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Directional Survey**

30-010-44504 JUL 27 2018

MARATHON OIL

BLACK RIVER 374 STATE 24 27 15 WXY # 3H

H&P 441

3/7/2018

Scientific Drilling

The **Scientific Drilling** In Wellbore Placement

SURVEY REPORT

BLACK RIVER 374 STATE 24 27 15 WXY # 3H

COMPUTED SURVEYS

CUSTOMER **Marathon Oil**
PROJECT **Black River 374**
FIELD **Wolfcamp Y**

SDI JOB NO. **OP:008288**
SDI DISTRICT **Midland**
SDI KIT/UNIT **KIT MUD PULSE**

SITE INFORMATION

Site Name **Black River**
Lat/Long **32° 12' 38.202" N, 104° 10' 51.11" W**
Northing **440,373.41 ft**
Easting **547,156.41 ft**

Section **24**
Township **27**
Range **15**

MAP INFORMATION

North Reference **Grid North**
Grid Correction **-0.08 deg**
System **US State Plane 1927**
Datum **North American Datum 1927 (Clarke 1866)**
Map Zone **New Mexico East: 3001**

**WELL INFORMATION**

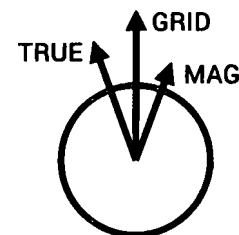
Lat/Long **32° 12' 38.202" N, 104° 10' 51.11" W**
Northing **440,373.41 ft**
Easting **547,156.41 ft**
UWI **300-154-4504**

DEPTH AND ELEVATION REFERENCE

Ground Level **3223 ft above Mean Sea Level**
Reference Datum **RKB**
Reference Height **26.5 ft above G.L.**
Reference Elevation **3249.5 ft**

VERTICAL SECTION REFERENCE

+N/-S **0 ft**
+E/-W **0 ft**
Proposal Direction **0.00°**
Calculation Method **Minimum Curvature**

**GEOMAGNETIC REFERENCE INFORMATION**Local Gravity: **998.516 mG [computed]**

MD	MODEL	DATE	DECLINATION	TRUE TO GRID	MAG TO GRID
0-13797 ft	HDGM2018	07 Mar 2018	7.37°	subtract 0.08°	add 7.29°

WELL NOTES**OPERATORS**

C. Searcy, B. Rose, P. Bankov, C. Searcy

SDI Operator Name (Printed)

SIGNATURE

DATE

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR	BUILD RATE
ft	deg	deg	ft	ft	ft	ft	°/100ft	ft	deg	°/100ft
0.00	0.00	0.00	0.00	0.00	0.00	0.00	Invalid	0.00	0.00	Invalid
42.40	0.49	142.91	42.40	-0.14	-0.14	0.11	1.16	0.18	142.91	1.16
109.60	0.19	79.50	109.60	-0.35	-0.35	0.39	0.65	0.53	132.03	-0.45
204.80	0.23	318.67	204.80	-0.18	-0.18	0.42	0.38	0.46	113.29	0.04
295.60	0.58	247.99	295.60	-0.22	-0.22	-0.13	0.60	0.25	210.03	0.39
387.00	0.84	236.86	386.99	-0.76	-0.76	-1.12	0.32	1.35	235.85	0.28
484.20	1.32	230.00	484.17	-1.87	-1.87	-2.57	0.51	3.18	234.02	0.49
594.00	2.23	244.21	593.92	-3.61	-3.61	-5.46	0.92	6.55	236.56	0.83
684.00	2.08	245.57	683.85	-5.05	-5.05	-8.53	0.18	9.91	239.39	-0.17
774.00	2.16	252.53	773.79	-6.23	-6.23	-11.63	0.30	13.19	241.82	0.09
865.00	1.65	256.73	864.74	-7.04	-7.04	-14.54	0.58	16.15	244.15	-0.55
955.00	1.43	262.51	954.71	-7.49	-7.49	-16.91	0.30	18.49	246.12	-0.25
1046.00	1.29	260.07	1045.68	-7.81	-7.81	-19.04	0.16	20.58	247.70	-0.15
1141.00	1.13	269.42	1140.66	-8.01	-8.01	-21.04	0.27	22.51	249.17	-0.17
1235.00	1.10	275.10	1234.65	-7.93	-7.93	-22.86	0.12	24.20	250.86	-0.04
1330.00	0.72	303.76	1329.63	-7.52	-7.52	-24.26	0.61	25.40	252.77	-0.40
1425.00	0.26	321.44	1424.63	-7.02	-7.02	-24.89	0.50	25.86	254.25	-0.48
1519.00	0.31	254.54	1518.63	-6.92	-6.92	-25.27	0.34	26.20	254.68	0.05
1613.00	0.26	250.77	1612.63	-7.06	-7.06	-25.71	0.06	26.66	254.65	-0.06
1708.00	0.60	81.29	1707.63	-7.05	-7.05	-25.42	0.90	26.38	254.49	0.37
1803.00	1.90	93.31	1802.60	-7.07	-7.07	-23.35	1.38	24.40	253.16	1.36
1897.00	3.00	93.81	1896.52	-7.32	-7.32	-19.35	1.17	20.68	249.28	1.17
1992.00	2.69	118.66	1991.40	-8.55	-8.55	-14.91	1.33	17.19	240.17	-0.33
2087.00	2.22	163.72	2086.32	-11.38	-11.38	-12.44	2.03	16.87	227.55	-0.50
2182.00	3.43	212.59	2181.22	-15.54	-15.54	-13.46	2.72	20.56	220.89	1.28
2276.00	4.32	228.36	2275.01	-20.27	-20.27	-17.62	1.47	26.86	221.01	0.95
2372.00	4.68	235.01	2370.71	-24.92	-24.92	-23.54	0.66	34.28	223.37	0.37
2467.00	4.25	253.83	2465.43	-28.12	-28.12	-30.10	1.60	41.19	226.94	-0.45
2561.00	4.43	259.99	2559.16	-29.72	-29.72	-37.02	0.53	47.48	231.24	0.19
2656.00	4.40	253.00	2653.87	-31.43	-31.43	-44.12	0.57	54.17	234.54	-0.03
2750.00	4.92	247.25	2747.56	-34.04	-34.04	-51.29	0.74	61.56	236.43	0.55
2844.00	4.71	248.17	2841.23	-37.03	-37.03	-58.59	0.24	69.31	237.70	-0.22

