



Final MWD Survey Certification

Lea County, NM

Client: Devon Energy

Well Name: Marwari 21-16 State Fed Com 234Y

Total Job No: SW-190029

API No: 30-025-46603

Start Date: December 24, 2019

End Date: January 07, 2020

Measured Start Depth: 1000 feet

Measured End Depth: 20540 feet

Vertical Section from well center at PTB: 9954.11 feet

I, Shaun Heck, certify that; I am employed by Total Directional Services, LLC and we conducted or supervised the taking of these open hole MWD surveys at the request of this client. This data is true, correct, complete and within the limitations of the tool as set forth by Total Directional Services, LLC. I am authorized and qualified to make this report and have reviewed this report and find that it conforms to the principals and procedures as set forth by Total Directional Services, LLC.

Date: January 07, 2020

Signed: Shaun Heck



Marwari 21-16 State Fed Com 234Y

Directional Survey Report

Start date: December 24, 2019

End date: January 07, 2020

Company Name: Devon Energy

State/Prov: New Mexico

Survey Company: Total Directional

Well Name: Marwari 21-16 State Fed Com 234Y

County: Lea

Job Number: SW-190029

Field:

Country: US

Proposed Azimuth: 0.6

Rig ID: Cactus 135

Location:

Declination: 6.38 KB: 30

API/UWI: 30-025-46603

Latitude/Longitude: 32.109998 / -103.683808

North Reference: Grid

Svy	Depth	Inc	Azm	TVD	NS	EW	VS	CD	CA	DLS	CL
TieIn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90.00	0.00	
1	199.00	0.70	141.60	199.00	-0.95	0.76	-0.94	1.22	141.60	0.35	199.00
2	306.00	1.00	150.70	305.98	-2.28	1.62	-2.26	2.80	144.63	0.31	107.00
3	401.00	1.30	185.10	400.97	-4.08	1.93	-4.06	4.51	154.68	0.78	95.00
4	497.00	1.90	203.30	496.93	-6.62	1.20	-6.61	6.73	169.72	0.81	96.00
5	592.00	2.50	205.40	591.86	-9.94	-0.31	-9.94	9.94	181.79	0.64	95.00
6	687.00	3.00	210.30	686.75	-13.96	-2.45	-13.98	14.17	189.97	0.58	95.00
7	783.00	2.80	211.90	782.62	-18.12	-4.96	-18.17	18.78	195.31	0.22	96.00
8	841.00	2.80	215.70	840.56	-20.47	-6.53	-20.54	21.49	197.70	0.32	58.00
9	1,003.00	2.20	230.70	1,002.40	-25.65	-11.25	-25.77	28.01	203.68	0.55	162.00
10	1,099.00	2.00	202.70	1,098.34	-28.37	-13.32	-28.50	31.34	205.16	1.08	96.00
11	1,193.00	1.80	174.90	1,192.29	-31.35	-13.82	-31.49	34.26	203.80	0.99	94.00
12	1,289.00	1.80	136.00	1,288.25	-33.94	-12.64	-34.07	36.21	200.43	1.25	96.00
13	1,384.00	1.60	130.70	1,383.20	-35.87	-10.60	-35.98	37.41	196.46	0.27	95.00
14	1,479.00	1.30	124.20	1,478.17	-37.35	-8.70	-37.43	38.35	193.12	0.36	95.00
15	1,575.00	1.30	131.40	1,574.15	-38.68	-6.99	-38.75	39.30	190.24	0.17	96.00
16	1,670.00	1.30	131.10	1,669.13	-40.10	-5.37	-40.15	40.46	187.62	0.01	95.00
17	1,765.00	1.00	129.90	1,764.11	-41.34	-3.92	-41.38	41.52	185.41	0.32	95.00
18	1,861.00	1.10	131.20	1,860.09	-42.48	-2.58	-42.51	42.56	183.48	0.11	96.00
19	1,956.00	1.00	123.60	1,955.07	-43.54	-1.21	-43.55	43.56	181.59	0.18	95.00
20	2,051.00	0.70	140.70	2,050.06	-44.45	-0.15	-44.45	44.45	180.19	0.41	95.00
21	2,147.00	1.00	139.90	2,146.05	-45.54	0.76	-45.53	45.55	179.04	0.31	96.00
22	2,242.00	1.00	137.00	2,241.04	-46.79	1.86	-46.76	46.82	177.72	0.05	95.00
23	2,337.00	0.80	154.30	2,336.03	-47.99	2.72	-47.96	48.07	176.76	0.35	95.00
24	2,433.00	1.00	136.00	2,432.02	-49.20	3.59	-49.16	49.33	175.83	0.36	96.00
25	2,528.00	0.70	145.90	2,527.00	-50.27	4.49	-50.22	50.47	174.90	0.35	95.00
26	2,623.00	0.80	153.30	2,622.00	-51.35	5.11	-51.29	51.60	174.31	0.15	95.00
27	2,719.00	1.30	157.50	2,717.98	-52.95	5.83	-52.89	53.27	173.72	0.53	96.00
28	2,814.00	1.00	120.30	2,812.96	-54.36	6.96	-54.29	54.81	172.71	0.83	95.00
29	2,909.00	1.00	109.90	2,907.95	-55.06	8.45	-54.97	55.71	171.27	0.19	95.00
30	3,005.00	1.00	100.20	3,003.93	-55.50	10.07	-55.39	56.40	169.72	0.18	96.00
31	3,100.00	1.00	95.10	3,098.92	-55.72	11.71	-55.59	56.94	168.13	0.09	95.00
32	3,195.00	0.90	93.20	3,193.91	-55.83	13.28	-55.69	57.39	166.62	0.11	95.00
33	3,291.00	1.10	84.60	3,289.89	-55.79	14.95	-55.63	57.76	165.00	0.26	96.00

