

# Occidental Petroleum

Project: Weld County, CO (UTM-NAD83)  
Site: 4N-68W-11 (S&B 5-11HZ Pad)  
Well: Shake 11-11HZ  
Wellbore: ST01  
Design: Plan #2

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)



## SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
9470.00	91.47	272.03	6834.35	909.20	-3022.69	0.00	0.00	3009.87	Start DLS 3.00 TFO -135.83
9786.14	84.67	265.41	6845.00	902.18	-3338.21	3.00	-135.83	3325.46	Start 377.00 hold at 9786.14 MD
10163.14	84.67	265.41	6880.00	872.13	-3712.38	0.00	0.00	3700.00	Start DLS 1.50 TFO 30.45
10609.30	90.45	268.79	6898.99	849.63	-4157.31	1.50	30.45	4145.20	Start 1276.87 hold at 10609.30 MD
11886.17	90.45	268.79	6889.00	822.75	-5433.86	0.00	0.00	5422.00	Start DLS 1.50 TFO 42.32
12042.30	92.18	270.37	6885.42	821.61	-5589.94	1.50	42.32	5578.08	Start 2824.55 hold at 12042.30 MD
14866.85	92.18	270.37	6778.00	839.91	-8412.38	0.00	0.00	8400.00	Start DLS 1.50 TFO -67.31
14953.81	92.68	269.17	6774.31	839.56	-8499.26	1.50	-67.31	8486.88	Start 2015.33 hold at 14953.81 MD
16969.14	92.68	269.17	6680.00	810.28	-10512.17	0.00	0.00	10500.00	Start DLS 4.00 TFO 0.24
17436.13	111.35	269.25	6583.20	803.98	-10966.86	4.00	0.24	10954.73	TD at 17436.13

Azimuths to True North  
Magnetic North: 7.93°

Magnetic Field  
Strength: 51872.2nT  
Dip Angle: 66.56°  
Date: 8/29/2021  
Model: IGRF2020



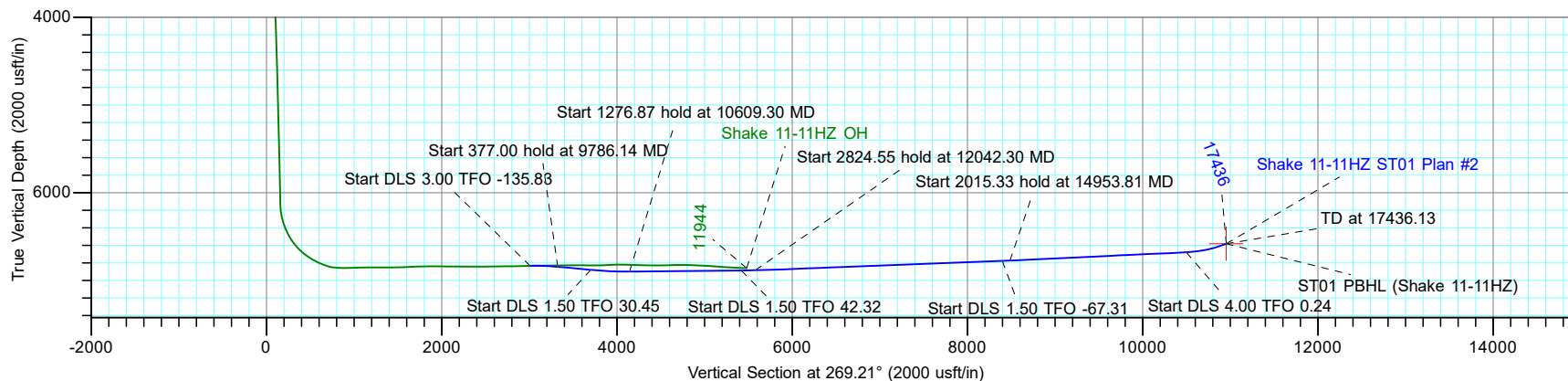
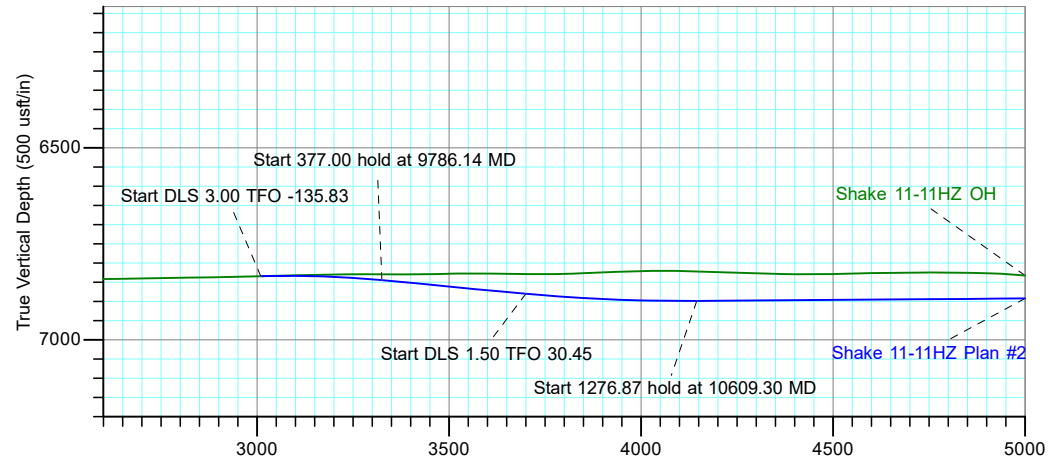
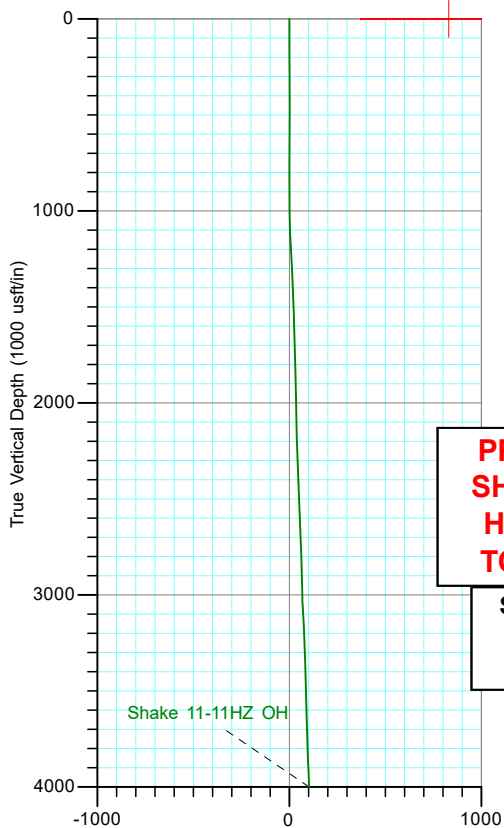
4993' GE + 20' KB @ 5013.00usft

