7	0.19	0.16	-0.29	
1,649.0	18.72	291.18	1,627.0	3,448.0	67.0	-169.1	-65.5	1.87	-0.28	-5.75	
1,681.0	18.68	291.00	1,657.3	3,417.7	70.7	-178.6	-69.1	0.22	-0.12	-0.56	
1,713.0	18.94	290.74	1,687.6	3,387.4	74.3	-188.3	-72.7	0.85	0.81	-0.81	
1,744.0	18.41	292.49	1,716.9	3,358.1	78.0	-197.5	-76.3	2.49	-1.71	5.65	
1,776.0	18.33	292.49	1,747.3	3,327.7	81.9	-206.8	-80.1	0.25	-0.25	0.00	
TIE IN TO SURFACE SURVEY											
1,808.0	18.81	292.93	1,777.6	3,297.4	85.8	-216.2	-83.9	1.56	1.50	1.37	
1,935.0	18.65	298.60	1,897.9	3,177.1	103.5	-252.9	-101.3	1.44	-0.13	4.46	
2,028.0	18.12	302.71	1,986.2	3,088.8	118.4	-278.1	-116.0	1.51	-0.57	4.42	
2,121.0	17.68	309.29	2,074.7	3,000.3	135.2	-301.2	-132.6	2.22	-0.47	7.08	
2,215.0	17.82	311.68	2,164.2	2,910.8	153.8	-323.0	-151.0	0.79	0.15	2.54	
2,308.0	17.53	315.64	2,252.8	2,822.2	173.3	-343.5	-170.3	1.33	-0.31	4.26	
2,402.0	16.68	312.73	2,342.7	2,732.3	192.5	-363.3	-189.4	1.28	-0.90	-3.10	
2,496.0	16.22	311.62	2,432.8	2,642.2	210.4	-383.0	-207.1	0.59	-0.49	-1.18	
2,591.0	14.49	313.44	2,524.4	2,550.6	227.4	-401.5	-224.0	1.89	-1.82	1.92	
2,683.0	12.88	315.37	2,613.8	2,461.2	242.6	-417.1	-239.0	1.82	-1.75	2.10	
2,778.0	10.80	321.51	2,706.8	2,368.2	257.1	-430.1	-253.4	2.56	-2.19	6.46	
2,870.0	8.40	318.20	2,797.5	2,277.5	268.9	-439.9	-265.1	2.68	-2.61	-3.60	
2,964.0	5.90	323.11	2,890.8	2,184.2	277.9	-447.4	-274.0	2.74	-2.66	5.22	
3,057.0	4.57	327.31	2,983.4	2,091.6	284.8	-452.3	-280.9	1.49	-1.43	4.52	
3,150.0	3.02	345.85	3,076.2	1,998.8	290.3	-454.9	-286.4	2.11	-1.67	19.94	
3,242.0	2.77	345.42	3,168.0	1,907.0	294.8	-456.0	-290.9	0.27	-0.27	-0.47	

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-12HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	KB 20' @ 5075.0usft (PD 461)
Site:	SW SE SEC. 25 T2N R66W 6th P.M.	MD Reference:	KB 20' @ 5075.0usft (PD 461)
Well:	GRACIE 24-12HZ	North Reference:	True
Wellbore:	JOB # 2018-388-461	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)	
3,335.0	2.53	341.71	3,260.9	1,814.1	298.9	-457.2	-295.0	0.32	-0.26	-3.99	
3,429.0	2.19	331.18	3,354.9	1,720.1	302.5	-458.8	-298.5	0.58	-0.36	-11.20	
3,523.0	1.90	330.53	3,448.8	1,626.2	305.4	-460.4	-301.4	0.31	-0.31	-0.69	
3,616.0	1.68	317.58	3,541.8	1,533.2	307.7	-462.1	-303.8	0.49	-0.24	-13.92	
3,710.0	1.43	300.21	3,635.7	1,439.3	309.3	-464.0	-305.4	0.56	-0.27	-18.48	
3,805.0	1.08	286.51	3,730.7	1,344.3	310.2	-465.9	-306.2	0.48	-0.37	-14.42	
3,899.0	1.55	286.18	3,824.7	1,250.3	310.8	-468.0	-306.8	0.50	0.50	-0.35	
3,993.0	0.61	229.26	3,918.7	1,156.3	310.8	-469.6	-306.8	1.40	-1.00	-60.55	
4,085.0	0.69	238.51	4,010.7	1,064.3	310.2	-470.4	-306.2	0.14	0.09	10.05	