Svy	Depth	Inc	Azm	TVD	NS	EW	VS	CD	CA	DLS	CL
34	3,386.00	1.30	101.70	3,384.87	-55.92	16.91	-55.74	58.42	163.17	0.43	95.00
35	3,481.00	2.40	121.80	3,479.82	-57.19	19.66	-56.98	60.47	161.03	1.33	95.00
36	3,576.00	3.30	129.40	3,574.70	-59.97	23.46	-59.72	64.40	158.63	1.03	95.00
37	3,672.00	4.40	135.40	3,670.48	-64.35	28.18	-64.05	70.25	156.35	1.22	96.00
38	3,767.00	4.40	140.40	3,765.21	-69.75	33.06	-69.40	77.19	154.64	0.40	95.00
39	3,862.00	4.30	135.70	3,859.93	-75.11	37.87	-74.71	84.12	153.24	0.39	95.00
40	3,958.00	4.30	135.90	3,955.66	-80.27	42.89	-79.81	91.01	151.88	0.02	96.00
41	4,053.00	4.10	135.00	4,050.41	-85.23	47.77	-84.72	97.70	150.73	0.22	95.00
42	4,149.00	4.10	138.70	4,146.16	-90.23	52.46	-89.68	104.38	149.82	0.28	96.00
43	4,244.00	4.20	136.80	4,240.91	-95.32	57.09	-94.72	111.11	149.08	0.18	95.00
44	4,339.00	4.30	139.80	4,335.65	-100.58	61.77	-99.92	118.03	148.44	0.26	95.00
45	4,435.00	4.10	139.40	4,431.39	-105.93	66.32	-105.23	124.98	147.95	0.21	96.00
46	4,530.00	3.80	137.80	4,526.17	-110.84	70.65	-110.10	131.44	147.49	0.34	95.00
47	4,626.00	3.40	136.80	4,621.98	-115.27	74.73	-114.48	137.38	147.04	0.42	96.00
48	4,721.00	3.20	137.00	4,716.82	-119.27	78.47	-118.44	142.77	146.66	0.21	95.00
49	4,816.00	3.50	142.20	4,811.66	-123.50	82.06	-122.63	148.27	146.40	0.45	95.00
50	4,912.00	3.30	142.90	4,907.49	-128.02	85.52	-127.11	153.95	146.26	0.21	96.00
51	5,007.00	3.10	143.80	5,002.34	-132.27	88.69	-131.33	159.25	146.16	0.22	95.00
52	5,195.00	2.90	142.70	5,190.08	-140.15	94.57	-139.16	169.08	145.99	0.11	188.00
53	5,291.00	2.80	140.90	5,285.96	-143.91	97.52	-142.88	173.84	145.88	0.14	96.00
54	5,386.00	3.20	135.80	5,380.83	-147.61	100.83	-146.54	178.76	145.66	0.51	95.00
55	5,481.00	3.50	132.50	5,475.67	-151.47	104.82	-150.36	184.20	145.32	0.38	95.00
56	5,576.00	3.50	132.50	5,570.49	-155.39	109.09	-154.23	189.86	144.93	0.00	95.00
57	5,672.00	3.30	129.80	5,666.33	-159.13	113.38	-157.94	195.39	144.53	0.27	96.00
58	5,767.00	3.30	128.00	5,761.17	-162.57	117.63	-161.33	200.66	144.11	0.11	95.00
59	5,862.00	3.30	127.10	5,856.01	-165.90	121.97	-164.61	205.91	143.68	0.05	95.00
60	5,958.00	3.20	126.40	5,951.86	-169.16	126.33	-167.82	211.12	143.25	0.11	96.00
61	6,053.00	3.20	124.60	6,046.71	-172.24	130.65	-170.86	216.18	142.82	0.11	95.00
62	6,149.00	3.40	124.20	6,142.55	-175.36	135.21	-173.93	221.43	142.37	0.21	96.00
63	6,245.00	3.10	121.90	6,238.39	-178.33	139.76	-176.86	226.57	141.91	0.34	96.00
64	6,340.00	3.00	119.80	6,333.26	-180.92	144.10	-179.40	231.30	141.46	0.16	95.00
65	6,436.00	2.90	119.90	6,429.13	-183.38	148.39	-181.82	235.90	141.02	0.10	96.00
66	6,531.00	2.60	139.20	6,524.02	-186.21	151.88	-184.61	240.29	140.80	1.02	95.00
67	6,627.00	2.50	154.50	6,619.93	-189.75	154.20	-188.12	244.51	140.90	0.71	96.00
68	6,722.00	2.50	148.90	6,714.84	-193.39	156.16	-191.75	248.57	141.08	0.26	95.00
69	6,818.00	1.60	189.90	6,810.78	-196.51	157.02	-194.85	251.53	141.37	1.73	96.00
70	6,913.00	1.50	204.40	6,905.75	-198.94	156.27	-197.30	252.98	141.85	0.42	95.00
71	7,009.00	1.20	198.60	7,001.72	-201.04	155.43	-199.40	254.12	142.29	0.34	96.00
72	7,104.00	1.10	198.60	7,096.70	-202.85	154.83	-201.22	255.18	142.65	0.11	95.00
73	7,200.00	0.80	208.60	7,192.69	-204.31	154.21	-202.68	255.98	142.95	0.36	96.00
74	7,295.00	0.80	227.20	7,287.68	-205.34	153.41	-203.73	256.32	143.24	0.27	95.00
75	7,390.00	0.70	243.20	7,382.67	-206.06	152.40	-204.45	256.29	143.51	0.24	95.00
76	7,485.00	0.50	246.70	7,477.67	-206.48	151.50	-204.88	256.10	143.73	0.21	95.00
77	7,581.00	0.60	253.00	7,573.66	-206.79	150.64	-205.21	255.84	143.93	0.12	96.00
78	7,676.00	0.60	260.70	7,668.66	-207.02	149.67	-205.44	255.46	144.13	0.08	95.00
79	7,771.00	0.50	259.00	7,763.65	-207.18	148.77	-205.61	255.06	144.32	0.11	95.00
80	7,867.00	0.30	238.50	7,859.65	-207.39	148.15	-205.83	254.87	144.46	0.25	96.00
81	7,962.00	0.30	238.70	7,954.65	-207.65	147.72	-206.09	254.84	144.57	0.00	95.00

Svy	Depth	Inc	Azm	TVD	NS	EW	VS	CD	CA	DLS	CL
82	8,057.00	0.30	259.20	8,049.65	-207.83	147.27	-206.27	254.71	144.68	0.11	95.00
83	8,153.00	0.30	272.60	8,145.65	-207.86	146.77	-206.31	254.46	144.77	0.07	96.00
84	8,248.00	0.30	295.30	8,240.65	-207.74	146.30	-206.20	254.09	144.85	0.12	95.00
85	8,344.00	0.40	297.30	8,336.64	-207.48	145.77	-205.94	253.57	144.91	0.10	96.00
86	8,439.00	0.50	317.80	8,431.64	-207.02	145.20	-205.49	252.87	144.96	0.20	95.00
87	8,535.00	0.50	319.50	8,527.64	-206.39	144.65	-204.87	252.03	144.98	0.02	96.00
88	8,630.00	0.80	324.60	8,622.63	-205.54	143.99	-204.02	250.96	144.99	0.32	95.00
89	8,725.00	1.00	326.00	8,717.62	-204.31	143.14	-202.80	249.47	144.98	0.21	95.00
90	8,821.00	1.50	338.40	8,813.60	-202.45	142.21	-200.95	247.41	144.91	0.59	96.00
91	8,916.00	1.40	339.20	8,908.57	-200.21	141.34	-198.72	245.07	144.78	0.11	95.00
92	9,011.00	1.20	3.80	9,003.54	-198.13	141.00	-196.64	243.18	144.56	0.62	95.00
93	9,107.00	1.90	3.10	9,099.51	-195.54	141.15	-194.05	241.16	144.18	0.73	96.00
94	9,202.00	1.50	9.20	9,194.46	-192.74	141.43	-191.25	239.06	143.73	0.46	95.00
95	9,297.00	0.10	212.90	9,289.45	-191.58	141.59	-190.09	238.22	143.53	1.68	95.00
96	9,393.00	0.10	318.10	9,385.45	-191.59	141.49	-190.10	238.17	143.55	0.17	96.00
97	9,488.00	0.80	21.20	9,480.45	-190.91	141.67	-189.41	237.73	143.42	0.80	95.00
98	9,583.00	1.50	23.90	9,575.43	-189.15	142.41	-187.65	236.77	143.02	0.74	95.00
99	9,679.00	0.80	29.90	9,671.41	-187.42	143.26	-185.91	235.90	142.61	0.74	96.00
100	9,774.00	0.50	92.80	9,766.41	-186.87	144.00	-185.35	235.92	142.38	0.76	95.00
101	9,870.00	0.40	168.10	9,862.40	-187.22	144.49	-185.69	236.49	142.34	0.58	96.00
102	9,965.00	0.30	125.40	9,957.40	-187.68	144.76	-186.16	237.03	142.36	0.29	95.00
103	10,048.00	0.30	126.00	10,040.40	-187.94	145.11	-186.41	237.44	142.33	0.00	83.00
104	10,158.00	6.10	0.60	10,150.20	-182.26	145.41	-180.73	233.16	141.42	5.71	110.00
105	10,253.00	17.00	358.50	10,243.13	-163.27	145.10	-161.74	218.43	138.37	11.48	95.00
106	10,349.00	26.70	0.80	10,332.13	-127.59	145.03	-126.06	193.17	131.34	10.14	96.00
107	10,444.00	37.50	4.00	10,412.50	-77.25	147.35	-75.70	166.37	117.67	11.50	95.00
108	10,540.00	49.00	1.70	10,482.31	-11.67	150.48	-10.09	150.93	94.43	12.09	96.00
109	10,635.00	60.30	0.50	10,537.18	65.68	151.90	67.26	165.49	66.62	11.94	95.00
110	10,730.00	71.90	358.10	10,575.61	152.37	150.76	153.94	214.35	44.70	12.43	95.00
111	10,826.00	84.30	358.00	10,595.37	246.07	147.57	247.60	286.92	30.95	12.92	96.00
112	10,921.00	92.50	1.10	10,598.02	340.93	146.83	342.45	371.21	23.30	9.23	95.00
113	11,017.00	94.00	359.90	10,592.58	436.77	147.67	438.29	461.06	18.68	2.00	96.00
114	11,112.00	94.30	359.60	10,585.70	531.52	147.25	533.03	551.54	15.49	0.45	95.00
115	11,207.00	92.80	359.80	10,579.82	626.33	146.76	627.84	643.30	13.19	1.59	95.00
116	11,302.00	93.10	359.70	10,574.93	721.21	146.34	722.70	735.91	11.47	0.33	95.00
117	11,397.00	93.50	359.50	10,569.46	816.05	145.68	817.53	828.95	10.12	0.47	95.00
118	11,493.00	93.70	359.40	10,563.43	911.85	144.76	913.32	923.27	9.02	0.23	96.00
119	11,588.00	94.20	359.30	10,556.89	1,006.62	143.69	1,008.07	1,016.82	8.12	0.54	95.00
120	11,683.00	92.80	360.00	10,551.09	1,101.44	143.11	1,102.88	1,110.70	7.40	1.65	95.00
121	11,778.00	93.20	359.70	10,546.12	1,196.31	142.86	1,197.74	1,204.81	6.81	0.53	95.00
122	11,873.00	91.60	0.20	10,542.14	1,291.22	142.78	1,292.65	1,299.09	6.31	1.76	95.00
123	11,969.00	92.30	0.10	10,538.87	1,387.17	143.03	1,388.59	1,394.52	5.89	0.74	96.00
124	12,064.00	93.10	0.10	10,534.40	1,482.06	143.19	1,483.48	1,488.96	5.52	0.84	95.00
125	12,159.00	93.60	360.00	10,528.85	1,576.90	143.28	1,578.31	1,583.39	5.19	0.54	95.00
126	12,255.00	92.10	0.20	10,524.07	1,672.77	143.44	1,674.19	1,678.91	4.90	1.58	96.00
127	12,350.00	92.90	0.70	10,519.93	1,767.68	144.19	1,769.09	1,773.55	4.66	0.99	95.00
128	12,446.00	93.00	1.10	10,514.99	1,863.54	145.70	1,864.96	1,869.23	4.47	0.43	96.00
129	12,541.00	92.00	0.50	10,510.85	1,958.44	147.02	1,959.87	1,963.95	4.29	1.23	95.00