**PROPOSED LINE CALLS**  
**SHL: 1896' FNL, 839' FWL**  
**HEEL: 945' FNL, 75' FEL**  
**TOE: 942' FNL, 475' FWL**

**SEC / TOWNSHIP / RANGE**  
**SHL: Sec 11, T4N, R68W**  
**BHL: Sec 9, T4N, R68W**

## DESIGN TARGET DETAILS

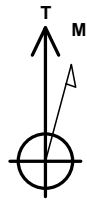
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
ST01 PBHL (Shake 11-11HZ)	6583.20	803.98	-10966.86	40.332519	-105.016121
ST01 Shake 11-11HZ - 460' Circle	0.00	434.96	-10117.26	40.331507	-105.013072
ST01 Shake 11-11HZ - 460' Circle 2	0.00	557.72	-838.73	40.331849	-104.979779



**TOTAL DIRECTIONAL SERVICES LLC**

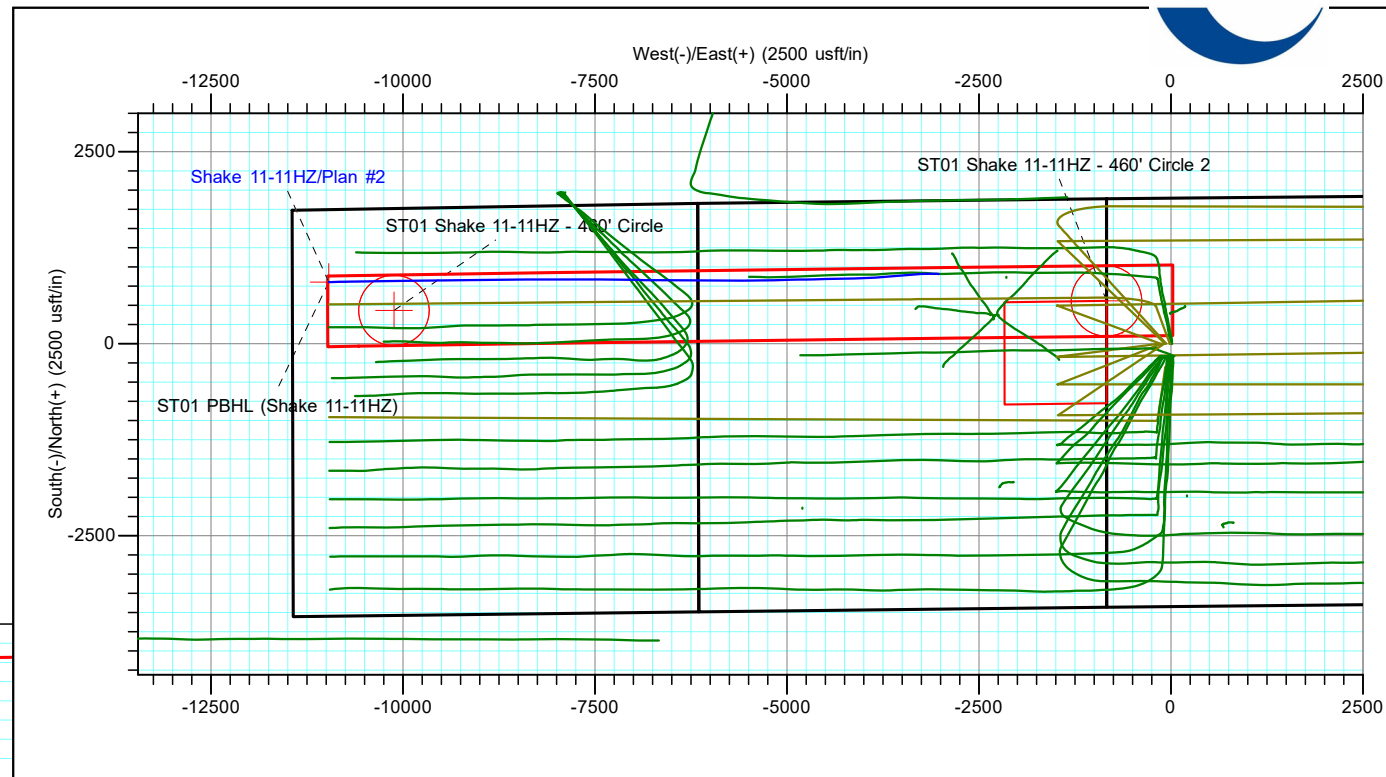
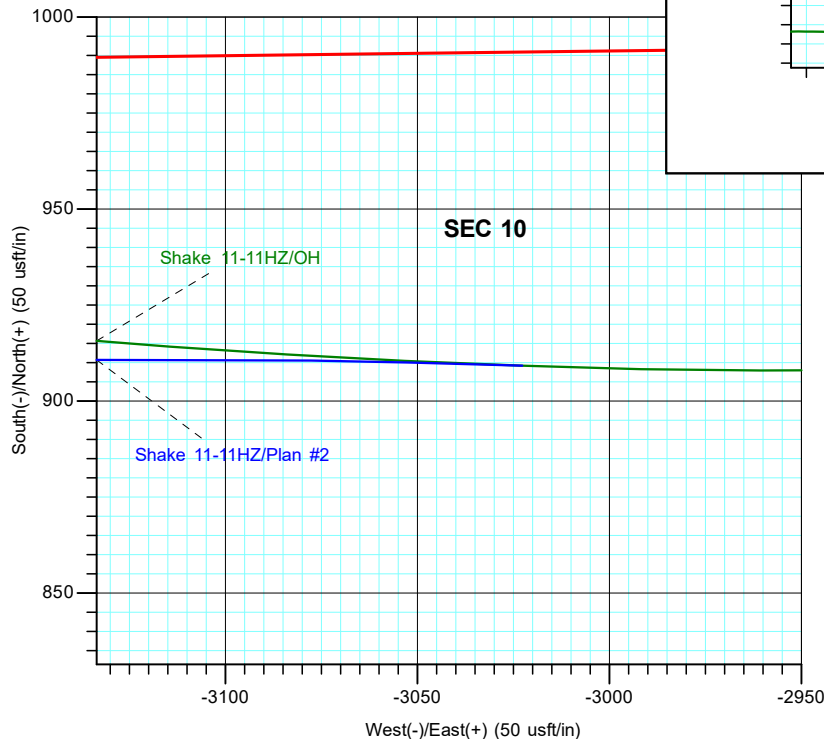
Plan: Plan #2 (Shake 11-11HZ/ST01)  
4N-68W-11 (S&B 5-11HZ Pad)  
Created By: Dustin Ault Date: 16:39, August 29 2021  
Date: \_\_\_\_\_  
Approved: \_\_\_\_\_ Date: \_\_\_\_\_

