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MS Directional Survey Data Certification

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JUL 19 2019

DISTRICT II-ARTESIA O.C.D.

MS Directional Job Number: MSMO-63723
Survey Type: MWD
Operating Company: Murchison Oil & Gas, LLC
Well Name & Number: Rock Ridge Federal BSS #004H
Location: Eddy County, NM
API Number: 30-015-45730
Tie In Depth: Surface
Surveyed Depths: 137' – 12,987' MD
Projected TD Survey: 13,060' MD
Dates Performed: 03/24/2019 – 04/09/2019

I certify that the data is true, correct and complete and within the limitations of the tool set forth by MS Directional; 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 Directional.

Digitally signed by:

MWD Surveyor Name: Sam Finley

Date: 06-25-2019

Email: Samuel.Finley@msdir.com

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Company:		Murchison Oil & Gas, LLC									
Well Name:		Rock Ridge Federal BSS #004H									
Location:		Eddy County, NM									
Rig:		Latshaw #7				Magnetic Declination:		6.87		REFERENCED TO GRID NORTH	
Job Number:		MSMO-63723									
API #:		30-015-45730									
Vertical Section Azimuth:				269.82		Proposed Direction:		269.82			
Survey Calculation Method:				Minimum Curvature							
PTB:	MD		INC		AZM	TVD	N/S	E/W		VS	
	13,060		93.5		270	8406.06	-25.23	-4594.48		4594.54	
#	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	137	1.30	320.60	136.99	1.20	-0.99	0.98	1.55	320.60	0.95	0.95
2	227	1.30	157.60	226.98	1.05	-1.25	1.24	1.63	310.02	2.86	0.00
3	257	1.20	158.70	256.97	0.44	-1.00	1.00	1.09	293.65	0.34	-0.33
4	337	0.80	139.90	336.96	-0.77	-0.34	0.34	0.84	203.70	0.64	-0.50
5	435	0.80	122.70	434.95	-1.66	0.68	-0.67	1.80	157.79	0.24	0.00
6	525	0.60	130.70	524.94	-2.31	1.56	-1.56	2.79	145.87	0.25	-0.22
7	614	1.00	130.40	613.94	-3.12	2.51	-2.50	4.00	141.15	0.45	0.45
8	703	0.80	125.30	702.92	-3.98	3.61	-3.60	5.37	137.79	0.24	-0.22
9	793	1.10	120.00	792.91	-4.77	4.87	-4.85	6.82	134.43	0.35	0.33
10	883	1.00	113.90	882.90	-5.52	6.34	-6.32	8.40	131.08	0.17	-0.11
11	973	0.90	122.50	972.88	-6.22	7.65	-7.63	9.86	129.12	0.19	-0.11
12	1,067	1.00	109.50	1066.87	-6.89	9.05	-9.02	11.37	127.31	0.25	0.11
13	1,161	0.50	197.50	1160.87	-7.56	9.69	-9.67	12.29	127.94	1.17	-0.53
14	1,254	1.10	221.60	1253.86	-8.61	8.98	-8.95	12.44	133.80	0.73	0.65
15	1,349	1.10	214.00	1348.84	-10.05	7.86	-7.83	12.76	141.95	0.15	0.00
16	1,444	2.80	142.60	1443.79	-12.65	8.76	-8.72	15.39	145.28	2.80	1.79
17	1,538	3.60	140.60	1537.64	-16.75	12.03	-11.98	20.63	144.31	0.86	0.85
18	1,633	2.50	131.70	1632.51	-20.44	15.47	-15.41	25.63	142.87	1.26	-1.16
19	1,725	2.60	122.80	1724.42	-22.90	18.72	-18.65	29.58	140.73	0.44	0.11
20	1,820	2.80	131.70	1819.31	-25.61	22.27	-22.19	33.94	139.00	0.49	0.21
21	1,915	3.10	135.50	1914.19	-28.99	25.80	-25.71	38.81	138.33	0.38	0.32
22	2,009	3.50	117.30	2008.03	-32.12	30.13	-30.03	44.04	136.83	1.19	0.43
23	2,103	4.30	113.60	2101.81	-34.84	35.91	-35.80	50.04	134.14	0.89	0.85
24	2,198	3.70	118.90	2196.58	-37.75	41.86	-41.74	56.37	132.05	0.74	-0.63
25	2,291	3.70	124.00	2289.39	-40.88	46.97	-46.84	62.27	131.03	0.35	0.00
26	2,386	4.00	127.50	2384.18	-44.61	52.14	-52.00	68.62	130.55	0.40	0.32
27	2,480	4.00	122.50	2477.95	-48.37	57.51	-57.36	75.15	130.07	0.37	0.00
28	2,574	3.00	112.60	2571.77	-51.08	62.55	-62.39	80.75	129.24	1.24	-1.06
29	2,667	2.80	102.30	2664.65	-52.49	67.01	-66.85	85.13	128.07	0.60	-0.22
30	2,728	3.10	104.20	2725.57	-53.22	70.07	-69.90	87.99	127.22	0.52	0.49
31	2,832	3.00	105.80	2829.42	-54.65	75.41	-75.24	93.13	125.93	0.13	-0.10
32	2,927	3.10	110.80	2924.29	-56.24	80.21	-80.03	97.96	125.04	0.30	0.11
33	3,021	3.10	108.00	3018.15	-57.92	85.00	-84.82	102.86	124.27	0.16	0.00

