

# Occidental Petroleum

Project: Weld County, CO (UTM-NAD83)  
 Site: 4N-68W-13 SBJ 22-13HZ PAD  
 Well: SBJ 13-7HZ  
 Wellbore: Plan C  
 Design: Surveys

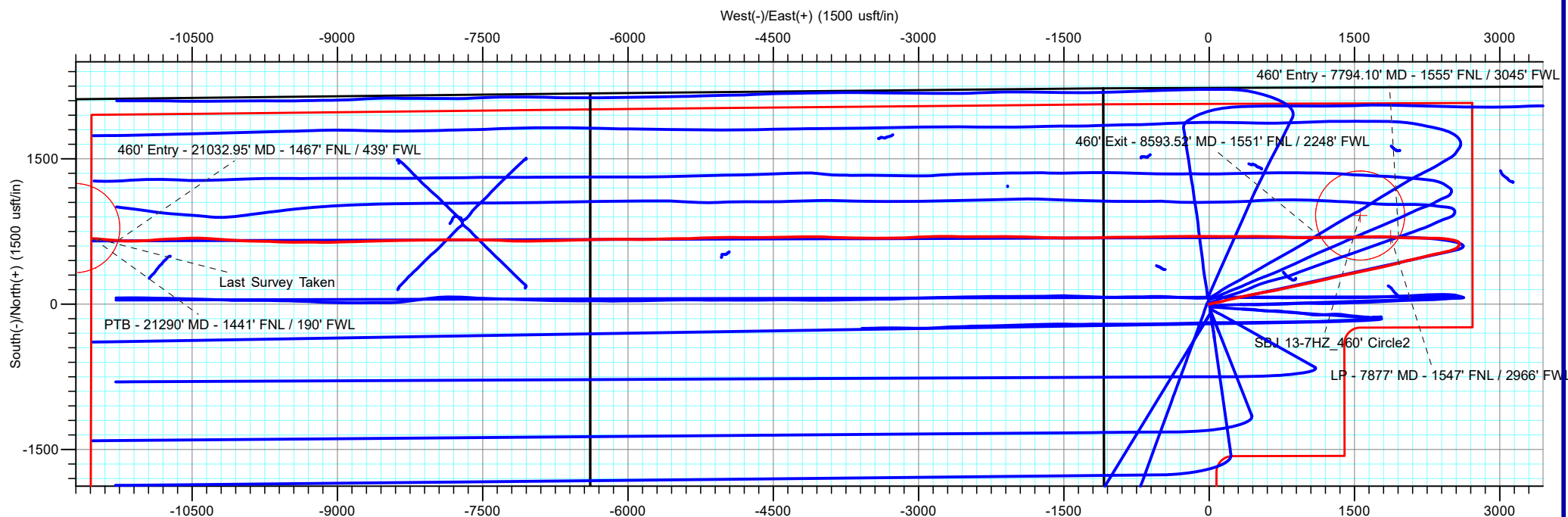
PROJECT DETAILS: Weld County, CO (UTM-NAD83)  
 Geodetic System: Universal Transverse Mercator (US Survey Feet)  
 Datum: North American Datum 1983  
 Ellipsoid: GRS 1980  
 Zone: Zone 13N (108 W to 102 W)



**ACTUAL LINE CALLS**  
**SHL: 2232' FNL, 1082' FWL**  
**LP: 1547' FNL, 2966' FWL**  
**TOE: 1441' FNL, 190' FWL**

**SHL: Sec 13-T4N-R68W**  
**LP: Sec 13-T4N-R68W**  
**BHL: Sec 15-T4N-R68W**

ANNOTATIONS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	VSec	Departure	Annotation	
7794.10	86.62	272.95	6789.43	686.47	1956.47	-1914.54	3323.81	460' Entry - 7794.10' MD - 1555' FNL / 3045' FWL	
7877.11	91.21	274.13	6790.92	691.61	1873.66	-1831.57	3406.77	LP - 7877' MD - 1547' FNL / 2966' FWL	
8593.52	93.29	269.35	6751.44	686.01	1158.82	-1118.19	4121.91	460' Exit - 8593.52' MD - 1551' FNL / 2248' FWL	
21032.95	95.52	273.98	6356.17	655.94	-11263.88	11282.94	16549.35	460' Entry - 21032.95' MD - 1467' FNL / 439' FWL	
21248.00	96.74	274.62	6333.31	673.55	-11476.98	11496.70	16763.19	Last Survey Taken	
21290.00	96.74	274.62	6328.38	676.91	-11518.55	11538.40	16804.90	PTB - 21290' MD - 1441' FNL / 190' FWL	



**TOTAL DIRECTIONAL SERVICES LLC**

Design: Surveys (SBJ 13-7HZ/Plan C)  
 4N-68W-13 SBJ 22-13HZ PAD  
 Created By: RDW Date: 12/28, December 20 2021  
 Approved: \_\_\_\_\_ Date: \_\_\_\_\_