Project: Weld County, CO (UTM-NAD83)  
Site: 4N-68W-11 (S&B 5-11HZ Pad)  
Well: Shake 11-11HZ  
Wellbore: ST01  
Design: Plan #2



**Magnetic Field  
Strength: 51872.2nT  
Dip Angle: 66.56°  
Date: 8/29/2021  
Model: IGRF2020**

**PROPOSED LINE CALLS**  
**SHL: 1896' FNL, 839' FWL**  
**HEEL: 945' FNL, 75' FEL**  
**TOE: 942' FNL, 475' FWL**



Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
ST01 PBHL (Shake 11-11HZ)	6583.20	803.98	-10966.86	14647821.00	1635924.00	40.332519	-105.016121
ST01 Shake 11-11HZ - 460' Circle	0.00	434.96	-10117.26	14647452.20	1636773.70	40.331507	-105.013072
ST01 Shake 11-11HZ - 460' Circle 2	0.00	557.72	-838.73	14647577.40	1646052.20	40.331849	-104.979779

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
9470.00	91.47	272.03	6834.35	909.20	-3022.69	0.00	0.00	3009.87	Start DLS 3.00 TFO -135.83
9786.14	84.67	265.41	6845.00	902.18	-3338.21	3.00	-135.83	3325.46	Start 377.00 hold at 9786.14 MD
10163.14	84.67	265.41	6880.00	872.13	-3712.38	0.00	0.00	3700.00	Start DLS 1.50 TFO 30.45
10609.30	90.45	268.79	6898.99	849.63	-4157.31	1.50	30.45	4145.20	Start 1276.87 hold at 10609.30 MD
11886.17	90.45	268.79	6889.00	822.75	-5433.86	0.00	0.00	5422.00	Start DLS 1.50 TFO 42.32
12042.30	92.18	270.37	6885.42	821.61	-5589.94	1.50	42.32	5578.08	Start 2824.55 hold at 12042.30 MD
14866.85	92.18	270.37	6778.00	839.91	-8412.38	0.00	0.00	8400.00	Start DLS 1.50 TFO -67.31
14953.81	92.68	269.17	6774.31	839.56	-8499.26	1.50	-67.31	8486.88	Start 2015.33 hold at 14953.81 MD
16969.14	92.68	269.17	6680.00	810.28	-10512.17	0.00	0.00	10500.00	Start DLS 4.00 TFO 0.24
17436.13	111.35	269.25	6583.20	803.98	-10966.86	4.00	0.24	10954.73	TD at 17436.13

**TOTAL DIRECTIONAL SERVICES LLC**

Plan: Plan #2 (Shake 11-11HZ/ST01)  
4N-68W-11 (S&B 5-11HZ Pad)

Created By: Dustin Ault Date: 16:41, August 29 2021

Date: \_\_\_\_\_

Approved: \_\_\_\_\_ Date: \_\_\_\_\_



# **Occidental Petroleum**

**Weld County, CO (UTM-NAD83)**

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

**Shake 11-11HZ**

**ST01**

**Plan: Plan #2**

## **Standard Planning Report**

**29 August, 2021**





# Total Directional Services

## Planning Report



<b>Database:</b>	EDM 5000.15 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Shake 11-11HZ
<b>Company:</b>	Occidental Petroleum	<b>TVD Reference:</b>	4993' GE + 20' KB @ 5013.00usft
<b>Project:</b>	Weld County, CO (UTM-NAD83)	<b>MD Reference:</b>	4993' GE + 20' KB @ 5013.00usft
<b>Site:</b>	4N-68W-11 (S&B 5-11HZ Pad)	<b>North Reference:</b>	True
<b>Well:</b>	Shake 11-11HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ST01		
<b>Design:</b>	Plan #2		

<b>Project</b>	Weld County, CO (UTM-NAD83)		
<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)		

Site		4N-68W-11 (S&B 5-11HZ Pad)			
Site Position:		Northing:	14,647,020.58 usft	Latitude:	40.330320
From:	Lat/Long	Easting:	1,646,741.13 usft	Longitude:	-104.977307
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.01

Well	Shake 11-11HZ					
Well Position	+N/-S	-0.73 usft	Northing:	14,647,019.89 usft	Latitude:	40.330318
	+E/-W	149.94 usft	Easting:	1,646,891.07 usft	Longitude:	-104.976769
Position Uncertainty		3.28 usft	Wellhead Elevation:		Ground Level:	4,993.00 usft

<b>Wellbore</b>	ST01				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2020	8/29/2021	7.93	66.56	51,872.22952165

<b>Design</b>	Plan #2				
<b>Audit Notes:</b>					
<b>Version:</b>		<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	9,470.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	269.21	

