

Occidental Petroleum

Project: Weld County, CO (UTM-NAD83)
Site: 4N-68W-11 (S&B 5-11HZ Pad)
Well: Shake 11-3HZ
Wellbore: OH
Design: OH

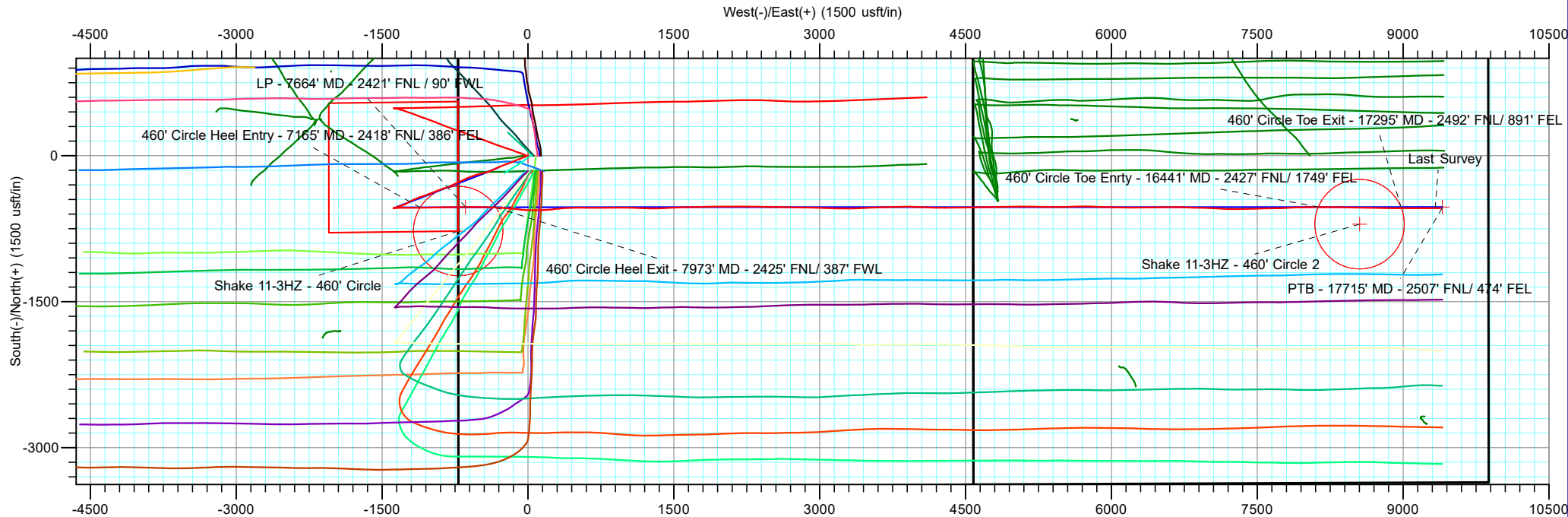
PROJECT DETAILS: Weld County, CO (UTM-NAD83)
Geodetic System: Universal Transverse Mercator (US Survey Feet)
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: Zone 13N (108 W to 102 W)



ACTUAL LINE CALLS
SHL: 1895' FNL, 719' FWL
HEEL: 2421' FNL, 90' FWL
TOE: 2501' FNL, 474' FEL

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSec	Departure	Annotation
7165.78	50.29	89.81	6836.29	-532.18	-1107.53	-1107.62	1767.32	460' Circle Heel Entry - 7165' MD - 2418' FNL/ 386' FEL
7664.12	89.67	89.88	6983.55	-527.74	-642.39	-642.49	2231.86	LP - 7664' MD - 2421' FNL / 90' FWL
7973.22	89.69	92.25	6979.66	-531.01	-333.38	-333.47	2540.92	460' Circle Heel Exit - 7973' MD - 2425' FNL/ 387' FWL
16441.84	90.03	90.77	7010.01	-526.91	8128.67	8128.58	11007.92	460' Circle Toe Entry - 16441' MD - 2427' FNL/ 1749' FEL
17295.24	89.02	90.15	7025.86	-538.97	8981.72	8981.63	11861.08	460' Circle Toe Exit - 17295' MD - 2492' FNL/ 891' FEL
17644.00	91.94	89.90	7024.12	-538.79	9330.43	9330.33	12209.79	Last Survey
17715.00	91.94	89.90	7021.71	-538.67	9401.39	9401.29	12280.75	PTB - 17715' MD - 2507' FNL/ 474' FEL



TOTAL DIRECTIONAL SERVICES LLC

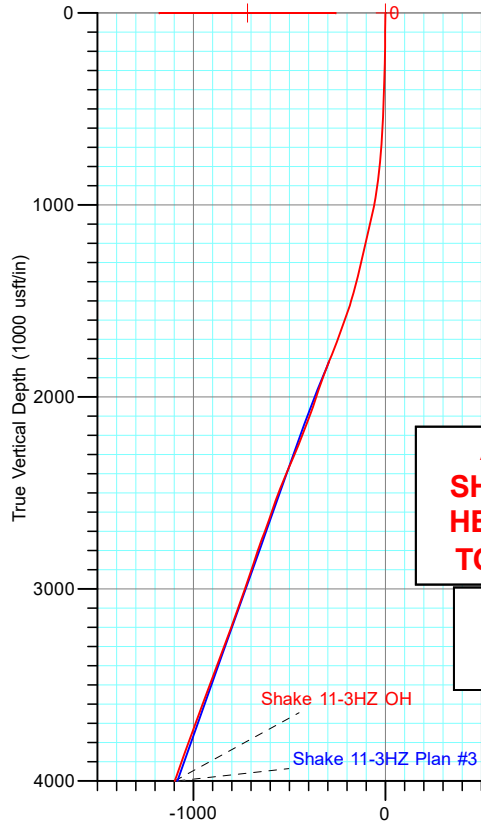
Design: OH (Shake 11-3HZ/OH)
4N-68W-11 (S&B 5-11HZ Pad)
Created By: RDW Date: 11:45, December 01 2021
Approved: _____ Date: _____