Svy	Depth	Inc	Azm	TVD	NS	EW	VS	CD	CA	DLS	CL
130	12,636.00	90.80	0.60	10,508.52	2,053.41	147.93	2,054.84	2,058.73	4.12	1.27	95.00
131	12,731.00	91.50	0.60	10,506.62	2,148.38	148.93	2,149.82	2,153.54	3.97	0.74	95.00
132	12,827.00	92.30	0.80	10,503.44	2,244.32	150.10	2,245.77	2,249.33	3.83	0.86	96.00
133	12,922.00	93.90	1.20	10,498.30	2,339.16	151.75	2,340.62	2,344.08	3.71	1.74	95.00
134	13,017.00	93.10	0.80	10,492.50	2,433.97	153.41	2,435.44	2,438.80	3.61	0.94	95.00
135	13,112.00	91.30	0.70	10,488.85	2,528.89	154.65	2,530.37	2,533.61	3.50	1.90	95.00
136	13,207.00	90.80	0.10	10,487.11	2,623.87	155.31	2,625.35	2,628.46	3.39	0.82	95.00
137	13,302.00	89.70	360.00	10,486.70	2,718.87	155.40	2,720.34	2,723.30	3.27	1.16	95.00
138	13,397.00	90.90	360.00	10,486.20	2,813.86	155.40	2,815.34	2,818.15	3.16	1.26	95.00
139	13,492.00	89.80	359.90	10,485.62	2,908.86	155.31	2,910.33	2,913.00	3.06	1.16	95.00
140	13,587.00	91.40	359.90	10,484.62	3,003.85	155.15	3,005.31	3,007.86	2.96	1.68	95.00
141	13,683.00	89.50	0.20	10,483.87	3,099.84	155.23	3,101.30	3,103.73	2.87	2.00	96.00
142	13,778.00	88.20	1.20	10,485.78	3,194.81	156.39	3,196.28	3,198.64	2.80	1.73	95.00
143	13,873.00	88.80	1.40	10,488.26	3,289.76	158.55	3,291.24	3,293.58	2.76	0.67	95.00
144	13,968.00	89.10	359.40	10,490.00	3,384.73	159.21	3,386.22	3,388.48	2.69	2.13	95.00
145	14,063.00	89.90	359.30	10,490.83	3,479.72	158.13	3,481.19	3,483.31	2.60	0.85	95.00
146	14,159.00	88.00	359.00	10,492.59	3,575.69	156.71	3,577.14	3,579.12	2.51	2.00	96.00
147	14,254.00	88.20	358.70	10,495.74	3,670.62	154.80	3,672.04	3,673.88	2.41	0.38	95.00
148	14,349.00	88.50	358.70	10,498.48	3,765.56	152.65	3,766.95	3,768.65	2.32	0.32	95.00
149	14,445.00	88.50	358.80	10,500.99	3,861.50	150.56	3,862.87	3,864.44	2.23	0.10	96.00
150	14,540.00	90.50	359.00	10,501.82	3,956.48	148.73	3,957.82	3,959.27	2.15	2.12	95.00
151	14,635.00	91.10	358.90	10,500.49	4,051.45	146.99	4,052.77	4,054.12	2.08	0.64	95.00
152	14,730.00	91.00	358.50	10,498.75	4,146.41	144.84	4,147.70	4,148.94	2.00	0.43	95.00
153	14,826.00	91.30	357.80	10,496.83	4,242.34	141.74	4,243.59	4,244.71	1.91	0.79	96.00
154	14,921.00	91.40	357.50	10,494.59	4,337.23	137.84	4,338.44	4,339.42	1.82	0.33	95.00
155	15,016.00	92.10	357.30	10,491.69	4,432.09	133.54	4,433.25	4,434.10	1.73	0.77	95.00
156	15,112.00	92.80	356.90	10,487.58	4,527.88	128.68	4,528.98	4,529.71	1.63	0.84	96.00
157	15,207.00	92.70	356.50	10,483.02	4,622.61	123.22	4,623.65	4,624.25	1.53	0.43	95.00
158	15,302.00	91.30	357.70	10,479.71	4,717.43	118.42	4,718.41	4,718.91	1.44	1.94	95.00
159	15,398.00	90.70	359.10	10,478.03	4,813.37	115.74	4,814.32	4,814.76	1.38	1.59	96.00
160	15,493.00	90.90	359.40	10,476.71	4,908.36	114.50	4,909.29	4,909.69	1.34	0.38	95.00
161	15,588.00	91.60	359.40	10,474.63	5,003.33	113.50	5,004.24	5,004.61	1.30	0.74	95.00
162	15,683.00	90.00	359.80	10,473.31	5,098.31	112.84	5,099.21	5,099.56	1.27	1.74	95.00
163	15,778.00	90.20	359.80	10,473.14	5,193.31	112.51	5,194.21	5,194.53	1.24	0.21	95.00
164	15,873.00	90.40	359.80	10,472.65	5,288.31	112.17	5,289.19	5,289.50	1.22	0.21	95.00
165	15,969.00	90.80	359.50	10,471.64	5,384.30	111.59	5,385.18	5,385.46	1.19	0.52	96.00
166	16,064.00	90.20	0.10	10,470.81	5,479.30	111.26	5,480.16	5,480.43	1.16	0.89	95.00
167	16,160.00	89.20	359.60	10,471.31	5,575.29	111.01	5,576.15	5,576.40	1.14	1.16	96.00
168	16,255.00	90.20	0.10	10,471.81	5,670.29	110.76	5,671.14	5,671.37	1.12	1.18	95.00
169	16,350.00	88.80	359.50	10,472.64	5,765.28	110.43	5,766.12	5,766.34	1.10	1.60	95.00
170	16,445.00	89.80	359.40	10,473.80	5,860.27	109.51	5,861.10	5,861.29	1.07	1.06	95.00
171	16,541.00	90.00	359.50	10,473.97	5,956.27	108.59	5,957.08	5,957.26	1.04	0.23	96.00
172	16,636.00	90.90	359.40	10,473.22	6,051.26	107.68	6,052.05	6,052.22	1.02	0.95	95.00
173	16,731.00	90.20	358.60	10,472.31	6,146.24	106.02	6,147.01	6,147.15	0.99	1.12	95.00
174	16,826.00	90.30	0.30	10,471.90	6,241.23	105.11	6,241.99	6,242.11	0.96	1.79	95.00
175	16,922.00	89.40	0.80	10,472.15	6,337.22	106.03	6,337.99	6,338.11	0.96	1.07	96.00
176	17,017.00	88.10	0.80	10,474.22	6,432.19	107.36	6,432.96	6,433.09	0.96	1.37	95.00
177	17,113.00	86.90	0.80	10,478.41	6,528.09	108.70	6,528.87	6,528.99	0.95	1.25	96.00