<b>Plan Survey Tool Program</b>	<b>Date</b>	8/29/2021			
<b>Depth From (usft)</b>	<b>Depth To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>	
1	9,470.00	17,436.12	Plan #2 (ST01)	APC_ISCWSA REV 2 MWD+II	
				Fixed:v2:Rockies, crustal dec +	



# Total Directional Services

## Planning Report



<b>Database:</b>	EDM 5000.15 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Shake 11-11HZ
<b>Company:</b>	Occidental Petroleum	<b>TVD Reference:</b>	4993' GE + 20' KB @ 5013.00usft
<b>Project:</b>	Weld County, CO (UTM-NAD83)	<b>MD Reference:</b>	4993' GE + 20' KB @ 5013.00usft
<b>Site:</b>	4N-68W-11 (S&B 5-11HZ Pad)	<b>North Reference:</b>	True
<b>Well:</b>	Shake 11-11HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ST01		
<b>Design:</b>	Plan #2		

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
9,470.00	91.47	272.03	6,834.35	909.20	-3,022.69	0.00	0.00	0.00	0.00	
9,786.14	84.67	265.41	6,845.00	902.18	-3,338.21	3.00	-2.15	-2.09	-135.83	
10,163.14	84.67	265.41	6,880.00	872.13	-3,712.38	0.00	0.00	0.00	0.00	
10,609.30	90.45	268.79	6,898.99	849.63	-4,157.31	1.50	1.29	0.76	30.45	
11,886.17	90.45	268.79	6,889.00	822.75	-5,433.86	0.00	0.00	0.00	0.00	
12,042.30	92.18	270.37	6,885.42	821.61	-5,589.94	1.50	1.11	1.01	42.32	
14,866.85	92.18	270.37	6,778.00	839.91	-8,412.38	0.00	0.00	0.00	0.00	
14,953.81	92.68	269.17	6,774.31	839.56	-8,499.26	1.50	0.58	-1.39	-67.31	
16,969.14	92.68	269.17	6,680.00	810.28	-10,512.17	0.00	0.00	0.00	0.00	
17,436.13	111.35	269.25	6,583.20	803.98	-10,966.86	4.00	4.00	0.02	0.24	



# Total Directional Services

## Planning Report



<b>Database:</b>	EDM 5000.15 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Shake 11-11HZ
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<b>Project:</b>	Weld County, CO (UTM-NAD83)	<b>MD Reference:</b>	4993' GE + 20' KB @ 5013.00usft
<b>Site:</b>	4N-68W-11 (S&B 5-11HZ Pad)	<b>North Reference:</b>	True
<b>Well:</b>	Shake 11-11HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ST01		
<b>Design:</b>	Plan #2		

Planned 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
2.58	0.01	327.13	2.58	0.00	0.00	0.00	0.33	0.33	0.00
<b>ST01 Shake 11-11HZ - 460' Circle 2</b>									
96.00	0.32	327.13	96.00	0.23	-0.15	0.14	0.33	0.33	0.00
180.00	0.42	275.54	180.00	0.45	-0.58	0.57	0.40	0.12	-61.42
264.00	0.50	300.89	264.00	0.67	-1.20	1.19	0.26	0.10	30.18
354.00	0.44	336.48	353.99	1.19	-1.68	1.66	0.33	-0.07	39.54
443.00	0.30	319.09	442.99	1.68	-1.96	1.94	0.20	-0.16	-19.54
533.00	0.55	10.63	532.99	2.28	-2.04	2.01	0.48	0.28	57.27
623.00	1.22	12.91	622.98	3.64	-1.74	1.69	0.75	0.74	2.53
713.00	1.86	12.16	712.94	6.00	-1.22	1.14	0.71	0.71	-0.83
803.00	5.43	1.83	802.75	11.69	-0.78	0.62	4.02	3.97	-11.48
893.00	7.29	357.80	892.19	21.65	-0.86	0.56	2.12	2.07	-4.48
