

ANADARKO PETROLEUM CORP

WELD COUNTY (NAD 83)

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

GRACIE 24-11HZ

JOB # 2018-387-461

12 July, 2018

Survey: FINAL SURVEYS





Project: WELD COUNTY (NAD 83)
 Site: SW SE SEC. 25 T2N R66W 6th P.M.
 Well: GRACIE 24-11HZ
 Wellbore: JOB # 2018-387-461
 Design: FINAL SURVEYS

ANNOTATIONS

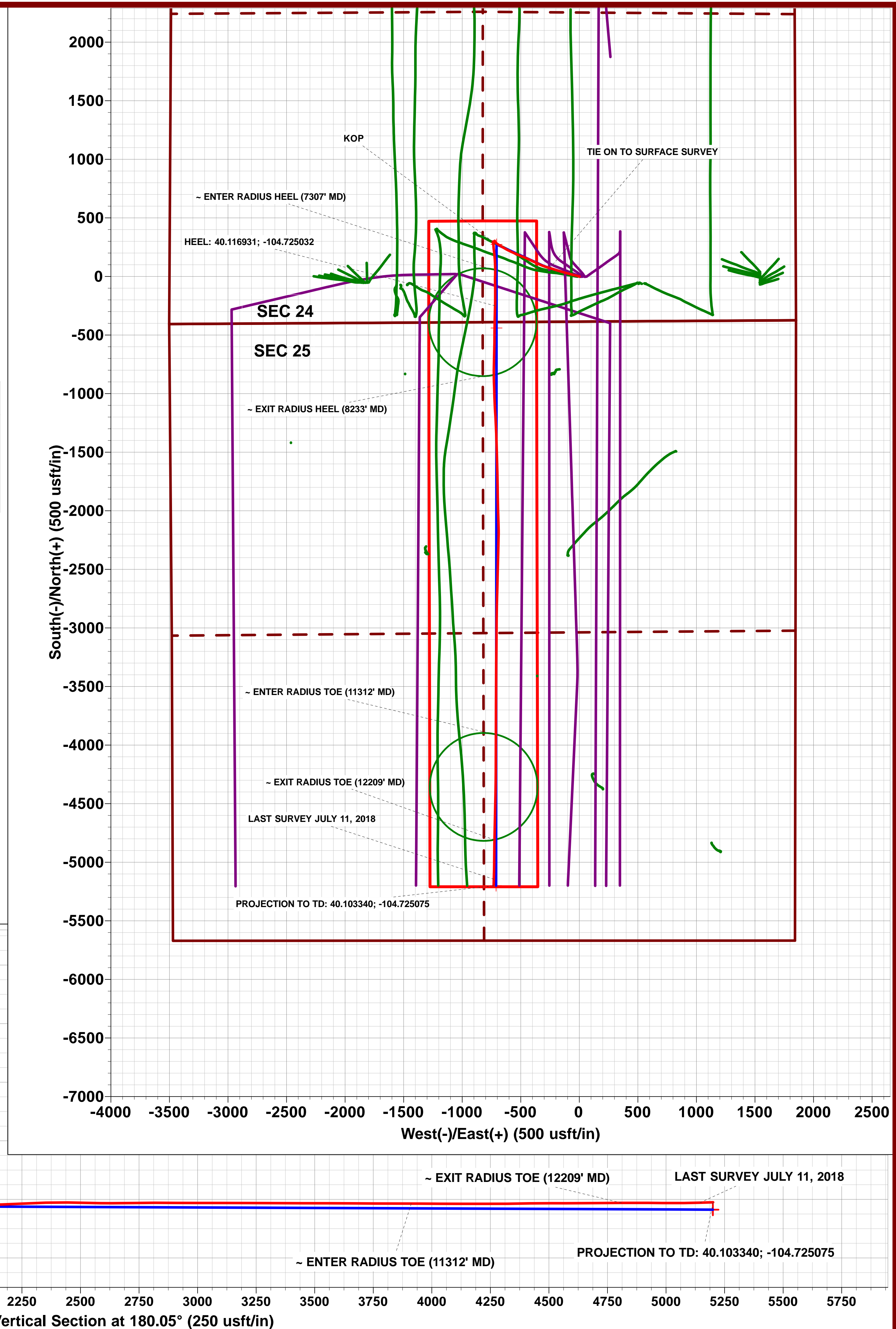
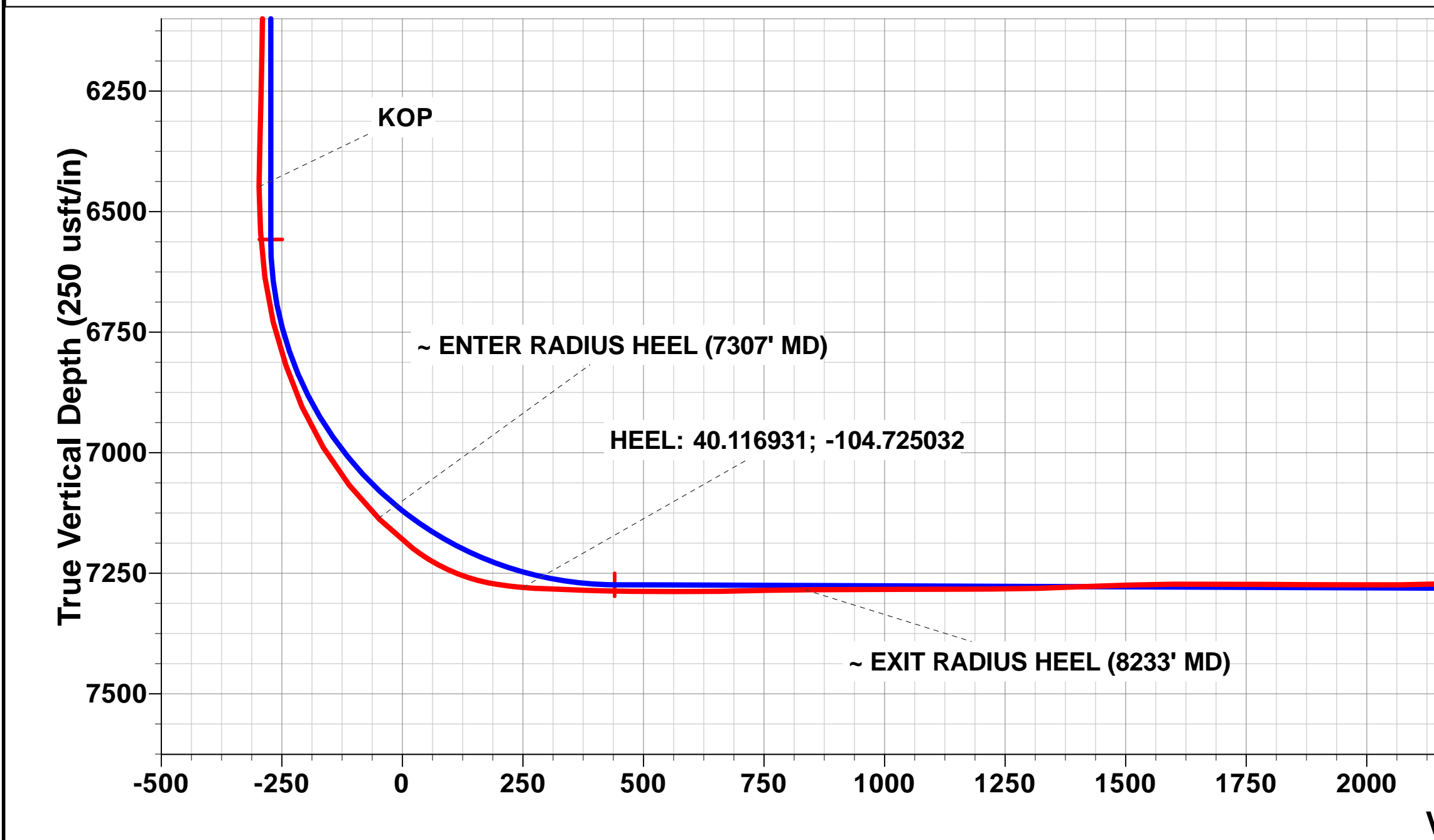