Occidental Petroleum

Project: Weld County, CO (UTM-NAD83)
Site: 4N-68W-11 (S&B 5-11HZ Pad)
Well: Shake 11-3HZ
Wellbore: OH
Design: OH

PROJECT DETAILS: Weld County, CO (UTM-NAD83)

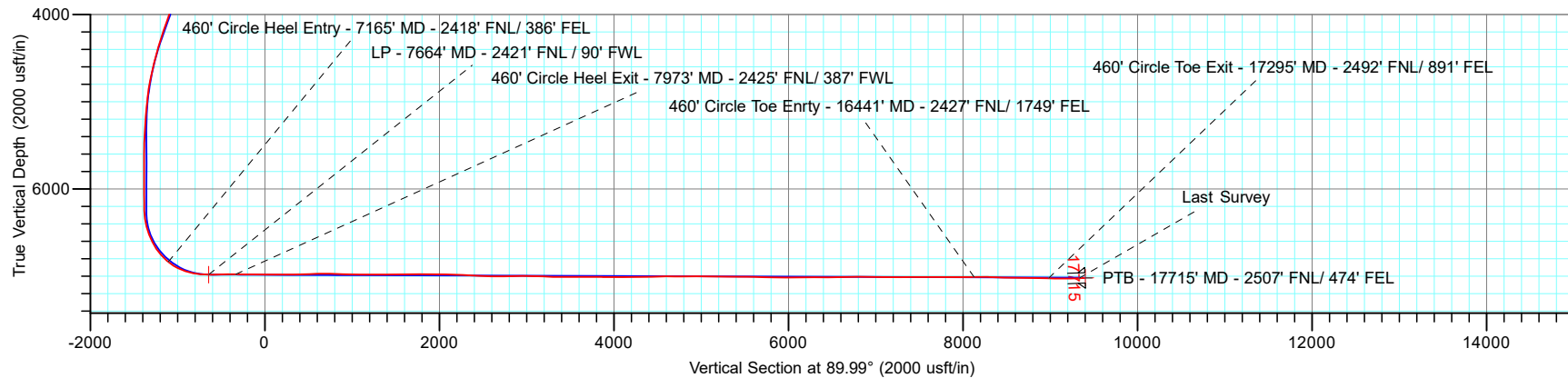
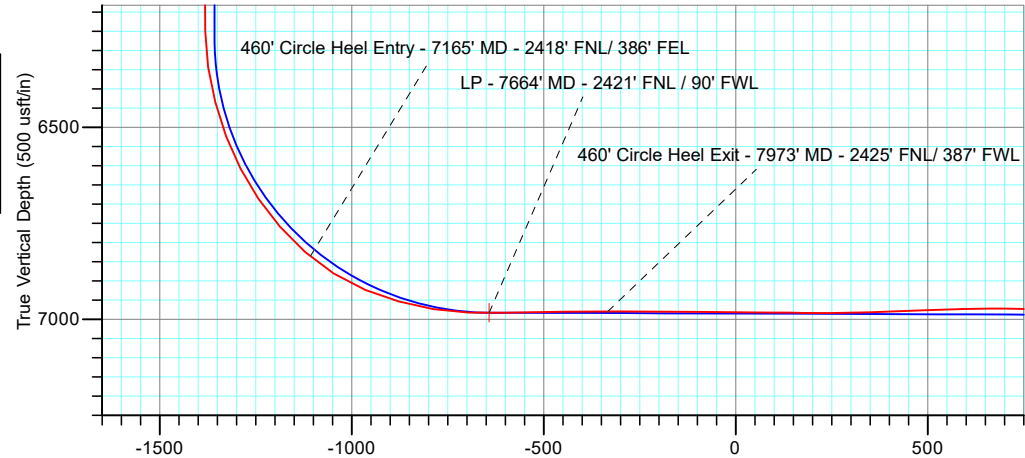
Geodetic System: Universal Transverse Mercator (US Survey Feet)
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: Zone 13N (108 W to 102 W)



ACTUAL LINE CALLS
SHL: 1895' FNL, 719' FWL
HEEL: 2421' FNL, 90' FWL
TOE: 2501' FNL, 474' FEL

SEC / TOWNSHIP / RANGE
SHL: Sec 11, T4N, R68W
BHL: Sec 11, T4N, R68W

ANNOTATIONS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	VSec	Departure	Annotation	
7165.78	50.29	89.81	6836.29	-532.18	-1107.53	-1107.62	1767.32	460' Circle Heel Entry - 7165' MD - 2418' FNL/ 386' FEL	
7664.12	89.67	89.88	6983.55	-527.74	-642.39	-642.49	2231.86	LP - 7664' MD - 2421' FNL / 90' FWL	
7973.22	89.69	92.25	6979.66	-531.01	-333.38	-333.47	2540.92	460' Circle Heel Exit - 7973' MD - 2425' FNL/ 387' FWL	
16441.84	90.03	90.77	7010.01	-526.91	8128.67	8128.58	11007.92	460' Circle Toe Entry - 16441' MD - 2427' FNL/ 1749' FEL	
17295.24	89.02	90.15	7025.86	-538.97	8981.72	8981.63	11861.08	460' Circle Toe Exit - 17295' MD - 2492' FNL/ 891' FEL	
17644.00	91.94	89.90	7024.12	-538.79	9330.43	9330.33	12209.79	Last Survey	
17715.00	91.94	89.90	7021.71	-538.67	9401.39	9401.29	12280.75	PTB - 17715' MD - 2507' FNL/ 474' FEL	