983.00	8.42	353.53	981.35	33.90	-1.82	1.36	1.41	1.26	-4.74
1,073.00	8.40	348.56	1,070.38	46.89	-3.87	3.22	0.81	-0.02	-5.52
1,163.00	9.74	342.39	1,159.25	60.59	-7.48	6.64	1.84	1.49	-6.86
1,253.00	9.15	340.46	1,248.03	74.59	-12.17	11.15	0.74	-0.66	-2.14
1,343.00	9.05	340.60	1,336.90	88.01	-16.92	15.70	0.11	-0.11	0.16
1,432.00	9.10	344.19	1,424.79	101.39	-21.16	19.76	0.64	0.06	4.03
1,522.00	8.75	346.63	1,513.70	114.90	-24.68	23.10	0.57	-0.39	2.71
1,612.00	8.69	348.18	1,602.66	128.21	-27.66	25.89	0.27	-0.07	1.72
1,702.00	11.28	353.48	1,691.29	143.61	-30.05	28.07	3.05	2.88	5.89
1,792.00	10.78	351.02	1,779.63	160.67	-32.37	30.15	0.76	-0.56	-2.73
1,848.00	10.13	348.46	1,834.70	170.67	-34.17	31.81	1.43	-1.16	-4.57
1,922.00	9.09	349.51	1,907.66	182.80	-36.53	34.01	1.43	-1.41	1.42
2,014.00	9.85	353.66	1,998.40	197.76	-38.73	36.00	1.11	0.83	4.51
2,107.00	8.81	351.17	2,090.17	212.71	-40.70	37.76	1.20	-1.12	-2.68
2,199.00	10.53	351.26	2,180.86	227.98	-43.06	39.91	1.87	1.87	0.10
2,291.00	10.24	348.79	2,271.36	244.31	-45.92	42.55	0.58	-0.32	-2.68
2,385.00	10.32	348.01	2,363.85	260.74	-49.30	45.70	0.17	0.09	-0.83
2,478.00	10.23	345.93	2,455.36	276.90	-53.04	49.21	0.41	-0.10	-2.24
2,570.00	9.22	343.90	2,546.03	291.91	-57.07	53.04	1.16	-1.10	-2.21
2,662.00	8.52	343.29	2,636.93	305.52	-61.07	56.85	0.77	-0.76	-0.66
2,755.00	7.82	340.53	2,728.99	318.08	-65.16	60.77	0.86	-0.75	-2.97
2,848.00	8.54	351.14	2,821.05	330.87	-68.33	63.76	1.79	0.77	11.41
2,941.00	7.01	346.63	2,913.19	343.21	-70.71	65.97	1.77	-1.65	-4.85
3,034.00	8.74	351.53	3,005.31	355.72	-73.06	68.15	1.99	1.86	5.27
3,127.00	10.17	341.85	3,097.05	370.52	-76.66	71.54	2.29	1.54	-10.41
3,219.00	8.27	336.72	3,187.86	384.31	-81.81	76.50	2.25	-2.07	-5.58
3,312.00	8.89	341.25	3,279.82	397.26	-86.76	81.27	0.99	0.67	4.87
3,405.00	9.15	348.28	3,371.67	411.31	-90.57	84.89	1.22	0.28	7.56
3,497.00	9.26	355.83	3,462.49	425.85	-92.60	86.71	1.32	0.12	8.21
3,590.00	9.43	352.83	3,554.26	440.88	-94.09	88.00	0.55	0.18	-3.23
3,683.00	9.43	349.26	3,646.00	455.92	-96.46	90.17	0.63	0.00	-3.84
3,776.00	9.19	346.71	3,737.78	470.63	-99.59	93.09	0.51	-0.26	-2.74
3,869.00	7.72	344.29	3,829.76	483.87	-102.99	96.31	1.63	-1.58	-2.60
3,962.00	9.45	342.79	3,921.72	497.18	-106.94	100.07	1.88	1.86	-1.61
4,056.00	10.31	347.86	4,014.32	512.78	-110.99	103.91	1.30	0.91	5.39
4,148.00	8.29	345.41	4,105.11	527.25	-114.39	107.11	2.24	-2.20	-2.66
4,241.00	10.14	351.56	4,196.91	541.83	-117.28	109.80	2.25	1.99	6.61
4,335.00	8.51	347.92	4,289.66	556.82	-119.95	112.26	1.84	-1.73	-3.87
4,428.00	9.75	349.32	4,381.48	571.29	-122.85	114.96	1.35	1.33	1.51
4,522.00	8.88	346.65	4,474.24	586.17	-126.00	117.91	1.03	-0.93	-2.84
4,614.00	11.04	350.55	4,564.85	601.77	-129.09	120.78	2.46	2.35	4.24