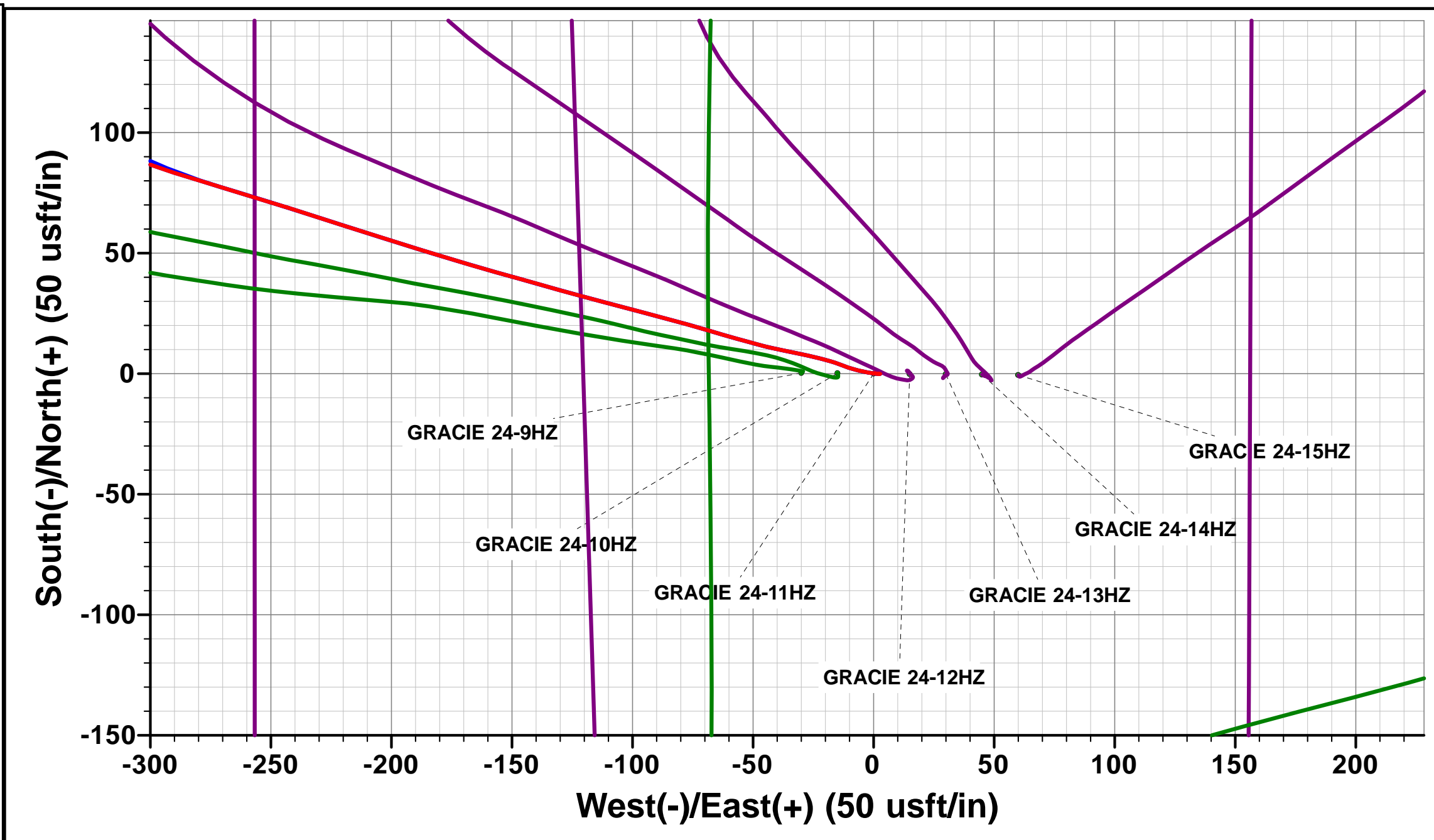
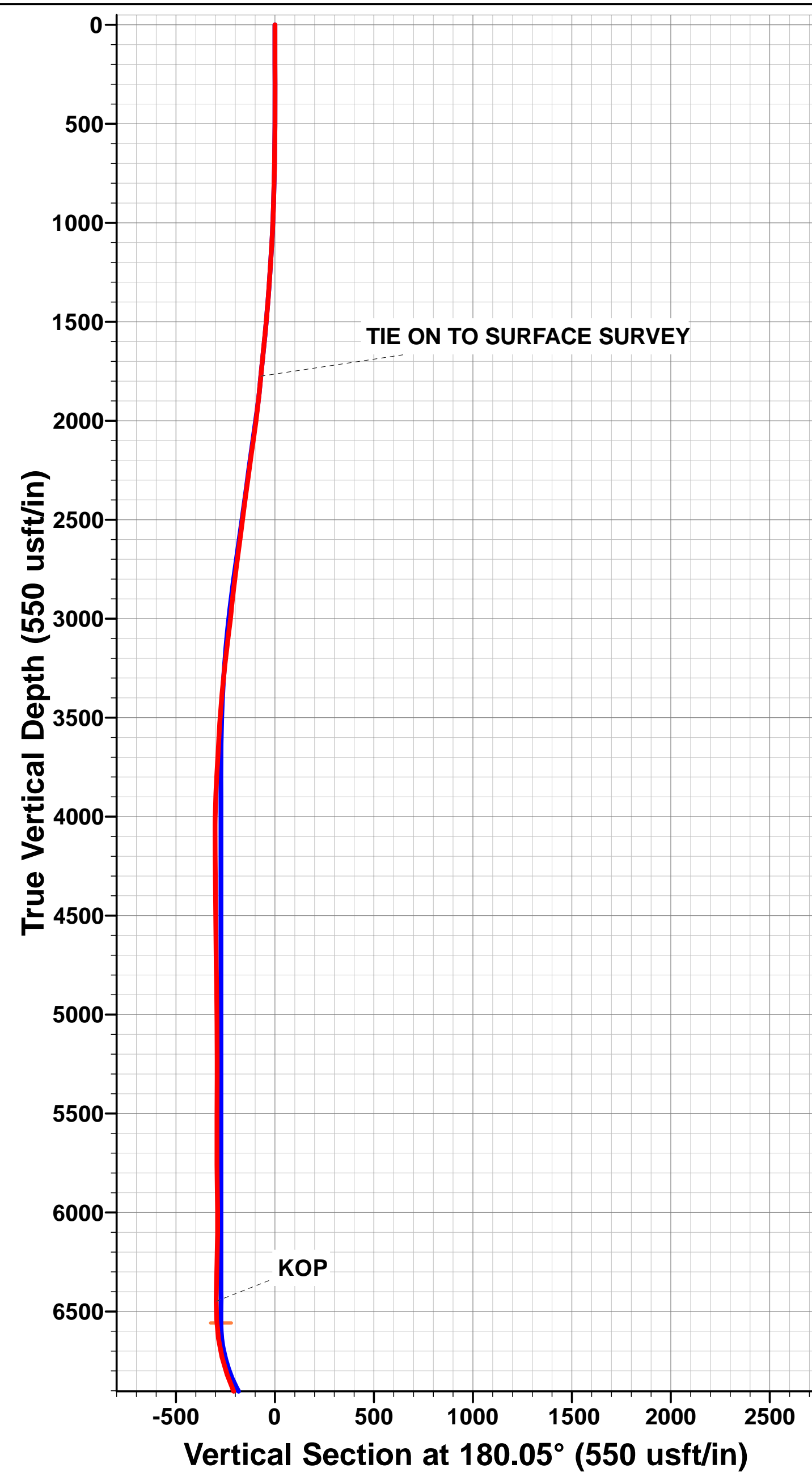
TVD	MD	Inc	Azi	+N-S	+E-W	VSec	Departure	Annotation
1774.6	1808.0	18.46	287.04	71.6	-251.8	-71.3	267.9	TIE ON TO SURFACE SURVEY
6448.6	6556.0	1.14	358.27	297.9	-737.9	-297.2	836.2	KOP
7136.1	7307.0	44.55	182.27	50.1	-718.3	-49.5	1087.1	~ ENTER RADIUS HEEL (7307' MD)
7279.6	7648.0	85.09	181.35	-249.5	-719.0	250.2	1386.8	HEEL: 40.116931; -104.725032
7284.5	8233.0	90.28	178.63	-834.2	-729.6	834.8	1971.5	~ EXIT RADIUS HEEL (8233' MD)
7268.3	11312.0	89.78	180.25	-3911.8	-712.0	3912.4	5050.1	~ ENTER RADIUS TOE (11312' MD)
7265.1	12209.0	90.44	181.08	-4808.7	-724.0	4809.3	5947.1	~ EXIT RADIUS TOE (12209' MD)
7264.4	12545.0	91.84	181.60	-5144.6	-729.6	5145.2	6283.1	LAST SURVEY JULY 11, 2018
7262.6	12601.0	91.84	181.60	-5200.5	-731.2	5201.2	6339.0	PROJECTION TO TD: 40.103340; -104.725075