# Occidental Petroleum

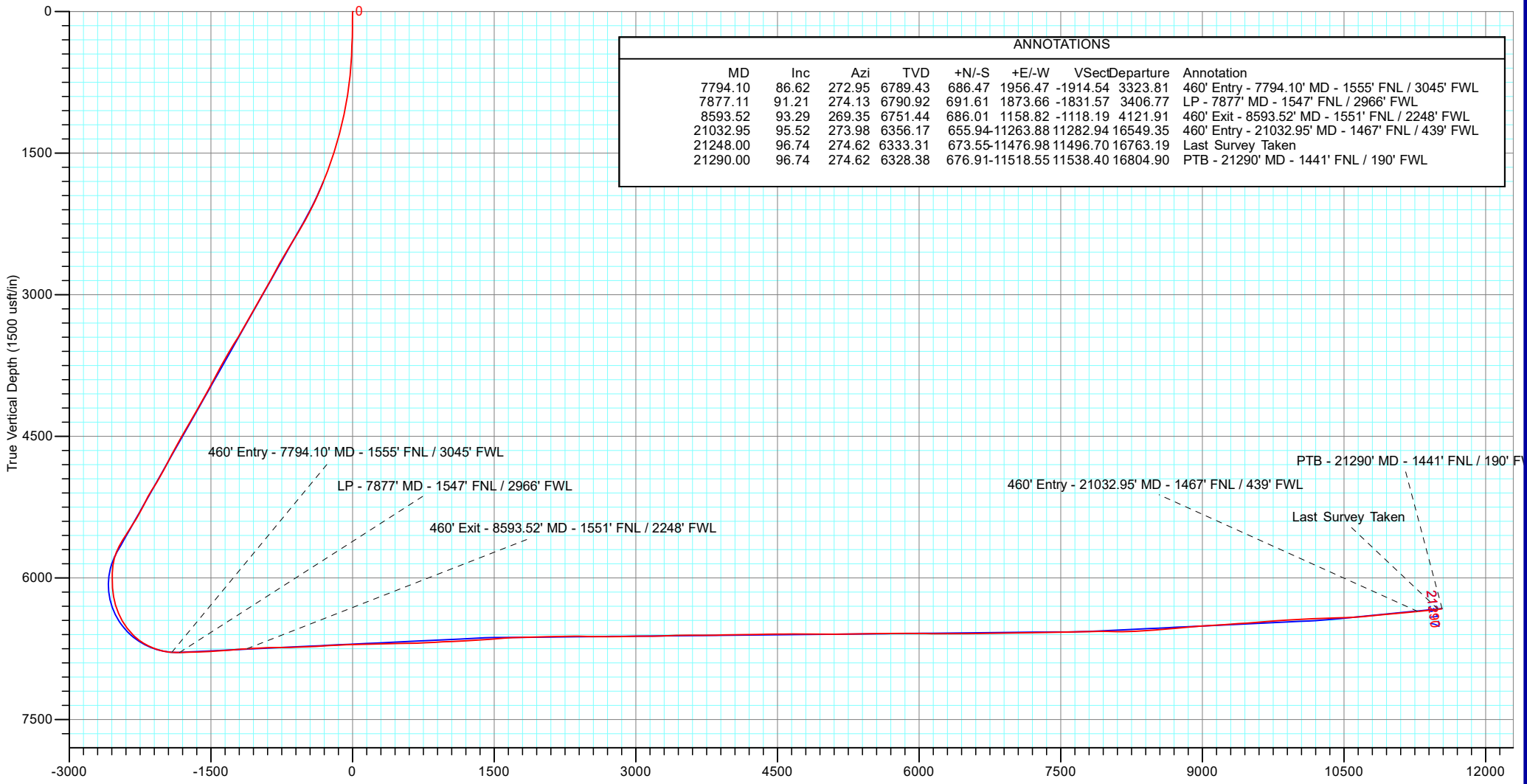
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Geodetic System: Universal Transverse Mercator (US Survey Feet)  
 Datum: North American Datum 1983  
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**TOTAL DIRECTIONAL SERVICES LLC**

Design: Surveys (SBJ 13-7HZ/Plan C)  
 4N-68W-13 SBJ 22-13HZ PAD  
 Created By: RDW Date: 12:24, December 20 2021  
 Approved: \_\_\_\_\_ Date: \_\_\_\_\_



# Occidental Petroleum

Weld County, CO (UTM-NAD83)  
4N-68W-13 SBJ 22-13HZ PAD  
SBJ 13-7HZ

Plan C

Design: Surveys

## Standard Survey Report

20 December, 2021





# Survey Report



<b>Company:</b>	Occidental Petroleum	<b>Local Co-ordinate Reference:</b>	Well SBJ 13-7HZ
<b>Project:</b>	Weld County, CO (UTM-NAD83)	<b>TVD Reference:</b>	RKB = 20' @ 4879.00usft (PD 461)
<b>Site:</b>	4N-68W-13 SBJ 22-13HZ PAD	<b>MD Reference:</b>	RKB = 20' @ 4879.00usft (PD 461)
<b>Well:</b>	SBJ 13-7HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan C	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys	<b>Database:</b>	EDM 5000.16 Single User Db

<b>Project</b>	Weld County, CO (UTM-NAD83)		
<b>Map System:</b>	Universal Transverse Mercator (US Survey Fee	<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)		

<b>Site</b>	4N-68W-13 SBJ 22-13HZ PAD		
<b>Site Position:</b>		<b>Northing:</b>	14,641,145.55 usft
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,652,517.50 usft
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "
		<b>Latitude:</b>	40.314181
		<b>Longitude:</b>	-104.956591

<b>Well</b>	SBJ 13-7HZ					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	14,641,416.45 usft	<b>Latitude:</b>	40.314925
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	1,652,447.67 usft	<b>Longitude:</b>	-104.956841
<b>Position Uncertainty</b>		3.28 usft	<b>Wellhead Elevation:</b>	usft	<b>Ground Level:</b>	4,859.00 usft
<b>Grid Convergence:</b>		0.03 °				

<b>Wellbore</b>	Plan C				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IFR	10/6/2021	7.86	66.48	51,858.40

<b>Design</b>	Surveys				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<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	273.24	

<b>Survey Program</b>	<b>Date</b>	12/20/2021			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
99.00	1,849.00	Survey #1 (Plan C)	APC_ISCWSA REV 2 MM Fixed:v2:crustal field declination		
1,920.00	21,290.00	Survey #2 (Plan C)	APC_ISCWSA REV 2 MM Fixed:v2:Rockies, crustal dec + 3-axis correction		