Svy	Depth	Inc	Azm	TVD	NS	EW	VS	CD	CA	DLS	CL
178	17,208.00	88.20	0.30	10,482.47	6,622.99	109.61	6,623.78	6,623.90	0.95	1.47	95.00
179	17,303.00	88.80	0.40	10,484.95	6,717.96	110.19	6,718.74	6,718.86	0.94	0.64	95.00
180	17,399.00	89.40	359.60	10,486.46	6,813.95	110.19	6,814.73	6,814.84	0.93	1.04	96.00
181	17,494.00	88.50	359.40	10,488.20	6,908.92	109.36	6,909.69	6,909.79	0.91	0.97	95.00
182	17,589.00	87.00	359.90	10,491.93	7,003.85	108.78	7,004.60	7,004.69	0.89	1.66	95.00
183	17,685.00	86.90	359.50	10,497.04	7,099.71	108.28	7,100.45	7,100.54	0.87	0.43	96.00
184	17,780.00	88.70	359.80	10,500.69	7,194.63	107.70	7,195.37	7,195.44	0.86	1.92	95.00
185	17,876.00	88.10	358.40	10,503.37	7,290.58	106.19	7,291.29	7,291.35	0.83	1.59	96.00
186	17,971.00	89.90	359.10	10,505.03	7,385.54	104.12	7,386.23	7,386.27	0.81	2.03	95.00
187	18,066.00	90.70	358.70	10,504.53	7,480.52	102.29	7,481.18	7,481.22	0.78	0.94	95.00
188	18,161.00	91.60	359.10	10,502.62	7,575.48	100.47	7,576.12	7,576.15	0.76	1.04	95.00
189	18,257.00	90.10	359.90	10,501.20	7,671.46	99.63	7,672.09	7,672.11	0.74	1.77	96.00
190	18,352.00	89.50	359.00	10,501.53	7,766.46	98.72	7,767.07	7,767.09	0.73	1.14	95.00
191	18,447.00	89.30	357.90	10,502.52	7,861.42	96.15	7,861.99	7,862.00	0.70	1.18	95.00
192	18,543.00	87.90	0.10	10,504.87	7,957.37	94.48	7,957.92	7,957.93	0.68	2.72	96.00
193	18,639.00	87.30	359.40	10,508.89	8,053.28	94.06	8,053.82	8,053.83	0.67	0.96	96.00
194	18,735.00	88.30	359.80	10,512.58	8,149.20	93.39	8,149.74	8,149.74	0.66	1.12	96.00
195	18,830.00	90.00	0.60	10,513.98	8,244.19	93.72	8,244.72	8,244.72	0.65	1.98	95.00
196	18,926.00	89.40	1.80	10,514.49	8,340.16	95.73	8,340.71	8,340.71	0.66	1.40	96.00
197	19,021.00	91.30	1.90	10,513.91	8,435.11	98.80	8,435.68	8,435.69	0.67	2.00	95.00
198	19,117.00	90.50	1.00	10,512.40	8,531.06	101.23	8,531.66	8,531.67	0.68	1.25	96.00
199	19,213.00	88.20	0.50	10,513.49	8,627.04	102.48	8,627.64	8,627.65	0.68	2.45	96.00
200	19,309.00	89.10	0.10	10,515.75	8,723.01	102.99	8,723.61	8,723.62	0.68	1.03	96.00
201	19,405.00	88.20	0.90	10,518.01	8,818.98	103.82	8,819.59	8,819.59	0.67	1.25	96.00
202	19,501.00	89.00	0.40	10,520.36	8,914.95	104.91	8,915.56	8,915.56	0.67	0.98	96.00
203	19,596.00	88.20	1.00	10,522.68	9,009.91	106.07	9,010.53	9,010.53	0.67	1.05	95.00
204	19,692.00	88.90	0.60	10,525.11	9,105.87	107.41	9,106.49	9,106.50	0.68	0.84	96.00
205	19,788.00	88.00	1.20	10,527.70	9,201.82	108.92	9,202.46	9,202.47	0.68	1.13	96.00
206	19,884.00	88.80	0.80	10,530.38	9,297.77	110.59	9,298.42	9,298.43	0.68	0.93	96.00
207	19,979.00	87.80	1.00	10,533.20	9,392.71	112.08	9,393.37	9,393.38	0.68	1.07	95.00
208	20,075.00	88.70	0.30	10,536.13	9,488.66	113.17	9,489.33	9,489.34	0.68	1.19	96.00
209	20,170.00	87.30	0.60	10,539.45	9,583.60	113.92	9,584.26	9,584.27	0.68	1.51	95.00
210	20,266.00	88.20	359.90	10,543.22	9,679.52	114.34	9,680.19	9,680.20	0.68	1.19	96.00
211	20,362.00	89.20	359.70	10,545.40	9,775.49	114.00	9,776.15	9,776.16	0.67	1.06	96.00
212	20,457.00	90.20	359.40	10,545.89	9,870.49	113.26	9,871.13	9,871.14	0.66	1.10	95.00
213	20,492.00	90.40	359.40	10,545.71	9,905.49	112.89	9,906.12	9,906.13	0.65	0.57	35.00
PTB	20,540.00	90.40	359.40	10,545.38	9,953.48	112.39	9,954.11	9,954.12	0.65	0.00	48.00



Devon Energy

Lea County, NM (NAD83)

