

**Provide Signature Page for
Directional Survey**

30-015-44502

**MWD
SURVEYS**

Customer: Marathon Oil
Well: [REDACTED]
Field/Block: Wolfcamp
Co./Parish: Eddy County
State: New Mexico

PGS Job #: LNM1347917
MWD Operator: Miles A. Compton IV
Directional Driller: Greg Fisher
Date of First Survey: December 17, 2017
Date of Last Survey: January 19, 2018

PRODIRECTIONAL

Total Correction: 7.20 East Grid

Vertical Section Plane: 359.84 Nominal Dip Angle: 60.10 Magnetic Field Strength: 0.480

Measured		Coordinates						Closure		Vib/Shk					
Depth	Inc.	Azm.	T.V.D.	Ver. Sect.	+N / -S	+E / -W	Dist.	Angle	DLS	Temp (°F)	Color	Date	Time	Flow Rate	
Survey's are tied into:							Date Received:								
Company:															
Tie-In	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
1	164	0.6	105.4	164.00	-0.23	-0.23	0.83	0.86	105.40	0.37	63 °F		12/17/17	10:01	556 (gpm)
2	224	1.1	92.7	223.99	-0.34	-0.34	1.71	1.74	101.23	0.89	66 °F		12/17/17	10:15	556 (gpm)
3	315	1.8	97.1	314.96	-0.57	-0.56	4.00	4.04	97.93	0.78	68 °F		12/17/17	10:49	556 (gpm)
4	407	1.4	96.7	406.92	-0.88	-0.87	6.55	6.60	97.54	0.43	68 °F		12/17/17	11:28	556 (gpm)
5	444	1.0	90.1	443.92	-0.94	-0.92	7.32	7.38	97.16	1.14	68 °F		12/17/17	11:58	556 (gpm)
6	532	0.9	127.0	531.91	-1.36	-1.34	8.64	8.74	98.80	0.69	68 °F		12/19/17	04:04	760 (gpm)
7	593	0.8	127.7	592.90	-1.91	-1.89	9.36	9.55	101.39	0.16	68 °F		12/19/17	04:24	867 (gpm)
8	685	0.9	146.4	684.89	-2.91	-2.88	10.27	10.66	105.67	0.32	72 °F		12/19/17	04:48	867 (gpm)
9	776	1.6	108.1	775.87	-3.90	-3.87	11.87	12.48	108.06	1.16	72 °F		12/19/17	05:10	867 (gpm)
10	867	2.0	105.7	866.82	-4.74	-4.69	14.61	15.34	107.82	0.45	75 °F		12/19/17	05:34	867 (gpm)
11	959	1.5	128.2	958.78	-5.92	-5.87	17.10	18.08	108.96	0.91	84 °F		12/19/17	06:13	867 (gpm)
12	1,050	1.2	129.5	1,049.76	-7.27	-7.22	18.77	20.11	111.03	0.33	90 °F		12/19/17	06:48	867 (gpm)
13	1,145	1.4	123.7	1,144.73	-8.55	-8.49	20.50	22.19	112.50	0.25	97 °F		12/19/17	07:33	867 (gpm)
14	1,239	1.6	125.7	1,238.70	-9.96	-9.90	22.52	24.60	113.72	0.22	102 °F		12/19/17	08:19	867 (gpm)
15	1,334	1.3	128.4	1,333.67	-11.41	-11.34	24.44	26.95	114.89	0.32	93 °F		12/19/17	09:02	867 (gpm)
16	1,428	1.6	129.9	1,427.64	-12.92	-12.84	26.29	29.26	116.04	0.32	93 °F		12/19/17	12:36	867 (gpm)
17	1,523	1.1	134.3	1,522.61	-14.41	-14.33	27.96	31.42	117.14	0.54	97 °F		12/19/17	13:43	867 (gpm)
18	1,617	1.0	136.1	1,616.60	-15.63	-15.55	29.17	33.06	118.06	0.11	104 °F		12/19/17	14:44	867 (gpm)
19	1,712	0.8	124.2	1,711.58	-16.61	-16.52	30.29	34.51	118.61	0.29	109 °F		12/19/17	15:24	867 (gpm)
20	1,806	1.5	108.9	1,805.56	-17.38	-17.29	32.00	36.37	118.38	0.81	113 °F		12/19/17	15:53	867 (gpm)
21	1,901	2.2	101.9	1,900.51	-18.17	-18.07	34.96	39.35	117.33	0.77	113 °F		12/19/17	16:35	867 (gpm)
22	1,995	2.0	102.8	1,994.45	-18.91	-18.80	38.33	42.69	116.13	0.22	109 °F		12/19/17	17:23	867 (gpm)
23	2,090	2.2	102.0	2,089.39	-19.67	-19.55	41.73	46.08	115.10	0.21	108 °F		12/19/17	17:51	867 (gpm)
24	2,184	2.7	111.3	2,183.30	-20.86	-20.73	45.55	50.05	114.47	0.68	109 °F		12/19/17	18:19	867 (gpm)
25	2,278	3.3	118.3	2,277.17	-22.96	-22.82	50.00	54.96	114.53	0.75	113 °F		12/19/17	19:09	867 (gpm)