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
99.00	0.59	23.48	99.00	0.47	0.20	-0.18	0.60	0.60	0.00	
185.00	0.76	88.49	184.99	0.89	0.95	-0.90	0.86	0.20	75.59	
274.00	1.73	92.93	273.97	0.84	2.88	-2.83	1.09	1.09	4.99	
366.00	2.39	92.10	365.91	0.69	6.19	-6.14	0.72	0.72	-0.90	
456.00	3.04	76.29	455.81	1.19	10.38	-10.30	1.10	0.72	-17.57	
546.00	3.58	68.17	545.66	2.80	15.31	-15.12	0.79	0.60	-9.02	
636.00	5.77	69.45	635.36	5.43	22.15	-21.81	2.44	2.43	1.42	
726.00	6.65	75.98	724.83	8.29	31.44	-30.93	1.25	0.98	7.26	



# Survey Report



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<b>Site:</b>	4N-68W-13 SBJ 22-13HZ PAD	<b>MD Reference:</b>	RKB = 20' @ 4879.00usft (PD 461)
<b>Well:</b>	SBJ 13-7HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan C	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys	<b>Database:</b>	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)	
815.00	8.25	78.45	813.07	10.81	42.70	-42.02	1.83	1.80	2.78	
905.00	9.37	81.47	902.01	13.19	56.27	-55.44	1.35	1.24	3.36	
995.00	10.79	80.95	990.62	15.60	71.84	-70.84	1.58	1.58	-0.58	
1,085.00	12.04	78.57	1,078.84	18.79	89.36	-88.15	1.48	1.39	-2.64	
1,175.00	12.70	76.92	1,166.75	22.89	108.20	-106.73	0.83	0.73	-1.83	
1,265.00	14.79	77.58	1,254.17	27.60	129.05	-127.29	2.33	2.32	0.73	
1,355.00	17.49	74.93	1,340.61	33.59	153.34	-151.19	3.11	3.00	-2.94	
1,445.00	17.07	74.19	1,426.55	40.70	179.11	-176.52	0.53	-0.47	-0.82	
1,535.00	19.23	77.02	1,512.07	47.63	206.26	-203.24	2.59	2.40	3.14	
1,624.00	18.61	76.66	1,596.26	54.20	234.36	-230.92	0.71	-0.70	-0.40	
1,714.00	20.43	77.93	1,681.08	60.80	263.70	-259.84	2.08	2.02	1.41	
1,804.00	23.08	79.91	1,764.67	67.17	296.43	-292.16	3.05	2.94	2.20	
1,849.00	23.86	79.28	1,805.94	70.41	314.06	-309.58	1.82	1.73	-1.40	
1,920.00	23.54	78.33	1,870.96	75.95	342.05	-337.21	0.70	-0.45	-1.34	
2,013.00	24.39	78.49	1,955.94	83.54	379.06	-373.73	0.92	0.91	0.17	
2,105.00	26.39	78.28	2,039.05	91.48	417.70	-411.86	2.18	2.17	-0.23	
2,199.00	27.84	77.85	2,122.72	100.35	459.61	-453.20	1.56	1.54	-0.46	
2,291.00	29.27	78.55	2,203.52	109.33	502.66	-495.67	1.60	1.55	0.76	
2,383.00	32.45	79.74	2,282.49	118.20	549.00	-541.44	3.52	3.46	1.29	
2,475.00	32.28	79.61	2,360.20	127.02	597.45	-589.32	0.20	-0.18	-0.14	
2,567.00	31.59	79.59	2,438.27	135.81	645.31	-636.61	0.75	-0.75	-0.02	
2,660.00	31.01	79.52	2,517.74	144.57	692.83	-683.55	0.62	-0.62	-0.08	
2,752.00	31.33	77.62	2,596.46	154.01	739.50	-729.61	1.12	0.35	-2.07	
2,845.00	29.17	77.20	2,676.79	164.21	785.22	-774.68	2.33	-2.32	-0.45	
2,937.00	29.61	76.68	2,756.95	174.42	829.20	-818.02	0.55	0.48	-0.57	
3,029.00	29.88	76.80	2,836.83	184.89	873.63	-861.78	0.30	0.29	0.13	
3,121.00	30.29	78.59	2,916.43	194.71	918.68	-906.21	1.07	0.45	1.95	
3,213.00	30.87	80.28	2,995.64	203.28	964.69	-951.66	1.13	0.63	1.84	
3,340.00	30.24	78.06	3,105.01	215.40	1,028.09	-1,014.28	1.02	-0.50	-1.75	
3,433.00	30.00	77.06	3,185.45	225.45	1,073.67	-1,059.21	0.60	-0.26	-1.08	
3,525.00	31.16	76.73	3,264.65	236.07	1,119.25	-1,104.12	1.27	1.26	-0.36	
3,617.00	30.77	75.86	3,343.54	247.28	1,165.24	-1,149.40	0.65	-0.42	-0.95	
3,709.00	30.86	76.96	3,422.55	258.35	1,211.04	-1,194.50	0.62	0.10	1.20	
3,802.00	33.82	77.63	3,501.12	269.28	1,259.57	-1,242.34	3.21	3.18	0.72	
3,894.00	31.62	77.29	3,578.52	280.07	1,308.11	-1,290.19	2.40	-2.39	-0.37	
3,987.00	30.50	76.75	3,658.18	290.85	1,354.87	-1,336.26	1.24	-1.20	-0.58	
4,081.00	30.50	77.37	3,739.18	301.53	1,401.37	-1,382.08	0.33	0.00	0.66	
4,173.00	29.09	77.83	3,819.01	311.35	1,446.01	-1,426.10	1.55	-1.53	0.50	
4,267.00	28.16	79.28	3,901.52	320.29	1,490.14	-1,469.66	1.23	-0.99	1.54	
4,360.00	29.26	77.10	3,983.09	329.45	1,533.86	-1,512.79	1.63	1.18	-2.34	
4,453.00	30.12	78.40	4,063.88	339.22	1,578.88	-1,557.18	1.16	0.92	1.40	
4,547.00	30.29	79.44	4,145.12	348.30	1,625.28	-1,603.00	0.59	0.18	1.11	
4,640.00	31.94	77.44	4,224.74	357.95	1,672.36	-1,649.45	2.09	1.77	-2.15	