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR	BUILD RATE
ft	deg	deg	ft	ft	ft	ft	°/100ft	ft	deg	°/100ft
2939.00	4.80	248.89	2935.91	-39.91	-39.91	-65.92	0.11	77.06	238.80	0.10
3034.00	4.71	248.29	3030.58	-42.79	-42.79	-73.25	0.10	84.83	239.71	-0.09
3128.00	4.43	248.68	3124.28	-45.54	-45.54	-80.22	0.30	92.25	240.42	-0.30
3223.00	4.61	248.49	3218.98	-48.27	-48.27	-87.19	0.18	99.66	241.03	0.18
3317.00	4.89	247.88	3312.66	-51.16	-51.16	-94.41	0.31	107.38	241.55	0.30
3412.00	5.08	247.44	3407.30	-54.30	-54.30	-102.05	0.21	115.60	241.98	0.20
3507.00	5.01	247.04	3501.93	-57.54	-57.54	-109.75	0.08	123.92	242.33	-0.08
3601.00	4.88	247.43	3595.58	-60.67	-60.67	-117.23	0.14	132.00	242.64	-0.14
3696.00	4.68	247.83	3690.25	-63.69	-63.69	-124.55	0.22	139.89	242.92	-0.21
3791.00	4.75	245.80	3784.93	-66.76	-66.76	-131.73	0.19	147.68	243.12	0.07
3885.00	5.14	244.27	3878.58	-70.19	-70.19	-139.07	0.44	155.77	243.22	0.41
3980.00	5.15	244.58	3973.20	-73.86	-73.86	-146.75	0.03	164.29	243.28	0.01
4074.00	5.22	245.13	4066.81	-77.47	-77.47	-154.44	0.09	172.79	243.36	0.07
4169.00	5.09	245.13	4161.43	-81.06	-81.06	-162.19	0.14	181.32	243.44	-0.14
4263.00	4.72	244.37	4255.09	-84.49	-84.49	-169.45	0.40	189.35	243.50	-0.39
4358.00	4.60	241.96	4349.77	-87.97	-87.97	-176.34	0.24	197.07	243.49	-0.12
4453.00	4.16	242.15	4444.49	-91.37	-91.37	-182.75	0.47	204.32	243.44	-0.47
4547.00	4.01	240.50	4538.26	-94.58	-94.58	-188.62	0.20	211.00	243.37	-0.16
4642.00	3.80	249.17	4633.04	-97.33	-97.33	-194.45	0.66	217.45	243.41	-0.22
4737.00	4.84	257.44	4727.77	-99.32	-99.32	-201.31	1.28	224.48	243.74	1.10
4831.00	5.68	258.77	4821.37	-101.09	-101.09	-209.74	0.90	232.83	244.27	0.89
4926.00	5.13	259.11	4915.95	-102.81	-102.81	-218.52	0.57	241.49	244.80	-0.57
5020.00	4.97	259.36	5009.58	-104.35	-104.35	-226.65	0.17	249.52	245.28	-0.17
5115.00	4.83	258.43	5104.23	-105.92	-105.92	-234.62	0.17	257.42	245.70	-0.15
5210.00	4.86	257.06	5198.89	-107.62	-107.62	-242.46	0.13	265.27	246.07	0.03
5304.00	4.52	256.29	5292.58	-109.39	-109.39	-249.94	0.37	272.83	246.36	-0.36
5399.00	4.34	254.32	5387.30	-111.25	-111.25	-257.03	0.25	280.07	246.60	-0.19
5494.00	4.46	252.96	5482.02	-113.30	-113.30	-264.02	0.17	287.30	246.77	0.13
5589.00	4.73	253.31	5576.71	-115.51	-115.51	-271.31	0.28	294.87	246.94	0.28
5684.00	4.52	250.33	5671.40	-117.89	-117.89	-278.58	0.34	302.50	247.06	-0.23
5778.00	5.27	256.07	5765.06	-120.18	-120.18	-286.25	0.95	310.46	247.23	0.80
5873.00	5.26	259.76	5859.66	-122.00	-122.00	-294.77	0.36	319.02	247.52	-0.01