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Nominal Dip Angle: 60.10

Magnetic Field Strength: 0.480

Measured Depth	Inc.	Azm.	T.V.D.	Ver. Sect.	Coordinates		Closure		DLS	Temp (°F)	Vib/Shk		Date	Time	Flow Rate
					+N / -S	+E / -W	Dist.	Angle			Color				
26	2,373	2.5	116.1	2,372.05	-25.18	-25.02	54.27	59.76	114.76	0.85	108 °F		12/19/17	20:02	867 (gpm)
27	2,412	2.3	123.2	2,411.02	-25.98	-25.83	55.69	61.38	114.88	0.92	109 °F		12/19/17	20:27	867 (gpm)
28	2,493	1.8	116.7	2,491.96	-27.45	-27.29	58.18	64.26	115.13	0.68	86 °F		12/21/17	07:40	457 (gpm)
29	2,556	1.8	125.2	2,554.93	-28.47	-28.30	59.88	66.23	115.30	0.42	86 °F		12/21/17	08:25	506 (gpm)
30	2,650	2.7	132.5	2,648.86	-30.83	-30.65	62.71	69.80	116.05	1.00	90 °F		12/21/17	09:07	506 (gpm)
31	2,745	3.4	134.8	2,743.72	-34.33	-34.15	66.36	74.63	117.23	0.75	90 °F		12/21/17	09:55	506 (gpm)
32	2,840	4.4	142.4	2,838.50	-39.22	-39.02	70.59	80.65	118.93	1.18	93 °F		12/21/17	10:32	650 (gpm)
33	2,934	4.6	145.4	2,932.21	-45.19	-44.98	74.93	87.39	120.98	0.33	99 °F		12/21/17	10:59	720 (gpm)
34	3,029	4.6	144.1	3,026.91	-51.42	-51.20	79.32	94.41	122.84	0.11	100 °F		12/21/17	11:26	720 (gpm)
35	3,123	4.4	145.8	3,120.62	-57.47	-57.24	83.56	101.28	124.41	0.26	104 °F		12/21/17	11:55	720 (gpm)
36	3,217	5.2	142.7	3,214.29	-63.85	-63.61	88.17	108.72	125.81	0.89	106 °F		12/21/17	12:42	720 (gpm)
37	3,312	5.2	141.7	3,308.90	-70.67	-70.41	93.45	117.00	127.00	0.10	109 °F		12/21/17	13:13	720 (gpm)
38	3,406	5.8	145.1	3,402.46	-77.92	-77.65	98.80	125.66	128.16	0.73	109 °F		12/21/17	13:59	720 (gpm)
39	3,501	6.0	146.2	3,496.96	-86.00	-85.71	104.31	135.01	129.41	0.24	111 °F		12/21/17	14:32	720 (gpm)
40	3,595	5.8	148.9	3,590.46	-94.17	-93.86	109.50	144.22	130.60	0.36	113 °F		12/21/17	15:06	720 (gpm)
41	3,690	6.4	141.4	3,684.93	-102.43	-102.11	115.28	154.00	131.53	1.05	115 °F		12/21/17	15:51	720 (gpm)
42	3,784	6.2	142.0	3,778.36	-110.54	-110.20	121.67	164.16	132.17	0.22	113 °F		12/21/17	16:19	720 (gpm)
43	3,879	6.2	143.3	3,872.80	-118.72	-118.36	127.90	174.26	132.78	0.15	111 °F		12/21/17	16:52	720 (gpm)
44	3,973	5.9	141.6	3,966.28	-126.59	-126.22	133.93	184.03	133.30	0.37	113 °F		12/21/17	17:20	720 (gpm)
45	4,067	6.9	141.2	4,059.69	-134.79	-134.40	140.47	194.41	133.73	1.06	115 °F		12/21/17	18:16	720 (gpm)
46	4,162	7.4	142.8	4,153.95	-144.13	-143.72	147.75	206.12	134.21	0.57	117 °F		12/21/17	18:42	720 (gpm)
47	4,256	7.7	141.5	4,247.14	-153.91	-153.47	155.33	218.36	134.66	0.37	117 °F		12/21/17	19:08	720 (gpm)
48	4,351	7.6	141.5	4,341.29	-163.82	-163.37	163.20	230.92	135.03	0.11	117 °F		12/21/17	19:30	720 (gpm)
49	4,445	7.4	144.6	4,434.49	-173.64	-173.17	170.58	243.07	135.43	0.48	117 °F		12/21/17	19:54	720 (gpm)
50	4,539	6.8	144.1	4,527.77	-183.11	-182.61	177.35	254.55	135.84	0.64	115 °F		12/21/17	20:18	720 (gpm)
51	4,634	6.2	145.4	4,622.16	-191.90	-191.39	183.56	265.18	136.20	0.65	115 °F		12/21/17	20:41	720 (gpm)
52	4,728	5.2	140.6	4,715.69	-199.39	-198.86	189.14	274.44	136.43	1.18	115 °F		12/21/17	21:03	720 (gpm)
53	4,823	5.4	138.2	4,810.29	-206.06	-205.52	194.85	283.21	136.53	0.31	117 °F		12/21/17	21:39	697 (gpm)