# Survey Report



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## Survey

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4,732.00	29.89	77.02	4,303.67	368.39	1,718.45	-1,694.88	2.24	-2.23	-0.46	
4,824.00	29.75	77.43	4,383.48	378.51	1,763.07	-1,738.85	0.27	-0.15	0.45	
4,917.00	31.45	76.78	4,463.53	389.08	1,809.21	-1,784.33	1.86	1.83	-0.70	
5,009.00	31.32	77.47	4,542.07	399.76	1,855.92	-1,830.36	0.42	-0.14	0.75	
5,101.00	30.60	76.79	4,620.96	410.30	1,902.06	-1,875.82	0.87	-0.78	-0.74	
5,194.00	28.51	74.14	4,701.86	421.77	1,946.46	-1,919.51	2.65	-2.25	-2.85	
5,287.00	28.27	73.67	4,783.68	434.03	1,988.94	-1,961.23	0.35	-0.26	-0.51	
5,380.00	29.83	75.24	4,864.97	446.12	2,032.45	-2,003.98	1.87	1.68	1.69	
5,472.00	30.60	77.68	4,944.48	456.94	2,077.46	-2,048.31	1.58	0.84	2.65	
5,566.00	33.19	78.40	5,024.28	467.23	2,126.04	-2,096.23	2.78	2.76	0.77	
5,659.00	32.32	77.45	5,102.49	477.75	2,175.24	-2,144.76	1.09	-0.94	-1.02	
5,752.00	26.82	73.56	5,183.35	489.10	2,219.67	-2,188.48	6.26	-5.91	-4.18	
5,845.00	29.16	76.64	5,265.48	500.27	2,261.85	-2,229.95	2.96	2.52	3.31	
5,939.00	30.71	77.23	5,346.93	510.87	2,307.54	-2,274.97	1.68	1.65	0.63	
6,032.00	33.14	79.59	5,425.86	520.71	2,355.71	-2,322.51	2.94	2.61	2.54	
6,125.00	33.82	77.28	5,503.43	531.01	2,405.96	-2,372.10	1.55	0.73	-2.48	
6,219.00	33.02	74.60	5,581.90	543.57	2,456.18	-2,421.52	1.79	-0.85	-2.85	
6,313.00	30.67	74.07	5,661.74	556.95	2,503.93	-2,468.44	2.52	-2.50	-0.56	
6,407.00	23.83	62.90	5,745.31	572.21	2,543.96	-2,507.55	9.06	-7.28	-11.88	
6,500.00	14.61	40.06	5,833.15	589.81	2,568.32	-2,530.87	12.62	-9.91	-24.56	
6,593.00	9.93	28.72	5,924.02	605.83	2,579.73	-2,541.36	5.64	-5.03	-12.19	
6,685.00	7.98	1.27	6,014.93	619.18	2,583.68	-2,544.55	5.04	-2.12	-29.84	
6,778.00	7.85	341.96	6,107.06	631.67	2,581.86	-2,542.03	2.85	-0.14	-20.76	
6,871.00	11.43	303.98	6,198.82	642.87	2,572.24	-2,531.79	7.64	3.85	-40.84	
6,963.00	17.16	290.29	6,287.96	652.69	2,551.93	-2,510.96	7.19	6.23	-14.88	
7,056.00	23.60	283.02	6,375.11	661.65	2,520.88	-2,479.46	7.43	6.92	-7.82	
7,148.00	31.03	279.07	6,456.80	669.55	2,479.46	-2,437.66	8.31	8.08	-4.29	
7,240.00	36.26	273.78	6,533.38	675.08	2,428.85	-2,386.81	6.51	5.68	-5.75	
7,333.00	45.37	273.66	6,603.69	679.02	2,368.26	-2,326.09	9.80	9.80	-0.13	
7,425.00	53.78	270.41	6,663.30	681.38	2,298.34	-2,256.16	9.53	9.14	-3.53	
7,517.00	61.59	269.44	6,712.45	681.25	2,220.65	-2,178.60	8.54	8.49	-1.05	
7,609.00	70.99	271.44	6,749.40	681.95	2,136.52	-2,094.56	10.41	10.22	2.17	
7,703.00	76.26	270.67	6,775.89	683.60	2,046.38	-2,004.47	5.66	5.61	-0.82	
7,794.10	86.62	272.95	6,789.43	686.47	1,956.47	-1,914.54	11.64	11.38	2.51	
<b>460' Entry - 7794.10' MD - 1555' FNL / 3045' FWL</b>										
7,796.00	86.84	273.00	6,789.54	686.56	1,954.58	-1,912.65	11.64	11.38	2.45	
7,877.11	91.21	274.13	6,790.92	691.61	1,873.66	-1,831.57	5.56	5.38	1.39	
<b>LP - 7877' MD - 1547' FNL / 2966' FWL</b>										
7,890.00	91.90	274.31	6,790.57	692.56	1,860.81	-1,818.69	5.56	5.38	1.39	
7,983.00	91.96	270.69	6,787.44	696.61	1,767.96	-1,725.76	3.89	0.06	-3.89	
8,075.00	90.61	267.24	6,785.38	694.95	1,676.02	-1,634.06	4.03	-1.47	-3.75	
8,168.00	93.15	269.12	6,782.33	691.99	1,583.13	-1,541.48	3.40	2.73	2.02	
8,261.00	93.67	270.00	6,776.79	691.28	1,490.30	-1,448.84	1.10	0.56	0.95	
8,355.00	93.86	269.44	6,770.62	690.82	1,396.50	-1,355.22	0.63	0.20	-0.60	