# Total Directional Services

## Planning Report



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<b>Company:</b>	Occidental Petroleum	<b>TVD Reference:</b>	4993' GE + 20' KB @ 5013.00usft
<b>Project:</b>	Weld County, CO (UTM-NAD83)	<b>MD Reference:</b>	4993' GE + 20' KB @ 5013.00usft
<b>Site:</b>	4N-68W-11 (S&B 5-11HZ Pad)	<b>North Reference:</b>	True
<b>Well:</b>	Shake 11-11HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ST01		
<b>Design:</b>	Plan #2		

Planned 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)
4,706.00	9.57	348.45	4,655.37	617.95	-132.07	123.53	1.65	-1.60	-2.28
4,801.00	9.43	349.26	4,749.06	633.34	-135.10	126.35	0.20	-0.15	0.85
4,893.00	7.40	347.34	4,840.07	646.52	-137.80	128.87	2.23	-2.21	-2.09
5,010.00	9.71	350.01	4,955.76	663.59	-141.16	132.00	2.00	1.97	2.28
5,103.00	7.82	347.40	5,047.67	677.49	-143.91	134.55	2.08	-2.03	-2.81
5,197.00	9.42	351.85	5,140.61	691.35	-146.39	136.85	1.84	1.70	4.73
5,289.00	7.19	351.30	5,231.64	704.49	-148.33	138.60	2.43	-2.42	-0.60
5,382.00	8.37	352.41	5,323.78	716.96	-150.10	140.21	1.28	1.27	1.19
5,474.00	9.68	349.02	5,414.64	731.19	-152.46	142.37	1.54	1.42	-3.68
5,566.00	7.51	343.96	5,505.60	744.56	-155.60	145.32	2.50	-2.36	-5.50
5,661.00	9.16	352.18	5,599.60	758.02	-158.34	147.88	2.14	1.74	8.65
5,754.00	8.44	349.86	5,691.50	772.07	-160.55	149.89	0.86	-0.77	-2.49
5,846.00	9.79	352.85	5,782.34	786.48	-162.71	151.85	1.55	1.47	3.25
5,939.00	7.53	350.42	5,874.27	800.34	-164.71	153.66	2.46	-2.43	-2.61
6,031.00	8.93	351.93	5,965.32	813.35	-166.72	155.49	1.54	1.52	1.64
6,124.00	8.47	351.82	6,057.25	827.28	-168.70	157.28	0.49	-0.49	-0.12
6,218.00	8.10	348.62	6,150.27	840.62	-171.00	159.39	0.63	-0.39	-3.40
6,311.00	12.73	308.91	6,241.82	853.50	-180.28	168.49	8.90	4.98	-42.70
6,405.00	17.25	282.30	6,332.71	862.99	-201.99	190.07	8.64	4.81	-28.31
6,497.00	23.05	272.86	6,419.06	866.80	-233.34	221.37	7.21	6.30	-10.26
6,589.00	30.42	275.30	6,501.17	869.86	-274.58	262.56	8.10	8.01	2.65
6,681.00	36.35	273.69	6,577.96	873.77	-325.03	312.95	6.52	6.45	-1.75
6,774.00	46.46	275.99	6,647.63	879.07	-386.22	374.06	10.99	10.87	2.47
6,867.00	52.57	274.44	6,707.98	885.45	-456.62	444.37	6.69	6.57	-1.67
6,959.00	59.83	275.74	6,759.13	892.27	-532.72	520.36	7.98	7.89	1.41
7,052.00	65.96	275.32	6,801.48	900.23	-615.08	602.61	6.60	6.59	-0.45
7,144.00	71.69	271.49	6,834.71	905.27	-700.66	688.11	7.34	6.23	-4.16
7,237.00	84.44	272.48	6,853.90	908.43	-791.41	778.81	13.75	13.71	1.06
7,330.00	90.44	273.70	6,858.06	913.44	-884.14	871.46	6.58	6.45	1.31
7,423.00	90.35	272.99	6,857.41	918.87	-976.98	964.21	0.77	-0.10	-0.76
7,517.00	91.47	273.56	6,855.92	924.24	-1,070.81	1,057.96	1.34	1.19	0.61
7,611.00	91.00	271.35	6,853.90	928.26	-1,164.69	1,151.78	2.40	-0.50	-2.35
7,703.00	90.08	269.95	6,853.03	929.31	-1,256.68	1,243.75	1.82	-1.00	-1.52
7,796.00	90.41	269.26	6,852.63	928.67	-1,349.68	1,336.74	0.82	0.35	-0.74
7,888.00	89.82	268.21	6,852.45	926.63	-1,441.65	1,428.74	1.31	-0.64	-1.14
7,981.00	91.88	269.33	6,851.07	924.64	-1,534.61	1,521.72	2.52	2.22	1.20
8,073.00	92.45	269.08	6,847.59	923.36	-1,626.54	1,613.65	0.68	0.62	-0.27
8,167.00	92.35	270.65	6,843.65	923.14	-1,720.45	1,707.56	1.67	-0.11	1.67
8,261.00	91.47	270.65	6,840.52	924.21	-1,814.39	1,801.48	0.94	-0.94	0.00
8,354.00	90.08	271.28	6,839.26	925.77	-1,907.37	1,894.42	1.64	-1.49	0.68
8,447.00	88.86	270.70	6,840.12	927.38	-2,000.35	1,987.37	1.45	-1.31	-0.62
8,540.00	88.87	271.92	6,841.97	929.51	-2,093.31	2,080.29	1.31	0.01	1.31
8,633.00	89.00	270.05	6,843.69	931.10	-2,186.27	2,173.23	2.02	0.14	-2.01
8,725.00	90.89	269.77	6,843.78	930.96	-2,278.27	2,265.21	2.08	2.05	-0.30
8,818.00	89.29	268.98	6,843.64	929.95	-2,371.26	2,358.21	1.92	-1.72	-0.85
8,910.00	90.99	267.67	6,843.41	927.26	-2,463.21	2,450.19	2.33	1.85	-1.42
9,004.00	90.41	267.27	6,842.26	923.11	-2,557.11	2,544.14	0.75	-0.62	-0.43
9,097.00	91.06	267.47	6,841.07	918.84	-2,650.01	2,637.09	0.73	0.70	0.22
9,190.00	90.82	266.80	6,839.55	914.19	-2,742.88	2,730.01	0.77	-0.26	-0.72
9,285.00	90.49	268.14	6,838.46	910.00	-2,837.78	2,824.96	1.45	-0.35	1.41
9,377.00	91.56	269.41	6,836.81	908.03	-2,929.74	2,916.94	1.80	1.16	1.38
9,470.00	91.47	272.03	6,834.35	909.20	-3,022.69	3,009.87	2.82	-0.10	2.82
Start DLS 3.00 TFO -135.83									