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	Measured		Coordinates					Closure		DLS	Temp (°F)	Vib/Shk	Date	Time	Flow Rate
	Depth	Inc.	Azm.	T.V.D.	Ver. Sect.	+N / -S	+E / -W	Dist.	Angle			Color			
54	4,917	5.7	132.7	4,903.85	-212.54	-211.98	201.23	292.29	136.49	0.65	117 °F		12/21/17	22:17	697 (gpm)
55	5,012	6.0	130.4	4,998.35	-218.98	-218.40	208.48	301.93	136.33	0.40	118 °F		12/21/17	22:38	697 (gpm)
56	5,106	5.4	132.7	5,091.89	-225.18	-224.58	215.47	311.23	136.19	0.68	120 °F		12/21/17	22:59	697 (gpm)
57	5,200	5.4	128.4	5,185.47	-230.95	-230.33	222.19	320.03	136.03	0.43	120 °F		12/21/17	23:20	697 (gpm)
58	5,295	4.8	127.1	5,280.09	-236.14	-235.50	228.86	328.39	135.82	0.64	122 °F		12/21/17	23:41	697 (gpm)
59	5,390	4.8	130.3	5,374.76	-241.13	-240.47	235.07	336.28	135.65	0.28	120 °F		12/22/17	00:29	697 (gpm)
60	5,484	4.3	132.1	5,468.46	-246.05	-245.38	240.68	343.71	135.55	0.55	122 °F		12/22/17	00:54	697 (gpm)
61	5,579	4.1	129.2	5,563.21	-250.60	-249.91	245.95	350.64	135.46	0.31	124 °F		12/22/17	01:15	697 (gpm)
62	5,673	2.8	131.2	5,657.04	-254.25	-253.55	250.29	356.27	135.37	1.39	124 °F		12/22/17	01:55	697 (gpm)
63	5,768	1.9	138.2	5,751.95	-256.96	-256.25	253.08	360.16	135.36	0.99	124 °F		12/22/17	02:18	697 (gpm)
64	5,862	2.0	144.6	5,845.90	-259.46	-258.75	255.07	363.34	135.41	0.25	124 °F		12/22/17	02:42	697 (gpm)
65	5,957	0.9	197.7	5,940.87	-261.53	-260.81	255.80	365.32	135.56	1.71	124 °F		12/22/17	03:45	602 (gpm)
66	6,051	0.8	248.8	6,034.86	-262.46	-261.75	254.97	365.41	135.75	0.79	122 °F		12/22/17	04:23	601 (gpm)
67	6,145	0.4	341.7	6,128.86	-262.39	-261.68	254.25	364.86	135.82	0.97	120 °F		12/22/17	05:02	695 (gpm)
68	6,240	0.6	186.9	6,223.86	-262.57	-261.86	254.09	364.87	135.86	1.03	120 °F		12/22/17	05:34	695 (gpm)
69	6,334	0.8	142.4	6,317.85	-263.58	-262.87	254.43	365.83	135.93	0.60	122 °F		12/22/17	05:58	697 (gpm)
70	6,429	1.2	117.7	6,412.84	-264.57	-263.85	255.72	367.44	135.90	0.61	122 °F		12/22/17	06:39	697 (gpm)
71	6,523	1.3	140.1	6,506.82	-265.85	-265.13	257.27	369.44	135.86	0.53	122 °F		12/22/17	07:07	697 (gpm)
72	6,618	0.3	83.0	6,601.81	-266.65	-265.93	258.21	370.66	135.84	1.23	122 °F		12/22/17	07:53	697 (gpm)
73	6,712	1.0	64.0	6,695.80	-266.26	-265.54	259.19	371.07	135.69	0.77	122 °F		12/22/17	08:18	697 (gpm)
74	6,806	1.0	71.7	6,789.78	-265.65	-264.92	260.71	371.69	135.46	0.14	122 °F		12/22/17	08:59	697 (gpm)
75	6,901	0.9	76.9	6,884.77	-265.22	-264.49	262.22	372.44	135.25	0.14	122 °F		12/22/17	09:31	697 (gpm)
76	6,996	0.9	85.7	6,979.76	-265.00	-264.27	263.69	373.32	135.06	0.15	122 °F		12/22/17	10:07	697 (gpm)
77	7,090	0.1	335.2	7,073.76	-264.87	-264.14	264.39	373.73	134.97	1.00	124 °F		12/22/17	10:59	697 (gpm)
78	7,185	0.2	88.3	7,168.76	-264.79	-264.06	264.52	373.76	134.95	0.27	124 °F		12/22/17	11:45	697 (gpm)
79	7,279	1.0	117.8	7,262.75	-265.17	-264.43	265.41	374.66	134.89	0.88	126 °F		12/22/17	12:37	697 (gpm)
80	7,374	0.2	157.8	7,357.74	-265.72	-264.97	266.21	375.60	134.87	0.90	127 °F		12/22/17	13:25	697 (gpm)
81	7,468	1.2	297.8	7,451.74	-265.41	-264.67	265.40	374.81	134.92	1.45	127 °F		12/22/17	15:00	697 (gpm)