AS DRILLED LOCAL COORDINATES:

SHL: 386ft FSL & 1849ft FEL Sec 24
 HEEL: 140ft FsL & 2569.3ft FEL Sec 24
 BHL: 471ft FSL & 2564.9ft FEL Sec 25

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N-S	+E-W	Latitude	Longitude	Shape
BHL - GRACIE 24-11HZ (P2)	5199.5		-710.9	40° 6' 12.035 N	104° 43' 30.007 W	Point
HEEL - GRACIE 24-11HZ (P2)	439.7		-706.7	40° 6' 59.072 N	104° 43' 29.955 W	Point
KOP - GRACIE 24-11HZ (P3)	273.5		-706.1	40° 7' 6.120 N	104° 43' 29.947 W	Point



Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-11HZ
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 24-11HZ	North Reference:	True
Wellbore:	JOB # 2018-387-461	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 24-11HZ					
Well Position	+N-S	0.0 usft	Northing:	14,569,683.68 usft	Latitude:	40° 7' 3.417 N
	+E-W	0.0 usft	Easting:	1,718,008.31 usft	Longitude:	104° 43' 20.859 W
Position Uncertainty	0.0 usft		Wellhead Elevation:	usft	Ground Level:	5,055.0 usft

Wellbore	JOB # 2018-387-461				
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	180.05	

Survey Program	Date	12/07/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
129.0	12,601.0	FINAL SURVEYS (JOB # 2018-387-461)	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	0.62	73.47	129.0	4,946.0	0.2	0.7	-0.2	0.48	0.48	0.00	
161.0	0.53	112.76	161.0	4,914.0	0.2	1.0	-0.2	1.24	-0.28	122.78	
193.0	0.79	96.06	193.0	4,882.0	0.1	1.3	-0.1	1.00	0.81	-52.19	
224.0	0.53	75.67	224.0	4,851.0	0.1	1.7	-0.1	1.12	-0.84	-65.77	
256.0	0.62	101.51	256.0	4,819.0	0.1	2.0	-0.1	0.85	0.28	80.75	
288.0	0.92	103.09	288.0	4,787.0	0.0	2.4	0.0	0.94	0.94	4.94	
346.0	0.18	299.96	346.0	4,729.0	0.0	2.8	0.0	1.89	-1.28	-281.26	
383.0	0.57	251.54	383.0	4,692.0	-0.1	2.6	0.1	1.27	1.05	-130.86	
415.0	0.35	309.98	415.0	4,660.0	0.0	2.3	0.0	1.53	-0.69	182.62	
446.0	0.79	249.25	446.0	4,629.0	-0.1	2.1	0.1	2.23	1.42	-195.90	
478.0	1.10	275.53	478.0	4,597.0	-0.1	1.6	0.1	1.64	0.97	82.12	
509.0	0.62	295.66	509.0	4,566.0	0.0	1.1	0.0	1.81	-1.55	64.94	