Van Doo Dah 21-33 / Marwari 21-16

Marwari 21-16 State Fed Com 234Y

OH

Design: OH

Standard Survey Report

14 January, 2020



Company:	Devon Energy	Local Co-ordinate Reference:	Well Marwari 21-16 State Fed Com 234Y
Project:	Lea County, NM (NAD83)	TVD Reference:	3389.9' GE + 30' KB @ 3419.90usft
Site:	Van Doo Dah 21-33 / Marwari 21-16	MD Reference:	3389.9' GE + 30' KB @ 3419.90usft
Well:	Marwari 21-16 State Fed Com 234Y	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.15 Single User Db

Project	Lea County, NM (NAD83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site						Van Doo Dah 21-33 / Marwari 21-16											
Site Position:			Northing:			404,359.07 usft			Latitude:			32.109997					
From:			Map			Easting:			742,413.69 usft			Longitude:			-103.683905		
Position Uncertainty:			0.00 usft			Slot Radius:			13-3/16 "			Grid Convergence:			0.35 °		

Well	Marwari 21-16 State Fed Com 234Y					
Well Position	+N/-S	0.00 usft	Northing:	404,359.67 usft	Latitude:	32.109998
	+E/-W	0.00 usft	Easting:	742,443.67 usft	Longitude:	-103.683808
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,389.90 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/9/2019	6.73	59.91	47,604.41411912

Design	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	0.65	

Survey Program	Date	1/14/2020			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
199.00	20,492.00	Survey #1 (OH)	OWSG (Rev2) MWD	OWSG MWD - Standard	
20,540.00	20,540.00	Survey #2 - Proj to TD (OH)	BLIND	OWSG BLIND	

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	
SHL (M 21-16 State Fed Com 234Y)										
199.00	0.70	141.60	199.00	-0.95	0.76	-0.94	0.35	0.35	0.00	
306.00	1.00	150.70	305.98	-2.28	1.62	-2.26	0.31	0.28	8.50	
401.00	1.30	185.10	400.97	-4.08	1.93	-4.05	0.78	0.32	36.21	
497.00	1.90	203.30	496.93	-6.62	1.20	-6.61	0.81	0.63	18.96	
592.00	2.50	205.40	591.86	-9.94	-0.31	-9.94	0.64	0.63	2.21	
687.00	3.00	210.30	686.75	-13.96	-2.45	-13.98	0.58	0.53	5.16	
783.00	2.80	211.90	782.62	-18.12	-4.96	-18.17	0.22	-0.21	1.67	
841.00	2.80	215.70	840.56	-20.47	-6.53	-20.54	0.32	0.00	6.55	



Total Directional Services

Survey Report



Company:	Devon Energy	Local Co-ordinate Reference:	Well Marwari 21-16 State Fed Com 234Y
Project:	Lea County, NM (NAD83)	TVD Reference:	3389.9' GE + 30' KB @ 3419.90usft
Site:	Van Doo Dah 21-33 / Marwari 21-16	MD Reference:	3389.9' GE + 30' KB @ 3419.90usft
Well:	Marwari 21-16 State Fed Com 234Y	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.15 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)	
1,003.00	2.20	230.70	1,002.40	-25.65	-11.25	-25.78	0.55	-0.37	9.26	
1,099.00	2.00	202.70	1,098.34	-28.37	-13.32	-28.51	1.08	-0.21	-29.17	
1,193.00	1.80	174.90	1,192.29	-31.35	-13.82	-31.50	0.99	-0.21	-29.57	
1,289.00	1.80	136.00	1,288.25	-33.94	-12.64	-34.08	1.25	0.00	-40.52	
1,384.00	1.60	130.70	1,383.20	-35.87	-10.60	-35.99	0.27	-0.21	-5.58	
1,479.00	1.30	124.20	1,478.17	-37.35	-8.70	-37.44	0.36	-0.32	-6.84	
1,575.00	1.30	131.40	1,574.15	-38.68	-6.99	-38.75	0.17	0.00	7.50	
1,670.00	1.30	131.10	1,669.13	-40.10	-5.37	-40.16	0.01	0.00	-0.32	
1,765.00	1.00	129.90	1,764.11	-41.34	-3.92	-41.38	0.32	-0.32	-1.26	
1,861.00	1.10	131.20	1,860.09	-42.48	-2.58	-42.51	0.11	0.10	1.35	
1,956.00	1.00	123.60	1,955.07	-43.54	-1.21	-43.55	0.18	-0.11	-8.00	
2,051.00	0.70	140.70	2,050.06	-44.45	-0.15	-44.45	0.41	-0.32	18.00	
2,147.00	1.00	139.90	2,146.05	-45.54	0.76	-45.53	0.31	0.31	-0.83	
2,242.00	1.00	137.00	2,241.04	-46.79	1.86	-46.76	0.05	0.00	-3.05	
2,337.00	0.80	154.30	2,336.03	-47.99	2.72	-47.96	0.35	-0.21	18.21	
2,433.00	1.00	136.00	2,432.02	-49.20	3.59	-49.15	0.36	0.21	-19.06	
2,528.00	0.70	145.90	2,527.00	-50.27	4.49	-50.22	0.35	-0.32	10.42	
2,623.00	0.80	153.30	2,622.00	-51.35	5.11	-51.28	0.15	0.11	7.79	
2,719.00	1.30	157.50	2,717.98	-52.95	5.83	-52.88	0.53	0.52	4.38	
2,814.00	1.00	120.30	2,812.96	-54.36	6.96	-54.28	0.83	-0.32	-39.16	
2,909.00	1.00	109.90	2,907.95	-55.06	8.45	-54.97	0.19	0.00	-10.95	
3,005.00	1.00	100.20	3,003.93	-55.50	10.07	-55.38	0.18	0.00	-10.10	
3,100.00	1.00	95.10	3,098.92	-55.72	11.71	-55.58	0.09	0.00	-5.37	
3,195.00	0.90	93.20	3,193.91	-55.83	13.28	-55.68	0.11	-0.11	-2.00	
3,291.00	1.10	84.60	3,289.89	-55.79	14.95	-55.62	0.26	0.21	-8.96	
3,386.00	1.30	101.70	3,384.87	-55.92	16.91	-55.73	0.43	0.21	18.00	
3,481.00	2.40	121.80	3,479.82	-57.19	19.66	-56.96	1.33	1.16	21.16	
3,576.00	3.30	129.40	3,574.70	-59.97	23.46	-59.70	1.03	0.95	8.00	
3,672.00	4.40	135.40	3,670.48	-64.35	28.18	-64.03	1.22	1.15	6.25	
3,767.00	4.40	140.40	3,765.21	-69.75	33.06	-69.37	0.40	0.00	5.26	
3,862.00	4.30	135.70	3,859.93	-75.11	37.87	-74.68	0.39	-0.11	-4.95	
3,958.00	4.30	135.90	3,955.66	-80.27	42.89	-79.78	0.02	0.00	0.21	
4,053.00	4.10	135.00	4,050.41	-85.23	47.77	-84.68	0.22	-0.21	-0.95	
4,149.00	4.10	138.70	4,146.16	-90.23	52.46	-89.63	0.28	0.00	3.85	
4,244.00	4.20	136.80	4,240.91	-95.32	57.09	-94.67	0.18	0.11	-2.00	
4,339.00	4.30	139.80	4,335.65	-100.58	61.77	-99.87	0.26	0.11	3.16	
4,435.00	4.10	139.40	4,431.39	-105.93	66.32	-105.17	0.21	-0.21	-0.42	
4,530.00	3.80	137.80	4,526.17	-110.84	70.65	-110.04	0.34	-0.32	-1.68	
4,626.00	3.40	136.80	4,621.98	-115.27	74.73	-114.42	0.42	-0.42	-1.04	
4,721.00	3.20	137.00	4,716.82	-119.27	78.47	-118.37	0.21	-0.21	0.21	
4,816.00	3.50	142.20	4,811.66	-123.50	82.06	-122.56	0.45	0.32	5.47	
4,912.00	3.30	142.90	4,907.49	-128.02	85.52	-127.04	0.21	-0.21	0.73	
5,007.00	3.10	143.80	5,002.34	-132.27	88.69	-131.26	0.22	-0.21	0.95	

