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HOBBS OCD
NOV 21 2017
RECEIVED

Survey Company: MS Energy Services
MWD Surveyor Name: Matt Wilson
Survey Type: MWD
Operating Company: Devon Energy Production Company, LP
Well Name & Number: Rebel 20 FED 8H
API Number: 30-025-43159
Surveyed Depths: 144' – 15,576' MD; PTB: 15,630'
Dates Performed: 06/08/2017 – 06/26/2017
Location: Lea County, NM
Job Number: DDMO-170523

I certify that the data is true, correct and complete and within the limitations of the tool set forth by MS Energy Services; that I am authorized and qualified to make this report and that I have reviewed this report and find it conforms to the principles and procedures as set forth by MS Energy Services.

Digitally signed by: 
Title: MWD Field Specialist
Date: 07-10-2017
Email: mwilson@msenergyservices.com



SURVEY CALCULATION PROGRAM

7/10/17 10:54

Company:		Devon Energy Production Company,LP													
Well Name:		Rebel 20 FED 8H													
Location:		Lea County, NM													
Rig:		Cactus #126					Magnetic Declination:		6.74		REFERENCED TO GRID NORTH				
Job Number:		DDMO-170523													
API #:		30-025-43159													
Vertical Section Azimuth:					180.00					Proposed Direction:		180.00			
Survey Calculation Method:					Minimum Curvature										
PTB:		MD		INC		AZM		TVD		N/S		E/W		VS	
		15,630		90.6		180.7		10786.56		-4829.6		234.14		4829.6	
#		Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure Distance		Azm	DLS/ 100	BUR/ 100'		
TIE IN		0	0.00	0.00	0.00	0.00	0.00				0.00				
1		144	0.20	157.20	144.44	-0.23	0.10	0.23	0.25	157.20	0.14	0.14			
2		183	0.20	187.60	183.00	-0.36	0.11	0.36	0.38	162.36	0.27	0.00			
3		275	0.40	194.70	275.00	-0.83	0.01	0.83	0.83	179.16	0.22	0.22			
4		366	0.50	194.40	366.00	-1.52	-0.17	1.52	1.53	186.27	0.11	0.11			
5		458	0.60	198.00	457.99	-2.37	-0.42	2.37	2.41	189.95	0.11	0.11			
6		550	0.70	215.10	549.99	-3.29	-0.89	3.29	3.41	195.11	0.24	0.11			
7		643	1.00	217.40	642.97	-4.40	-1.71	4.40	4.72	201.22	0.32	0.32			