Vertical Section at 89.99° (2000 usft/in)



TOTAL DIRECTIONAL SERVICES LLC

Design: OH (Shake 11-3HZ/OH)
4N-68W-11 (S&B 5-11HZ Pad)
Created By: Dustin Ault Date: 11:53, December 01 2021
Date: _____
Approved: _____ Date: _____



Occidental Petroleum

Weld County, CO (UTM-NAD83)

4N-68W-11 (S&B 5-11HZ Pad)

Shake 11-3HZ

OH

Design: OH

Standard Survey Report

01 December, 2021





Survey Report



Company:	Occidental Petroleum	Local Co-ordinate Reference:	Well Shake 11-3HZ
Project:	Weld County, CO (UTM-NAD83)	TVD Reference:	4993' GE + 20' KB @ 5013.00usft
Site:	4N-68W-11 (S&B 5-11HZ Pad)	MD Reference:	4993' GE + 20' KB @ 5013.00usft
Well:	Shake 11-3HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.16 Single User Db

Project	Weld County, CO (UTM-NAD83)		
Map System:	Universal Transverse Mercator (US Survey Fee	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Zone 13N (108 W to 102 W)		

Site	4N-68W-11 (S&B 5-11HZ Pad)		
Site Position:		Northing:	14,647,020.58 usft
From:	Lat/Long	Easting:	1,646,741.13 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	40.330320
		Longitude:	-104.977307

Well	Shake 11-3HZ		
Well Position	+N/-S	0.00 usft	Northing: 14,647,020.59 usft
	+E/-W	0.00 usft	Easting: 1,646,771.23 usft
Position Uncertainty	3.28 usft	Wellhead Elevation:	usft
Grid Convergence:	0.01 °	Ground Level:	4,993.00 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2020	9/20/2021	7.93
			Dip Angle (°)
			66.56
			Field Strength (nT)
			51,865.83

Design	OH		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0.00	0.00	0.00
			Direction (°)
			89.99

Survey Program	Date	12/1/2021		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
96.00	1,858.00	Survey #1 - MWD+IFR (OH)	APC_ISCWSA REV 2 MW Fixed:v2:crustal field declination	
1,923.00	17,715.00	Survey #2 - MWD+IFR+MS (OH)	APC_ISCWSA REV 2 MW Fixed:v2:Rockies, crustal dec + 3-axis correction	

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
96.00	0.30	232.39	96.00	-0.15	-0.20	-0.20	0.31	0.31	0.00
180.00	0.58	284.43	180.00	-0.18	-0.79	-0.79	0.55	0.33	61.95
264.00	1.19	270.52	263.99	-0.07	-2.07	-2.07	0.76	0.73	-16.56
354.00	2.29	260.76	353.94	-0.35	-4.78	-4.78	1.26	1.22	-10.84
443.00	2.18	256.90	442.88	-1.02	-8.18	-8.18	0.21	-0.12	-4.34
533.00	2.54	247.05	532.80	-2.18	-11.69	-11.69	0.60	0.40	-10.94
623.00	3.51	249.30	622.67	-3.93	-16.10	-16.10	1.09	1.08	2.50
713.00	4.37	246.98	712.46	-6.25	-21.83	-21.83	0.97	0.96	-2.58