Company:	Devon Energy	Local Co-ordinate Reference:	Well Marwari 21-16 State Fed Com 234Y
Project:	Lea County, NM (NAD83)	TVD Reference:	3389.9' GE + 30' KB @ 3419.90usft
Site:	Van Doo Dah 21-33 / Marwari 21-16	MD Reference:	3389.9' GE + 30' KB @ 3419.90usft
Well:	Marwari 21-16 State Fed Com 234Y	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.15 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)
5,195.00	2.90	142.70	5,190.08	-140.15	94.57	-139.08	0.11	-0.11	-0.59
5,291.00	2.80	140.90	5,285.96	-143.91	97.52	-142.80	0.14	-0.10	-1.88
5,386.00	3.20	135.80	5,380.83	-147.61	100.83	-146.46	0.51	0.42	-5.37
5,481.00	3.50	132.50	5,475.67	-151.47	104.82	-150.27	0.38	0.32	-3.47
5,576.00	3.50	132.50	5,570.49	-155.39	109.09	-154.14	0.00	0.00	0.00
5,672.00	3.30	129.80	5,666.33	-159.13	113.38	-157.84	0.27	-0.21	-2.81
5,767.00	3.30	128.00	5,761.17	-162.57	117.63	-161.23	0.11	0.00	-1.89
5,862.00	3.30	127.10	5,856.01	-165.90	121.97	-164.51	0.05	0.00	-0.95
5,958.00	3.20	126.40	5,951.86	-169.16	126.33	-167.72	0.11	-0.10	-0.73
6,053.00	3.20	124.60	6,046.71	-172.24	130.65	-170.75	0.11	0.00	-1.89
6,149.00	3.40	124.20	6,142.55	-175.36	135.21	-173.82	0.21	0.21	-0.42
6,245.00	3.10	121.90	6,238.39	-178.33	139.76	-176.74	0.34	-0.31	-2.40
6,340.00	3.00	119.80	6,333.26	-180.92	144.10	-179.28	0.16	-0.11	-2.21
6,436.00	2.90	119.90	6,429.13	-183.38	148.39	-181.69	0.10	-0.10	0.10
6,531.00	2.60	139.20	6,524.02	-186.21	151.88	-184.48	1.02	-0.32	20.32
6,627.00	2.50	154.50	6,619.93	-189.75	154.20	-188.00	0.71	-0.10	15.94
6,722.00	2.50	148.90	6,714.84	-193.39	156.16	-191.62	0.26	0.00	-5.89
6,818.00	1.60	189.90	6,810.78	-196.51	157.02	-194.72	1.73	-0.94	42.71
6,913.00	1.50	204.40	6,905.75	-198.94	156.27	-197.17	0.42	-0.11	15.26
7,009.00	1.20	198.60	7,001.72	-201.04	155.43	-199.27	0.34	-0.31	-6.04
7,104.00	1.10	198.60	7,096.70	-202.85	154.83	-201.09	0.11	-0.11	0.00
7,200.00	0.80	208.60	7,192.69	-204.31	154.21	-202.56	0.36	-0.31	10.42
7,295.00	0.80	227.20	7,287.68	-205.34	153.41	-203.60	0.27	0.00	19.58
7,390.00	0.70	243.20	7,382.67	-206.06	152.40	-204.32	0.24	-0.11	16.84
7,485.00	0.50	246.70	7,477.67	-206.48	151.50	-204.76	0.21	-0.21	3.68
7,581.00	0.60	253.00	7,573.66	-206.79	150.64	-205.08	0.12	0.10	6.56
7,676.00	0.60	260.70	7,668.66	-207.02	149.67	-205.32	0.08	0.00	8.11
7,771.00	0.50	259.00	7,763.65	-207.18	148.77	-205.49	0.11	-0.11	-1.79
7,867.00	0.30	238.50	7,859.65	-207.39	148.15	-205.70	0.25	-0.21	-21.35
7,962.00	0.30	238.70	7,954.65	-207.65	147.72	-205.97	0.00	0.00	0.21
8,057.00	0.30	259.20	8,049.65	-207.83	147.27	-206.15	0.11	0.00	21.58
8,153.00	0.30	272.60	8,145.65	-207.86	146.77	-206.19	0.07	0.00	13.96
8,248.00	0.30	295.30	8,240.65	-207.74	146.30	-206.08	0.12	0.00	23.89
8,344.00	0.40	297.30	8,336.64	-207.48	145.77	-205.82	0.10	0.10	2.08
8,439.00	0.50	317.80	8,431.64	-207.02	145.20	-205.37	0.20	0.11	21.58
8,535.00	0.50	319.50	8,527.64	-206.39	144.65	-204.75	0.02	0.00	1.77
8,630.00	0.80	324.60	8,622.63	-205.54	143.99	-203.90	0.32	0.32	5.37
8,725.00	1.00	326.00	8,717.62	-204.31	143.14	-202.68	0.21	0.21	1.47
8,821.00	1.50	338.40	8,813.60	-202.45	142.21	-200.83	0.59	0.52	12.92
8,916.00	1.40	339.20	8,908.57	-200.21	141.34	-198.60	0.11	-0.11	0.84
9,011.00	1.20	3.80	9,003.54	-198.13	141.00	-196.53	0.62	-0.21	25.89
9,107.00	1.90	3.10	9,099.51	-195.54	141.15	-193.93	0.73	0.73	-0.73
9,202.00	1.50	9.20	9,194.46	-192.74	141.43	-191.13	0.46	-0.42	6.42