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Job Number:		MSMO-63723												
API #:		30-015-45730												
Vertical Section Azimuth:				269.82		Proposed Direction:		269.82						
Survey Calculation Method:				Minimum Curvature										
PTB:	MD		INC		AZM		TVD		N/S		E/W		VS	
	13,060		93.5		270		8406.06		-25.23		-4594.48		4594.54	
#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure Distance		Azm	DLS/ 100	BUR/ 100'		
34	3,115	3.20	111.70	3112.01	-59.68	89.85	-89.67	107.87	123.59	0.24	0.11			
35	3,209	3.20	109.10	3205.86	-61.51	94.77	-94.58	112.98	122.98	0.15	0.00			
36	3,303	3.10	109.50	3299.72	-63.22	99.65	-99.45	118.01	122.39	0.11	-0.11			
37	3,398	3.30	112.40	3394.57	-65.11	104.59	-104.39	123.21	121.90	0.27	0.21			
38	3,493	3.20	109.30	3489.42	-67.03	109.63	-109.41	128.50	121.44	0.21	-0.11			
39	3,585	3.20	108.10	3581.28	-68.68	114.49	-114.27	133.51	120.96	0.07	0.00			
40	3,680	3.00	107.70	3676.14	-70.26	119.38	-119.16	138.52	120.48	0.21	-0.21			
41	3,774	3.90	127.50	3769.97	-72.95	124.26	-124.03	144.09	120.42	1.57	0.96			
42	3,868	4.00	128.80	3863.75	-76.95	129.35	-129.11	150.51	120.75	0.14	0.11			
43	3,963	4.10	131.50	3958.51	-81.28	134.47	-134.22	157.13	121.15	0.23	0.11			
44	4,057	3.30	108.40	4052.32	-84.36	139.56	-139.29	163.08	121.15	1.78	-0.85			
45	4,152	3.30	105.00	4147.16	-85.93	144.79	-144.52	168.37	120.69	0.21	0.00			
46	4,246	3.10	103.80	4241.01	-87.24	149.88	-149.60	173.42	120.20	0.22	-0.21			
47	4,341	2.90	104.30	4335.88	-88.44	154.70	-154.42	178.20	119.76	0.21	-0.21			
48	4,435	3.40	120.30	4429.74	-90.44	159.41	-159.13	183.28	119.57	1.07	0.53			
49	4,529	3.50	124.80	4523.57	-93.48	164.17	-163.88	188.92	119.66	0.31	0.11			
50	4,623	3.50	124.50	4617.40	-96.74	168.89	-168.59	194.64	119.80	0.02	0.00			
51	4,718	3.40	121.90	4712.23	-99.88	173.68	-173.36	200.35	119.90	0.20	-0.11			
52	4,812	3.40	124.50	4806.06	-102.93	178.34	-178.02	205.91	119.99	0.16	0.00			
53	4,905	2.90	122.30	4898.92	-105.75	182.60	-182.27	211.01	120.08	0.55	-0.54			
54	5,000	2.40	128.20	4993.82	-108.26	186.20	-185.85	215.38	120.18	0.60	-0.53			
55	5,094	3.50	122.60	5087.69	-111.02	190.16	-189.81	220.20	120.28	1.21	1.17			
56	5,188	3.70	126.30	5181.51	-114.37	195.02	-194.66	226.08	120.39	0.33	0.21			
57	5,282	3.40	121.90	5275.33	-117.63	199.83	-199.46	231.88	120.48	0.43	-0.32			
58	5,376	3.00	118.80	5369.18	-120.29	204.35	-203.97	237.13	120.48	0.46	-0.43			
59	5,471	3.80	114.70	5464.01	-122.81	209.39	-209.01	242.75	120.39	0.88	0.84			
60	5,565	4.00	115.20	5557.79	-125.50	215.19	-214.79	249.11	120.25	0.22	0.21			
61	5,660	3.80	114.00	5652.57	-128.19	221.06	-220.66	255.54	120.11	0.23	-0.21			
62	5,754	3.70	116.20	5746.37	-130.80	226.63	-226.22	261.67	119.99	0.19	-0.11			
63	5,848	3.50	111.40	5840.19	-133.19	232.02	-231.60	267.53	119.86	0.38	-0.21			
64	5,942	3.50	113.10	5934.01	-135.36	237.33	-236.91	273.22	119.70	0.11	0.00			
65	6,036	2.30	118.80	6027.89	-137.39	241.63	-241.19	277.96	119.62	1.31	-1.28			
66	6,130	2.40	111.00	6121.81	-139.01	245.12	-244.68	281.79	119.56	0.36	0.11			
67	6,225	0.70	121.50	6216.77	-140.02	247.47	-247.03	284.34	119.50	1.81	-1.79			