# Survey Report



<b>Company:</b>	Occidental Petroleum	<b>Local Co-ordinate Reference:</b>	Well SBJ 13-7HZ
<b>Project:</b>	Weld County, CO (UTM-NAD83)	<b>TVD Reference:</b>	RKB = 20' @ 4879.00usft (PD 461)
<b>Site:</b>	4N-68W-13 SBJ 22-13HZ PAD	<b>MD Reference:</b>	RKB = 20' @ 4879.00usft (PD 461)
<b>Well:</b>	SBJ 13-7HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan C	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys	<b>Database:</b>	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)	
8,447.00	95.46	268.58	6,763.15	689.24	1,304.82	-1,263.78	1.97	1.74	-0.93	
8,540.00	94.50	268.60	6,755.07	686.96	1,212.20	-1,171.43	1.03	-1.03	0.02	
8,593.52	93.29	269.35	6,751.44	686.01	1,158.82	-1,118.19	2.66	-2.26	1.40	
<b>460' Exit - 8593.52' MD - 1551' FNL / 2248' FWL</b>										
8,632.00	92.42	269.89	6,749.52	685.75	1,120.39	-1,079.83	2.66	-2.26	1.40	
8,724.00	93.47	269.70	6,744.80	685.42	1,028.51	-988.12	1.16	1.14	-0.21	
8,817.00	92.41	271.24	6,740.03	686.18	935.64	-895.36	2.01	-1.14	1.66	
8,911.00	90.01	272.20	6,738.04	689.01	841.71	-801.42	2.75	-2.55	1.02	
9,002.00	90.33	272.78	6,737.77	692.96	750.80	-710.43	0.73	0.35	0.64	
9,096.00	91.75	271.34	6,736.06	696.34	656.88	-616.47	2.15	1.51	-1.53	
9,189.00	92.25	270.65	6,732.82	697.95	563.95	-523.60	0.92	0.54	-0.74	
9,280.00	93.00	270.63	6,728.65	698.97	473.05	-432.79	0.82	0.82	-0.02	
9,372.00	93.75	268.77	6,723.23	698.49	381.22	-341.13	2.18	0.82	-2.02	
9,465.00	93.29	269.89	6,717.52	697.40	288.40	-248.52	1.30	-0.49	1.20	
9,558.00	92.21	269.91	6,713.06	697.24	195.51	-155.79	1.16	-1.16	0.02	
9,651.00	93.09	270.11	6,708.76	697.26	102.61	-63.03	0.97	0.95	0.22	
9,744.00	90.58	271.16	6,705.79	698.29	9.67	29.81	2.93	-2.70	1.13	
9,837.00	91.23	269.89	6,704.32	699.14	-83.31	122.70	1.53	0.70	-1.37	
9,931.00	91.60	270.09	6,701.99	699.12	-177.28	216.52	0.45	0.39	0.21	
10,023.00	92.12	269.91	6,699.01	699.12	-269.23	308.32	0.60	0.57	-0.20	
10,117.00	90.54	269.10	6,696.83	698.31	-363.20	402.09	1.89	-1.68	-0.86	
10,211.00	90.77	268.32	6,695.75	696.19	-457.17	495.79	0.87	0.24	-0.83	
10,304.00	91.04	268.06	6,694.28	693.26	-550.11	588.42	0.40	0.29	-0.28	
10,397.00	91.91	270.41	6,691.89	692.02	-643.07	681.15	2.69	0.94	2.53	
10,489.00	92.70	269.79	6,688.19	692.18	-734.99	772.94	1.09	0.86	-0.67	
10,582.00	93.57	269.02	6,683.10	691.21	-827.84	865.59	1.25	0.94	-0.83	
10,675.00	92.84	269.01	6,677.90	689.62	-920.68	958.19	0.79	-0.78	-0.01	
10,768.00	92.42	269.39	6,673.64	688.32	-1,013.58	1,050.86	0.61	-0.45	0.41	
10,861.00	92.63	268.62	6,669.54	686.71	-1,106.47	1,143.52	0.86	0.23	-0.83	
10,954.00	93.12	268.98	6,664.87	684.76	-1,199.33	1,236.12	0.65	0.53	0.39	
11,046.00	93.54	270.15	6,659.53	684.06	-1,291.17	1,327.78	1.35	0.46	1.27	
11,139.00	94.27	270.05	6,653.20	684.22	-1,383.96	1,420.42	0.79	0.78	-0.11	
11,233.00	95.24	269.82	6,645.40	684.12	-1,477.63	1,513.94	1.06	1.03	-0.24	
11,327.00	94.16	270.13	6,637.70	684.08	-1,571.31	1,607.47	1.20	-1.15	0.33	
11,419.00	91.18	271.91	6,633.42	685.72	-1,663.19	1,699.29	3.77	-3.24	1.93	
11,511.00	92.23	272.18	6,630.68	689.00	-1,755.09	1,791.22	1.18	1.14	0.29	
11,603.00	91.57	271.93	6,627.63	692.29	-1,846.98	1,883.15	0.77	-0.72	-0.27	
11,696.00	89.99	270.28	6,626.36	694.09	-1,939.94	1,976.07	2.46	-1.70	-1.77	
11,790.00	91.71	272.07	6,624.97	696.01	-2,033.91	2,070.00	2.64	1.83	1.90	
11,882.00	91.65	269.32	6,622.27	697.13	-2,125.85	2,161.86	2.99	-0.07	-2.99	
11,975.00	91.03	270.43	6,620.10	696.93	-2,218.82	2,254.67	1.37	-0.67	1.19	
12,067.00	90.13	269.63	6,619.17	696.97	-2,310.82	2,346.52	1.31	-0.98	-0.87	
12,161.00	89.00	269.19	6,619.88	696.01	-2,404.81	2,440.30	1.29	-1.20	-0.47	



