



7821 Will Rogers Blvd.
Fort Worth, Texas 76140
817.568.1038 (office)
817.568.1499 (fax)
www.msdir.com

October 2, 2019

The Railroad Commission of Texas
Oil & Gas Division
PO Box 12967
Austin, TX 78711-2967

Lime Rock Resources IV-A, LP
UL 10 Livingston, 3H (Permit No: 853626)
Survey: UL / Abstract: U312
Field: Fuhrman-Mascho
Andrews County, TX

API Number: 42-003-48092

Please find the attached survey performed on the above referenced well by MS Directional LLC;
Operator Number 592486. Other information required by your office is as follows:

Name of Surveyor	Drainhole Number	Surveyed Depths	Dates Performed	Type of Survey
Louis Orgeron	Original Wellbore	199' – 11,801'	08/16/19 – 09/09/19	MWD

If any other information is required, please contact the undersigned at the letterhead address and telephone number.

Sincerely,

Amber Greer
Regulatory Administrator

CONFIDENTIALITY NOTICE: This document contains MS Directional LLC's proprietary and confidential information and may not be copied, published, distributed or transmitted, in whole or in part, by any medium or in any form without MS Directional LLC's prior written consent. The information contained in this document is not to be used by or disclosed to any individuals other than those who need to know such information and who have been given notice that such information is proprietary and confidential.

V09.04.02

Company:		Lime Rock Resources IV-A, LP									
Well Name:		UL 10 Livingston 3H									
Location:		Andrews County, TX									
Rig:		HWD #12				Magnetic Declination:		6.29		REFERENCED TO GRID NORTH	
Job Number:		MSMO-69067									
API #:		42-003-48092									
Vertical Section Azimuth:				160.89		Proposed Direction:		160.89			
Survey Calculation Method:				Minimum Curvature							
PTB:	MD		INC		AZM	TVD	N/S	E/W		VS	
	11,858		92.4		163.7	4430.65	-7068.47	2461.74		7484.87	
#	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	199	0.20	294.00	199.00	0.14	-0.32	-0.24	0.35	294.00	0.10	0.10
2	380	0.30	279.00	380.00	0.34	-1.07	-0.68	1.13	287.76	0.07	0.06
3	565	0.30	309.70	565.00	0.73	-1.92	-1.32	2.06	290.74	0.09	0.00
4	748	0.20	217.40	747.99	0.78	-2.49	-1.55	2.61	287.44	0.20	-0.05
5	930	0.30	252.20	929.99	0.38	-3.13	-1.39	3.16	276.97	0.10	0.05
6	1,095	0.30	245.10	1094.99	0.07	-3.94	-1.35	3.94	271.01	0.02	0.00
7	1,273	0.30	243.10	1272.99	-0.34	-4.78	-1.24	4.79	265.96	0.01	0.00
8	1,452	0.40	272.70	1451.98	-0.52	-5.82	-1.41	5.84	264.89	0.11	0.06
9	1,564	0.40	274.50	1563.98	-0.47	-6.60	-1.71	6.61	265.92	0.01	0.00
10	1,693	0.80	232.10	1692.98	-0.99	-7.76	-1.61	7.82	262.73	0.44	0.31
11	1,865	0.90	216.30	1864.96	-2.82	-9.50	-0.45	9.91	253.50	0.15	0.06
12	2,036	1.10	77.70	2035.95	-3.55	-8.70	0.51	9.39	247.80	1.09	0.12
13	2,208	0.60	59.60	2207.93	-2.74	-6.31	0.53	6.88	246.51	0.33	-0.29
14	2,384	0.90	47.50	2383.91	-1.34	-4.49	-0.20	4.69	253.38	0.19	0.17
15	2,555	1.10	43.60	2554.88	0.76	-2.37	-1.49	2.49	287.68	0.12	0.12
16	2,728	0.40	176.10	2727.88	1.36	-1.18	-1.67	1.80	318.87	0.81	-0.40
17	2,899	0.50	195.50	2898.87	0.04	-1.34	-0.48	1.34	271.75	0.11	0.06
18	3,080	0.50	182.80	3079.86	-1.51	-1.59	0.90	2.19	226.54	0.06	0.00
19	3,252	0.30	203.20	3251.86	-2.67	-1.81	1.93	3.23	214.05	0.14	-0.12
20	3,424	0.30	211.70	3423.86	-3.47	-2.22	2.55	4.12	212.62	0.03	0.00
21	3,597	0.40	220.00	3596.85	-4.32	-2.85	3.15	5.17	213.40	0.06	0.06
22	3,771	0.40	199.90	3770.85	-5.35	-3.44	3.93	6.37	212.75	0.08	0.00
23	3,815	0.50	193.60	3814.85	-5.68	-3.54	4.21	6.70	211.92	0.25	0.23
24	3,858	3.60	163.40	3857.82	-7.16	-3.20	5.72	7.84	204.07	7.39	7.21
25	3,901	8.20	148.50	3900.58	-11.07	-1.21	10.07	11.14	186.24	11.19	10.70
26	3,944	12.80	134.90	3942.85	-17.05	3.77	17.35	17.46	167.53	12.08	10.70
27	3,988	17.80	130.30	3985.28	-24.85	12.36	27.52	27.75	153.56	11.69	11.36
28	4,033	22.00	129.00	4027.59	-34.61	24.16	40.61	42.20	145.08	9.38	9.33
29	4,077	24.90	129.50	4067.95	-45.69	37.71	55.52	59.24	140.46	6.61	6.59
30	4,124	27.20	130.00	4110.17	-58.89	53.58	73.18	79.61	137.70	4.92	4.89
31	4,166	30.10	129.70	4147.02	-71.79	69.04	90.43	99.60	136.12	6.91	6.90
32	4,210	33.90	125.70	4184.34	-86.00	87.50	109.91	122.69	134.50	9.89	8.64
33	4,256	38.10	122.30	4221.55	-101.08	109.93	131.50	149.33	132.60	10.11	9.13