Survey Report



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Well:	Shake 11-3HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.16 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
803.00	6.66	243.85	802.04	-9.89	-29.67	-29.68	2.57	2.54	-3.48
893.00	8.26	245.19	891.27	-14.90	-40.23	-40.23	1.79	1.78	1.49
983.00	11.25	247.34	979.96	-21.00	-54.20	-54.20	3.35	3.32	2.39
1,073.00	13.96	251.16	1,067.79	-27.89	-72.58	-72.59	3.15	3.01	4.24
1,163.00	13.38	249.76	1,155.24	-35.00	-92.63	-92.63	0.74	-0.64	-1.56
1,253.00	13.94	246.99	1,242.69	-42.84	-112.37	-112.38	0.96	0.62	-3.08
1,343.00	14.78	247.06	1,329.88	-51.55	-132.92	-132.93	0.93	0.93	0.08
1,432.00	15.61	246.33	1,415.77	-60.78	-154.35	-154.36	0.96	0.93	-0.82
1,522.00	17.80	247.46	1,501.96	-70.92	-178.15	-178.16	2.46	2.43	1.26
1,612.00	20.94	251.21	1,586.86	-81.37	-206.08	-206.10	3.75	3.49	4.17
1,702.00	20.74	250.06	1,670.97	-91.99	-236.29	-236.31	0.51	-0.22	-1.28
1,792.00	23.20	248.00	1,754.43	-104.07	-267.71	-267.73	2.86	2.73	-2.29
1,858.00	24.10	246.10	1,814.89	-114.40	-292.09	-292.11	1.79	1.36	-2.88
2,019.00	20.22	244.25	1,963.97	-139.81	-347.22	-347.24	2.45	-2.41	-1.15
2,113.00	20.49	246.41	2,052.10	-153.45	-376.93	-376.96	0.85	0.29	2.30
2,205.00	21.68	253.61	2,137.96	-164.69	-408.00	-408.02	3.10	1.29	7.83
2,297.00	22.08	254.96	2,223.33	-173.98	-441.00	-441.03	0.70	0.43	1.47
2,389.00	24.13	255.91	2,307.95	-183.04	-475.94	-475.97	2.26	2.23	1.03
2,482.00	23.63	256.19	2,392.98	-192.12	-512.48	-512.51	0.55	-0.54	0.30
2,574.00	22.80	251.01	2,477.54	-202.32	-547.24	-547.28	2.39	-0.90	-5.63
2,667.00	20.15	249.79	2,564.08	-213.72	-579.32	-579.36	2.89	-2.85	-1.31
2,760.00	20.50	249.35	2,651.29	-225.00	-609.59	-609.63	0.41	0.38	-0.47
2,853.00	22.79	245.14	2,737.73	-238.32	-641.18	-641.22	2.97	2.46	-4.53
2,945.00	19.54	243.90	2,823.51	-252.58	-671.17	-671.21	3.57	-3.53	-1.35
3,038.00	20.91	244.81	2,910.78	-266.49	-700.15	-700.20	1.51	1.47	0.98
3,130.00	20.88	248.14	2,996.73	-279.58	-730.23	-730.28	1.29	-0.03	3.62
3,223.00	20.60	242.70	3,083.71	-293.25	-760.15	-760.20	2.09	-0.30	-5.85
3,317.00	22.11	244.08	3,171.26	-308.57	-790.76	-790.81	1.69	1.61	1.47
3,409.00	21.71	250.18	3,256.62	-321.91	-822.34	-822.40	2.51	-0.43	6.63
3,502.00	20.92	254.57	3,343.27	-332.16	-854.53	-854.59	1.91	-0.85	4.72
3,594.00	22.35	249.67	3,428.79	-342.61	-886.77	-886.83	2.50	1.55	-5.33
3,687.00	22.14	248.64	3,514.87	-355.14	-919.67	-919.74	0.48	-0.23	-1.11
3,780.00	21.90	248.41	3,601.08	-367.90	-952.12	-952.19	0.27	-0.26	-0.25
3,873.00	21.00	248.31	3,687.64	-380.44	-983.73	-983.80	0.97	-0.97	-0.11
3,966.00	21.32	250.75	3,774.37	-392.18	-1,015.18	-1,015.25	1.01	0.34	2.62
4,058.00	21.16	249.34	3,860.12	-403.55	-1,046.51	-1,046.58	0.58	-0.17	-1.53
4,151.00	20.59	250.27	3,947.02	-414.99	-1,077.60	-1,077.68	0.71	-0.61	1.00
4,244.00	18.65	251.90	4,034.62	-425.13	-1,107.14	-1,107.21	2.17	-2.09	1.75
4,338.00	20.48	247.40	4,123.19	-436.12	-1,136.61	-1,136.68	2.52	1.95	-4.79
4,431.00	20.89	248.51	4,210.20	-448.45	-1,167.06	-1,167.13	0.61	0.44	1.19
4,523.00	20.10	242.53	4,296.38	-461.75	-1,196.35	-1,196.43	2.43	-0.86	-6.50
4,617.00	17.85	240.81	4,385.27	-476.23	-1,223.26	-1,223.34	2.47	-2.39	-1.83
4,710.00	15.57	240.34	4,474.34	-489.36	-1,246.55	-1,246.64	2.46	-2.45	-0.51