# Survey Report



<b>Company:</b>	Occidental Petroleum	<b>Local Co-ordinate Reference:</b>	Well SBJ 13-7HZ
<b>Project:</b>	Weld County, CO (UTM-NAD83)	<b>TVD Reference:</b>	RKB = 20' @ 4879.00usft (PD 461)
<b>Site:</b>	4N-68W-13 SBJ 22-13HZ PAD	<b>MD Reference:</b>	RKB = 20' @ 4879.00usft (PD 461)
<b>Well:</b>	SBJ 13-7HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan C	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys	<b>Database:</b>	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)	
12,253.00	89.52	270.14	6,621.07	695.47	-2,496.80	2,532.12	1.18	0.57	1.03	
12,346.00	89.38	271.43	6,621.96	696.74	-2,589.78	2,625.02	1.40	-0.15	1.39	
12,438.00	89.53	271.49	6,622.83	699.09	-2,681.75	2,716.98	0.18	0.16	0.07	
12,530.00	90.81	268.81	6,622.56	699.33	-2,773.74	2,808.83	3.23	1.39	-2.91	
12,624.00	92.00	268.72	6,620.26	697.30	-2,867.68	2,902.51	1.27	1.27	-0.10	
12,716.00	89.21	266.53	6,619.29	693.49	-2,959.59	2,994.05	3.86	-3.03	-2.38	
12,808.00	89.41	267.53	6,620.39	688.72	-3,051.45	3,085.51	1.11	0.22	1.09	
12,901.00	92.12	267.38	6,619.15	684.59	-3,144.35	3,178.01	2.92	2.91	-0.16	
12,993.00	92.72	269.47	6,615.27	682.07	-3,236.22	3,269.60	2.36	0.65	2.27	
13,086.00	90.95	269.05	6,612.29	680.87	-3,329.16	3,362.33	1.96	-1.90	-0.45	
13,179.00	91.89	270.38	6,609.98	680.40	-3,422.13	3,455.12	1.75	1.01	1.43	
13,273.00	91.67	270.93	6,607.06	681.48	-3,516.08	3,548.98	0.63	-0.23	0.59	
13,365.00	89.47	270.92	6,606.15	682.96	-3,608.06	3,640.89	2.39	-2.39	-0.01	
13,461.00	88.76	270.49	6,607.63	684.15	-3,704.04	3,736.79	0.86	-0.74	-0.45	
13,553.00	91.11	271.87	6,607.74	686.04	-3,796.01	3,828.72	2.96	2.55	1.50	
13,645.00	91.07	272.02	6,605.99	689.16	-3,887.94	3,920.68	0.17	-0.04	0.16	
13,738.00	91.10	272.48	6,604.23	692.81	-3,980.85	4,013.65	0.50	0.03	0.49	
13,831.00	91.04	270.82	6,602.49	695.49	-4,073.79	4,106.59	1.79	-0.06	-1.78	
13,923.00	91.35	268.51	6,600.57	694.95	-4,165.77	4,198.39	2.53	0.34	-2.51	
14,015.00	91.07	268.82	6,598.63	692.81	-4,257.72	4,290.07	0.45	-0.30	0.34	
14,109.00	90.38	269.30	6,597.44	691.27	-4,351.70	4,383.81	0.89	-0.73	0.51	
14,201.00	90.34	269.14	6,596.86	690.01	-4,443.69	4,475.59	0.18	-0.04	-0.17	
14,293.00	90.45	269.23	6,596.22	688.71	-4,535.68	4,567.35	0.15	0.12	0.10	
14,385.00	90.49	269.63	6,595.47	687.79	-4,627.67	4,659.15	0.44	0.04	0.43	
14,478.00	89.51	269.97	6,595.47	687.47	-4,720.67	4,751.98	1.12	-1.05	0.37	
14,572.00	89.66	270.03	6,596.15	687.47	-4,814.66	4,845.83	0.17	0.16	0.06	
14,664.00	89.63	269.99	6,596.72	687.48	-4,906.66	4,937.68	0.05	-0.03	-0.04	
14,758.00	89.82	271.12	6,597.17	688.39	-5,000.66	5,031.57	1.22	0.20	1.20	
14,850.00	90.31	269.06	6,597.07	688.54	-5,092.65	5,123.43	2.30	0.53	-2.24	
14,942.00	90.35	266.47	6,596.54	684.95	-5,184.57	5,215.00	2.82	0.04	-2.82	
15,035.00	91.41	267.40	6,595.11	679.98	-5,277.42	5,307.42	1.52	1.14	1.00	
15,128.00	91.35	269.54	6,592.87	677.50	-5,370.36	5,400.07	2.30	-0.06	2.30	
15,220.00	90.34	269.00	6,591.51	676.32	-5,462.34	5,491.84	1.24	-1.10	-0.59	
15,312.00	90.54	269.18	6,590.81	674.86	-5,554.33	5,583.59	0.29	0.22	0.20	
15,405.00	90.38	268.22	6,590.06	672.75	-5,647.30	5,676.30	1.05	-0.17	-1.03	
15,497.00	90.37	268.33	6,589.46	669.98	-5,739.25	5,767.95	0.12	-0.01	0.12	
15,592.00	89.84	269.27	6,589.28	667.99	-5,834.23	5,862.66	1.14	-0.56	0.99	
15,684.00	89.34	271.44	6,589.94	668.56	-5,926.22	5,954.54	2.42	-0.54	2.36	
15,778.00	89.69	270.34	6,590.74	670.02	-6,020.21	6,048.45	1.23	0.37	-1.17	
15,871.00	89.57	269.53	6,591.34	669.92	-6,113.20	6,141.30	0.88	-0.13	-0.87	
15,965.00	89.54	270.13	6,592.07	669.64	-6,207.20	6,235.13	0.64	-0.03	0.64	
16,057.00	89.33	269.24	6,592.98	669.13	-6,299.19	6,326.94	0.99	-0.23	-0.97	
16,149.00	90.95	267.84	6,592.75	666.79	-6,391.16	6,418.63	2.33	1.76	-1.52	
16,241.00	91.21	267.26	6,591.02	662.86	-6,483.06	6,510.16	0.69	0.28	-0.63	