V09.04.02

Company:		Lime Rock Resources IV-A, LP									
Well Name:		UL 10 Livingston 3H									
Location:		Andrews County, TX									
Rig:		HWD #12				Magnetic Declination:		6.29		REFERENCED TO GRID NORTH ▼	
Job Number:		MSMO-69067									
API #:		42-003-48092									
Vertical Section Azimuth:				160.89		Proposed Direction:		160.89			
Survey Calculation Method:				Minimum Curvature							
PTB:	MD		INC		AZM	TVD	N/S	E/W		VS	
	11,858		92.4		163.7	4430.65	-7068.47	2461.74		7484.87	
#	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	4,298	43.40	121.50	4253.35	-115.55	133.20	152.79	176.34	130.94	12.68	12.62
35	4,345	47.80	123.30	4286.23	-133.56	161.53	179.08	209.59	129.58	9.75	9.36
36	4,386	50.70	124.90	4312.99	-150.97	187.24	203.95	240.53	128.88	7.67	7.07
37	4,430	51.30	125.40	4340.68	-170.66	215.20	231.71	274.66	128.42	1.62	1.36
38	4,472	51.80	125.50	4366.80	-189.74	241.99	258.51	307.51	128.10	1.20	1.19
39	4,516	52.30	125.80	4393.86	-209.96	270.19	286.85	342.18	127.85	1.26	1.14
40	4,558	52.50	125.90	4419.48	-229.45	297.16	314.09	375.43	127.67	0.51	0.48
41	4,601	54.20	126.10	4445.15	-249.73	325.07	342.39	409.92	127.53	3.97	3.95
42	4,645	60.10	127.10	4469.01	-271.76	354.72	372.92	446.86	127.46	13.54	13.41
43	4,689	65.70	128.40	4489.04	-295.74	385.67	405.71	486.01	127.48	13.00	12.73
44	4,735	70.00	128.30	4506.38	-322.17	419.08	441.62	528.60	127.55	9.35	9.35
45	4,779	73.70	128.80	4520.09	-348.23	451.77	476.94	570.40	127.62	8.48	8.41
46	4,822	77.10	129.50	4530.92	-374.49	484.04	512.32	611.99	127.73	8.06	7.91
47	4,865	82.30	129.60	4538.61	-401.42	516.65	548.44	654.27	127.85	12.10	12.09
48	4,892	86.00	132.10	4541.36	-418.99	536.96	571.69	681.08	127.97	16.51	13.70
49	4,934	89.60	132.40	4542.97	-447.20	568.02	608.52	722.93	128.21	8.60	8.57
50	4,978	91.20	133.90	4542.67	-477.29	600.12	647.46	766.78	128.50	4.98	3.64
51	5,022	93.30	134.60	4540.94	-507.97	631.61	686.75	810.53	128.81	5.03	4.77
52	5,065	93.50	135.00	4538.39	-538.22	662.06	725.30	853.23	129.11	1.04	0.47
53	5,109	93.70	138.60	4535.63	-570.22	692.12	765.39	896.76	129.48	8.18	0.45
54	5,152	94.00	143.30	4532.74	-603.53	719.14	805.71	938.84	130.00	10.93	0.70
55	5,196	94.30	147.70	4529.55	-639.69	743.99	848.01	981.18	130.69	10.00	0.68
56	5,240	93.30	152.50	4526.63	-677.74	765.87	891.12	1022.68	131.51	11.12	-2.27
57	5,282	92.00	156.10	4524.69	-715.53	784.06	932.79	1061.48	132.38	9.10	-3.10
58	5,325	90.30	159.50	4523.83	-755.33	800.30	975.71	1100.46	133.34	8.84	-3.95
59	5,368	89.00	161.60	4524.09	-795.87	814.62	1018.71	1138.87	134.33	5.74	-3.02
60	5,412	89.50	163.10	4524.67	-837.80	827.96	1062.69	1177.89	135.34	3.59	1.14
61	5,454	91.00	165.50	4524.48	-878.23	839.32	1104.61	1214.80	136.30	6.74	3.57
62	5,497	91.70	166.20	4523.47	-919.91	849.83	1147.43	1252.37	137.27	2.30	1.63
63	5,540	92.00	166.50	4522.08	-961.67	859.97	1190.22	1290.10	138.20	0.99	0.70
64	5,583	92.00	166.60	4520.58	-1003.47	869.97	1232.98	1328.08	139.08	0.23	0.00
65	5,627	91.60	166.70	4519.20	-1046.26	880.12	1276.74	1367.21	139.93	0.94	-0.91
66	5,670	91.20	166.70	4518.15	-1088.09	890.01	1319.50	1405.72	140.72	0.93	-0.93
67	5,712	91.20	166.50	4517.27	-1128.94	899.74	1361.29	1443.62	141.45	0.48	0.00