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-11HZ
Project:	WELD COUNTY (NAD 83)	TD 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 24-11HZ	North Reference:	True
Wellbore:	JOB # 2018-387-461	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	1.58	280.28	541.0	4,534.0	0.1	0.5	-0.1	3.11	3.00	-48.06	
572.0	2.64	275.18	571.9	4,503.1	0.3	-0.6	-0.3	3.47	3.42	-16.45	
604.0	3.21	278.96	603.9	4,471.1	0.5	-2.2	-0.5	1.88	1.78	11.81	
636.0	3.69	283.00	635.8	4,439.2	0.9	-4.1	-0.9	1.68	1.50	12.62	
668.0	3.91	282.56	667.8	4,407.2	1.3	-6.2	-1.3	0.69	0.69	-1.37	
700.0	3.74	286.87	699.7	4,375.3	1.9	-8.3	-1.9	1.04	-0.53	13.47	
731.0	4.61	286.87	730.6	4,344.4	2.5	-10.4	-2.5	2.81	2.81	0.00	
763.0	5.19	293.46	762.5	4,312.5	3.5	-13.0	-3.5	2.52	1.81	20.59	
795.0	6.06	288.45	794.4	4,280.6	4.6	-15.9	-4.6	3.12	2.72	-15.66	
858.0	7.08	282.21	856.9	4,218.1	6.5	-22.9	-6.4	1.97	1.62	-9.90	
891.0	7.56	283.79	889.7	4,185.3	7.4	-27.0	-7.4	1.58	1.45	4.79	
922.0	8.17	282.91	920.4	4,154.6	8.4	-31.1	-8.4	2.01	1.97	-2.84	
953.0	8.31	280.28	951.1	4,123.9	9.3	-35.4	-9.2	1.30	0.45	-8.48	
984.0	9.36	281.77	981.7	4,093.3	10.2	-40.1	-10.2	3.47	3.39	4.81	
1,016.0	10.41	284.41	1,013.2	4,061.8	11.4	-45.4	-11.4	3.57	3.28	8.25	
1,048.0	10.63	286.08	1,044.7	4,030.3	13.0	-51.1	-12.9	1.17	0.69	5.22	
1,080.0	11.07	285.02	1,076.1	3,998.9	14.6	-56.9	-14.5	1.51	1.37	-3.31	
1,111.0	11.47	286.52	1,106.5	3,968.5	16.2	-62.7	-16.2	1.60	1.29	4.84	
1,143.0	12.83	286.08	1,137.8	3,937.2	18.1	-69.2	-18.1	4.26	4.25	-1.37	
1,175.0	13.32	286.34	1,169.0	3,906.0	20.2	-76.1	-20.1	1.54	1.53	0.81	
1,207.0	13.54	284.41	1,200.1	3,874.9	22.1	-83.3	-22.0	1.56	0.69	-6.03	
1,238.0	13.80	284.94	1,230.2	3,844.8	24.0	-90.4	-23.9	0.93	0.84	1.71	
1,270.0	13.70	285.02	1,261.3	3,813.7	25.9	-97.7	-25.9	0.32	-0.31	0.25	
1,301.0	14.55	285.02	1,291.4	3,783.6	27.9	-105.0	-27.8	2.74	2.74	0.00	
1,333.0	15.82	284.58	1,322.2	3,752.8	30.0	-113.1	-29.9	3.99	3.97	-1.37	
1,365.0	16.26	285.02	1,353.0	3,722.0	32.3	-121.7	-32.2	1.43	1.37	1.37	
1,396.0	16.48	286.17	1,382.7	3,692.3	34.7	-130.1	-34.5	1.26	0.71	3.71	
1,427.0	16.57	285.64	1,412.5	3,662.5	37.1	-138.6	-36.9	0.57	0.29	-1.71	
1,459.0	17.01	285.55	1,443.1	3,631.9	39.6	-147.5	-39.4	1.38	1.37	-0.28	
1,491.0	17.14	285.81	1,473.7	3,601.3	42.1	-156.5	-42.0	0.47	0.41	0.81	
1,522.0	17.71	286.43	1,503.3	3,571.7	44.7	-165.5	-44.5	1.93	1.84	2.00	
1,554.0	17.62	285.99	1,533.7	3,541.3	47.4	-174.8	-47.2	0.50	-0.28	-1.37	
1,586.0	18.02	287.77	1,564.2	3,510.8	50.2	-184.1	-50.1	2.11	1.25	5.56	
1,617.0	18.41	287.22	1,593.7	3,481.3	53.1	-193.4	-53.0	1.37	1.26	-1.77	
1,649.0	18.85	287.40	1,624.0	3,451.0	56.2	-203.2	-56.0	1.39	1.37	0.56	
1,681.0	19.20	287.31	1,654.2	3,420.8	59.3	-213.1	-59.1	1.10	1.09	-0.28	
1,713.0	19.28	288.28	1,684.4	3,390.6	62.5	-223.1	-62.3	1.03	0.25	3.03	
1,744.0	18.19	287.92	1,713.8	3,361.2	65.6	-232.6	-65.4	3.54	-3.52	-1.16	
1,776.0	18.24	287.04	1,744.2	3,330.8	68.6	-242.2	-68.4	0.87	0.16	-2.75	
TIE ON TO SURFACE SURVEY											
1,808.0	18.46	287.04	1,774.6	3,300.4	71.6	-251.8	-71.3	0.69	0.69	0.00	
1,935.0	18.71	287.23	1,894.9	3,180.1	83.5	-290.5	-83.2	0.20	0.20	0.15	
2,028.0	17.91	292.78	1,983.2	3,091.8	93.4	-317.9	-93.2	2.06	-0.86	5.97	
2,121.0	18.97	296.18	2,071.5	3,003.5	105.7	-344.6	-105.4	1.62	1.14	3.66	
2,215.0	18.26	294.00	2,160.6	2,914.4	118.4	-371.8	-118.1	1.06	-0.76	-2.32	
2,308.0	18.62	295.63	2,248.8	2,826.2	130.7	-398.5	-130.4	0.68	0.39	1.75	
2,402.0	17.05	294.52	2,338.3	2,736.7	142.9	-424.6	-142.6	1.71	-1.67	-1.18	
2,496.0	18.80	294.38	2,427.7	2,647.3	154.9	-450.9	-154.5	1.86	1.86	-0.15	
2,591.0	18.08	290.99	2,517.8	2,557.2	166.5	-478.6	-166.1	1.36	-0.76	-3.57	
2,683.0	19.28	294.28	2,605.0	2,470.0	177.9	-505.8	-177.4	1.74	1.30	3.58	
2,778.0	17.45	291.65	2,695.1	2,379.9	189.6	-533.3	-189.1	2.11	-1.93	-2.77	
2,870.0	17.60	295.35	2,782.9	2,292.1	200.6	-558.7	-200.1	1.22	0.16	4.02	
2,964.0	15.42	295.20	2,873.0	2,202.0	212.0	-582.9	-211.5	2.32	-2.32	-0.16	