8		734	1.20	227.00	733.96	-5.68	-2.89	5.68	6.37	206.95	0.30	0.22			
9		825	1.50	228.50	824.93	-7.12	-4.48	7.12	8.41	212.16	0.33	0.33			
10		976	1.50	242.40	975.88	-9.34	-7.71	9.34	12.11	219.52	0.24	0.00			
11		1,069	1.50	250.40	1068.85	-10.31	-9.93	10.31	14.32	223.92	0.22	0.00			
12		1,160	1.40	256.60	1159.82	-10.97	-12.14	10.97	16.36	227.89	0.20	-0.11			
13		1,254	1.50	259.20	1253.79	-11.47	-14.46	11.47	18.46	231.59	0.13	0.11			
14		1,344	1.40	258.00	1343.76	-11.92	-16.69	11.92	20.51	234.48	0.12	-0.11			
15		1,526	1.30	260.40	1525.71	-12.72	-20.90	12.72	24.47	238.67	0.06	-0.05			
16		1,709	1.10	267.90	1708.67	-13.13	-24.71	13.13	27.98	242.00	0.14	-0.11			
17		1,897	1.00	270.90	1896.64	-13.17	-28.15	13.17	31.08	244.92	0.06	-0.05			
18		2,086	0.60	262.90	2085.62	-13.27	-30.78	13.27	33.52	246.68	0.22	-0.21			
19		2,274	1.20	258.30	2273.60	-13.79	-33.69	13.79	36.40	247.73	0.32	0.32			
20		2,462	0.90	258.10	2461.57	-14.50	-37.06	14.50	39.79	248.64	0.16	-0.16			
21		2,650	0.80	249.00	2649.54	-15.27	-39.73	15.27	42.56	248.97	0.09	-0.05			
22		2,838	0.60	240.40	2837.53	-16.23	-41.81	16.23	44.85	248.79	0.12	-0.11			
23		3,026	0.40	223.80	3025.52	-17.19	-43.12	17.19	46.42	248.27	0.13	-0.11			
24		3,214	0.40	221.80	3213.52	-18.15	-44.01	18.15	47.61	247.59	0.01	0.00			
25		3,402	0.50	226.80	3401.51	-19.20	-45.05	19.20	48.97	246.91	0.06	0.05			
26		3,590	0.90	237.20	3589.50	-20.56	-46.89	20.56	51.20	246.32	0.22	0.21			
27		3,778	1.20	230.00	3777.47	-22.63	-49.63	22.63	54.55	245.49	0.17	0.16			
28		3,966	1.20	208.80	3965.43	-25.62	-52.09	25.62	58.05	243.81	0.23	0.00			
29		4,154	1.50	197.50	4153.37	-29.69	-53.78	29.69	61.43	241.10	0.21	0.16			
30		4,342	1.70	190.50	4341.30	-34.78	-55.03	34.78	65.10	237.71	0.15	0.11			
31		4,531	1.80	184.10	4530.21	-40.50	-55.75	40.50	68.91	234.01	0.12	0.05			
32		4,720	1.00	136.30	4719.16	-44.65	-54.82	44.65	70.70	230.84	0.71	-0.42			
33		4,814	1.40	83.60	4813.14	-45.11	-53.12	45.11	69.69	229.66	1.20	0.43			