V09.04.02

Company:		Lime Rock Resources IV-A, LP												
Well Name:		UL 10 Livingston 3H												
Location:		Andrews County, TX												
Rig:		HWD #12				Magnetic Declination:		6.29		REFERENCED TO GRID NORTH				
Job Number:		MSMO-69067												
API #:		42-003-48092												
Vertical Section Azimuth:		160.89				Proposed Direction:		160.89						
Survey Calculation Method:		Minimum Curvature												
PTB:	MD		INC		AZM		TVD		N/S		E/W		VS	
	11,858		92.4		163.7		4430.65		-7068.47		2461.74		7484.87	
#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure Distance		Azm	DLS/ 100	BUR/ 100'		
68	5,758	91.30	166.90	4516.27	-1173.69	910.32	1407.04	1485.34		142.20	0.90	0.22		
69	5,802	91.20	167.30	4515.31	-1216.57	920.14	1450.77	1525.36		142.90	0.94	-0.23		
70	5,846	91.30	167.50	4514.35	-1259.50	929.74	1494.48	1565.49		143.57	0.51	0.23		
71	5,888	91.30	166.30	4513.39	-1300.40	939.26	1536.23	1604.13		144.16	2.86	0.00		
72	5,930	91.80	165.90	4512.26	-1341.15	949.34	1578.04	1643.15		144.71	1.52	1.19		
73	5,973	91.80	166.40	4510.91	-1382.88	959.63	1620.84	1683.23		145.24	1.16	0.00		
74	6,014	92.20	165.80	4509.48	-1422.66	969.47	1661.65	1721.58		145.73	1.76	0.98		
75	6,057	92.40	165.50	4507.75	-1464.28	980.12	1704.46	1762.03		146.20	0.84	0.47		
76	6,099	92.40	165.40	4505.99	-1504.90	990.66	1746.29	1801.70		146.64	0.24	0.00		
77	6,141	92.80	165.80	4504.09	-1545.54	1001.10	1788.11	1841.44		147.07	1.35	0.95		
78	6,184	93.20	166.30	4501.84	-1587.21	1011.45	1830.88	1882.09		147.49	1.49	0.93		
79	6,226	93.10	166.50	4499.53	-1627.97	1021.31	1872.62	1921.82		147.90	0.53	-0.24		
80	6,269	91.70	165.20	4497.73	-1669.63	1031.81	1915.42	1962.73		148.28	4.44	-3.26		
81	6,311	89.60	164.00	4497.25	-1710.12	1042.96	1957.32	2003.07		148.62	5.76	-5.00		
82	6,357	89.50	164.00	4497.61	-1754.33	1055.64	2003.26	2047.45		148.96	0.22	-0.22		
83	6,400	91.20	164.30	4497.35	-1795.70	1067.39	2046.18	2088.98		149.27	4.01	3.95		
84	6,446	92.00	164.50	4496.06	-1839.98	1079.75	2092.08	2133.40		149.59	1.79	1.74		
85	6,488	91.80	164.50	4494.67	-1880.43	1090.97	2133.97	2173.99		149.88	0.48	-0.48		
86	6,530	92.00	164.30	4493.28	-1920.87	1102.26	2175.87	2214.66		150.15	0.67	0.48		
87	6,574	91.70	163.50	4491.86	-1963.12	1114.45	2219.79	2257.40		150.42	1.94	-0.68		
88	6,617	91.20	162.80	4490.77	-2004.26	1126.91	2262.74	2299.34		150.65	2.00	-1.16		
89	6,662	90.80	162.40	4489.99	-2047.19	1140.37	2307.71	2343.38		150.88	1.26	-0.89		
90	6,705	90.70	162.30	4489.42	-2088.16	1153.41	2350.69	2385.53		151.09	0.33	-0.23		
91	6,749	90.80	163.70	4488.85	-2130.24	1166.27	2394.66	2428.60		151.30	3.19	0.23		
92	6,791	90.80	165.00	4488.26	-2170.67	1177.60	2436.58	2469.53		151.52	3.09	0.00		
93	6,835	90.50	165.10	4487.76	-2213.18	1188.95	2480.46	2512.32		151.75	0.72	-0.68		
94	6,881	90.10	164.90	4487.52	-2257.61	1200.85	2526.34	2557.12		151.99	0.97	-0.87		
95	6,925	90.20	165.10	4487.41	-2300.12	1212.24	2570.23	2600.01		152.21	0.51	0.23		
96	6,968	90.40	165.30	4487.18	-2341.69	1223.23	2613.10	2641.93		152.42	0.66	0.47		
97	7,010	90.40	165.50	4486.89	-2382.33	1233.81	2654.97	2682.87		152.62	0.48	0.00		
98	7,053	90.30	165.50	4486.62	-2423.96	1244.58	2697.83	2724.80		152.82	0.23	-0.23		
99	7,097	90.30	165.70	4486.39	-2466.58	1255.52	2741.68	2767.73		153.02	0.45	0.00		
100	7,138	90.30	165.90	4486.18	-2506.32	1265.58	2782.53	2807.73		153.21	0.49	0.00		
101	7,182	89.90	166.10	4486.10	-2549.02	1276.22	2826.36	2850.65		153.40	1.02	-0.91		