Survey Report



Company:	Occidental Petroleum	Local Co-ordinate Reference:	Well Shake 11-3HZ
Project:	Weld County, CO (UTM-NAD83)	TVD Reference:	4993' GE + 20' KB @ 5013.00usft
Site:	4N-68W-11 (S&B 5-11HZ Pad)	MD Reference:	4993' GE + 20' KB @ 5013.00usft
Well:	Shake 11-3HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.16 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,803.00	15.42	245.68	4,563.96	-500.63	-1,268.67	-1,268.75	1.54	-0.16	5.74
4,919.00	14.02	252.58	4,676.16	-511.19	-1,296.13	-1,296.22	1.93	-1.21	5.95
5,011.00	10.93	250.44	4,765.98	-517.45	-1,314.99	-1,315.08	3.40	-3.36	-2.33
5,104.00	8.78	249.41	4,857.60	-522.90	-1,329.94	-1,330.03	2.32	-2.31	-1.11
5,199.00	7.28	248.49	4,951.66	-527.65	-1,342.33	-1,342.42	1.58	-1.58	-0.97
5,292.00	5.72	247.26	5,044.06	-531.61	-1,352.08	-1,352.18	1.68	-1.68	-1.32
5,385.00	5.30	264.33	5,136.64	-533.82	-1,360.63	-1,360.73	1.81	-0.45	18.35
5,477.00	3.85	259.31	5,228.34	-534.81	-1,367.90	-1,367.99	1.63	-1.58	-5.46
5,571.00	2.90	254.75	5,322.18	-536.02	-1,373.29	-1,373.39	1.05	-1.01	-4.85
5,663.00	3.62	253.00	5,414.03	-537.49	-1,378.32	-1,378.41	0.79	0.78	-1.90
5,756.00	0.81	237.04	5,506.95	-538.70	-1,381.68	-1,381.77	3.06	-3.02	-17.16
5,849.00	0.82	246.56	5,599.94	-539.32	-1,382.84	-1,382.93	0.15	0.01	10.24
5,942.00	1.07	49.98	5,692.94	-539.03	-1,382.78	-1,382.88	2.01	0.27	175.72
6,035.00	0.26	40.53	5,785.93	-538.31	-1,381.98	-1,382.07	0.88	-0.87	-10.16
6,128.00	0.12	261.11	5,878.93	-538.17	-1,381.94	-1,382.03	0.39	-0.15	-149.91
6,221.00	0.02	141.84	5,971.93	-538.19	-1,382.03	-1,382.12	0.14	-0.11	-128.25
6,314.00	0.29	342.72	6,064.93	-537.98	-1,382.09	-1,382.18	0.33	0.29	-171.10
6,406.00	0.41	52.21	6,156.93	-537.56	-1,381.90	-1,381.99	0.45	0.13	75.53
6,499.00	0.52	99.21	6,249.93	-537.42	-1,381.22	-1,381.31	0.41	0.12	50.54
6,593.00	8.48	85.98	6,343.56	-537.00	-1,373.87	-1,373.96	8.48	8.47	-14.07
6,686.00	14.58	87.94	6,434.64	-536.10	-1,355.31	-1,355.41	6.57	6.56	2.11
6,779.00	20.61	92.16	6,523.25	-536.30	-1,327.23	-1,327.33	6.62	6.48	4.54
6,871.00	27.40	87.28	6,607.26	-535.90	-1,289.86	-1,289.95	7.68	7.38	-5.30
6,963.00	33.85	90.55	6,686.39	-535.14	-1,243.04	-1,243.13	7.24	7.01	3.55
7,055.00	41.55	87.25	6,759.13	-533.92	-1,186.85	-1,186.94	8.65	8.37	-3.59
7,148.00	48.66	89.67	6,824.74	-532.24	-1,121.04	-1,121.14	7.86	7.65	2.60
7,165.78	50.29	89.81	6,836.29	-532.18	-1,107.53	-1,107.62	9.18	9.16	0.81
460' Circle Heel Entry - 7165' MD - 2418' FNL/ 386' FEL									
7,241.00	57.18	90.36	6,880.76	-532.29	-1,046.92	-1,047.01	9.18	9.16	0.73
7,334.00	67.35	90.16	6,923.98	-532.65	-964.71	-964.80	10.94	10.94	-0.22
7,426.00	74.78	89.49	6,953.81	-532.37	-877.75	-877.84	8.11	8.08	-0.73
7,518.00	80.43	88.16	6,973.56	-530.52	-787.95	-788.05	6.30	6.14	-1.45
7,612.00	88.42	89.03	6,982.68	-528.23	-694.50	-694.59	8.55	8.50	0.93
7,664.12	89.67	89.88	6,983.55	-527.74	-642.39	-642.49	2.90	2.40	1.63
LP - 7664' MD - 2421' FNL / 90' FWL									
7,705.00	90.65	90.55	6,983.44	-527.89	-601.51	-601.61	2.90	2.40	1.63
7,797.00	91.41	89.41	6,981.78	-527.86	-509.53	-509.62	1.49	0.83	-1.24
7,892.00	90.76	91.33	6,979.98	-528.48	-414.56	-414.65	2.13	-0.68	2.02
7,973.22	89.69	92.25	6,979.66	-531.01	-333.38	-333.47	1.74	-1.32	1.13
460' Circle Heel Exit - 7973' MD - 2425' FNL/ 387' FWL									
7,986.00	89.52	92.39	6,979.75	-531.53	-320.61	-320.70	1.74	-1.32	1.13
8,078.00	89.61	96.08	6,980.45	-538.32	-228.88	-228.97	4.01	0.10	4.01
8,170.00	89.90	96.34	6,980.84	-548.27	-137.42	-137.52	0.42	0.32	0.28
8,263.00	89.84	94.60	6,981.06	-557.14	-44.85	-44.94	1.87	-0.06	-1.87