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-11HZ
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 24-11HZ	North Reference:	True
Wellbore:	JOB # 2018-387-461	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)	
3,057.0	13.11	294.15	2,963.1	2,111.9	221.6	-603.7	-221.1	2.50	-2.48	-1.13	
3,150.0	14.41	300.18	3,053.4	2,021.6	231.7	-623.3	-231.2	2.08	1.40	6.48	
3,242.0	13.48	300.40	3,142.7	1,932.3	242.9	-642.5	-242.4	1.01	-1.01	0.24	
3,335.0	12.02	300.03	3,233.4	1,841.6	253.3	-660.2	-252.7	1.57	-1.57	-0.40	
3,429.0	11.29	300.27	3,325.5	1,749.5	262.8	-676.6	-262.2	0.78	-0.78	0.26	
3,523.0	8.15	305.42	3,418.1	1,656.9	271.3	-690.0	-270.7	3.46	-3.34	5.48	
3,616.0	7.24	300.88	3,510.3	1,564.7	278.1	-700.4	-277.5	1.18	-0.98	-4.88	
3,710.0	4.90	314.22	3,603.8	1,471.2	284.0	-708.4	-283.4	2.89	-2.49	14.19	
3,805.0	4.61	301.70	3,698.4	1,376.6	288.8	-714.5	-288.2	1.13	-0.31	-13.18	
3,899.0	4.43	335.99	3,792.2	1,282.8	294.1	-719.2	-293.5	2.84	-0.19	36.48	
3,993.0	2.10	347.96	3,886.0	1,189.0	299.1	-721.1	-298.5	2.57	-2.48	12.73	
4,085.0	1.99	325.77	3,978.0	1,097.0	302.1	-722.3	-301.4	0.86	-0.12	-24.12	
4,178.0	0.33	124.85	4,070.9	1,004.1	303.3	-723.0	-302.6	2.47	-1.78	171.05	
4,298.0	0.32	194.53	4,190.9	884.1	302.7	-722.8	-302.1	0.31	-0.01	58.07	
4,392.0	0.54	230.79	4,284.9	790.1	302.2	-723.2	-301.6	0.36	0.23	38.57	
4,486.0	0.91	226.66	4,378.9	696.1	301.4	-724.1	-300.8	0.40	0.39	-4.39	
4,581.0	1.43	206.69	4,473.9	601.1	299.8	-725.2	-299.2	0.69	0.55	-21.02	
4,674.0	0.85	280.35	4,566.9	508.1	298.9	-726.4	-298.3	1.55	-0.62	79.20	
4,769.0	1.15	244.87	4,661.9	413.1	298.6	-727.9	-298.0	0.71	0.32	-37.35	
4,862.0	1.97	235.68	4,754.8	320.2	297.3	-730.1	-296.7	0.92	0.88	-9.88	
4,957.0	1.32	181.18	4,849.8	225.2	295.3	-731.5	-294.7	1.70	-0.68	-57.37	
5,052.0	0.32	80.47	4,944.8	130.2	294.3	-731.2	-293.6	1.49	-1.05	-106.01	
5,146.0	0.81	239.55	5,038.8	36.2	294.0	-731.5	-293.4	1.19	0.52	169.23	
5,241.0	0.93	253.09	5,133.8	-58.8	293.4	-732.9	-292.8	0.25	0.13	14.25	
5,335.0	1.37	242.19	5,227.8	-152.8	292.7	-734.6	-292.0	0.52	0.47	-11.60	
5,430.0	0.54	355.29	5,322.8	-247.8	292.6	-735.6	-292.0	1.75	-0.87	119.05	
5,523.0	0.73	290.20	5,415.8	-340.8	293.2	-736.2	-292.6	0.75	0.20	-69.99	
5,618.0	0.84	72.60	5,510.8	-435.8	293.7	-736.1	-293.0	1.56	0.12	149.89	
5,713.0	0.19	121.62	5,605.7	-530.7	293.8	-735.3	-293.1	0.77	-0.68	51.60	
5,807.0	0.35	258.02	5,699.7	-624.7	293.6	-735.5	-293.0	0.54	0.17	145.11	
5,900.0	0.65	230.26	5,792.7	-717.7	293.2	-736.1	-292.6	0.41	0.32	-29.85	
5,994.0	1.03	221.09	5,886.7	-811.7	292.3	-737.1	-291.6	0.43	0.40	-9.76	
6,088.0	1.29	214.37	5,980.7	-905.7	290.8	-738.3	-290.1	0.31	0.28	-7.15	
6,181.0	0.70	20.59	6,073.7	-998.7	290.4	-738.7	-289.8	2.13	-0.63	178.73	
6,275.0	1.12	21.13	6,167.7	-1,092.7	291.8	-738.1	-291.2	0.45	0.45	0.57	
6,367.0	1.48	358.58	6,259.7	-1,184.7	293.8	-737.8	-293.2	0.67	0.39	-24.51	
6,461.0	1.13	359.49	6,353.6	-1,278.6	296.0	-737.9	-295.3	0.37	-0.37	0.97	
KOP											
6,556.0	1.14	358.27	6,448.6	-1,373.6	297.9	-737.9	-297.2	0.03	0.01	-1.28	
6,649.0	4.99	165.48	6,541.5	-1,466.5	294.9	-736.9	-294.2	6.57	4.14	179.80	
6,744.0	6.15	170.48	6,636.1	-1,561.1	285.9	-735.0	-285.2	1.32	1.22	5.26	
6,839.0	14.92	175.14	6,729.4	-1,654.4	268.6	-733.2	-268.0	9.27	9.23	4.91	
6,932.0	17.96	176.98	6,818.6	-1,743.6	242.4	-731.4	-241.7	3.32	3.27	1.98	
7,025.0	24.66	172.06	6,905.2	-1,830.2	208.8	-727.9	-208.1	7.45	7.20	-5.29	
7,120.0	30.85	174.24	6,989.2	-1,914.2	164.9	-722.8	-164.2	6.60	6.52	2.29	
7,215.0	38.51	176.80	7,067.3	-1,992.3	111.0	-718.7	-110.4	8.21	8.06	2.69	
~ ENTER RADIUS HEEL (7307' MD)											
7,307.0	44.55	182.27	7,136.1	-2,061.1	50.1	-718.3	-49.5	7.65	6.56	5.95	
7,310.0	44.75	182.43	7,138.3	-2,063.3	48.0	-718.4	-47.4	7.65	6.70	5.27	
7,403.0	52.93	179.55	7,199.4	-2,124.4	-21.9	-719.5	22.6	9.10	8.80	-3.10	
7,498.0	66.73	178.90	7,247.1	-2,172.1	-103.9	-718.4	104.5	14.54	14.53	-0.68	
7,592.0	81.26	180.64	7,272.9	-2,197.9	-194.0	-718.1	194.6	15.56	15.46	1.85	