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	13,060		93.5		270		8406.06	-25.23	-4594.48		4594.54		
#	Depth Feet	Inc Degrees	Az Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure Distance Azm		DLS/ 100	BUR/ 100'		
68	6,318	0.90	130.50	6309.76	-140.79	248.51	-248.06	285.62 119.53		0.25	0.22		
69	6,413	0.70	135.40	6404.76	-141.69	249.48	-249.04	286.91 119.59		0.22	-0.21		
70	6,507	1.00	113.70	6498.74	-142.43	250.64	-250.19	288.28 119.61		0.46	0.32		
71	6,601	0.50	100.60	6592.74	-142.84	251.79	-251.34	289.48 119.57		0.56	-0.53		
72	6,696	0.30	130.40	6687.73	-143.07	252.39	-251.94	290.12 119.55		0.30	-0.21		
73	6,791	0.40	102.10	6782.73	-143.30	252.90	-252.45	290.68 119.54		0.21	0.11		
74	6,885	0.10	214.10	6876.73	-143.44	253.18	-252.72	290.99 119.53		0.48	-0.32		
75	6,979	0.70	318.70	6970.73	-143.08	252.75	-252.30	290.44 119.51		0.78	0.64		
76	7,073	1.00	302.10	7064.72	-142.21	251.68	-251.23	289.08 119.47		0.41	0.32		
77	7,166	1.40	300.20	7157.70	-141.21	250.01	-249.56	287.13 119.46		0.43	0.43		
78	7,261	1.30	302.20	7252.67	-140.05	248.09	-247.65	284.89 119.44		0.12	-0.11		
79	7,356	0.60	282.20	7347.66	-139.37	246.69	-246.26	283.34 119.46		0.80	-0.74		
80	7,451	0.50	249.80	7442.65	-139.41	245.82	-245.38	282.60 119.56		0.34	-0.11		
81	7,545	0.60	240.50	7536.65	-139.79	245.01	-244.57	282.08 119.71		0.14	0.11		
82	7,639	0.80	256.30	7630.64	-140.19	243.94	-243.50	281.35 119.89		0.29	0.21		
83	7,734	1.00	267.90	7725.63	-140.38	242.47	-242.03	280.17 120.07		0.28	0.21		
84	7,828	1.30	269.70	7819.61	-140.41	240.58	-240.14	278.56 120.27		0.32	0.32		
85	7,900	2.40	289.30	7891.57	-139.92	238.34	-237.90	276.38 120.42		1.74	1.53		
86	7,948	8.90	294.70	7939.32	-138.03	234.02	-233.58	271.69 120.53		13.57	13.54		
87	7,996	15.20	300.20	7986.24	-133.31	225.19	-224.77	261.70 120.62		13.33	13.13		
88	8,043	19.40	301.00	8031.10	-126.19	213.17	-212.78	247.72 120.62		8.95	8.94		
89	8,090	23.90	298.80	8074.77	-117.58	198.13	-197.76	230.39 120.69		9.73	9.57		
90	8,138	28.20	295.90	8117.89	-107.93	179.40	-179.06	209.36 121.03		9.34	8.96		
91	8,185	31.90	294.90	8158.57	-97.85	158.14	-157.83	185.96 121.75		7.94	7.87		
92	8,232	35.90	293.10	8197.57	-87.21	134.19	-133.91	160.04 123.02		8.77	8.51		
93	8,279	40.00	289.00	8234.63	-76.88	107.22	-106.97	131.93 125.64		10.24	8.72		
94	8,326	44.30	285.00	8269.47	-67.71	77.06	-76.85	102.58 131.30		10.78	9.15		
95	8,373	48.20	283.70	8301.97	-59.31	44.17	-43.99	73.95 143.32		8.53	8.30		
96	8,421	52.60	285.50	8332.56	-49.97	8.40	-8.24	50.67 170.46		9.61	9.17		
97	8,468	57.20	285.70	8359.58	-39.63	-28.63	28.75	48.89 215.84		9.79	9.79		
98	8,516	60.90	283.80	8384.26	-29.17	-68.43	68.52	74.39 246.92		8.42	7.71		
99	8,562	64.30	280.00	8405.43	-20.77	-108.38	108.45	110.35 259.15		10.41	7.39		
100	8,610	68.20	276.60	8424.76	-14.45	-151.84	151.89	152.53 264.56		10.39	8.13		
101	8,657	72.80	274.40	8440.45	-10.22	-195.93	195.96	196.19 267.02		10.74	9.79		