SURVEY CALCULATION PROGRAM

7/10/17 10:54

Company:	Devon Energy Production Company,LP		
Well Name:	Rebel 20 FED 8H		
Location:	Lea County, NM		
Rig:	Cactus #126	Magnetic Declination:	6.74
Job Number:	DDMO-170523		
API #:	30-025-43159		
Vertical Section Azimuth:	180.00	Proposed Direction:	180.00
Survey Calculation Method:	Minimum Curvature		

REFERENCED TO GRID NORTH

Survey Calculation Method:		Minimum Curvature												
PTB:	MD		INC		AZM		TVD		N/S		E/W		VS	
	15,630		90.6		180.7		10786.56		-4829.6		234.14		4829.6	
#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure		DLS/ 100	BUR/ 100'			
34	4,908	2.20	70.30	4907.10	-44.38	-50.28	44.38	67.06	228.57	0.95	0.85			
35	5,003	3.30	65.20	5001.99	-42.62	-46.08	42.62	62.76	227.23	1.19	1.16			
36	5,097	4.00	55.70	5095.79	-39.63	-40.91	39.63	56.96	225.91	0.98	0.74			
37	5,191	5.20	51.70	5189.49	-35.15	-34.86	35.15	49.50	224.77	1.32	1.28			
38	5,285	5.10	49.50	5283.11	-29.79	-28.34	29.79	41.12	223.57	0.24	-0.11			
39	5,379	5.10	51.30	5376.74	-24.47	-21.90	24.47	32.84	221.84	0.17	0.00			
40	5,473	5.20	52.40	5470.36	-19.26	-15.27	19.26	24.57	218.41	0.15	0.11			
41	5,567	4.90	51.70	5563.99	-14.17	-8.74	14.17	16.65	211.68	0.33	-0.32			
42	5,661	6.10	47.20	5657.56	-8.29	-1.93	8.29	8.51	193.09	1.36	1.28			
43	5,755	5.80	45.00	5751.05	-1.53	5.10	1.53	5.32	106.75	0.40	-0.32			
44	5,849	5.50	45.30	5844.60	4.99	11.66	-4.99	12.68	66.81	0.32	-0.32			
45	5,943	5.60	45.80	5938.16	11.36	18.15	-11.36	21.41	57.96	0.12	0.11			
46	6,037	6.10	43.90	6031.67	18.16	24.90	-18.16	30.81	53.90	0.57	0.53			
47	6,131	5.90	43.20	6125.15	25.28	31.67	-25.28	40.52	51.41	0.23	-0.21			
48	6,225	5.70	47.90	6218.67	31.93	38.44	-31.93	49.97	50.29	0.55	-0.21			
49	6,319	5.40	45.40	6312.23	38.16	45.05	-38.16	59.04	49.73	0.41	-0.32			
50	6,413	5.20	46.60	6405.83	44.20	51.30	-44.20	67.71	49.25	0.24	-0.21			
51	6,507	4.80	45.10	6499.47	49.90	57.18	-49.90	75.89	48.89	0.45	-0.43			
52	6,601	5.00	46.60	6593.13	55.49	62.94	-55.49	83.91	48.60	0.25	0.21			
53	6,695	5.30	46.20	6686.75	61.31	69.05	-61.31	92.34	48.40	0.32	0.32			
54	6,789	6.20	49.00	6780.27	67.64	76.01	-67.64	101.75	48.33	1.00	0.96			
55	6,883	6.00	50.50	6873.74	74.10	83.64	-74.10	111.74	48.46	0.27	-0.21			
56	6,977	5.50	50.60	6967.27	80.08	90.91	-80.08	121.15	48.62	0.53	-0.53			
57	7,071	5.40	51.30	7060.84	85.71	97.84	-85.71	130.07	48.78	0.13	-0.11			
58	7,165	5.00	50.50	7154.46	91.08	104.45	-91.08	138.58	48.91	0.43	-0.43			
59	7,259	4.80	46.10	7248.11	96.41	110.45	-96.41	146.61	48.88	0.45	-0.21			
60	7,353	4.90	46.60	7341.78	101.90	116.20	-101.90	154.55	48.75	0.12	0.11			
61	7,447	5.70	52.40	7435.37	107.50	122.81	-107.50	163.22	48.80	1.02	0.85			
62	7,541	5.40	52.50	7528.93	113.04	130.02	-113.04	172.29	49.00	0.32	-0.32			
63	7,635	5.10	53.80	7622.54	118.20	136.90	-118.20	180.87	49.19	0.34	-0.32			
64	7,729	5.10	50.60	7716.17	123.32	143.50	-123.32	189.21	49.32	0.30	0.00			
65	7,823	5.40	53.20	7809.77	128.63	150.27	-128.63	197.80	49.44	0.41	0.32			
66	7,917	6.20	53.80	7903.29	134.27	157.91	-134.27	207.28	49.63	0.85	0.85			
67	8,011	6.30	55.70	7996.73	140.18	166.27	-140.18	217.47	49.87	0.24	0.11			



SURVEY CALCULATION PROGRAM

7/10/17 10:54

V09.04.02

Company:	Devon Energy Production Company,LP
Well Name:	Rebel 20 FED 8H
Location:	Lea County, NM
Rig:	Cactus #126
Job Number:	DDMO-170523
API #:	30-025-43159