# Total Directional Services

## Planning Report



<b>Database:</b>	EDM 5000.15 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Shake 11-11HZ
<b>Company:</b>	Occidental Petroleum	<b>TVD Reference:</b>	4993' GE + 20' KB @ 5013.00usft
<b>Project:</b>	Weld County, CO (UTM-NAD83)	<b>MD Reference:</b>	4993' GE + 20' KB @ 5013.00usft
<b>Site:</b>	4N-68W-11 (S&B 5-11HZ Pad)	<b>North Reference:</b>	True
<b>Well:</b>	Shake 11-11HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ST01		
<b>Design:</b>	Plan #2		

Planned 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)	
9,500.00	90.82	271.40	6,833.75	910.10	-3,052.67	3,039.83	3.00	-2.15	-2.09	
9,600.00	88.67	269.31	6,834.19	910.72	-3,152.66	3,139.80	3.00	-2.15	-2.09	
9,700.00	86.52	267.22	6,838.39	907.70	-3,252.51	3,239.69	3.00	-2.15	-2.09	
9,786.14	84.67	265.41	6,845.00	902.18	-3,338.21	3,325.46	3.00	-2.15	-2.10	
Start 377.00 hold at 9786.14 MD										
9,800.00	84.67	265.41	6,846.29	901.08	-3,351.97	3,339.23	0.00	0.00	0.00	
9,900.00	84.67	265.41	6,855.57	893.11	-3,451.22	3,438.57	0.00	0.00	0.00	
10,000.00	84.67	265.41	6,864.85	885.13	-3,550.46	3,537.92	0.00	0.00	0.00	
10,100.00	84.67	265.41	6,874.14	877.16	-3,649.71	3,637.27	0.00	0.00	0.00	
10,163.14	84.67	265.41	6,880.00	872.13	-3,712.38	3,700.00	0.00	0.00	0.00	
Start DLS 1.50 TFO 30.45										
10,200.00	85.15	265.69	6,883.27	869.28	-3,748.98	3,736.64	1.50	1.29	0.76	
10,300.00	86.44	266.45	6,890.60	862.45	-3,848.48	3,836.22	1.50	1.29	0.76	
10,400.00	87.74	267.21	6,895.67	856.92	-3,948.19	3,936.00	1.50	1.29	0.76	
10,500.00	89.03	267.97	6,898.49	852.72	-4,048.06	4,035.92	1.50	1.29	0.76	
10,609.30	90.45	268.79	6,898.99	849.63	-4,157.31	4,145.20	1.50	1.30	0.76	
Start 1276.87 hold at 10609.30 MD										
10,700.00	90.45	268.79	6,898.28	847.72	-4,247.99	4,235.90	0.00	0.00	0.00	
10,800.00	90.45	268.79	6,897.50	845.61	-4,347.96	4,335.89	0.00	0.00	0.00	
10,900.00	90.45	268.79	6,896.71	843.51	-4,447.94	4,435.89	0.00	0.00	0.00	
11,000.00	90.45	268.79	6,895.93	841.40	-4,547.91	4,535.88	0.00	0.00	0.00	
11,100.00	90.45	268.79	6,895.15	839.30	-4,647.89	4,635.87	0.00	0.00	0.00	
11,200.00	90.45	268.79	6,894.37	837.19	-4,747.86	4,735.87	0.00	0.00	0.00	
11,300.00	90.45	268.79	6,893.59	835.09	-4,847.84	4,835.86	0.00	0.00	0.00	
11,400.00	90.45	268.79	6,892.80	832.98	-4,947.81	4,935.86	0.00	0.00	0.00	
11,500.00	90.45	268.79	6,892.02	830.88	-5,047.79	5,035.85	0.00	0.00	0.00	
11,600.00	90.45	268.79	6,891.24	828.77	-5,147.76	5,135.85	0.00	0.00	0.00	
11,700.00	90.45	268.79	6,890.46	826.67	-5,247.74	5,235.84	0.00	0.00	0.00	
11,800.00	90.45	268.79	6,889.67	824.56	-5,347.71	5,335.83	0.00	0.00	0.00	
11,886.17	90.45	268.79	6,889.00	822.75	-5,433.86	5,422.00	0.00	0.00	0.00	
Start DLS 1.50 TFO 42.32										
11,900.00	90.60	268.93	6,888.87	822.48	-5,447.69	5,435.83	1.50	1.11	1.01	
12,000.00	91.71	269.94	6,886.86	821.50	-5,547.66	5,535.80	1.50	1.11	1.01	
12,042.30	92.18	270.37	6,885.42	821.61	-5,589.94	5,578.08	1.50	1.11	1.01	
Start 2824.55 hold at 12042.30 MD										
12,100.00	92.18	270.37	6,883.23	821.99	-5,647.59	5,635.72	0.00	0.00	0.00	
12,200.00	92.18	270.37	6,879.42	822.63	-5,747.52	5,735.63	0.00	0.00	0.00	
12,300.00	92.18	270.37	6,875.62	823.28	-5,847.44	5,835.54	0.00	0.00	0.00	
12,400.00	92.18	270.37	6,871.82	823.93	-5,947.37	5,935.44	0.00	0.00	0.00	
12,500.00	92.18	270.37	6,868.01	824.58	-6,047.29	6,035.35	0.00	0.00	0.00	
12,600.00	92.18	270.37	6,864.21	825.23	-6,147.22	6,135.26	0.00	0.00	0.00	
12,700.00	92.18	270.37	6,860.41	825.87	-6,247.14	6,235.16	0.00	0.00	0.00	
12,800.00	92.18	270.37	6,856.60	826.52	-6,347.07	6,335.07	0.00	0.00	0.00	
12,900.00	92.18	270.37	6,852.80	827.17	-6,447.00	6,434.98	0.00	0.00	0.00	
13,000.00	92.18	270.37	6,849.00	827.82	-6,546.92	6,534.89	0.00	0.00	0.00	
13,100.00	92.18	270.37	6,845.19	828.46	-6,646.85	6,634.79	0.00	0.00	0.00	
13,200.00	92.18	270.37	6,841.39	829.11	-6,746.77	6,734.70	0.00	0.00	0.00	
13,300.00	92.18	270.37	6,837.59	829.76	-6,846.70	6,834.61	0.00	0.00	0.00	
13,400.00	92.18	270.37	6,833.79	830.41	-6,946.62	6,934.51	0.00	0.00	0.00	
13,500.00	92.18	270.37	6,829.98	831.06	-7,046.55	7,034.42	0.00	0.00	0.00	
13,600.00	92.18	270.37	6,826.18	831.70	-7,146.47	7,134.33	0.00	0.00	0.00	
13,700.00	92.18	270.37	6,822.38	832.35	-7,246.40	7,234.23	0.00	0.00	0.00	
13,800.00	92.18	270.37	6,818.57	833.00	-7,346.33	7,334.14	0.00	0.00	0.00	
13,900.00	92.18	270.37	6,814.77	833.65	-7,446.25	7,434.05	0.00	0.00	0.00	





# Total Directional Services

## Planning Report



<b>Database:</b>	EDM 5000.15 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Shake 11-11HZ
<b>Company:</b>	Occidental Petroleum	<b>TVD Reference:</b>	4993' GE + 20' KB @ 5013.00usft
<b>Project:</b>	Weld County, CO (UTM-NAD83)	<b>MD Reference:</b>	4993' GE + 20' KB @ 5013.00usft
<b>Site:</b>	4N-68W-11 (S&B 5-11HZ Pad)	<b>North Reference:</b>	True
<b>Well:</b>	Shake 11-11HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ST01		
<b>Design:</b>	Plan #2		