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR	BUILD RATE
ft	deg	deg	ft	ft	ft	ft	°/100ft	ft	deg	°/100ft
5967.00	5.27	259.34	5953.26	-123.57	-123.57	-303.25	0.04	327.46	247.83	0.02
6062.00	5.00	264.17	6047.88	-124.80	-124.80	-311.67	0.54	335.72	248.18	-0.28
6157.00	4.85	264.56	6142.53	-125.60	-125.60	-319.79	0.17	343.57	248.56	-0.16
6251.00	4.61	255.89	6236.21	-126.89	-126.89	-327.40	0.80	351.14	248.81	-0.26
6346.00	4.92	247.45	6330.88	-129.39	-129.39	-334.87	0.81	359.00	248.87	0.33
6440.00	5.74	238.34	6424.48	-133.40	-133.40	-342.59	1.25	367.65	248.72	0.88
6535.00	5.76	238.18	6519.00	-138.41	-138.41	-350.69	0.02	377.01	248.46	0.01
6629.00	5.95	236.69	6612.51	-143.57	-143.57	-358.76	0.26	386.42	248.19	0.20
6724.00	6.19	235.17	6706.98	-149.20	-149.20	-367.08	0.31	396.24	247.88	0.26
6819.00	6.94	236.93	6801.35	-155.26	-155.26	-376.10	0.81	406.88	247.57	0.79
6913.00	6.45	237.62	6894.71	-161.18	-161.18	-385.32	0.52	417.67	247.30	-0.52
7008.00	5.64	236.03	6989.18	-166.65	-166.65	-393.70	0.87	427.52	247.06	-0.85
7103.00	5.01	236.24	7083.77	-171.57	-171.57	-401.03	0.66	436.19	246.84	-0.66
7197.00	3.33	235.58	7177.52	-175.39	-175.39	-406.69	1.80	442.90	246.67	-1.80
7292.00	4.05	247.38	7272.32	-178.24	-178.24	-412.06	1.10	448.96	246.61	0.76
7387.00	4.85	260.67	7367.04	-180.18	-180.18	-419.12	1.37	456.21	246.74	0.85
7481.00	5.13	264.21	7460.68	-181.25	-181.25	-427.23	0.44	464.08	247.01	0.30
7576.00	4.89	265.08	7555.32	-182.03	-182.03	-435.49	0.27	472.00	247.32	-0.26
7671.00	4.11	262.03	7650.03	-182.85	-182.85	-442.89	0.85	479.15	247.57	-0.82
7766.00	3.51	256.33	7744.82	-184.01	-184.01	-449.09	0.75	485.33	247.72	-0.63
7860.00	4.64	251.66	7838.58	-185.88	-185.88	-455.49	1.25	491.96	247.80	1.20
7955.00	3.82	246.94	7933.32	-188.33	-188.33	-462.05	0.94	498.95	247.82	-0.86
8050.00	4.71	236.73	8028.06	-191.71	-191.71	-468.22	1.23	505.94	247.73	0.94
8144.00	5.09	242.87	8121.71	-195.73	-195.73	-475.15	0.69	513.89	247.61	0.41
8238.00	4.33	244.17	8215.39	-199.18	-199.18	-482.06	0.82	521.59	247.55	-0.81
8333.00	3.23	230.33	8310.19	-202.45	-202.45	-487.36	1.50	527.73	247.44	-1.16
8427.00	2.04	215.22	8404.09	-205.51	-205.51	-490.36	1.45	531.68	247.26	-1.26
8522.00	1.10	208.55	8499.05	-207.69	-207.69	-491.77	1.01	533.83	247.10	-1.00
8569.00	0.93	219.06	8546.04	-208.38	-208.38	-492.23	0.53	534.52	247.05	-0.35
8617.00	2.93	350.72	8594.02	-207.47	-207.47	-492.67	7.53	534.57	247.16	4.17
8664.00	6.75	3.94	8640.85	-203.53	-203.53	-492.68	8.41	533.06	247.55	8.12
8712.00	11.72	8.62	8688.21	-195.89	-195.89	-491.75	10.47	529.33	248.28	10.36