Company:	Devon Energy	Local Co-ordinate Reference:	Well Marwari 21-16 State Fed Com 234Y
Project:	Lea County, NM (NAD83)	TVD Reference:	3389.9' GE + 30' KB @ 3419.90usft
Site:	Van Doo Dah 21-33 / Marwari 21-16	MD Reference:	3389.9' GE + 30' KB @ 3419.90usft
Well:	Marwari 21-16 State Fed Com 234Y	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.15 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)
9,297.00	0.10	212.90	9,289.45	-191.58	141.59	-189.97	1.68	-1.47	-164.53
9,393.00	0.10	318.10	9,385.45	-191.59	141.49	-189.98	0.17	0.00	109.58
9,488.00	0.80	21.20	9,480.45	-190.91	141.67	-189.30	0.80	0.74	66.42
9,583.00	1.50	23.90	9,575.43	-189.15	142.41	-187.53	0.74	0.74	2.84
9,679.00	0.80	29.90	9,671.41	-187.42	143.26	-185.79	0.74	-0.73	6.25
9,774.00	0.50	92.80	9,766.41	-186.87	144.00	-185.23	0.76	-0.32	66.21
9,870.00	0.40	168.10	9,862.40	-187.22	144.49	-185.57	0.58	-0.10	78.44
9,965.00	0.30	125.40	9,957.40	-187.68	144.76	-186.04	0.29	-0.11	-44.95
10,048.00	0.30	126.00	10,040.40	-187.94	145.11	-186.29	0.00	0.00	0.72
KOP									
10,122.36	4.07	1.72	10,114.70	-185.42	145.35	-183.76	5.71	5.07	-167.13
KOP (M 21-16 State Fed Com 234Y)									
10,158.00	6.10	0.60	10,150.20	-182.26	145.41	-180.60	5.71	5.70	-3.14
10,253.00	17.00	358.50	10,243.14	-163.27	145.10	-161.62	11.48	11.47	-2.21
10,349.00	26.70	0.80	10,332.13	-127.59	145.03	-125.94	10.14	10.10	2.40
10,444.00	37.50	4.00	10,412.50	-77.25	147.35	-75.58	11.50	11.37	3.37
10,540.00	49.00	1.70	10,482.31	-11.67	150.48	-9.97	12.09	11.98	-2.40
10,635.00	60.30	0.50	10,537.18	65.68	151.90	67.39	11.94	11.89	-1.26
10,730.00	71.90	358.10	10,575.61	152.37	150.76	154.06	12.43	12.21	-2.53
10,826.00	84.30	358.00	10,595.37	246.07	147.57	247.72	12.92	12.92	-0.10
10,883.22	89.24	359.87	10,598.59	303.17	146.51	304.80	9.23	8.63	3.27
LP (M 21-16 State Fed Com 234Y)									
10,921.00	92.50	1.10	10,598.02	340.93	146.83	342.57	9.23	8.63	3.26
11,017.00	94.00	359.90	10,592.58	436.77	147.67	438.41	2.00	1.56	-1.25
11,112.00	94.30	359.60	10,585.70	531.52	147.25	533.15	0.45	0.32	-0.32
11,207.00	92.80	359.80	10,579.82	626.33	146.76	627.95	1.59	-1.58	0.21
11,302.00	93.10	359.70	10,574.93	721.21	146.34	722.81	0.33	0.32	-0.11
11,397.00	93.50	359.50	10,569.46	816.05	145.68	817.64	0.47	0.42	-0.21
11,493.00	93.70	359.40	10,563.43	911.85	144.76	913.43	0.23	0.21	-0.10
11,588.00	94.20	359.30	10,556.89	1,006.62	143.69	1,008.18	0.54	0.53	-0.11
11,683.00	92.80	0.00	10,551.09	1,101.44	143.11	1,102.99	1.65	-1.47	0.74
11,778.00	93.20	359.70	10,546.12	1,196.31	142.86	1,197.85	0.53	0.42	-0.32
11,873.00	91.60	0.20	10,542.14	1,291.22	142.78	1,292.75	1.76	-1.68	0.53
11,969.00	92.30	0.10	10,538.87	1,387.17	143.03	1,388.69	0.74	0.73	-0.10
12,064.00	93.10	0.10	10,534.40	1,482.06	143.19	1,483.58	0.84	0.84	0.00
12,159.00	93.60	0.00	10,528.85	1,576.90	143.28	1,578.41	0.54	0.53	-0.11
12,255.00	92.10	0.20	10,524.07	1,672.77	143.44	1,674.29	1.58	-1.56	0.21
12,350.00	92.90	0.70	10,519.93	1,767.68	144.19	1,769.20	0.99	0.84	0.53
12,446.00	93.00	1.10	10,514.99	1,863.54	145.70	1,865.07	0.43	0.10	0.42
12,541.00	92.00	0.50	10,510.85	1,958.44	147.02	1,959.97	1.23	-1.05	-0.63
12,636.00	90.80	0.60	10,508.53	2,053.41	147.93	2,054.94	1.27	-1.26	0.11
12,731.00	91.50	0.60	10,506.62	2,148.38	148.93	2,149.92	0.74	0.74	0.00
12,827.00	92.30	0.80	10,503.44	2,244.32	150.10	2,245.87	0.86	0.83	0.21
12,922.00	93.90	1.20	10,498.30	2,339.16	151.75	2,340.73	1.74	1.68	0.42

Company:	Devon Energy	Local Co-ordinate Reference:	Well Marwari 21-16 State Fed Com 234Y
Project:	Lea County, NM (NAD83)	TVD Reference:	3389.9' GE + 30' KB @ 3419.90usft
Site:	Van Doo Dah 21-33 / Marwari 21-16	MD Reference:	3389.9' GE + 30' KB @ 3419.90usft
Well:	Marwari 21-16 State Fed Com 234Y	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.15 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)
13,017.00	93.10	0.80	10,492.50	2,433.97	153.41	2,435.55	0.94	-0.84	-0.42
13,112.00	91.30	0.70	10,488.85	2,528.89	154.65	2,530.47	1.90	-1.89	-0.11
13,207.00	90.80	0.10	10,487.11	2,623.87	155.31	2,625.46	0.82	-0.53	-0.63
13,302.00	89.70	0.00	10,486.70	2,718.87	155.40	2,720.45	1.16	-1.16	-0.11
13,397.00	90.90	0.00	10,486.20	2,813.86	155.40	2,815.44	1.26	1.26	0.00
13,492.00	89.80	359.90	10,485.62	2,908.86	155.31	2,910.43	1.16	-1.16	-0.11
13,587.00	91.40	359.90	10,484.62	3,003.85	155.15	3,005.41	1.68	1.68	0.00
13,683.00	89.50	0.20	10,483.87	3,099.84	155.23	3,101.40	2.00	-1.98	0.31
13,778.00	88.20	1.20	10,485.78	3,194.81	156.39	3,196.38	1.73	-1.37	1.05
13,873.00	88.80	1.40	10,488.26	3,289.76	158.55	3,291.34	0.67	0.63	0.21
13,968.00	89.10	359.40	10,490.00	3,384.73	159.21	3,386.32	2.13	0.32	-2.11
14,063.00	89.90	359.30	10,490.83	3,479.72	158.13	3,481.29	0.85	0.84	-0.11
14,159.00	88.00	359.00	10,492.59	3,575.69	156.71	3,577.23	2.00	-1.98	-0.31
14,254.00	88.20	358.70	10,495.74	3,670.62	154.80	3,672.13	0.38	0.21	-0.32
14,349.00	88.50	358.70	10,498.48	3,765.56	152.65	3,767.04	0.32	0.32	0.00
14,445.00	88.50	358.80	10,500.99	3,861.50	150.56	3,862.96	0.10	0.00	0.10
14,540.00	90.50	359.00	10,501.82	3,956.48	148.73	3,957.90	2.12	2.11	0.21
14,635.00	91.10	358.90	10,500.49	4,051.45	146.99	4,052.85	0.64	0.63	-0.11
14,730.00	91.00	358.50	10,498.75	4,146.41	144.84	4,147.78	0.43	-0.11	-0.42
14,826.00	91.30	357.80	10,496.83	4,242.34	141.74	4,243.67	0.79	0.31	-0.73
14,921.00	91.40	357.50	10,494.59	4,337.23	137.84	4,338.51	0.33	0.11	-0.32
15,016.00	92.10	357.30	10,491.69	4,432.09	133.54	4,433.32	0.77	0.74	-0.21
15,112.00	92.80	356.90	10,487.58	4,527.88	128.68	4,529.04	0.84	0.73	-0.42
15,207.00	92.70	356.50	10,483.02	4,622.61	123.22	4,623.71	0.43	-0.11	-0.42
15,302.00	91.30	357.70	10,479.71	4,717.43	118.42	4,718.46	1.94	-1.47	1.26
15,369.36	90.88	358.68	10,478.43	4,784.74	116.29	4,785.75	1.59	-0.62	1.46
S21/16 Crossing									
15,398.00	90.70	359.10	10,478.03	4,813.37	115.74	4,814.37	1.59	-0.63	1.46
15,493.00	90.90	359.40	10,476.71	4,908.36	114.50	4,909.34	0.38	0.21	0.32
15,588.00	91.60	359.40	10,474.64	5,003.33	113.50	5,004.29	0.74	0.74	0.00
15,683.00	90.00	359.80	10,473.31	5,098.31	112.84	5,099.26	1.74	-1.68	0.42
15,778.00	90.20	359.80	10,473.14	5,193.31	112.51	5,194.25	0.21	0.21	0.00
15,873.00	90.40	359.80	10,472.65	5,288.31	112.17	5,289.24	0.21	0.21	0.00
15,969.00	90.80	359.50	10,471.64	5,384.30	111.59	5,385.22	0.52	0.42	-0.31
16,064.00	90.20	0.10	10,470.81	5,479.30	111.26	5,480.20	0.89	-0.63	0.63
16,160.00	89.20	359.60	10,471.31	5,575.29	111.01	5,576.19	1.16	-1.04	-0.52
16,255.00	90.20	0.10	10,471.81	5,670.29	110.76	5,671.18	1.18	1.05	0.53
16,350.00	88.80	359.50	10,472.64	5,765.28	110.43	5,766.16	1.60	-1.47	-0.63
16,445.00	89.80	359.40	10,473.80	5,860.27	109.51	5,861.13	1.06	1.05	-0.11
16,541.00	90.00	359.50	10,473.97	5,956.27	108.59	5,957.11	0.23	0.21	0.10
16,636.00	90.90	359.40	10,473.22	6,051.26	107.68	6,052.09	0.95	0.95	-0.11
16,731.00	90.20	358.60	10,472.31	6,146.24	106.02	6,147.04	1.12	-0.74	-0.84
16,826.00	90.30	0.30	10,471.90	6,241.23	105.11	6,242.02	1.79	0.11	1.79
16,922.00	89.40	0.80	10,472.15	6,337.22	106.03	6,338.02	1.07	-0.94	0.52