4,178.0	1.11	212.44	4,103.7	971.3	309.2	-471.4	-305.1	0.62	0.45	-28.03	
4,298.0	1.83	218.01	4,223.6	851.4	306.7	-473.2	-302.6	0.61	0.60	4.64	
4,393.0	0.36	226.93	4,318.6	756.4	305.3	-474.3	-301.2	1.55	-1.55	9.39	
4,487.0	0.81	240.00	4,412.6	662.4	304.7	-475.1	-300.7	0.50	0.48	13.90	
4,581.0	1.09	195.09	4,506.6	568.4	303.5	-475.9	-299.5	0.82	0.30	-47.78	
4,675.0	1.64	223.51	4,600.5	474.5	301.7	-477.1	-297.6	0.91	0.59	30.23	
4,769.0	0.61	348.92	4,694.5	380.5	301.2	-478.1	-297.1	2.19	-1.10	133.41	
4,863.0	0.97	330.65	4,788.5	286.5	302.4	-478.6	-298.3	0.46	0.38	-19.44	
4,958.0	0.73	314.43	4,883.5	191.5	303.5	-479.4	-299.4	0.36	-0.25	-17.07	
5,052.0	1.05	297.53	4,977.5	97.5	304.4	-480.6	-300.2	0.44	0.34	-17.98	
5,146.0	1.08	284.83	5,071.5	3.5	305.0	-482.2	-300.8	0.25	0.03	-13.51	
5,241.0	0.59	4.73	5,166.5	-91.5	305.7	-483.0	-301.5	1.20	-0.52	84.11	
5,336.0	0.67	310.43	5,261.5	-186.5	306.5	-483.4	-302.4	0.61	0.08	-57.16	
5,430.0	1.22	281.36	5,355.5	-280.5	307.1	-484.8	-302.9	0.76	0.59	-30.93	
5,523.0	1.19	255.35	5,448.4	-373.4	307.0	-486.7	-302.9	0.58	-0.03	-27.97	
5,618.0	0.44	130.67	5,543.4	-468.4	306.6	-487.4	-302.4	1.56	-0.79	-131.24	
5,713.0	0.48	170.72	5,638.4	-563.4	305.9	-487.1	-301.7	0.33	0.04	42.16	
5,807.0	0.75	215.80	5,732.4	-657.4	305.0	-487.4	-300.9	0.57	0.29	47.96	
5,901.0	0.60	37.68	5,826.4	-751.4	304.9	-487.4	-300.7	1.44	-0.16	-189.49	
5,994.0	0.19	188.73	5,919.4	-844.4	305.2	-487.2	-301.0	0.83	-0.44	162.42	
6,088.0	1.03	216.69	6,013.4	-938.4	304.3	-487.7	-300.1	0.92	0.89	29.74	
6,181.0	1.17	218.79	6,106.4	-1,031.4	302.9	-488.8	-298.7	0.16	0.15	2.26	
6,275.0	1.89	249.61	6,200.4	-1,125.4	301.6	-490.8	-297.4	1.14	0.77	32.79	
6,367.0	1.08	288.12	6,292.3	-1,217.3	301.4	-493.1	-297.1	1.35	-0.88	41.86	
6,461.0	1.33	274.58	6,386.3	-1,311.3	301.7	-495.0	-297.5	0.40	0.27	-14.40	
6,556.0	1.10	354.31	6,481.3	-1,406.3	302.7	-496.2	-298.5	1.65	-0.24	83.93	
KOP											
6,643.0	0.79	240.96	6,568.3	-1,493.3	303.3	-496.8	-299.0	1.82	-0.36	-130.29	
6,650.0	0.89	235.72	6,575.3	-1,500.3	303.2	-496.9	-299.0	1.82	1.46	-74.84	
6,744.0	11.20	182.37	6,668.7	-1,593.7	293.7	-497.9	-289.4	11.37	10.97	-56.76	
6,839.0	18.68	175.35	6,760.4	-1,685.4	269.2	-497.0	-265.0	8.09	7.87	-7.39	
6,932.0	26.00	185.78	6,846.4	-1,771.4	234.1	-497.9	-229.8	8.92	7.87	11.22	
7,026.0	34.30	184.16	6,927.6	-1,852.6	187.1	-501.9	-182.8	8.87	8.83	-1.72	
7,121.0	43.21	176.27	7,001.7	-1,926.7	127.7	-501.7	-123.5	10.71	9.38	-8.31	
7,216.0	48.72	178.19	7,067.7	-1,992.7	59.6	-498.4	-55.3	5.98	5.80	2.02	
7,310.0	54.41	179.26	7,126.1	-2,051.1	-14.0	-496.8	18.3	6.12	6.05	1.14	