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR	BUILD RATE
ft	deg	deg	ft	ft	ft	ft	°/100ft	ft	deg	°/100ft
8759.00	16.97	7.68	8733.73	-184.37	-184.37	-490.12	11.18	523.65	249.39	11.17
8806.00	21.86	4.43	8778.05	-168.84	-168.84	-488.52	10.65	516.88	250.93	10.40
8853.00	26.86	2.71	8820.85	-149.49	-149.49	-487.34	10.76	509.76	252.95	10.65
8901.00	31.63	0.94	8862.72	-126.06	-126.06	-486.63	10.09	502.69	255.48	9.93
8948.00	36.84	358.77	8901.56	-99.63	-99.63	-486.73	11.38	496.82	258.43	11.08
8996.00	42.01	357.24	8938.63	-69.18	-69.18	-487.81	10.96	492.69	261.93	10.78
9043.00	48.98	359.24	8971.55	-35.70	-35.70	-488.81	15.12	490.11	265.82	14.81
9090.00	54.71	0.40	9000.58	1.24	1.24	-488.91	12.35	488.91	270.15	12.19
9137.00	57.07	0.74	9026.94	40.15	40.15	-488.52	5.07	490.16	274.70	5.03
9185.00	59.89	0.40	9052.03	81.07	81.07	-488.11	5.90	494.80	279.43	5.87
9232.00	62.51	359.57	9074.67	122.25	122.25	-488.13	5.79	503.20	284.06	5.58
9279.00	67.49	358.69	9094.52	164.83	164.83	-488.78	10.71	515.82	288.64	10.58
9326.00	71.01	358.35	9111.18	208.76	208.76	-489.91	7.52	532.53	293.08	7.49
9373.00	74.80	358.01	9124.99	253.65	253.65	-491.34	8.10	552.95	297.30	8.08
9420.00	79.58	0.29	9135.41	299.46	299.46	-492.01	11.21	575.98	301.33	10.17
9468.00	85.36	0.88	9141.70	347.02	347.02	-491.53	12.10	601.68	305.22	12.04
9595.00	93.23	0.49	9143.26	473.90	473.90	-490.01	6.20	681.68	314.04	6.20
9689.00	92.85	0.17	9138.28	567.77	567.77	-489.47	0.52	749.63	319.24	-0.40
9783.00	91.61	356.07	9134.61	661.62	661.62	-492.55	4.56	824.83	323.33	-1.32
9878.00	89.50	354.61	9133.70	756.30	756.30	-500.26	2.70	906.78	326.52	-2.23
9973.00	88.12	356.23	9135.67	850.97	850.97	-507.84	2.23	990.99	329.17	-1.45
10068.00	89.70	357.57	9137.48	945.81	945.81	-512.98	2.18	1075.97	331.53	1.66
10163.00	90.71	358.56	9137.15	1040.75	1040.75	-516.19	1.49	1161.73	333.62	1.06
10258.00	91.38	0.81	9135.42	1135.73	1135.73	-516.71	2.47	1247.74	335.54	0.71
10352.00	91.98	0.03	9132.67	1229.68	1229.68	-516.02	1.05	1333.56	337.24	0.64
10446.00	91.41	1.55	9129.89	1323.63	1323.63	-514.72	1.72	1420.19	338.75	-0.61
10541.00	88.32	1.10	9130.11	1418.59	1418.59	-512.52	3.29	1508.34	340.14	-3.25
10636.00	89.80	1.36	9131.67	1513.55	1513.55	-510.48	1.58	1597.32	341.36	1.56
10731.00	88.39	1.64	9133.18	1608.51	1608.51	-507.99	1.52	1686.81	342.47	-1.49
10825.00	89.16	0.68	9135.19	1702.46	1702.46	-506.08	1.32	1776.09	343.44	0.83
10921.00	89.73	0.36	9136.12	1798.45	1798.45	-505.22	0.68	1868.07	344.31	0.59
11015.00	90.47	0.88	9135.95	1892.45	1892.45	-504.20	0.96	1958.46	345.08	0.79