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					+N / -S	+E / -W	Dist.	Angle						
82	7,563	0.8	276.0	7,546.72	-264.87	-264.13	263.86	373.35	135.03	0.57	127 °F	12/22/17	15:54	697 (gpm)
83	7,657	1.3	247.2	7,640.71	-265.21	-264.48	262.23	372.44	135.24	0.76	127 °F	12/22/17	16:58	617 (gpm)
84	7,751	1.9	245.8	7,734.67	-266.25	-265.53	259.82	371.50	135.62	0.64	129 °F	12/22/17	17:56	640 (gpm)
85	7,846	1.7	290.1	7,829.63	-266.41	-265.69	257.06	369.69	135.95	1.44	129 °F	12/22/17	19:13	640 (gpm)
86	7,940	1.8	309.7	7,923.59	-264.98	-264.27	254.62	366.97	136.07	0.64	131 °F	12/22/17	20:05	640 (gpm)
87	8,035	1.7	294.2	8,018.54	-263.44	-262.74	252.18	364.18	136.17	0.51	133 °F	12/22/17	20:59	640 (gpm)
88	8,129	1.6	279.5	8,112.50	-262.65	-261.95	249.62	361.84	136.38	0.46	133 °F	12/22/17	21:54	640 (gpm)
89	8,224	1.2	285.1	8,207.48	-262.16	-261.47	247.35	359.93	136.59	0.44	135 °F	12/22/17	22:39	640 (gpm)
90	8,318	0.3	330.4	8,301.47	-261.69	-261.00	246.28	358.85	136.66	1.08	135 °F	12/22/17	23:29	640 (gpm)
91	8,413	0.4	116.3	8,396.47	-261.62	-260.93	246.45	358.92	136.63	0.71	136 °F	12/23/17	00:18	640 (gpm)
92	8,507	1.0	163.6	8,490.46	-262.55	-261.86	246.98	359.96	136.68	0.84	136 °F	12/23/17	01:04	640 (gpm)
93	8,602	1.1	179.0	8,585.44	-264.26	-263.57	247.23	361.37	136.83	0.31	138 °F	12/23/17	01:47	640 (gpm)
94	8,697	1.0	200.0	8,680.43	-265.95	-265.26	246.96	362.43	137.05	0.42	136 °F	12/23/17	03:29	640 (gpm)
95	8,791	0.7	213.5	8,774.42	-267.20	-266.51	246.36	362.94	137.25	0.38	138 °F	12/23/17	04:16	640 (gpm)
96	8,838	0.8	216.3	8,821.41	-267.70	-267.02	246.01	363.07	137.34	0.23	138 °F	12/23/17	04:50	640 (gpm)
97	8,885	0.6	237.7	8,868.41	-268.10	-267.41	245.61	363.09	137.43	0.69	142 °F	12/23/17	18:41	640 (gpm)
98	8,917	2.3	351.6	8,900.40	-267.55	-266.87	245.37	362.52	137.40	8.13	142 °F	12/23/17	19:31	593 (gpm)
99	8,948	4.9	5.0	8,931.34	-265.62	-264.93	245.40	361.12	137.19	8.76	142 °F	12/23/17	20:30	593 (gpm)
100	8,980	7.3	9.8	8,963.15	-262.25	-261.57	245.86	358.98	136.77	7.66	142 °F	12/23/17	21:43	593 (gpm)
101	9,011	9.9	16.0	8,993.80	-257.75	-257.06	246.93	356.45	136.15	8.89	144 °F	12/23/17	22:36	593 (gpm)
102	9,043	12.8	20.4	9,025.18	-251.79	-251.09	248.92	353.57	135.25	9.45	144 °F	12/23/17	23:15	593 (gpm)
103	9,074	16.3	19.2	9,055.18	-244.47	-243.76	251.55	350.29	134.10	11.33	145 °F	12/23/17	23:45	593 (gpm)
104	9,106	20.5	16.2	9,085.53	-234.85	-234.14	254.59	345.89	132.60	13.45	145 °F	12/24/17	00:15	593 (gpm)
105	9,137	24.5	11.9	9,114.17	-223.35	-222.63	257.44	340.35	130.85	13.94	145 °F	12/24/17	00:40	593 (gpm)
106	9,169	28.5	9.2	9,142.80	-209.32	-208.60	260.03	333.36	128.74	13.05	145 °F	12/24/17	01:06	593 (gpm)
107	9,200	32.6	7.2	9,169.50	-193.73	-193.00	262.26	325.62	126.35	13.62	147 °F	12/24/17	01:35	593 (gpm)
108	9,232	36.8	6.1	9,195.80	-175.65	-174.91	264.36	316.98	123.49	13.27	147 °F	12/24/17	02:03	536 (gpm)
109	9,263	41.0	4.5	9,219.92	-156.28	-155.53	266.14	308.26	120.30	13.93	149 °F	12/24/17	02:33	536 (gpm)

MWD SURVEYS

Customer: Marathon Oil
Well: [REDACTED]
Field/Block: Wolfcamp
Co./Parish: Eddy County
State: New Mexico

PGS Job #: LNM1347917
MWD Operator: Miles A. Compton IV
Directional Driller: Greg Fisher
Date of First Survey: December 17, 2017
Date of Last Survey: January 19, 2018