Survey Report



Company:	Occidental Petroleum	Local Co-ordinate Reference:	Well Shake 11-3HZ
Project:	Weld County, CO (UTM-NAD83)	TVD Reference:	4993' GE + 20' KB @ 5013.00usft
Site:	4N-68W-11 (S&B 5-11HZ Pad)	MD Reference:	4993' GE + 20' KB @ 5013.00usft
Well:	Shake 11-3HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.16 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,356.00	88.90	89.33	6,982.08	-560.32	48.06	47.96	5.76	-1.01	-5.67
8,448.00	89.98	89.74	6,982.98	-559.58	140.05	139.95	1.26	1.17	0.45
8,543.00	89.13	81.82	6,983.72	-552.59	234.71	234.62	8.38	-0.89	-8.34
8,636.00	91.66	86.26	6,983.08	-542.94	327.18	327.08	5.49	2.72	4.77
8,728.00	92.80	85.80	6,979.50	-536.57	418.89	418.79	1.34	1.24	-0.50
8,821.00	91.33	91.01	6,976.14	-533.99	511.75	511.66	5.82	-1.58	5.60
8,915.00	92.24	89.78	6,973.21	-534.64	605.70	605.61	1.63	0.97	-1.31
9,008.00	88.89	90.85	6,972.30	-535.15	698.68	698.59	3.78	-3.60	1.15
9,100.00	87.76	89.61	6,974.99	-535.52	790.64	790.55	1.82	-1.23	-1.35
9,193.00	87.67	88.96	6,978.69	-534.36	883.56	883.47	0.71	-0.10	-0.70
9,285.00	89.25	90.75	6,981.17	-534.13	975.52	975.43	2.59	1.72	1.95
9,378.00	89.51	90.75	6,982.17	-535.34	1,068.51	1,068.41	0.28	0.28	0.00
9,472.00	90.03	92.11	6,982.55	-537.69	1,162.47	1,162.38	1.55	0.55	1.45
9,565.00	90.57	91.71	6,982.06	-540.79	1,255.42	1,255.32	0.72	0.58	-0.43
9,659.00	90.38	88.21	6,981.28	-540.72	1,349.40	1,349.31	3.73	-0.20	-3.72
9,752.00	90.62	87.47	6,980.47	-537.22	1,442.33	1,442.24	0.84	0.26	-0.80
9,844.00	90.62	86.88	6,979.48	-532.69	1,534.21	1,534.12	0.64	0.00	-0.64
9,937.00	89.75	89.03	6,979.18	-529.37	1,627.15	1,627.05	2.49	-0.94	2.31
10,031.00	89.55	88.16	6,979.75	-527.06	1,721.12	1,721.02	0.95	-0.21	-0.93
10,123.00	90.63	89.41	6,979.61	-525.11	1,813.09	1,813.00	1.80	1.17	1.36
10,215.00	91.13	88.12	6,978.19	-523.13	1,905.06	1,904.97	1.50	0.54	-1.40
10,309.00	88.46	90.88	6,978.53	-522.31	1,999.04	1,998.94	4.09	-2.84	2.94
10,402.00	88.14	90.71	6,981.29	-523.60	2,091.99	2,091.89	0.39	-0.34	-0.18
10,494.00	87.56	89.41	6,984.74	-523.69	2,183.92	2,183.83	1.55	-0.63	-1.41
10,587.00	87.31	90.10	6,988.90	-523.30	2,276.82	2,276.73	0.79	-0.27	0.74
10,680.00	87.05	89.83	6,993.48	-523.24	2,369.71	2,369.62	0.40	-0.28	-0.29
10,774.00	87.98	91.80	6,997.55	-524.58	2,463.61	2,463.52	2.32	0.99	2.10
10,866.00	87.50	91.30	7,001.18	-527.06	2,555.50	2,555.41	0.75	-0.52	-0.54
10,960.00	90.26	91.46	7,003.02	-529.33	2,649.45	2,649.36	2.94	2.94	0.17
11,052.00	90.61	90.56	7,002.32	-530.95	2,741.43	2,741.34	1.05	0.38	-0.98
11,146.00	91.26	90.46	7,000.79	-531.79	2,835.41	2,835.32	0.70	0.69	-0.11
11,240.00	89.98	91.48	6,999.77	-533.38	2,929.39	2,929.30	1.74	-1.36	1.09
11,334.00	90.49	92.03	6,999.38	-536.26	3,023.35	3,023.25	0.80	0.54	0.59
11,427.00	87.58	91.42	7,000.95	-539.05	3,116.28	3,116.19	3.20	-3.13	-0.66
11,519.00	87.31	91.28	7,005.05	-541.22	3,208.16	3,208.07	0.33	-0.29	-0.15
11,612.00	88.54	89.73	7,008.42	-542.04	3,301.09	3,301.00	2.13	1.32	-1.67
11,705.00	89.91	87.15	7,009.68	-539.51	3,394.04	3,393.95	3.14	1.47	-2.77
11,798.00	90.35	88.37	7,009.47	-535.87	3,486.97	3,486.87	1.39	0.47	1.31
11,890.00	90.10	87.37	7,009.10	-532.45	3,578.90	3,578.81	1.12	-0.27	-1.09
11,983.00	89.97	88.34	7,009.05	-528.97	3,671.83	3,671.74	1.05	-0.14	1.04
12,075.00	90.42	87.68	7,008.73	-525.78	3,763.78	3,763.69	0.87	0.49	-0.72
12,168.00	88.47	88.92	7,009.64	-523.02	3,856.73	3,856.64	2.48	-2.10	1.33
12,261.00	90.09	92.68	7,010.80	-524.32	3,949.69	3,949.60	4.40	1.74	4.04