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR	BUILD RATE
ft	deg	deg	ft	ft	ft	ft	°/100ft	ft	deg	°/100ft
11110.00	89.30	1.94	9136.15	1987.42	1987.42	-501.86	1.67	2049.80	345.83	-1.24
11205.00	90.97	2.05	9135.92	2082.35	2082.35	-498.55	1.77	2141.20	346.54	1.77
11299.00	91.01	2.16	9134.30	2176.28	2176.28	-495.11	0.12	2231.88	347.18	0.03
11393.00	88.69	1.95	9134.55	2270.21	2270.21	-491.74	2.47	2322.86	347.78	-2.46
11488.00	89.23	0.91	9136.27	2365.16	2365.16	-489.37	1.23	2415.26	348.31	0.56
11583.00	89.66	1.27	9137.19	2460.14	2460.14	-487.55	0.60	2507.99	348.79	0.46
11677.00	88.76	359.39	9138.48	2554.13	2554.13	-487.01	2.22	2600.14	349.20	-0.96
11772.00	89.36	359.12	9140.04	2649.10	2649.10	-488.24	0.70	2693.72	349.56	0.63
11866.00	91.71	359.98	9139.16	2743.09	2743.09	-488.97	2.66	2786.33	349.89	2.50
11961.00	91.51	359.14	9136.49	2838.05	2838.05	-489.70	0.92	2879.99	350.21	-0.21
12055.00	91.37	358.07	9134.12	2931.99	2931.99	-491.99	1.14	2972.98	350.47	-0.15
12150.00	92.25	358.80	9131.12	3026.90	3026.90	-494.58	1.19	3067.04	350.72	0.92
12244.00	90.20	0.89	9129.11	3120.87	3120.87	-494.84	3.12	3159.86	350.99	-2.18
12339.00	89.63	1.64	9129.25	3215.85	3215.85	-492.74	0.99	3253.38	351.29	-0.60
12433.00	88.93	0.65	9130.43	3309.82	3309.82	-490.86	1.29	3346.02	351.56	-0.75
12528.00	89.93	0.68	9131.38	3404.81	3404.81	-489.77	1.06	3439.85	351.81	1.06
12623.00	88.86	359.42	9132.38	3499.80	3499.80	-489.69	1.74	3533.89	352.03	-1.13
12718.00	90.91	359.51	9132.58	3594.79	3594.79	-490.58	2.16	3628.11	352.23	2.16
12812.00	91.75	359.93	9130.40	3688.76	3688.76	-491.04	1.00	3721.30	352.42	0.89
12907.00	91.95	358.58	9127.34	3783.70	3783.70	-492.27	1.44	3815.59	352.59	0.21
13002.00	91.14	1.49	9124.78	3878.66	3878.66	-492.22	3.18	3909.76	352.77	-0.85
13096.00	89.39	1.29	9124.34	3972.62	3972.62	-489.94	1.87	4002.72	352.97	-1.86
13189.00	89.36	0.51	9125.35	4065.61	4065.61	-488.48	0.84	4094.85	353.15	-0.03
13284.00	89.46	0.46	9126.32	4160.60	4160.60	-487.68	0.12	4189.08	353.31	0.10
13378.00	89.53	359.70	9127.15	4254.59	4254.59	-487.55	0.81	4282.44	353.46	0.07
13472.00	89.80	359.08	9127.70	4348.59	4348.59	-488.55	0.71	4375.94	353.59	0.28
13567.00	92.65	0.22	9125.67	4443.55	4443.55	-489.12	3.23	4470.39	353.72	3.00
13662.00	91.34	359.89	9122.35	4538.49	4538.49	-489.03	1.42	4564.76	353.85	-1.38
13757.00	92.69	0.08	9119.01	4633.43	4633.43	-489.06	1.43	4659.17	353.97	1.42
13797.00	92.25	0.28	9117.29	4673.39	4673.39	-488.93	1.20	4698.90	354.03	-1.09
13848.00	92.25	0.28	9115.30	4723.35	4723.35	-488.67				