PRO DIRECTIONAL

Total Correction: 7.20 East Grid

Vertical Section Plane: 359.84

Nominal Dip Angle: 60.10

Magnetic Field Strength: 0.480

	Measured			Coordinates				Closure			Temp (°F)	Vib/Shk	Date	Time	Flow Rate
	Depth	Inc.	Azm.	T.V.D.	Ver. Sect.	+N / -S	+E / -W	Dist.	Angle	DLS		Color			
110	9,295	45.3	2.6	9,243.26	-134.44	-133.70	267.48	299.03	116.56	14.04	149 °F		12/24/17	03:03	536 (gpm)
111	9,326	49.7	1.6	9,264.20	-111.61	-110.86	268.31	290.31	112.45	14.39	149 °F		12/24/17	03:37	536 (gpm)
112	9,358	53.0	0.6	9,284.18	-86.63	-85.88	268.79	282.17	107.72	10.60	149 °F		12/24/17	04:06	536 (gpm)
113	9,389	56.3	0.1	9,302.12	-61.35	-60.60	268.94	275.68	102.70	10.73	151 °F		12/24/17	04:40	536 (gpm)
114	9,421	60.1	359.9	9,318.98	-34.16	-33.41	268.94	271.00	97.08	11.89	151 °F		12/24/17	05:15	536 (gpm)
115	9,452	62.2	0.6	9,333.93	-7.01	-6.26	269.06	269.13	91.33	7.06	151 °F		12/24/17	06:02	536 (gpm)
116	9,484	64.0	1.1	9,348.41	21.52	22.28	269.48	270.40	85.27	5.79	151 °F		12/24/17	06:59	536 (gpm)
117	9,515	66.0	1.3	9,361.51	49.61	50.36	270.07	274.73	79.44	6.48	153 °F		12/24/17	07:55	536 (gpm)
118	9,547	67.9	1.0	9,374.04	79.05	79.80	270.66	282.18	73.57	6.00	153 °F		12/24/17	08:45	536 (gpm)
119	9,578	69.9	0.5	9,385.20	107.96	108.72	271.04	292.03	68.14	6.62	153 °F		12/24/17	09:28	550 (gpm)
120	9,610	71.5	359.7	9,395.78	138.16	138.92	271.09	304.61	62.87	5.53	153 °F		12/24/17	10:10	550 (gpm)
121	9,641	73.0	359.6	9,405.23	167.69	168.44	270.91	319.01	58.13	4.85	153 °F		12/24/17	10:47	550 (gpm)
122	9,673	74.0	359.3	9,414.31	198.37	199.12	270.62	335.98	53.65	3.25	154 °F		12/24/17	11:27	550 (gpm)
123	9,704	75.6	358.9	9,422.44	228.28	229.03	270.15	354.17	49.71	5.31	154 °F		12/24/17	12:23	550 (gpm)
124	9,736	77.8	358.9	9,429.80	259.41	260.17	269.55	374.62	46.01	6.88	154 °F		12/24/17	13:03	550 (gpm)
125	9,767	81.4	360.0	9,435.40	289.90	290.65	269.26	396.20	42.81	12.13	154 °F		12/24/17	13:52	550 (gpm)
126	9,799	85.1	359.6	9,439.16	321.67	322.42	269.15	420.00	39.85	11.63	154 °F		12/24/17	14:34	550 (gpm)
127	9,809	86.2	359.8	9,439.92	331.64	332.40	269.09	427.67	38.99	11.18	154 °F		12/24/17	15:41	550 (gpm)
128	9,863	90.1	359.5	9,441.66	385.60	386.36	268.76	470.64	34.82	7.24	154 °F		01/17/18	06:10	292 (gpm)
129	9,926	89.9	359.5	9,441.66	448.60	449.35	268.21	523.31	30.83	0.32	154 °F	01/17/18	06:50	292 (gpm)	
130	10,020	91.0	0.3	9,440.92	542.60	543.35	268.05	605.87	26.26	1.45	154 °F	01/17/18	07:45	292 (gpm)	
131	10,115	90.3	359.6	9,439.84	637.59	638.34	267.97	692.30	22.77	1.04	154 °F	01/17/18	08:39	292 (gpm)	
132	10,209	88.5	359.6	9,440.83	731.58	732.33	267.31	779.59	20.05	1.91	154 °F	01/17/18	09:27	292 (gpm)	
133	10,304	90.6	1.1	9,441.58	826.57	827.32	267.89	869.61	17.94	2.72	151 °F	01/17/18	10:00	292 (gpm)	
134	10,398	88.3	0.8	9,442.48	920.54	921.29	269.45	959.89	16.30	2.47	151 °F	01/17/18	10:47	292 (gpm)	
135	10,493	89.9	1.0	9,443.97	1,015.51	1,016.27	270.94	1,051.76	14.93	1.70	151 °F	01/17/18	12:15	292 (gpm)	
136	10,587	89.4	0.2	9,444.54	1,109.49	1,110.26	271.93	1,143.07	13.76	1.00	151 °F	01/17/18	13:08	292 (gpm)	
137	10,682	89.8	358.8	9,445.21	1,204.49	1,205.25	271.10	1,235.36	12.68	1.53	151 °F	01/17/18	14:16	292 (gpm)	

MWD SURVEYS

Customer: Marathon Oil

Well: [REDACTED]