Magnetic Declination: 6.74 REFERENCED TO GRID NORTH

Vertical Section Azimuth: 180.00 Proposed Direction: 180.00

Survey Calculation Method: Minimum Curvature

PTB:	MD		INC		AZM		TVD		N/S		E/W		VS	
	15,630		90.6		180.7		10786.56		-4829.6		234.14		4829.6	
#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure		DLS/ 100	BUR/ 100'			
68	8,104	6.00	56.70	8089.20	145.72	174.54	-145.72	227.38	50.14	0.34	-0.32			
69	8,198	6.10	53.90	8182.67	151.36	182.69	-151.36	237.24	50.36	0.33	0.11			
70	8,293	5.70	54.00	8277.17	157.11	190.58	-157.11	246.99	50.50	0.42	-0.42			
71	8,386	5.40	53.80	8369.73	162.41	197.85	-162.41	255.97	50.62	0.32	-0.32			
72	8,481	5.00	53.40	8464.34	167.52	204.78	-167.52	264.57	50.72	0.42	-0.42			
73	8,575	4.30	49.10	8558.03	172.27	210.73	-172.27	272.18	50.74	0.83	-0.74			
74	8,669	3.50	45.20	8651.82	176.59	215.43	-176.59	278.56	50.66	0.90	-0.85			
75	8,763	3.10	40.70	8745.66	180.54	219.13	-180.54	283.92	50.51	0.51	-0.43			
76	8,857	2.60	39.50	8839.54	184.12	222.14	-184.12	288.52	50.35	0.54	-0.53			
77	8,951	2.10	42.20	8933.46	187.04	224.65	-187.04	292.32	50.22	0.54	-0.53			
78	9,045	2.60	35.90	9027.38	190.04	227.06	-190.04	296.09	50.07	0.60	0.53			
79	9,139	2.20	28.10	9121.30	193.36	229.16	-193.36	299.84	49.84	0.55	-0.43			
80	9,233	2.20	13.90	9215.23	196.70	230.44	-196.70	302.98	49.52	0.58	0.00			
81	9,327	2.20	1.70	9309.16	200.26	230.93	-200.26	305.66	49.07	0.50	0.00			
82	9,421	2.00	348.40	9403.10	203.67	230.65	-203.67	307.70	48.56	0.56	-0.21			
83	9,515	1.50	354.30	9497.06	206.50	230.20	-206.50	309.25	48.11	0.56	-0.53			
84	9,609	1.60	355.20	9591.02	209.03	229.97	-209.03	310.77	47.73	0.11	0.11			
85	9,703	1.60	340.50	9684.99	211.57	229.42	-211.57	312.09	47.32	0.44	0.00			
86	9,797	1.40	344.90	9778.96	213.92	228.68	-213.92	313.14	46.91	0.25	-0.21			
87	9,891	1.20	350.10	9872.93	216.00	228.22	-216.00	314.23	46.58	0.25	-0.21			
88	9,985	1.10	344.00	9966.91	217.83	227.80	-217.83	315.19	46.28	0.17	-0.11			
89	10,079	1.10	325.30	10060.90	219.44	227.04	-219.44	315.75	45.97	0.38	0.00			
90	10,173	1.20	305.60	10154.88	220.76	225.72	-220.76	315.73	45.64	0.43	0.11			
91	10,268	1.70	221.30	10249.85	220.28	223.98	-220.28	314.15	45.48	2.09	0.53			
92	10,362	11.10	188.20	10343.18	210.25	221.77	-210.25	305.59	46.53	10.34	10.00			
93	10,412	14.80	189.90	10391.90	199.19	219.98	-199.19	296.76	47.84	7.44	7.40			
94	10,456	17.80	188.80	10434.13	187.01	217.99	-187.01	287.21	49.37	6.85	6.82			
95	10,488	20.60	188.90	10464.34	176.61	216.37	-176.61	279.29	50.78	8.75	8.75			
96	10,519	23.80	190.10	10493.04	165.06	214.42	-165.06	270.60	52.41	10.43	10.32			
97	10,551	26.30	189.00	10522.03	151.70	212.18	-151.70	260.83	54.44	7.95	7.81			
98	10,614	34.10	186.90	10576.44	120.33	207.87	-120.33	240.19	59.93	12.49	12.38			
99	10,646	38.30	186.10	10602.25	101.56	205.74	-101.56	229.44	63.73	13.21	13.13			
100	10,696	45.20	182.80	10639.54	68.39	203.22	-68.39	214.42	71.40	14.48	13.80			
101	10,740	51.90	179.20	10668.65	35.44	202.70	-35.44	205.78	80.08	16.41	15.23			