# Survey Report



<b>Company:</b>	Occidental Petroleum	<b>Local Co-ordinate Reference:</b>	Well SBJ 13-7HZ
<b>Project:</b>	Weld County, CO (UTM-NAD83)	<b>TVD Reference:</b>	RKB = 20' @ 4879.00usft (PD 461)
<b>Site:</b>	4N-68W-13 SBJ 22-13HZ PAD	<b>MD Reference:</b>	RKB = 20' @ 4879.00usft (PD 461)
<b>Well:</b>	SBJ 13-7HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan C	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys	<b>Database:</b>	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)
16,335.00	91.25	267.35	6,589.00	658.44	-6,576.93	6,603.63	0.10	0.04	0.10
16,428.00	91.46	270.11	6,586.80	656.38	-6,669.87	6,696.31	2.98	0.23	2.97
16,521.00	90.43	269.88	6,585.27	656.37	-6,762.86	6,789.15	1.13	-1.11	-0.25
16,615.00	90.05	268.11	6,584.87	654.72	-6,856.84	6,882.88	1.93	-0.40	-1.88
16,708.00	90.34	268.73	6,584.56	652.16	-6,949.80	6,975.55	0.74	0.31	0.67
16,800.00	90.34	268.77	6,584.01	650.15	-7,041.78	7,067.27	0.04	0.00	0.04
16,894.00	91.22	271.38	6,582.73	650.27	-7,135.76	7,161.11	2.93	0.94	2.78
16,986.00	91.48	273.11	6,580.56	653.88	-7,227.66	7,253.07	1.90	0.28	1.88
17,078.00	91.21	273.44	6,578.40	659.13	-7,319.49	7,345.04	0.46	-0.29	0.36
17,171.00	91.11	270.66	6,576.52	662.46	-7,412.40	7,437.99	2.99	-0.11	-2.99
17,263.00	90.93	269.52	6,574.88	662.60	-7,504.38	7,529.84	1.25	-0.20	-1.24
17,356.00	91.16	270.65	6,573.19	662.74	-7,597.36	7,622.68	1.24	0.25	1.22
17,448.00	91.18	270.48	6,571.31	663.64	-7,689.34	7,714.56	0.19	0.02	-0.18
17,541.00	91.20	270.25	6,569.38	664.24	-7,782.32	7,807.42	0.25	0.02	-0.25
17,633.00	90.20	269.67	6,568.25	664.17	-7,874.31	7,899.26	1.26	-1.09	-0.63
17,725.00	89.68	269.26	6,568.35	663.31	-7,966.31	7,991.06	0.72	-0.57	-0.45
17,817.00	89.11	269.10	6,569.32	662.00	-8,058.29	8,082.83	0.64	-0.62	-0.17
17,908.00	90.48	269.59	6,569.64	660.96	-8,149.28	8,173.61	1.60	1.51	0.54
18,001.00	92.76	269.77	6,567.02	660.44	-8,242.24	8,266.39	2.46	2.45	0.19
18,096.00	93.69	268.92	6,561.67	659.35	-8,337.08	8,361.02	1.33	0.98	-0.89
18,190.00	94.35	267.52	6,555.08	656.44	-8,430.80	8,454.42	1.64	0.70	-1.49
18,282.00	94.20	268.06	6,548.22	652.90	-8,522.47	8,545.75	0.61	-0.16	0.59
18,375.00	94.76	268.97	6,540.96	650.50	-8,615.16	8,638.15	1.15	0.60	0.98
18,469.00	95.02	267.91	6,532.95	647.95	-8,708.78	8,731.48	1.16	0.28	-1.13
18,562.00	95.32	268.80	6,524.56	645.29	-8,801.36	8,823.77	1.01	0.32	0.96
18,654.00	94.57	269.02	6,516.63	643.55	-8,893.00	8,915.16	0.85	-0.82	0.24
18,749.00	93.66	267.07	6,509.82	640.32	-8,987.70	9,009.52	2.26	-0.96	-2.05
18,842.00	93.63	269.43	6,503.90	637.48	-9,080.46	9,101.97	2.53	-0.03	2.54
18,934.00	93.18	270.72	6,498.44	637.60	-9,172.29	9,193.67	1.48	-0.49	1.40
19,028.00	94.00	271.52	6,492.55	639.44	-9,266.09	9,287.42	1.22	0.87	0.85
19,121.00	94.13	269.84	6,485.96	640.54	-9,358.85	9,380.09	1.81	0.14	-1.81
19,214.00	94.41	269.37	6,479.04	639.90	-9,451.59	9,472.64	0.59	0.30	-0.51
19,308.00	94.31	270.99	6,471.89	640.19	-9,545.31	9,566.24	1.72	-0.11	1.72
19,402.00	94.75	273.47	6,464.46	643.84	-9,638.94	9,659.92	2.67	0.47	2.64
19,495.00	93.97	271.72	6,457.39	648.03	-9,731.57	9,752.64	2.06	-0.84	-1.88
19,589.00	93.87	270.95	6,450.97	650.22	-9,825.32	9,846.37	0.82	-0.11	-0.82
19,681.00	93.83	271.18	6,444.79	651.93	-9,917.10	9,938.09	0.25	-0.04	0.25
19,774.00	92.34	273.49	6,439.78	655.71	-10,009.88	10,030.94	2.95	-1.60	2.48
19,867.00	92.91	274.12	6,435.52	661.88	-10,102.58	10,123.84	0.91	0.61	0.68
19,959.00	91.82	273.38	6,431.73	667.89	-10,194.30	10,215.75	1.43	-1.18	-0.80
20,052.00	91.99	273.98	6,428.64	673.85	-10,287.05	10,308.70	0.67	0.18	0.65
20,144.00	91.66	272.71	6,425.71	679.22	-10,378.85	10,400.65	1.43	-0.36	-1.38
20,237.00	91.99	268.96	6,422.74	680.57	-10,471.78	10,493.50	4.05	0.35	-4.03