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-11HZ
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 24-11HZ	North Reference:	True
Wellbore:	JOB # 2018-387-461	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: 40.116931; -104.725032										
7,648.0	85.09	181.35	7,279.6	-2,204.6	-249.5	-719.0	250.2	6.95	6.84	1.26
7,685.0	87.62	181.81	7,281.9	-2,206.9	-286.5	-720.1	287.1	6.95	6.84	1.25
7,778.0	87.95	180.81	7,285.5	-2,210.5	-379.4	-722.2	380.0	1.13	0.35	-1.08
7,871.0	89.59	180.84	7,287.5	-2,212.5	-472.3	-723.5	473.0	1.76	1.76	0.03
7,964.0	89.62	180.36	7,288.2	-2,213.2	-565.3	-724.5	566.0	0.52	0.03	-0.52
8,057.0	90.99	181.62	7,287.7	-2,212.7	-658.3	-726.1	658.9	2.00	1.47	1.35
8,152.0	91.41	182.05	7,285.7	-2,210.7	-753.2	-729.1	753.9	0.63	0.44	0.45
~ EXIT RADIUS HEEL (8233' MD)										
8,233.0	90.28	178.63	7,284.5	-2,209.5	-834.2	-729.6	834.8	4.45	-1.40	-4.22
8,247.0	90.08	178.04	7,284.4	-2,209.4	-848.2	-729.2	848.8	4.45	-1.40	-4.22
8,340.0	90.58	178.65	7,283.9	-2,208.9	-941.2	-726.5	941.8	0.85	0.54	0.66
8,434.0	89.77	178.41	7,283.6	-2,208.6	-1,035.1	-724.1	1,035.8	0.90	-0.86	-0.26
8,528.0	90.63	177.12	7,283.3	-2,208.3	-1,129.1	-720.4	1,129.7	1.65	0.91	-1.37
8,622.0	89.75	175.80	7,283.0	-2,208.0	-1,222.9	-714.6	1,223.5	1.69	-0.94	-1.40
8,716.0	92.33	177.95	7,281.3	-2,206.3	-1,316.7	-709.5	1,317.3	3.57	2.74	2.29
8,812.0	91.65	178.57	7,277.9	-2,202.9	-1,412.6	-706.6	1,413.2	0.96	-0.71	0.65
8,905.0	92.03	178.47	7,274.9	-2,199.9	-1,505.5	-704.2	1,506.1	0.42	0.41	-0.11
8,999.0	90.39	178.27	7,273.0	-2,198.0	-1,599.5	-701.5	1,600.1	1.76	-1.74	-0.21
9,093.0	89.56	178.69	7,273.0	-2,198.0	-1,693.4	-699.0	1,694.0	0.99	-0.88	0.45
9,187.0	90.01	179.51	7,273.4	-2,198.4	-1,787.4	-697.6	1,788.0	1.00	0.48	0.87
9,282.0	89.47	178.81	7,273.8	-2,198.8	-1,882.4	-696.2	1,883.0	0.93	-0.57	-0.74
9,376.0	90.00	178.96	7,274.2	-2,199.2	-1,976.4	-694.3	1,977.0	0.59	0.56	0.16
9,470.0	90.21	177.25	7,274.1	-2,199.1	-2,070.3	-691.2	2,070.9	1.83	0.22	-1.82
9,563.0	92.03	179.82	7,272.2	-2,197.2	-2,163.3	-688.9	2,163.9	3.39	1.96	2.76
9,658.0	92.83	181.98	7,268.2	-2,193.2	-2,258.2	-690.3	2,258.8	2.42	0.84	2.27
9,751.0	91.74	180.98	7,264.5	-2,189.5	-2,351.1	-692.7	2,351.7	1.59	-1.17	-1.08
9,844.0	89.19	181.63	7,263.7	-2,188.7	-2,444.0	-694.9	2,444.6	2.83	-2.74	0.70
9,937.0	88.69	181.15	7,265.5	-2,190.5	-2,537.0	-697.1	2,537.6	0.75	-0.54	-0.52
10,031.0	89.74	181.50	7,266.7	-2,191.7	-2,630.9	-699.3	2,631.5	1.18	1.12	0.37
10,125.0	91.29	181.67	7,265.9	-2,190.9	-2,724.9	-701.9	2,725.5	1.66	1.65	0.18
10,218.0	89.85	180.99	7,265.0	-2,190.0	-2,817.9	-704.1	2,818.5	1.71	-1.55	-0.73
10,313.0	89.78	180.88	7,265.3	-2,190.3	-2,912.8	-705.6	2,913.5	0.14	-0.07	-0.12
10,406.0	89.93	180.58	7,265.5	-2,190.5	-3,005.8	-706.8	3,006.5	0.36	0.16	-0.32
10,501.0	89.93	180.16	7,265.6	-2,190.6	-3,100.8	-707.4	3,101.5	0.44	0.00	-0.44
10,595.0	89.90	180.69	7,265.8	-2,190.8	-3,194.8	-708.1	3,195.5	0.56	-0.03	0.56
10,688.0	89.67	180.68	7,266.1	-2,191.1	-3,287.8	-709.2	3,288.4	0.25	-0.25	-0.01
10,781.0	89.75	180.08	7,266.6	-2,191.6	-3,380.8	-709.8	3,381.4	0.65	0.09	-0.65
10,874.0	90.11	180.51	7,266.7	-2,191.7	-3,473.8	-710.3	3,474.4	0.60	0.39	0.46
10,967.0	89.79	180.25	7,266.8	-2,191.8	-3,566.8	-710.9	3,567.4	0.44	-0.34	-0.28
11,062.0	89.55	180.22	7,267.3	-2,192.3	-3,661.8	-711.3	3,662.4	0.25	-0.25	-0.03
11,156.0	89.76	180.15	7,267.9	-2,192.9	-3,755.8	-711.6	3,756.4	0.24	0.22	-0.07
11,251.0	89.92	180.06	7,268.2	-2,193.2	-3,850.8	-711.8	3,851.4	0.19	0.17	-0.09
~ ENTER RADIUS TOE (11312' MD)										
11,312.0	89.78	180.25	7,268.3	-2,193.3	-3,911.8	-712.0	3,912.4	0.40	-0.23	0.32
11,345.0	89.70	180.36	7,268.5	-2,193.5	-3,944.8	-712.1	3,945.4	0.40	-0.23	0.32
11,439.0	89.85	180.25	7,268.9	-2,193.9	-4,038.8	-712.6	4,039.4	0.20	0.16	-0.12
11,533.0	89.93	180.09	7,269.0	-2,194.0	-4,132.8	-712.9	4,133.4	0.19	0.09	-0.17
11,628.0	89.96	180.28	7,269.1	-2,194.1	-4,227.8	-713.2	4,228.4	0.20	0.03	0.20
11,723.0	90.39	180.58	7,268.8	-2,193.8	-4,322.8	-713.9	4,323.4	0.55	0.45	0.32
11,818.0	91.24	181.42	7,267.5	-2,192.5	-4,417.8	-715.6	4,418.4	1.26	0.89	0.88
11,912.0	89.70	181.24	7,266.7	-2,191.7	-4,511.8	-717.8	4,512.4	1.65	-1.64	-0.19
12,005.0	90.30	181.21	7,266.7	-2,191.7	-4,604.7	-719.8	4,605.4	0.65	0.65	-0.03