~ ENTER RADIUS HEEL (7394' MD)											
7,394.3	60.48	180.82	7,171.4	-2,096.4	-85.0	-496.9	89.3	7.37	7.20	1.85	
7,403.0	61.11	180.97	7,175.7	-2,100.7	-92.6	-497.0	96.9	7.37	7.21	1.72	
7,498.0	63.25	180.13	7,220.0	-2,145.0	-176.6	-497.8	180.9	2.38	2.25	-0.88	
7,592.0	68.80	177.70	7,258.2	-2,183.2	-262.5	-496.2	266.7	6.36	5.90	-2.59	
7,686.0	70.23	176.98	7,291.1	-2,216.1	-350.4	-492.1	354.6	1.68	1.52	-0.77	
7,779.0	78.69	179.57	7,316.0	-2,241.0	-439.9	-489.4	444.1	9.48	9.10	2.78	

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-12HZ
Project:	WELD COUNTY (NAD 83)	TDV Reference:	KB 20' @ 5075.0usft (PD 461)
Site:	SW SE SEC. 25 T2N R66W 6th P.M.	MD Reference:	KB 20' @ 5075.0usft (PD 461)
Well:	GRACIE 24-12HZ	North Reference:	True
Wellbore:	JOB # 2018-388-461	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)
HEEL:40.116256; -104.724160										
7,835.0	83.06	182.13	7,324.9	-2,249.9	-495.2	-490.3	499.3	9.01	7.80	4.58
7,872.0	85.95	183.80	7,328.4	-2,253.4	-531.9	-492.2	536.1	9.01	7.82	4.50
7,964.0	87.22	181.53	7,333.9	-2,258.9	-623.7	-496.4	627.9	2.82	1.38	-2.47
~ EXIT RADIUS HEEL (8308' MD)										
8,038.0	87.01	181.60	7,337.6	-2,262.6	-697.6	-498.5	701.8	0.30	-0.29	0.10
8,058.0	86.95	181.62	7,338.7	-2,263.7	-717.5	-499.0	721.8	0.30	-0.29	0.10
8,153.0	88.97	181.13	7,342.1	-2,267.1	-812.4	-501.3	816.7	2.19	2.13	-0.52
8,248.0	89.11	181.16	7,343.6	-2,268.6	-907.4	-503.2	911.7	0.15	0.15	0.03
8,341.0	90.11	179.13	7,344.3	-2,269.3	-1,000.4	-503.4	1,004.7	2.43	1.08	-2.18
8,434.0	90.61	179.33	7,343.7	-2,268.7	-1,093.4	-502.2	1,097.6	0.58	0.54	0.22
8,528.0	91.05	178.94	7,342.3	-2,267.3	-1,187.4	-500.8	1,191.6	0.63	0.47	-0.41
8,622.0	91.63	178.87	7,340.1	-2,265.1	-1,281.3	-499.0	1,285.5	0.62	0.62	-0.07
8,716.0	90.15	178.79	7,338.7	-2,263.7	-1,375.3	-497.0	1,379.5	1.58	-1.57	-0.09
8,812.0	90.50	178.53	7,338.1	-2,263.1	-1,471.2	-494.8	1,475.4	0.45	0.36	-0.27
8,905.0	90.17	181.81	7,337.6	-2,262.6	-1,564.2	-495.1	1,568.4	3.54	-0.35	3.53
8,999.0	89.94	183.29	7,337.5	-2,262.5	-1,658.1	-499.3	1,662.3	1.59	-0.24	1.57
9,094.0	89.66	185.27	7,337.8	-2,262.8	-1,752.9	-506.3	1,757.1	2.10	-0.29	2.08
9,187.0	89.88	183.80	7,338.2	-2,263.2	-1,845.6	-513.7	1,849.9	1.60	0.24	-1.58
9,282.0	89.38	178.11	7,338.8	-2,263.8	-1,940.5	-515.3	1,944.9	6.01	-0.53	-5.99
9,376.0	90.16	180.39	7,339.2	-2,264.2	-2,034.5	-514.1	2,038.8	2.56	0.83	2.43
9,470.0	89.84	179.25	7,339.2	-2,264.2	-2,128.5	-513.8	2,132.8	1.26	-0.34	-1.21
9,564.0	89.84	181.55	7,339.5	-2,264.5	-2,222.5	-514.4	2,226.8	2.45	0.00	2.45
9,658.0	89.66	184.77	7,339.9	-2,264.9	-2,316.3	-519.6	2,320.7	3.43	-0.19	3.43