Field/Block: Wolfcamp

Co./Parish: Eddy County

State: New Mexico

PGS Job #: LNM1347917

MWD Operator: Miles A. Compton IV

Directional Driller: Greg Fisher

Date of First Survey: December 17, 2017

Date of Last Survey: January 19, 2018

PRO DIRECTIONAL

Total Correction: 7.20 East Grid

Vertical Section Plane: 359.84

Nominal Dip Angle: 60.10

Magnetic Field Strength: 0.480

Measured			Coordinates				Closure			Vib/Shk		Color	Date	Time	Flow Rate
Depth	Inc.	Azm.	T.V.D.	Ver. Sect.	+N / -S	+E / -W	Dist.	Angle	DLS	Temp (°F)					
138	10,777	87.8	356.0	9,447.20	1,299.37	1,300.12	266.79	1,327.21	11.60	3.62	151 °F		01/17/18	15:01	292 (gpm)
139	10,871	88.0	355.1	9,450.64	1,393.04	1,393.77	259.50	1,417.72	10.55	0.98	151 °F		01/17/18	15:57	292 (gpm)
140	10,966	86.5	356.1	9,455.20	1,487.67	1,488.38	252.22	1,509.60	9.62	1.90	151 °F		01/17/18	16:47	292 (gpm)
141	11,061	85.9	355.7	9,461.50	1,582.23	1,582.92	245.44	1,601.84	8.81	0.76	151 °F		01/17/18	17:26	292 (gpm)
142	11,156	88.0	357.1	9,466.55	1,676.92	1,677.60	239.49	1,694.60	8.12	2.66	162 °F		01/17/18	18:15	292 (gpm)
143	11,250	87.6	356.5	9,470.16	1,770.72	1,771.38	234.25	1,786.80	7.53	0.77	163 °F		01/17/18	19:04	292 (gpm)
144	11,345	89.5	357.7	9,472.56	1,865.57	1,866.22	229.44	1,880.27	7.01	2.37	163 °F		01/17/18	20:29	292 (gpm)
145	11,439	89.8	358.5	9,473.14	1,959.53	1,960.17	226.32	1,973.19	6.59	0.91	163 °F		01/17/18	22:48	292 (gpm)
146	11,534	90.5	358.9	9,472.89	2,054.51	2,055.14	224.17	2,067.33	6.23	0.85	165 °F		01/17/18	22:28	292 (gpm)
147	11,629	92.3	0.5	9,470.57	2,149.47	2,150.10	223.67	2,161.71	5.94	2.53	165 °F		01/17/18	23:49	292 (gpm)
148	11,723	92.0	0.1	9,467.04	2,243.40	2,244.04	224.16	2,255.21	5.70	0.53	165 °F		01/18/18	00:25	292 (gpm)
149	11,817	91.2	1.8	9,464.42	2,337.34	2,337.98	225.72	2,348.85	5.51	2.00	167 °F		01/18/18	01:52	292 (gpm)
150	11,912	90.2	2.2	9,463.25	2,432.27	2,432.92	229.04	2,443.67	5.38	1.13	167 °F		01/18/18	03:35	292 (gpm)
151	12,007	88.2	1.6	9,464.58	2,527.19	2,527.85	232.19	2,538.49	5.25	2.20	167 °F		01/18/18	05:44	292 (gpm)
152	12,101	87.3	1.3	9,468.27	2,621.08	2,621.75	234.56	2,632.22	5.11	1.01	167 °F		01/18/18	06:30	292 (gpm)
153	12,195	87.1	1.5	9,472.86	2,714.93	2,715.61	236.86	2,725.92	4.98	0.30	167 °F		01/18/18	07:17	292 (gpm)
154	12,290	87.0	1.3	9,477.75	2,809.77	2,810.45	239.17	2,820.61	4.86	0.24	171 °F		01/18/18	08:09	292 (gpm)
155	12,384	90.5	2.0	9,479.80	2,903.69	2,904.38	241.88	2,914.43	4.76	3.80	171 °F		01/18/18	09:26	292 (gpm)
156	12,479	93.6	3.1	9,476.41	2,998.51	2,999.21	246.10	3,009.29	4.69	3.46	171 °F		01/18/18	10:34	292 (gpm)
157	12,574	90.0	1.3	9,473.42	3,093.36	3,094.07	249.75	3,104.13	4.61	4.24	172 °F		01/18/18	11:23	292 (gpm)
158	12,668	90.5	1.8	9,473.01	3,187.32	3,188.04	252.29	3,198.00	4.52	0.75	174 °F		01/18/18	12:15	292 (gpm)
159	12,762	90.1	1.3	9,472.52	3,281.27	3,282.00	254.83	3,291.88	4.44	0.68	174 °F		01/18/18	13:18	292 (gpm)
160	12,857	91.5	1.6	9,471.19	3,376.23	3,376.96	257.23	3,386.74	4.36	1.51	174 °F		01/18/18	14:39	292 (gpm)
161	12,951	93.3	1.0	9,467.26	3,470.11	3,470.85	259.37	3,480.52	4.27	2.02	174 °F		01/18/18	16:17	292 (gpm)
162	13,046	92.4	0.1	9,462.53	3,564.98	3,565.72	260.28	3,575.21	4.17	1.34	176 °F		01/18/18	17:44	292 (gpm)
163	13,141	92.3	359.6	9,458.64	3,659.90	3,660.64	260.03	3,669.87	4.06	0.54	176 °F		01/18/18	18:32	292 (gpm)
164	13,235	92.2	359.4	9,454.95	3,753.83	3,754.57	259.21	3,763.50	3.95	0.24	178 °F		01/18/18	19:31	292 (gpm)
165	13,330	91.7	358.7	9,451.71	3,848.76	3,849.50	257.63	3,858.11	3.83	0.91	178 °F		01/18/18	20:30	292 (gpm)