V09.04.02

Company:	Lime Rock Resources IV-A, LP		
Well Name:	UL 10 Livingston 3H		
Location:	Andrews County, TX		
Rig:	HWD #12	Magnetic Declination:	6.29
Job Number:	MSMO-69067		
API #:	42-003-48092		
Vertical Section Azimuth:	160.89	Proposed Direction:	160.89
Survey Calculation Method:	Minimum Curvature		
PTB:	MD	INC	AZM
	11,858	92.4	163.7

REFERENCED TO GRID NORTH

#	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	7,224	88.60	166.20	4486.65	-2589.79	1286.27	2868.18	2891.63	153.59	3.10	-3.10
103	7,267	88.50	166.00	4487.74	-2631.52	1296.60	2910.99	2933.61	153.77	0.52	-0.23
104	7,309	89.80	166.00	4488.36	-2672.27	1306.76	2952.81	2974.66	153.94	3.10	3.10
105	7,352	90.50	166.50	4488.25	-2714.03	1316.98	2995.62	3016.69	154.12	2.00	1.63
106	7,394	90.90	166.60	4487.74	-2754.88	1326.75	3037.42	3057.71	154.28	0.98	0.95
107	7,437	91.60	167.60	4486.80	-2796.78	1336.35	3080.15	3099.65	154.46	2.84	1.63
108	7,480	92.50	167.60	4485.26	-2838.75	1345.57	3122.83	3141.51	154.64	2.09	2.09
109	7,526	93.00	167.90	4483.05	-2883.65	1355.32	3168.45	3186.28	154.83	1.27	1.09
110	7,579	91.80	167.20	4480.83	-2935.36	1366.74	3221.04	3237.95	155.03	2.62	-2.26
111	7,609	92.00	167.00	4479.84	-2964.59	1373.43	3250.85	3267.28	155.14	0.94	0.67
112	7,640	92.70	166.90	4478.57	-2994.76	1380.43	3281.65	3297.60	155.25	2.28	2.26
113	7,670	92.90	166.60	4477.10	-3023.93	1387.29	3311.46	3326.97	155.36	1.20	0.67
114	7,701	91.90	165.90	4475.81	-3054.01	1394.66	3342.30	3357.39	155.46	3.94	-3.23
115	7,731	92.10	165.80	4474.76	-3083.08	1401.99	3372.17	3386.88	155.55	0.75	0.67
116	7,762	92.70	165.90	4473.46	-3113.12	1409.56	3403.02	3417.36	155.64	1.96	1.94
117	7,793	90.90	165.70	4472.49	-3143.15	1417.16	3433.89	3447.86	155.73	5.84	-5.81
118	7,823	90.80	165.50	4472.04	-3172.21	1424.62	3463.79	3477.42	155.82	0.75	-0.33
119	7,854	91.20	165.50	4471.50	-3202.21	1432.38	3494.68	3507.97	155.90	1.29	1.29
120	7,885	89.70	165.80	4471.26	-3232.25	1440.06	3525.57	3538.53	155.99	4.93	-4.84
121	7,916	89.50	165.50	4471.47	-3262.28	1447.74	3556.47	3569.09	156.07	1.16	-0.65
122	7,947	88.10	165.40	4472.12	-3292.28	1455.53	3587.36	3599.67	156.15	4.53	-4.52
123	7,977	88.00	165.10	4473.14	-3321.27	1463.16	3617.26	3629.28	156.22	1.05	-0.33