SURVEY CALCULATION PROGRAM

7/10/17 10:54

Company:		Devon Energy Production Company,LP												
Well Name:		Rebel 20 FED 8H												
Location:		Lea County, NM												
Rig:		Cactus #126					Magnetic Declination:		6.74		REFERENCED TO GRID NORTH			
Job Number:		DDMO-170523												
API #:		30-025-43159												
Vertical Section Azimuth:					180.00					Proposed Direction:		180.00		
Survey Calculation Method:					Minimum Curvature									
PTB:	MD		INC		AZM		TVD		N/S		E/W		VS	
	15,630		90.6		180.7		10786.56		-4829.6		234.14		4829.6	
#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure		Azm	DLS/ 100	BUR/ 100'		
102	10,790	58.50	177.20	10697.18	-5.57	204.02	5.57	204.09	91.56	13.60	13.20			
103	10,834	63.80	177.30	10718.40	-44.05	205.87	44.05	210.53	102.08	12.05	12.05			
104	10,884	70.50	177.20	10737.80	-90.04	208.08	90.04	226.72	113.40	13.40	13.40			
105	10,930	77.70	176.90	10750.40	-134.20	210.35	134.20	249.51	122.54	15.66	15.65			
106	10,953	82.50	177.00	10754.35	-156.81	211.56	156.81	263.34	126.55	20.87	20.87			
107	11,047	85.30	177.10	10764.34	-250.15	216.37	250.15	330.74	139.14	2.98	2.98			
108	11,141	85.10	177.40	10772.21	-343.71	220.86	343.71	408.56	147.28	0.38	-0.21			
109	11,235	85.30	177.90	10780.07	-437.30	224.70	437.30	491.66	152.80	0.57	0.21			
110	11,329	84.90	177.70	10788.10	-530.89	228.30	530.89	577.90	156.73	0.48	-0.43			
111	11,423	85.00	176.20	10796.38	-624.39	233.28	624.39	666.54	159.51	1.59	0.11			
112	11,517	86.10	177.70	10803.67	-717.97	238.27	717.97	756.47	161.64	1.97	1.17			
113	11,611	87.90	178.20	10808.59	-811.78	241.62	811.78	846.97	163.42	1.99	1.91			
114	11,705	89.30	178.20	10810.88	-905.70	244.58	905.70	938.14	164.89	1.49	1.49			
115	11,799	90.00	179.00	10811.46	-999.67	246.87	999.67	1029.70	166.13	1.13	0.74			
116	11,893	90.10	178.90	10811.38	-1093.65	248.59	1093.65	1121.55	167.19	0.15	0.11			
117	11,988	90.90	179.50	10810.55	-1188.64	249.92	1188.64	1214.63	168.13	1.05	0.84			
118	12,081	91.50	179.90	10808.60	-1281.62	250.41	1281.62	1305.85	168.94	0.78	0.65			
119	12,175	89.80	180.60	10807.53	-1375.60	250.00	1375.60	1398.14	169.70	1.96	-1.81			
120	12,269	89.50	180.50	10808.11	-1469.60	249.09	1469.60	1490.56	170.38	0.34	-0.32			
121	12,363	89.70	180.90	10808.76	-1563.59	247.95	1563.59	1583.13	170.99	0.48	0.21			
122	12,457	89.70	180.90	10809.26	-1657.58	246.47	1657.58	1675.80	171.54	0.00	0.00			
123	12,551	90.10	181.40	10809.42	-1751.56	244.58	1751.56	1768.55	172.05	0.68	0.43			
124	12,646	90.70	181.90	10808.76	-1846.51	241.85	1846.51	1862.29	172.54	0.82	0.63			
125	12,740	91.00	181.80	10807.36	-1940.45	238.81	1940.45	1955.10	172.98	0.34	0.32			
126	12,834	90.30	181.20	10806.30	-2034.42	236.35	2034.42	2048.10	173.37	0.98	-0.74			
127	12,928	91.50	181.50	10804.82	-2128.38	234.14	2128.38	2141.22	173.72	1.32	1.28			
128	13,022	90.30	181.20	10803.34	-2222.34	231.92	2222.34	2234.41	174.04	1.32	-1.28			
129	13,116	88.10	181.00	10804.66	-2316.30	230.12	2316.30	2327.71	174.33	2.35	-2.34			
130	13,210	88.40	181.20	10807.53	-2410.24	228.32	2410.24	2421.03	174.59	0.38	0.32			
131	13,304	88.00	180.30	10810.48	-2504.19	227.09	2504.19	2514.46	174.82	1.05	-0.43			
132	13,398	87.90	179.80	10813.84	-2598.13	227.01	2598.13	2608.03	175.01	0.54	-0.11			
133	13,492	88.60	179.50	10816.71	-2692.08	227.58	2692.08	2701.68	175.17	0.81	0.74			
134	13,586	89.90	179.00	10817.94	-2786.06	228.81	2786.06	2795.44	175.31	1.48	1.38			
135	13,680	90.20	178.90	10817.86	-2880.05	230.53	2880.05	2889.26	175.42	0.34	0.32			