Planned 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)
14,000.00	92.18	270.37	6,810.97	834.29	-7,546.18	7,533.96	0.00	0.00	0.00
14,100.00	92.18	270.37	6,807.16	834.94	-7,646.10	7,633.86	0.00	0.00	0.00
14,200.00	92.18	270.37	6,803.36	835.59	-7,746.03	7,733.77	0.00	0.00	0.00
14,300.00	92.18	270.37	6,799.56	836.24	-7,845.95	7,833.68	0.00	0.00	0.00
14,400.00	92.18	270.37	6,795.75	836.89	-7,945.88	7,933.58	0.00	0.00	0.00
14,500.00	92.18	270.37	6,791.95	837.53	-8,045.80	8,033.49	0.00	0.00	0.00
14,600.00	92.18	270.37	6,788.15	838.18	-8,145.73	8,133.40	0.00	0.00	0.00
14,700.00	92.18	270.37	6,784.35	838.83	-8,245.66	8,233.31	0.00	0.00	0.00
14,800.00	92.18	270.37	6,780.54	839.48	-8,345.58	8,333.21	0.00	0.00	0.00
14,866.85	92.18	270.37	6,778.00	839.91	-8,412.38	8,400.00	0.00	0.00	0.00
<b>Start DLS 1.50 TFO -67.31</b>									
14,900.00	92.37	269.91	6,776.68	839.99	-8,445.50	8,433.12	1.50	0.58	-1.39
14,953.81	92.68	269.17	6,774.31	839.56	-8,499.26	8,486.88	1.50	0.58	-1.39
<b>Start 2015.33 hold at 14953.81 MD</b>									
15,000.00	92.68	269.17	6,772.15	838.89	-8,545.39	8,533.02	0.00	0.00	0.00
15,100.00	92.68	269.17	6,767.47	837.44	-8,645.27	8,632.91	0.00	0.00	0.00
15,200.00	92.68	269.17	6,762.79	835.98	-8,745.15	8,732.80	0.00	0.00	0.00
15,300.00	92.68	269.17	6,758.11	834.53	-8,845.03	8,832.69	0.00	0.00	0.00
15,400.00	92.68	269.17	6,753.43	833.08	-8,944.91	8,932.58	0.00	0.00	0.00
15,500.00	92.68	269.17	6,748.75	831.62	-9,044.79	9,032.47	0.00	0.00	0.00
15,600.00	92.68	269.17	6,744.07	830.17	-9,144.67	9,132.36	0.00	0.00	0.00
15,700.00	92.68	269.17	6,739.39	828.72	-9,244.55	9,232.25	0.00	0.00	0.00
15,800.00	92.68	269.17	6,734.71	827.27	-9,344.43	9,332.14	0.00	0.00	0.00
15,900.00	92.68	269.17	6,730.03	825.81	-9,444.31	9,432.03	0.00	0.00	0.00
16,000.00	92.68	269.17	6,725.35	824.36	-9,544.19	9,531.92	0.00	0.00	0.00
16,100.00	92.68	269.17	6,720.67	822.91	-9,644.07	9,631.81	0.00	0.00	0.00
16,200.00	92.68	269.17	6,715.99	821.45	-9,743.95	9,731.70	0.00	0.00	0.00
16,300.00	92.68	269.17	6,711.31	820.00	-9,843.83	9,831.59	0.00	0.00	0.00
16,400.00	92.68	269.17	6,706.63	818.55	-9,943.71	9,931.48	0.00	0.00	0.00
16,500.00	92.68	269.17	6,701.95	817.10	-10,043.59	10,031.37	0.00	0.00	0.00
16,600.00	92.68	269.17	6,697.27	815.64	-10,143.47	10,131.26	0.00	0.00	0.00
16,700.00	92.68	269.17	6,692.60	814.19	-10,243.35	10,231.15	0.00	0.00	0.00
16,800.00	92.68	269.17	6,687.92	812.74	-10,343.23	10,331.04	0.00	0.00	0.00
16,900.00	92.68	269.17	6,683.24	811.28	-10,443.11	10,430.93	0.00	0.00	0.00
16,969.14	92.68	269.17	6,680.00	810.28	-10,512.17	10,500.00	0.00	0.00	0.00
<b>Start DLS 4.00 TFO 0.24</b>									
17,000.00	93.92	269.17	6,678.22	809.83	-10,542.97	10,530.81	4.00	4.00	0.02
17,100.00	97.91	269.19	6,667.92	808.41	-10,642.41	10,630.25	4.00	4.00	0.02
17,200.00	101.91	269.21	6,650.71	807.03	-10,740.89	10,728.74	4.00	4.00	0.02
17,300.00	105.91	269.22	6,626.67	805.70	-10,837.93	10,825.79	4.00	4.00	0.02
17,400.00	109.91	269.24	6,595.93	804.43	-10,933.05	10,920.92	4.00	4.00	0.02
17,436.13	111.35	269.25	6,583.20	803.98	-10,966.86	10,954.73	4.00	4.00	0.02
<b>TD at 17436.13 - ST01 PBHL (Shake 11-11HZ) - ST01 Shake 11-11HZ - 460' Circle</b>									



# Total Directional Services

## Planning Report



<b>Database:</b>	EDM 5000.15 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Shake 11-11HZ
<b>Company:</b>	Occidental Petroleum	<b>TVD Reference:</b>	4993' GE + 20' KB @ 5013.00usft
<b>Project:</b>	Weld County, CO (UTM-NAD83)	<b>MD Reference:</b>	4993' GE + 20' KB @ 5013.00usft
<b>Site:</b>	4N-68W-11 (S&B 5-11HZ Pad)	<b>North Reference:</b>	True
<b>Well:</b>	Shake 11-11HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ST01		
<b>Design:</b>	Plan #2		

Design 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									
ST01 Shake 11-11HZ - 4	0.00	0.00	0.00	557.72	-838.73	14,647,577.40	1,646,052.20	40.331850	-104.979779
- plan misses target center by 1007.23usft at 0.07usft MD (0.07 TVD, 0.00 N, 0.00 E)									
- Circle (radius 460.00)									
ST01 Shake 11-11HZ - 4	0.00	0.00	0.00	434.96	-10,117.26	14,647,452.20	1,636,773.70	40.331507	-105.013072
- plan misses target center by 6648.05usft at 17436.13usft MD (6583.20 TVD, 803.98 N, -10966.86 E)									
- Circle (radius 460.00)									
ST01 PBHL (Shake 11-1	0.00	0.00	6,583.20	803.98	-10,966.86	14,647,821.00	1,635,924.00	40.332519	-105.016121
- plan hits target center									
- Point									

Plan Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(usft)	(usft)	+N/-S (usft)	+E/-W (usft)	
9,470.00	6,834.35	909.20	-3,022.69	Start DLS 3.00 TFO -135.83
9,786.14	6,845.00	902.18	-3,338.21	Start 377.00 hold at 9786.14 MD
10,163.14	6,880.00	872.13	-3,712.38	Start DLS 1.50 TFO 30.45
10,609.30	6,898.99	849.63	-4,157.31	Start 1276.87 hold at 10609.30 MD
11,886.17	6,889.00	822.75	-5,433.86	Start DLS 1.50 TFO 42.32
12,042.30	6,885.42	821.61	-5,589.94	Start 2824.55 hold at 12042.30 MD
14,866.85	6,778.00	839.91	-8,412.38	Start DLS 1.50 TFO -67.31
14,953.81	6,774.31	839.56	-8,499.26	Start 2015.33 hold at 14953.81 MD
16,969.14	6,680.00	810.28	-10,512.17	Start DLS 4.00 TFO 0.24
17,436.13	6,583.20	803.98	-10,966.86	TD at 17436.13