# Survey Report



<b>Company:</b>	Occidental Petroleum	<b>Local Co-ordinate Reference:</b>	Well SBJ 13-7HZ
<b>Project:</b>	Weld County, CO (UTM-NAD83)	<b>TVD Reference:</b>	RKB = 20' @ 4879.00usft (PD 461)
<b>Site:</b>	4N-68W-13 SBJ 22-13HZ PAD	<b>MD Reference:</b>	RKB = 20' @ 4879.00usft (PD 461)
<b>Well:</b>	SBJ 13-7HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan C	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys	<b>Database:</b>	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)	
20,329.00	92.76	267.67	6,418.93	677.87	-10,563.65	10,585.08	1.63	0.84	-1.40	
20,422.00	95.35	268.09	6,412.36	674.44	-10,656.35	10,677.43	2.82	2.78	0.45	
20,514.00	95.61	267.58	6,403.57	670.98	-10,747.86	10,768.61	0.62	0.28	-0.55	
20,606.00	95.04	266.22	6,395.03	666.02	-10,839.33	10,859.65	1.60	-0.62	-1.48	
20,699.00	94.80	264.72	6,387.05	658.71	-10,931.69	10,951.45	1.63	-0.26	-1.61	
20,791.00	95.52	268.07	6,378.78	652.94	-11,023.13	11,042.41	3.71	0.78	3.64	
20,886.00	95.37	269.60	6,369.76	651.02	-11,117.68	11,136.70	1.61	-0.16	1.61	
20,979.00	95.19	272.65	6,361.20	652.84	-11,210.25	11,229.23	3.27	-0.19	3.28	
21,032.95	95.52	273.98	6,356.17	655.94	-11,263.88	11,282.94	2.52	0.60	2.46	
<b>460' Entry - 21032.95' MD - 1467' FNL / 439' FWL</b>										
21,072.00	95.75	274.94	6,352.34	658.97	-11,302.62	11,321.80	2.52	0.60	2.46	
21,166.00	96.20	274.77	6,342.55	666.88	-11,395.77	11,415.25	0.51	0.48	-0.18	
21,248.00	96.74	274.62	6,333.31	673.55	-11,476.98	11,496.70	0.68	0.66	-0.18	
<b>Last Survey Taken</b>										
21,290.00	96.74	274.62	6,328.38	676.91	-11,518.55	11,538.40	0.00	0.00	0.00	
<b>PTB - 21290' MD - 1441' FNL / 190' FWL</b>										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
SBJ 13-7HZ_460' Circ	0.00	0.00	0.00	914.79	1,558.87	14,642,332.00	1,654,006.10	40.317437	-104.951249	
- actual wellpath misses target center by 1807.47usft at 7.52usft MD (7.52 TVD, 0.00 N, 0.00 E)										
- Circle (radius 460.00)										
SBJ 13-7HZ_460' Circ	0.00	0.00	0.00	785.15	-11,704.20	14,642,195.90	1,640,743.10	40.317074	-104.998829	
- actual wellpath misses target center by 6332.03usft at 21290.00usft MD (6328.38 TVD, 676.91 N, -11518.55 E)										
- Circle (radius 460.00)										
SBJ 13-7HZ LP	0.00	0.00	6,789.00	691.63	1,873.66	14,642,109.00	1,654,321.00	40.316824	-104.950120	
- actual wellpath misses target center by 1.92usft at 7877.16usft MD (6790.92 TVD, 691.61 N, 1873.61 E)										
- Point										

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
21,290.00	6,328.38	20" Casing	20	24	



# Survey Report



<b>Company:</b>	Occidental Petroleum	<b>Local Co-ordinate Reference:</b>	Well SBJ 13-7HZ
<b>Project:</b>	Weld County, CO (UTM-NAD83)	<b>TVD Reference:</b>	RKB = 20' @ 4879.00usft (PD 461)
<b>Site:</b>	4N-68W-13 SBJ 22-13HZ PAD	<b>MD Reference:</b>	RKB = 20' @ 4879.00usft (PD 461)
<b>Well:</b>	SBJ 13-7HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Plan C	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys	<b>Database:</b>	EDM 5000.16 Single User Db

## Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
7,794.10	6,789.43	686.47	1,956.47	460' Entry - 7794.10' MD - 1555' FNL / 3045' FWL
7,877.11	6,790.92	691.61	1,873.66	LP - 7877' MD - 1547' FNL / 2966' FWL
8,593.52	6,751.44	686.01	1,158.82	460' Exit - 8593.52' MD - 1551' FNL / 2248' FWL
21,032.95	6,356.17	655.94	-11,263.88	460' Entry - 21032.95' MD - 1467' FNL / 439' FWL
21,248.00	6,333.31	673.55	-11,476.98	Last Survey Taken
21,290.00	6,328.38	676.91	-11,518.55	PTB - 21290' MD - 1441' FNL / 190' FWL

Checked By: _____	Approved By: _____	Date: _____
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