SURVEY CALCULATION PROGRAM

7/10/17 10:54

V00 04.02

Company:	Devon Energy Production Company,LP
Well Name:	Rebel 20 FED 8H
Location:	Lea County, NM
Rig:	Cactus #126
Job Number:	DDMO-170523
API #:	30-025-43159

Magnetic Declination: 6.74

REFERENCED TO GRID NORTH

Vertical Section Azimuth: 180.00 Proposed Direction: 180.00

Survey Calculation Method: Minimum Curvature

PTB:	MD		INC		AZM	TVD	N/S	E/W		VS	
	15,630		90.6		180.7	10786.56	-4829.6	234.14		4829.6	
#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure Distance Azm		DLS/ 100	BUR/ 100'
136	13,774	91.00	179.30	10816.88	-2974.03	232.01	2974.03	2983.06	175.54	0.95	0.85
137	13,868	91.20	179.50	10815.07	-3068.01	232.99	3068.01	3076.84	175.66	0.30	0.21
138	13,962	91.90	179.90	10812.53	-3161.97	233.48	3161.97	3170.58	175.78	0.86	0.74
139	14,056	90.20	178.80	10810.81	-3255.94	234.55	3255.94	3264.38	175.88	2.15	-1.81
140	14,150	90.30	179.00	10810.40	-3349.92	236.36	3349.92	3358.25	175.96	0.24	0.11
141	14,245	90.80	179.20	10809.48	-3444.91	237.85	3444.91	3453.11	176.05	0.57	0.53
142	14,339	91.20	179.50	10807.84	-3538.89	238.91	3538.89	3546.94	176.14	0.53	0.43
143	14,433	91.60	179.50	10805.55	-3632.86	239.73	3632.86	3640.76	176.22	0.43	0.43
144	14,527	92.00	179.60	10802.60	-3726.81	240.47	3726.81	3734.56	176.31	0.44	0.43
145	14,621	90.40	180.00	10800.63	-3820.78	240.80	3820.78	3828.36	176.39	1.75	-1.70
146	14,715	90.60	179.80	10799.81	-3914.78	240.96	3914.78	3922.19	176.48	0.30	0.21
147	14,809	91.20	180.60	10798.33	-4008.76	240.64	4008.76	4015.98	176.56	1.06	0.64
148	14,903	91.50	179.90	10796.12	-4102.74	240.23	4102.74	4109.76	176.65	0.81	0.32
149	14,997	92.20	180.30	10793.08	-4196.69	240.06	4196.69	4203.55	176.73	0.86	0.74
150	15,091	90.50	180.40	10790.87	-4290.66	239.49	4290.66	4297.33	176.81	1.81	-1.81
151	15,185	90.70	180.60	10789.88	-4384.65	238.67	4384.65	4391.14	176.88	0.30	0.21
152	15,279	91.20	180.50	10788.32	-4478.63	237.77	4478.63	4484.94	176.96	0.54	0.53
153	15,373	89.70	180.50	10787.58	-4572.62	236.95	4572.62	4578.75	177.03	1.60	-1.60
154	15,468	90.10	180.60	10787.75	-4667.62	236.03	4667.62	4673.58	177.11	0.43	0.42
155	15,562	90.50	180.70	10787.26	-4761.61	234.97	4761.61	4767.40	177.17	0.44	0.43
156	15,576	90.60	180.70	10787.12	-4775.61	234.80	4775.61	4781.37	177.19	0.71	0.71