9,751.0	90.25	184.38	7,339.9	-2,264.9	-2,409.0	-527.0	2,413.5	0.76	0.63	-0.42
9,844.0	90.05	181.12	7,339.7	-2,264.7	-2,501.9	-531.5	2,506.4	3.51	-0.22	-3.51
9,937.0	89.91	182.10	7,339.7	-2,264.7	-2,594.9	-534.1	2,599.4	1.06	-0.15	1.05
10,032.0	89.75	179.64	7,340.0	-2,265.0	-2,689.9	-535.5	2,694.3	2.59	-0.17	-2.59
10,126.0	90.46	180.78	7,339.8	-2,264.8	-2,783.9	-535.9	2,788.3	1.43	0.76	1.21
10,219.0	89.44	173.47	7,339.9	-2,264.9	-2,876.7	-531.2	2,881.1	7.94	-1.10	-7.86
10,313.0	89.95	177.85	7,340.4	-2,265.4	-2,970.4	-524.1	2,974.8	4.69	0.54	4.66
10,407.0	89.62	180.83	7,340.8	-2,265.8	-3,064.4	-523.0	3,068.7	3.19	-0.35	3.17
10,501.0	90.08	181.08	7,341.0	-2,266.0	-3,158.3	-524.6	3,162.7	0.56	0.49	0.27
10,595.0	90.00	178.60	7,340.9	-2,265.9	-3,252.3	-524.3	3,256.7	2.64	-0.09	-2.64
10,688.0	89.89	178.09	7,341.0	-2,266.0	-3,345.3	-521.6	3,349.6	0.56	-0.12	-0.55
10,781.0	90.32	178.33	7,340.9	-2,265.9	-3,438.3	-518.7	3,442.6	0.53	0.46	0.26
10,874.0	89.99	176.60	7,340.6	-2,265.6	-3,531.2	-514.6	3,535.4	1.89	-0.35	-1.86
10,968.0	89.79	178.47	7,340.8	-2,265.8	-3,625.1	-510.6	3,629.3	2.00	-0.21	1.99
11,062.0	90.07	181.09	7,340.9	-2,265.9	-3,719.1	-510.2	3,723.3	2.80	0.30	2.79
11,156.0	89.98	182.55	7,340.9	-2,265.9	-3,813.0	-513.2	3,817.3	1.56	-0.10	1.55
11,251.0	88.36	182.58	7,342.2	-2,267.2	-3,907.9	-517.5	3,912.2	1.71	-1.71	0.03
11,345.0	90.44	181.51	7,343.2	-2,268.2	-4,001.8	-520.8	4,006.1	2.49	2.21	-1.14
~ ENTER RADIUS TOE (11365' MD)										
11,365.0	90.33	181.18	7,343.1	-2,268.1	-4,021.8	-521.3	4,026.1	1.75	-0.54	-1.66
11,439.0	89.93	179.95	7,342.9	-2,267.9	-4,095.8	-522.0	4,100.1	1.75	-0.54	-1.66
11,533.0	90.56	180.47	7,342.5	-2,267.5	-4,189.8	-522.3	4,194.1	0.87	0.67	0.55
11,628.0	89.42	177.15	7,342.5	-2,267.5	-4,284.8	-520.4	4,289.1	3.69	-1.20	-3.49
11,723.0	90.48	179.74	7,342.6	-2,267.6	-4,379.7	-517.8	4,384.0	2.95	1.12	2.73
11,818.0	89.93	179.08	7,342.3	-2,267.3	-4,474.7	-516.8	4,479.0	0.90	-0.58	-0.69
11,912.0	91.31	180.80	7,341.3	-2,266.3	-4,568.7	-516.7	4,573.0	2.35	1.47	1.83
12,005.0	89.10	179.07	7,340.9	-2,265.9	-4,661.7	-516.6	4,666.0	3.02	-2.38	-1.86
~ EXIST RADIUS TOE (12043' MD)										
12,043.0	88.85	178.99	7,341.6	-2,266.6	-4,699.7	-516.0	4,703.9	0.69	-0.66	-0.20

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-12HZ
Project:	WELD COUNTY (NAD 83)	TVD Reference:	KB 20' @ 5075.0usft (PD 461)
Site:	SW SE SEC. 25 T2N R66W 6th P.M.	MD Reference:	KB 20' @ 5075.0usft (PD 461)
Well:	GRACIE 24-12HZ	North Reference:	True
Wellbore:	JOB # 2018-388-461	Survey Calculation Method:	Minimum Curvature
Design:	FINAL SURVEYS	Database:	EOG RESOURCES