MWD SURVEYS

Customer: Marathon Oil
Well: [REDACTED]
Field/Block: Wolfcamp
Co./Parish: Eddy County
State: New Mexico

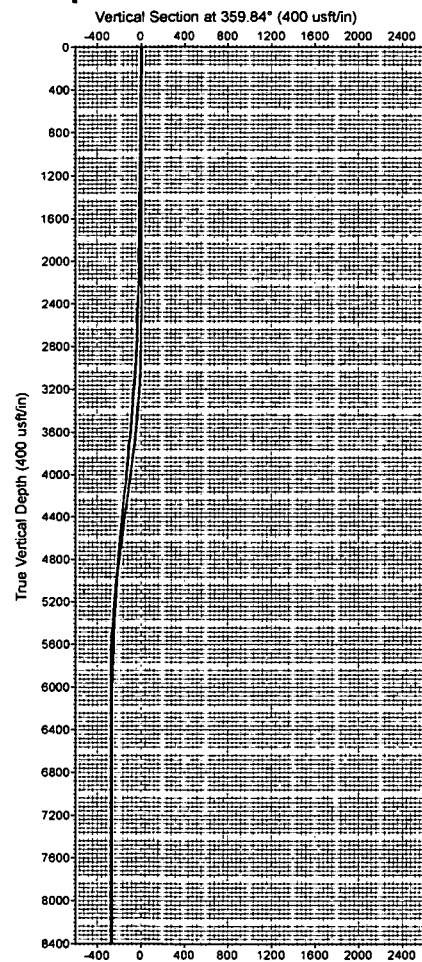
PGS Job #: LN1347917
MWD Operator: Miles A. Compton IV
Directional Driller: Greg Fisher
Date of First Survey: December 17, 2017
Date of Last Survey: January 19, 2018

PRO DIRECTIONAL

Total Correction: 7.20 East Grid

Vertical Section Plane: 359.84 Nominal Dip Angle: 60.10 Magnetic Field Strength: 0.480

Measured			Coordinates					Closure			Temp (°F)	Vib/Shk Color	Date	Time	Flow Rate
Depth	Inc.	Azm.	T.V.D.	Ver. Sect.	+N / -S	+E / -W	Dist.	Angle	DLS						
166	13,424	92.0	358.7	9,448.68	3,942.69	3,943.42	255.50	3,951.69	3.71	0.32	178 °F	[REDACTED]	01/18/18	21:14	292 (gpm)
167	13,519	91.7	358.6	9,445.61	4,037.62	4,038.35	253.27	4,046.28	3.59	0.33	180 °F		01/18/18	22:07	292 (gpm)
168	13,613	91.8	358.2	9,442.74	4,131.55	4,132.27	250.64	4,139.86	3.47	0.44	180 °F		01/18/18	23:10	292 (gpm)
169	13,708	91.6	358.0	9,439.92	4,226.46	4,227.17	247.49	4,234.41	3.35	0.30	180 °F		01/19/18	00:06	292 (gpm)
170	13,803	91.3	357.6	9,437.52	4,321.37	4,322.07	243.85	4,328.94	3.23	0.53	180 °F		01/19/18	00:56	292 (gpm)
171	13,897	91.0	356.9	9,435.63	4,415.26	4,415.94	239.34	4,422.42	3.10	0.81	172 °F		01/19/18	07:58	292 (gpm)
172	13,992	89.7	355.3	9,435.05	4,510.05	4,510.72	232.88	4,516.72	2.96	2.17	172 °F		01/19/18	09:04	280 (gpm)
173	14,029	89.8	355.0	9,435.21	4,546.92	4,547.58	229.75	4,553.38	2.89	0.85	176 °F		01/19/18	09:31	280 (gpm)
TD	14,081	89.8	355.0	9,435.40	4,598.74	4,599.39	225.22	4,604.90	2.80	0.00	176 °F		01/19/18		280 (gpm)



Marathon Oil
Eddy County, NM
Hermes Fee 23-28-30
WXY #5H
Plan #4 - FINAL PVA
GL: 3117' + KB: 26.5' (H&P480)

US State Plane 1927 (Exact solution)
NAD 1927 (NADCON CONUS)
Clarke 1866
New Mexico East 3001
Mean Sea Level

RKB Elevation: Well @ 3143.50usft (GL: 3117' + KB: 26.5' (H&P480))

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Spot
0.00	0.00	461896.28	565102.03	32.269694	-104.122705	