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-11HZ
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 24-11HZ	North Reference:	True
Wellbore:	JOB # 2018-387-461	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)
12,100.0	90.44	181.22	7,266.1	-2,191.1	-4,699.7	-721.8	4,700.3	0.15	0.15	0.01
12,193.0	90.65	181.10	7,265.2	-2,190.2	-4,792.7	-723.7	4,793.3	0.26	0.23	-0.13
- EXIT RADIUS TOE (12209' MD)										
12,209.0	90.44	181.08	7,265.1	-2,190.1	-4,808.7	-724.0	4,809.3	1.29	-1.29	-0.14
12,287.0	89.44	180.97	7,265.1	-2,190.1	-4,886.7	-725.4	4,887.3	1.29	-1.29	-0.14
12,382.0	89.62	180.20	7,265.9	-2,190.9	-4,981.7	-726.3	4,982.3	0.83	0.19	-0.81
12,476.0	90.54	181.52	7,265.8	-2,190.8	-5,075.6	-727.7	5,076.3	1.71	0.98	1.40
LAST SURVEY JULY 11, 2018										
12,545.0	91.84	181.60	7,264.4	-2,189.4	-5,144.6	-729.6	5,145.2	1.89	1.88	0.12
PROJECTION TO TD: 40.103340; -104.725075										
12,601.0	91.84	181.60	7,262.6	-2,187.6	-5,200.5	-731.2	5,201.2	0.00	0.00	0.00

Survey Report



Company:	ANADARKO PETROLEUM CORP	Local Co-ordinate Reference:	Well GRACIE 24-11HZ
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 24-11HZ	North Reference:	True
Wellbore:	JOB # 2018-387-461	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 24-11H - survey misses target center by 21.0usft at 7837.8usft MD (7287.1 TVD, -439.2 N, -723.0 E) - Point	0.00	0.00	7,274.0	-439.7	-706.7	14,569,241.98	1,717,303.29	40° 6' 59.072 N	104° 43' 29.955 W	
KOP - GRACIE 24-11HZ - survey misses target center by 83.8usft at 6560.7usft MD (6453.3 TVD, 297.9 N, -737.9 E) - Point	0.00	0.00	6,455.5	375.4	-706.0	14,570,056.74	1,717,301.45	40° 7' 7.127 N	104° 43' 29.946 W	
BHL - GRACIE 24-11HZ - survey misses target center by 74.2usft at 12597.1usft MD (7262.7 TVD, -5196.6 N, -731.1 E) - Point	0.00	0.00	7,334.0	-5,199.5	-710.9	14,564,484.07	1,717,313.96	40° 6' 12.035 N	104° 43' 30.007 W	
KOP - GRACIE 24-11HZ - survey misses target center by 36.4usft at 6667.8usft MD (6560.3 TVD, 293.2 N, -736.5 E) - Point	0.00	0.00	6,557.8	273.5	-706.1	14,569,954.90	1,717,301.68	40° 7' 6.120 N	104° 43' 29.947 W	
HEEL - GRACIE 24-11H - survey misses target center by 21.6usft at 7837.8usft MD (7287.1 TVD, -439.1 N, -723.0 E) - Point	0.00	0.00	7,273.0	-439.7	-706.7	14,569,241.98	1,717,303.29	40° 6' 59.072 N	104° 43' 29.955 W	
BHL - GRACIE 24-11HZ - survey misses target center by 37.4usft at 12598.3usft MD (7262.6 TVD, -5197.9 N, -731.1 E) - Point	0.00	0.00	7,294.0	-5,199.5	-710.9	14,564,484.07	1,717,313.96	40° 6' 12.035 N	104° 43' 30.007 W	

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
1,808.0	1,774.6	71.6	-251.8	TIE ON TO SURFACE SURVEY	
6,556.0	6,448.6	297.9	-737.9	KOP	
7,307.0	7,136.1	50.1	-718.3	~ ENTER RADIUS HEEL (7307' MD)	
7,648.0	7,279.6	-249.5	-719.0	HEEL: 40.116931; -104.725032	
8,233.0	7,284.5	-834.2	-729.6	~ EXIT RADIUS HEEL (8233' MD)	
11,312.0	7,268.3	-3,911.8	-712.0	~ ENTER RADIUS TOE (11312' MD)	
12,209.0	7,265.1	-4,808.7	-724.0	~ EXIT RADIUS TOE (12209' MD)	
12,545.0	7,264.4	-5,144.6	-729.6	LAST SURVEY JULY 11, 2018	
12,601.0	7,262.6	-5,200.5	-731.2	PROJECTION TO TD: 40.103340; -104.725075	

Checked By: _____ Approved By: _____ Date: _____