Company:	Devon Energy	Local Co-ordinate Reference:	Well Marwari 21-16 State Fed Com 234Y
Project:	Lea County, NM (NAD83)	TVD Reference:	3389.9' GE + 30' KB @ 3419.90usft
Site:	Van Doo Dah 21-33 / Marwari 21-16	MD Reference:	3389.9' GE + 30' KB @ 3419.90usft
Well:	Marwari 21-16 State Fed Com 234Y	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.15 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)
17,017.00	88.10	0.80	10,474.22	6,432.19	107.36	6,432.99	1.37	-1.37	0.00
17,113.00	86.90	0.80	10,478.41	6,528.09	108.70	6,528.90	1.25	-1.25	0.00
17,208.00	88.20	0.30	10,482.47	6,622.99	109.61	6,623.81	1.47	1.37	-0.53
17,303.00	88.80	0.40	10,484.95	6,717.96	110.19	6,718.77	0.64	0.63	0.11
17,399.00	89.40	359.60	10,486.46	6,813.95	110.19	6,814.76	1.04	0.63	-0.83
17,494.00	88.50	359.40	10,488.20	6,908.93	109.36	6,909.72	0.97	-0.95	-0.21
17,589.00	87.00	359.90	10,491.93	7,003.85	108.78	7,004.63	1.66	-1.58	0.53
17,685.00	86.90	359.50	10,497.04	7,099.71	108.28	7,100.48	0.43	-0.10	-0.42
17,780.00	88.70	359.80	10,500.69	7,194.63	107.70	7,195.39	1.92	1.89	0.32
17,876.00	88.10	358.40	10,503.37	7,290.58	106.19	7,291.32	1.59	-0.63	-1.46
17,971.00	89.90	359.10	10,505.03	7,385.54	104.12	7,386.24	2.03	1.89	0.74
18,066.00	90.70	358.70	10,504.53	7,480.52	102.29	7,481.20	0.94	0.84	-0.42
18,161.00	91.60	359.10	10,502.62	7,575.48	100.47	7,576.13	1.04	0.95	0.42
18,257.00	90.10	359.90	10,501.20	7,671.46	99.63	7,672.10	1.77	-1.56	0.83
18,352.00	89.50	359.00	10,501.53	7,766.46	98.72	7,767.08	1.14	-0.63	-0.95
18,447.00	89.30	357.90	10,502.52	7,861.42	96.15	7,862.00	1.18	-0.21	-1.16
18,543.00	87.90	0.10	10,504.87	7,957.37	94.48	7,957.92	2.72	-1.46	2.29
18,639.00	87.30	359.40	10,508.89	8,053.28	94.06	8,053.83	0.96	-0.63	-0.73
18,735.00	88.30	359.80	10,512.58	8,149.20	93.39	8,149.74	1.12	1.04	0.42
18,830.00	90.00	0.60	10,513.98	8,244.19	93.72	8,244.72	1.98	1.79	0.84
18,926.00	89.40	1.80	10,514.49	8,340.16	95.73	8,340.71	1.40	-0.63	1.25
19,021.00	91.30	1.90	10,513.91	8,435.11	98.80	8,435.69	2.00	2.00	0.11
19,117.00	90.50	1.00	10,512.40	8,531.06	101.23	8,531.66	1.25	-0.83	-0.94
19,213.00	88.20	0.50	10,513.49	8,627.04	102.48	8,627.65	2.45	-2.40	-0.52
19,309.00	89.10	0.10	10,515.75	8,723.01	102.99	8,723.62	1.03	0.94	-0.42
19,405.00	88.20	0.90	10,518.01	8,818.98	103.82	8,819.59	1.25	-0.94	0.83
19,501.00	89.00	0.40	10,520.36	8,914.95	104.91	8,915.56	0.98	0.83	-0.52
19,596.00	88.20	1.00	10,522.68	9,009.91	106.07	9,010.53	1.05	-0.84	0.63
19,692.00	88.90	0.60	10,525.11	9,105.87	107.41	9,106.50	0.84	0.73	-0.42
19,788.00	88.00	1.20	10,527.70	9,201.82	108.92	9,202.46	1.13	-0.94	0.63
19,884.00	88.80	0.80	10,530.38	9,297.77	110.59	9,298.42	0.93	0.83	-0.42
19,979.00	87.80	1.00	10,533.20	9,392.71	112.08	9,393.38	1.07	-1.05	0.21
20,075.00	88.70	0.30	10,536.13	9,488.66	113.17	9,489.33	1.19	0.94	-0.73
20,170.00	87.30	0.60	10,539.45	9,583.60	113.92	9,584.27	1.51	-1.47	0.32
20,266.00	88.20	359.90	10,543.22	9,679.52	114.34	9,680.19	1.19	0.94	-0.73
20,362.00	89.20	359.70	10,545.40	9,775.49	114.00	9,776.16	1.06	1.04	-0.21
20,457.00	90.20	359.40	10,545.89	9,870.49	113.26	9,871.14	1.10	1.05	-0.32
20,492.00	90.40	359.40	10,545.71	9,905.49	112.89	9,906.13	0.57	0.57	0.00
20,540.00	90.40	359.40	10,545.38	9,953.48	112.39	9,954.12	0.00	0.00	0.00
BHL - PBHL (M 21-16 State Fed Com 234Y)									



Total Directional Services

Survey Report



Company:	Devon Energy	Local Co-ordinate Reference:	Well Marwari 21-16 State Fed Com 234Y
Project:	Lea County, NM (NAD83)	TVD Reference:	3389.9' GE + 30' KB @ 3419.90usft
Site:	Van Doo Dah 21-33 / Marwari 21-16	MD Reference:	3389.9' GE + 30' KB @ 3419.90usft
Well:	Marwari 21-16 State Fed Com 234Y	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.15 Single User Db

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
10,048.00	10,040.40	-187.94	145.11	KOP
15,369.36	10,478.43	4,784.74	116.29	S21/16 Crossing
20,540.00	10,545.38	9,953.48	112.39	BHL

Checked By: _____

Approved By: _____

Date: _____