Survey Report



Company:	Occidental Petroleum	Local Co-ordinate Reference:	Well Shake 11-3HZ
Project:	Weld County, CO (UTM-NAD83)	TVD Reference:	4993' GE + 20' KB @ 5013.00usft
Site:	4N-68W-11 (S&B 5-11HZ Pad)	MD Reference:	4993' GE + 20' KB @ 5013.00usft
Well:	Shake 11-3HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.16 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,353.00	89.92	92.32	7,010.80	-528.33	4,041.60	4,041.51	0.43	-0.18	-0.39
12,446.00	89.58	92.50	7,011.20	-532.24	4,134.52	4,134.43	0.41	-0.37	0.19
12,540.00	91.06	90.84	7,010.68	-534.98	4,228.47	4,228.38	2.37	1.57	-1.77
12,633.00	90.57	89.02	7,009.35	-534.87	4,321.46	4,321.36	2.03	-0.53	-1.96
12,726.00	90.95	89.13	7,008.12	-533.36	4,414.44	4,414.34	0.43	0.41	0.12
12,821.00	91.88	89.85	7,005.78	-532.52	4,509.40	4,509.31	1.24	0.98	0.76
12,913.00	90.36	88.48	7,003.98	-531.18	4,601.37	4,601.28	2.22	-1.65	-1.49
13,006.00	89.60	88.14	7,004.01	-528.44	4,694.33	4,694.24	0.90	-0.82	-0.37
13,099.00	89.19	87.15	7,004.99	-524.61	4,787.24	4,787.15	1.15	-0.44	-1.06
13,193.00	90.08	90.29	7,005.59	-522.52	4,881.21	4,881.12	3.47	0.95	3.34
13,287.00	91.35	89.80	7,004.42	-522.59	4,975.20	4,975.11	1.45	1.35	-0.52
13,378.00	90.36	91.35	7,003.06	-523.50	5,066.18	5,066.09	2.02	-1.09	1.70
13,471.00	88.44	89.42	7,004.03	-524.13	5,159.16	5,159.07	2.93	-2.06	-2.08
13,563.00	89.08	90.97	7,006.02	-524.44	5,251.14	5,251.05	1.82	0.70	1.68
13,656.00	89.68	91.37	7,007.03	-526.34	5,344.11	5,344.02	0.78	0.65	0.43
13,749.00	90.94	88.90	7,006.53	-526.56	5,437.10	5,437.01	2.98	1.35	-2.66
13,842.00	88.62	89.13	7,006.88	-524.96	5,530.08	5,529.99	2.51	-2.49	0.25
13,935.00	88.59	89.45	7,009.15	-523.81	5,623.05	5,622.95	0.35	-0.03	0.34
14,028.00	87.83	88.51	7,012.05	-522.15	5,715.98	5,715.89	1.30	-0.82	-1.01
14,122.00	87.90	91.94	7,015.56	-522.52	5,809.90	5,809.81	3.65	0.07	3.65
14,214.00	90.69	91.98	7,016.69	-525.67	5,901.83	5,901.74	3.03	3.03	0.04
14,305.00	91.65	91.72	7,014.83	-528.61	5,992.77	5,992.67	1.09	1.05	-0.29
14,398.00	88.95	91.47	7,014.34	-531.19	6,085.72	6,085.63	2.92	-2.90	-0.27
14,490.00	89.80	90.81	7,015.35	-533.02	6,177.70	6,177.60	1.17	0.92	-0.72
14,583.00	90.15	88.21	7,015.39	-532.23	6,270.68	6,270.59	2.82	0.38	-2.80
14,676.00	90.20	90.26	7,015.10	-530.99	6,363.67	6,363.58	2.20	0.05	2.20
14,768.00	91.08	89.54	7,014.08	-530.83	6,455.66	6,455.57	1.24	0.96	-0.78
14,860.00	90.50	89.18	7,012.81	-529.80	6,547.65	6,547.55	0.74	-0.63	-0.39
14,952.00	91.59	89.30	7,011.13	-528.58	6,639.62	6,639.53	1.19	1.18	0.13
15,045.00	90.62	92.23	7,009.34	-529.82	6,732.59	6,732.49	3.32	-1.04	3.15
15,137.00	90.97	91.83	7,008.06	-533.08	6,824.52	6,824.43	0.58	0.38	-0.43
15,230.00	88.32	91.60	7,008.64	-535.86	6,917.47	6,917.37	2.86	-2.85	-0.25
15,323.00	89.11	91.42	7,010.72	-538.31	7,010.41	7,010.32	0.87	0.85	-0.19
15,417.00	89.82	93.93	7,011.60	-542.70	7,104.30	7,104.20	2.77	0.76	2.67
15,510.00	89.47	90.59	7,012.17	-546.37	7,197.21	7,197.11	3.61	-0.38	-3.59
15,603.00	90.38	91.49	7,012.30	-548.05	7,290.19	7,290.10	1.38	0.98	0.97
15,695.00	90.20	88.14	7,011.83	-547.76	7,382.18	7,382.08	3.65	-0.20	-3.64
15,788.00	90.00	87.85	7,011.67	-544.50	7,475.12	7,475.02	0.38	-0.22	-0.31
15,881.00	89.80	88.65	7,011.83	-541.66	7,568.08	7,567.98	0.89	-0.22	0.86
15,974.00	90.16	89.11	7,011.86	-539.85	7,661.06	7,660.96	0.63	0.39	0.49
16,066.00	89.96	88.02	7,011.77	-537.54	7,753.03	7,752.93	1.20	-0.22	-1.18
16,159.00	89.72	88.22	7,012.03	-534.49	7,845.98	7,845.88	0.34	-0.26	0.22
16,253.00	90.32	88.16	7,011.99	-531.52	7,939.93	7,939.84	0.64	0.64	-0.06
16,345.00	91.08	87.64	7,010.87	-528.15	8,031.86	8,031.77	1.00	0.83	-0.57