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)
12,100.0	88.47	178.88	7,342.9	-2,267.9	-4,756.7	-514.9	4,760.9	0.69	-0.66	-0.20
12,193.0	89.38	180.01	7,344.7	-2,269.7	-4,849.6	-514.0	4,853.9	1.56	0.98	1.22
12,287.0	89.09	179.72	7,345.9	-2,270.9	-4,943.6	-513.8	4,947.9	0.44	-0.31	-0.31
12,382.0	89.49	180.00	7,347.1	-2,272.1	-5,038.6	-513.6	5,042.8	0.51	0.42	0.29
LAST SURVEY JULY 14, 2018										
12,476.0	89.31	179.68	7,348.1	-2,273.1	-5,132.6	-513.3	5,136.8	0.39	-0.19	-0.34
PROJECTION TO TD:40.103345; -104.724241										
12,542.0	89.31	179.68	7,348.9	-2,273.9	-5,198.6	-512.9	5,202.8	0.00	0.00	0.00

Target Name	- hit/miss target	- Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
KOP - GRACIE 24-12HZ	- survey misses target center by 75.7usft at 6589.5usft MD (6514.8 TVD, 303.2 N, -496.3 E)	- Point	0.00	0.00	6,514.5	377.0	-479.7	14,570,059.02	1,717,542.63	40° 7' 7.142 N	104° 43' 26.840 W
KOP - GRACIE 24-12HZ	- survey misses target center by 30.9usft at 6694.0usft MD (6619.3 TVD, 300.9 N, -497.4 E)	- Point	0.00	0.00	6,616.8	275.1	-480.5	14,569,957.16	1,717,542.08	40° 7' 6.135 N	104° 43' 26.852 W
BHL - GRACIE 24-12HZ	- survey misses target center by 30.9usft at 12542.0usft MD (7348.9 TVD, -5198.6 N, -512.9 E)	- Point	0.00	0.00	7,376.0	-5,199.1	-527.8	14,564,484.98	1,717,511.95	40° 6' 12.038 N	104° 43' 27.458 W
HEEL - GRACIE 24-12H	- survey misses target center by 17.3usft at 7779.9usft MD (7316.2 TVD, -440.8 N, -489.4 E)	- Point	0.00	0.00	7,333.0	-438.2	-486.7	14,569,244.12	1,717,538.20	40° 6' 59.086 N	104° 43' 26.930 W
HEEL - GRACIE 24-12H	- survey misses target center by 17.3usft at 7779.9usft MD (7316.2 TVD, -440.8 N, -489.4 E)	- Point	0.00	0.00	7,333.0	-438.2	-486.7	14,569,244.12	1,717,538.20	40° 6' 59.086 N	104° 43' 26.930 W
BHL - GRACIE 24-12HZ	- survey misses target center by 15.2usft at 12542.0usft MD (7348.9 TVD, -5198.6 N, -512.9 E)	- Point	0.00	0.00	7,352.0	-5,199.1	-527.8	14,564,484.98	1,717,511.95	40° 6' 12.038 N	104° 43' 27.458 W

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
1,808.0	1,777.6	85.8	-216.2	TIE IN TO SURFACE SURVEY
6,643.0	6,568.3	303.3	-496.8	KOP
7,394.3	7,171.4	-85.0	-496.9	~ ENTER RADIUS HEEL (7394' MD)
7,835.0	7,324.9	-495.2	-490.3	HEEL:40.116256; -104.724160
8,038.0	7,337.6	-697.6	-498.5	~ EXIT RADIUS HEEL (8308' MD)
11,365.0	7,343.1	-4,021.8	-521.3	~ ENTER RADIUS TOE (11365' MD)
12,043.0	7,341.6	-4,699.7	-516.0	~ EXIST RADIUS TOE (12043' MD)
12,476.0	7,348.1	-5,132.6	-513.3	LAST SURVEY JULY 14, 2018
12,542.0	7,348.9	-5,198.6	-512.9	PROJECTION TO TD:40.103345; -104.724241

Checked By: _____ Approved By: _____ Date: _____