SECTION DETAILS

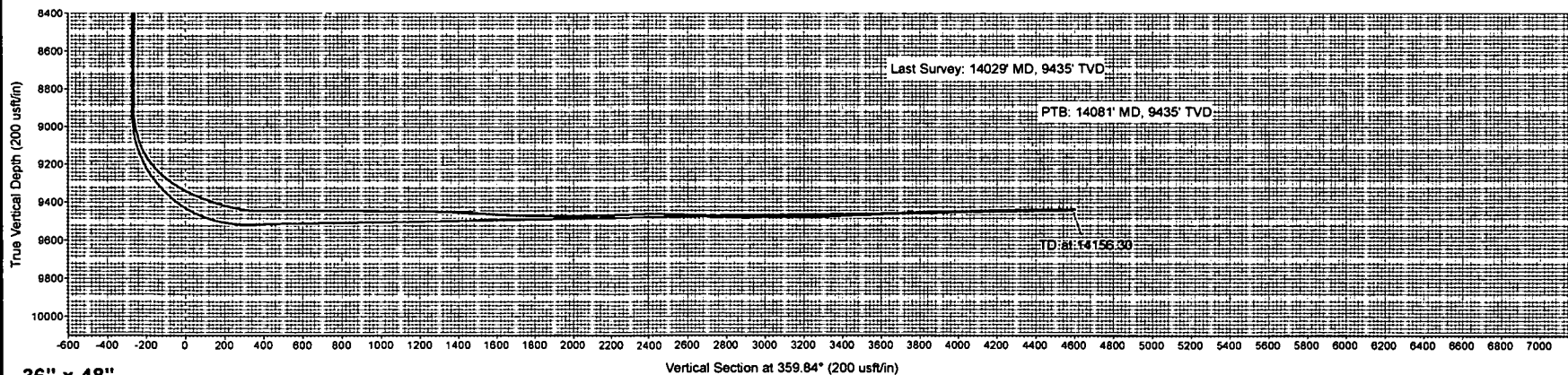
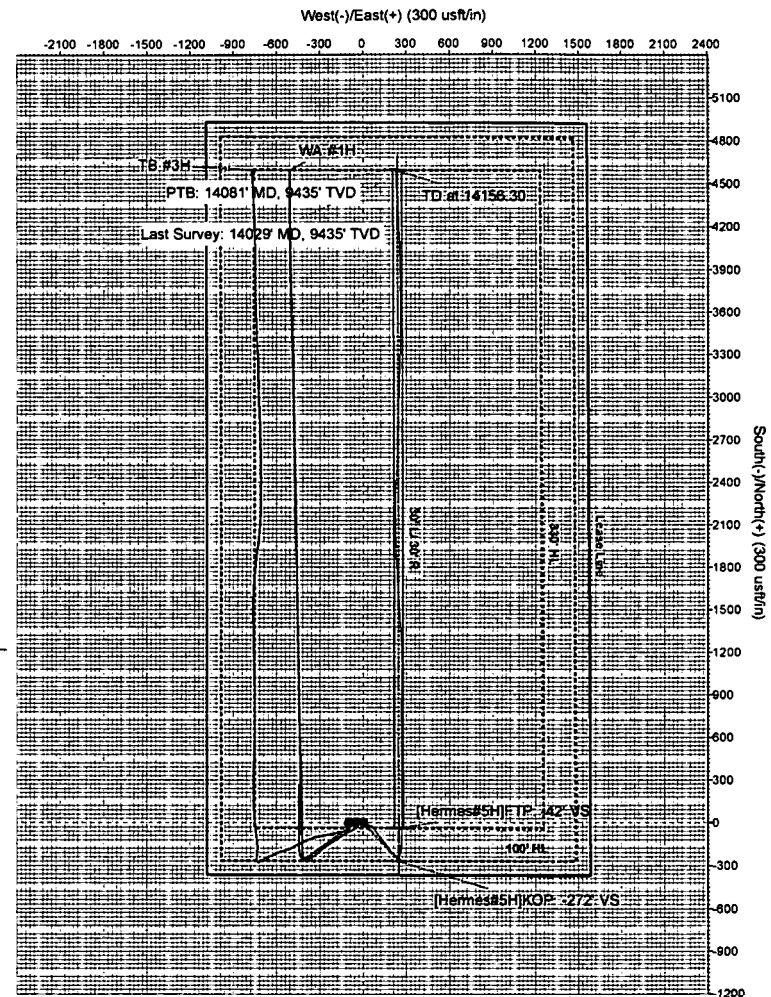
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	Vsect
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2600.00	0.00	0.00	2600.00	0.00	0.00	0.00	0.00
3	3933.33	10.00	137.42	3926.57	-85.45	78.53	0.75	-85.67
4	4883.30	10.00	137.42	4862.11	-206.91	190.16	0.00	-207.44
5	5883.30	0.00	0.00	5857.04	-271.00	249.06	1.00	-271.69
6	8968.28	0.00	0.00	8942.00	-271.00	249.06	0.00	-271.69
7	9876.30	91.00	359.84	9514.67	312.00	247.47	10.00	311.30
8	14156.30	91.00	359.84	9439.91	4589.32	235.80	0.00	4588.64

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting
[Hermes#5H]FTP: -42° VS	0.00	-41.21	249.06	461855.07	565351.09
[Hermes#5H]KOP: -272° VS	8942.00	-271.00	249.06	461625.28	565351.09
[Hermes#5H]LTP/BHL: 4589° VS	9439.91	4589.32	235.80	466485.60	565337.83



Target Line: 9520' TVD @ 0° VS: 91° INC



Azimuths to Grid North
True North: -0.11°
Magnetic North: 7.29°
Magnetic Field
Strength: 48013.5nT
Dip Angle: 60.04°
Date: 12/6/2017
Model: USER DEFINED

Azimuth Corrections

Total Magnetic Corr. (M to G): 7.29°

Declination (M to T): 7.40° East

36" x 48"