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	13,060		93.5		270		8406.06		-25.23		-4594.48		4594.54	
#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure Distance Azm		DLS/ 100	BUR/ 100'			
102	8,705	78.40	272.50	8452.38	-7.43	-242.31	242.34	242.43	268.24	12.28	11.67			
103	8,751	82.20	271.60	8460.13	-5.81	-287.62	287.64	287.68	268.84	8.48	8.26			
104	8,798	85.60	270.50	8465.13	-4.95	-334.34	334.35	334.37	269.15	7.60	7.23			
105	8,845	86.00	270.30	8468.57	-4.63	-381.21	381.22	381.24	269.30	0.95	0.85			
106	8,940	89.70	269.40	8472.13	-4.88	-476.13	476.14	476.15	269.41	4.01	3.89			
107	9,033	90.70	268.90	8471.81	-6.26	-569.11	569.13	569.15	269.37	1.20	1.08			
108	9,127	91.70	267.90	8469.84	-8.88	-663.05	663.08	663.11	269.23	1.50	1.06			
109	9,221	90.30	267.00	8468.20	-13.06	-756.94	756.98	757.06	269.01	1.77	-1.49			
110	9,314	89.90	268.10	8468.04	-17.04	-849.86	849.91	850.03	268.85	1.26	-0.43			
111	9,408	90.70	267.60	8467.54	-20.56	-943.79	943.85	944.01	268.75	1.00	0.85			
112	9,503	89.70	268.30	8467.21	-23.96	-1038.72	1038.79	1039.00	268.68	1.28	-1.05			
113	9,597	89.00	270.20	8468.28	-25.19	-1132.71	1132.78	1132.99	268.73	2.15	-0.74			
114	9,691	89.80	270.70	8469.26	-24.45	-1226.70	1226.77	1226.94	268.86	1.00	0.85			
115	9,785	90.60	270.30	8468.94	-23.63	-1320.69	1320.76	1320.90	268.97	0.95	0.85			
116	9,878	91.50	270.10	8467.23	-23.31	-1413.67	1413.74	1413.87	269.06	0.99	0.97			
117	9,973	90.10	270.00	8465.91	-23.23	-1508.66	1508.73	1508.84	269.12	1.48	-1.47			
118	10,067	90.70	270.20	8465.25	-23.06	-1602.66	1602.72	1602.83	269.18	0.67	0.64			
119	10,161	91.70	270.30	8463.28	-22.65	-1696.64	1696.70	1696.79	269.24	1.07	1.06			
120	10,255	91.40	270.00	8460.74	-22.41	-1790.60	1790.66	1790.74	269.28	0.45	-0.32			
121	10,349	92.20	269.70	8457.79	-22.65	-1884.55	1884.62	1884.69	269.31	0.91	0.85			
122	10,444	90.40	269.70	8455.63	-23.15	-1979.52	1979.59	1979.66	269.33	1.89	-1.89			
123	10,537	90.70	269.80	8454.74	-23.55	-2072.52	2072.58	2072.65	269.35	0.34	0.32			
124	10,631	91.40	269.70	8453.01	-23.96	-2166.50	2166.57	2166.63	269.37	0.75	0.74			
125	10,725	89.70	271.00	8452.11	-23.39	-2260.49	2260.55	2260.61	269.41	2.28	-1.81			
126	10,819	90.00	271.20	8452.36	-21.59	-2354.47	2354.53	2354.57	269.47	0.38	0.32			
127	10,913	90.90	271.10	8451.62	-19.70	-2448.45	2448.50	2448.53	269.54	0.96	0.96			
128	11,006	91.90	271.30	8449.35	-17.75	-2541.40	2541.44	2541.46	269.60	1.10	1.08			
129	11,100	91.10	269.80	8446.89	-16.85	-2635.36	2635.40	2635.41	269.63	1.81	-0.85			
130	11,193	91.40	269.40	8444.86	-17.50	-2728.34	2728.38	2728.39	269.63	0.54	0.32			
131	11,288	92.40	269.50	8441.71	-18.41	-2823.28	2823.32	2823.34	269.63	1.06	1.05			
132	11,383	92.00	268.30	8438.06	-20.23	-2918.19	2918.24	2918.26	269.60	1.33	-0.42			
133	11,477	91.20	269.80	8435.44	-21.79	-3012.14	3012.19	3012.21	269.59	1.81	-0.85			
134	11,572	90.80	270.00	8433.78	-21.96	-3107.12	3107.17	3107.20	269.60	0.47	-0.42			
135	11,667	91.40	269.40	8431.96	-22.45	-3202.10	3202.16	3202.18	269.60	0.89	0.63			