Survey Report



Company:	Occidental Petroleum	Local Co-ordinate Reference:	Well Shake 11-3HZ
Project:	Weld County, CO (UTM-NAD83)	TVD Reference:	4993' GE + 20' KB @ 5013.00usft
Site:	4N-68W-11 (S&B 5-11HZ Pad)	MD Reference:	4993' GE + 20' KB @ 5013.00usft
Well:	Shake 11-3HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.16 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
16,437.00	89.99	90.74	7,010.01	-526.85	8,123.83	8,123.74	3.57	-1.18	3.37
16,441.84	90.03	90.77	7,010.01	-526.91	8,128.67	8,128.58	1.13	0.92	0.65
460' Circle Toe Entry - 16441' MD - 2427' FNL/ 1749' FEL									
16,530.00	90.85	91.34	7,009.33	-528.54	8,216.81	8,216.72	1.13	0.92	0.65
16,622.00	87.60	90.75	7,010.57	-530.22	8,308.78	8,308.68	3.59	-3.53	-0.64
16,716.00	88.01	90.59	7,014.17	-531.31	8,402.70	8,402.61	0.47	0.44	-0.17
16,808.00	88.37	90.27	7,017.08	-532.00	8,494.65	8,494.56	0.52	0.39	-0.35
16,900.00	88.43	91.18	7,019.65	-533.17	8,586.61	8,586.52	0.99	0.07	0.99
16,994.00	89.28	90.77	7,021.53	-534.77	8,680.58	8,680.48	1.00	0.90	-0.44
17,088.00	90.39	91.67	7,021.80	-536.77	8,774.55	8,774.46	1.52	1.18	0.96
17,180.00	88.11	90.32	7,023.00	-538.37	8,866.52	8,866.43	2.88	-2.48	-1.47
17,273.00	88.87	90.31	7,025.45	-538.88	8,959.49	8,959.39	0.82	0.82	-0.01
17,295.24	89.02	90.15	7,025.86	-538.97	8,981.72	8,981.63	1.00	0.68	-0.73
460' Circle Toe Exit - 17295' MD - 2492' FNL/ 891' FEL									
17,365.00	89.50	89.64	7,026.76	-538.84	9,051.48	9,051.38	1.00	0.68	-0.73
17,459.00	89.82	89.42	7,027.32	-538.07	9,145.47	9,145.38	0.41	0.34	-0.23
17,552.00	91.11	90.79	7,026.56	-538.24	9,238.46	9,238.37	2.02	1.39	1.47
17,644.00	91.94	89.90	7,024.12	-538.79	9,330.43	9,330.33	1.32	0.90	-0.97
Last Survey									
17,715.00	91.94	89.90	7,021.71	-538.67	9,401.39	9,401.29	0.00	0.00	0.00
PTB - 17715' MD - 2507' FNL/ 474' FEL									

Design Targets									
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Shake 11-3HZ - 460' (0.00	0.00	0.00	-774.61	-717.63	14,646,245.80	1,646,053.80	40.328193	-104.979774
- actual wellpath misses target center by 1055.95usft at 2.73usft MD (2.73 TVD, 0.00 N, 0.00 E)									
- Circle (radius 460.00)									
Shake 11-3HZ - 460' (0.00	0.00	0.00	-703.30	8,552.49	14,646,319.50	1,655,323.90	40.328385	-104.946513
- actual wellpath misses target center by 7016.94usft at 16622.00usft MD (7010.57 TVD, -530.22 N, 8308.78 E)									
- Circle (radius 460.00)									
SHL (Shake 11-3HZ)	0.00	0.00	0.00	0.00	0.00	14,647,020.59	1,646,771.23	40.330320	-104.977199
- actual wellpath hits target center									
- Point									
LP (Shake 11-3HZ)	0.00	0.00	6,983.00	-530.00	-642.39	14,646,490.43	1,646,128.98	40.328865	-104.979504
- actual wellpath misses target center by 2.33usft at 7664.09usft MD (6983.55 TVD, -527.74 N, -642.42 E)									
- Point									
PBHL (Shake 11-3HZ)	0.00	0.00	7,018.00	-528.02	9,402.63	14,646,495.00	1,656,174.00	40.328865	-104.943462
- actual wellpath misses target center by 11.35usft at 17715.00usft MD (7021.71 TVD, -538.67 N, 9401.39 E)									
- Point									



Survey Report



Company:	Occidental Petroleum	Local Co-ordinate Reference:	Well Shake 11-3HZ
Project:	Weld County, CO (UTM-NAD83)	TVD Reference:	4993' GE + 20' KB @ 5013.00usft
Site:	4N-68W-11 (S&B 5-11HZ Pad)	MD Reference:	4993' GE + 20' KB @ 5013.00usft
Well:	Shake 11-3HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.16 Single User Db

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
17,715.00	7,021.71	20" Casing	20	24

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
7,165.78	6,836.29	-532.18	-1,107.53	460' Circle Heel Entry - 7165' MD - 2418' FNL/ 386' FEL
7,664.12	6,983.55	-527.74	-642.39	LP - 7664' MD - 2421' FNL / 90' FWL
7,973.22	6,979.66	-531.01	-333.38	460' Circle Heel Exit - 7973' MD - 2425' FNL/ 387' FWL
16,441.84	7,010.01	-526.91	8,128.67	460' Circle Toe Entry - 16441' MD - 2427' FNL/ 1749' FEL
17,295.24	7,025.86	-538.97	8,981.72	460' Circle Toe Exit - 17295' MD - 2492' FNL/ 891' FEL
17,644.00	7,024.12	-538.79	9,330.43	Last Survey
17,715.00	7,021.71	-538.67	9,401.39	PTB - 17715' MD - 2507' FNL/ 474' FEL

Checked By: _____ Approved By: _____ Date: _____