Company:	Murchison Oil & Gas, LLC		
Well Name:	Rock Ridge Federal BSS #004H		
Location:	Eddy County, NM		
Rig:	Latshaw #7	Magnetic Declination:	6.87
Job Number:	MSMO-63723		
API #:	30-015-45730		

Vertical Section Azimuth:	269.82	Proposed Direction:	269.82
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Survey Calculation Method:	Minimum Curvature
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PTB:	MD	INC	AZM	TVD	N/S	E/W	VS
	13,060	93.5	270	8406.06	-25.23	-4594.48	4594.54

#	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	11,761	90.00	268.80	8430.81	-23.93	-3296.08	3296.14	3296.17	269.58	1.62	-1.49
137	11,855	90.50	268.90	8430.40	-25.82	-3390.06	3390.12	3390.16	269.56	0.54	0.53
138	11,949	91.40	268.60	8428.84	-27.87	-3484.02	3484.09	3484.13	269.54	1.01	0.96
139	12,043	90.00	268.30	8427.69	-30.41	-3577.98	3578.06	3578.11	269.51	1.52	-1.49
140	12,138	89.40	269.90	8428.19	-31.90	-3672.96	3673.05	3673.10	269.50	1.80	-0.63
141	12,232	90.30	270.00	8428.43	-31.98	-3766.96	3767.04	3767.10	269.51	0.96	0.96
142	12,327	91.20	269.70	8427.19	-32.23	-3861.95	3862.03	3862.09	269.52	1.00	0.95
143	12,421	90.30	270.50	8425.96	-32.07	-3955.94	3956.02	3956.07	269.54	1.28	-0.96
144	12,515	90.90	270.40	8424.98	-31.33	-4049.93	4050.01	4050.05	269.56	0.65	0.64
145	12,610	91.90	270.10	8422.65	-30.92	-4144.90	4144.98	4145.02	269.57	1.10	1.05
146	12,704	90.70	271.50	8420.52	-29.60	-4238.87	4238.94	4238.97	269.60	1.96	-1.28
147	12,799	91.50	271.10	8418.70	-27.45	-4333.82	4333.89	4333.91	269.64	0.94	0.84
148	12,894	92.50	270.80	8415.38	-25.87	-4428.75	4428.81	4428.83	269.67	1.10	1.05
149	12,987	93.50	270.00	8410.52	-25.23	-4521.62	4521.68	4521.69	269.68	1.38	1.08
PTB:	13,060	93.50	270.00	8406.06	-25.23	-4594.48	4594.54	4594.55	269.69	0.00	0.00