124	8,007	87.20	164.60	4474.40	-3350.20	1471.00	3647.16	3658.92	156.29	3.14	-2.67
125	8,049	87.50	164.70	4476.34	-3390.66	1482.10	3689.02	3700.43	156.39	0.75	0.71
126	8,091	88.90	164.40	4477.66	-3431.12	1493.29	3730.92	3741.99	156.48	3.41	3.33
127	8,135	89.00	164.10	4478.47	-3473.46	1505.23	3774.83	3785.59	156.57	0.72	0.23
128	8,180	89.40	163.80	4479.10	-3516.70	1517.67	3819.76	3830.21	156.66	1.11	0.89
129	8,223	89.70	163.80	4479.43	-3558.00	1529.66	3862.71	3872.88	156.74	0.70	0.70
130	8,269	90.10	163.70	4479.51	-3602.16	1542.54	3908.65	3918.54	156.82	0.90	0.87
131	8,311	90.60	163.60	4479.26	-3642.46	1554.36	3950.60	3960.24	156.89	1.21	1.19
132	8,352	91.10	163.70	4478.65	-3681.80	1565.90	3991.55	4000.96	156.96	1.24	1.22
133	8,395	91.20	163.90	4477.79	-3723.08	1577.89	4034.48	4043.65	157.03	0.52	0.23
134	8,441	91.70	163.80	4476.62	-3767.25	1590.68	4080.41	4089.31	157.11	1.11	1.09
135	8,483	92.20	163.60	4475.19	-3807.54	1602.47	4122.33	4131.01	157.18	1.28	1.19

V09.04.02

Company:		Lime Rock Resources IV-A, LP												
Well Name:		UL 10 Livingston 3H												
Location:		Andrews County, TX												
Rig:		HWD #12				Magnetic Declination:		6.29		REFERENCED TO GRID NORTH				
Job Number:		MSMO-69067												
API #:		42-003-48092												
Vertical Section Azimuth:		160.89				Proposed Direction:		160.89						
Survey Calculation Method:		Minimum Curvature												
PTB:	MD		INC		AZM		TVD		N/S		E/W		VS	
	11,858		92.4		163.7		4430.65		-7068.47		2461.74		7484.87	
#	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	8,526	92.80	163.60	4473.32	-3848.75	1614.59	4165.24	4173.70		157.24	1.40	1.40		
137	8,568	93.10	163.90	4471.16	-3889.02	1626.33	4207.13	4215.38		157.31	1.01	0.71		
138	8,612	93.50	163.60	4468.62	-3931.19	1638.62	4251.01	4259.03		157.37	1.14	0.91		
139	8,655	91.40	164.50	4466.78	-3972.49	1650.43	4293.90	4301.70		157.44	5.31	-4.88		
140	8,697	89.30	165.80	4466.53	-4013.09	1661.19	4335.78	4343.32		157.51	5.88	-5.00		
141	8,740	89.00	165.90	4467.17	-4054.78	1671.70	4378.61	4385.87		157.59	0.74	-0.70		
142	8,782	89.10	165.50	4467.86	-4095.47	1682.07	4420.46	4427.44		157.67	0.98	0.24		
143	8,825	89.60	165.30	4468.35	-4137.08	1692.91	4463.32	4470.05		157.75	1.25	1.16		
144	8,868	90.10	165.50	4468.46	-4178.69	1703.75	4506.19	4512.67		157.82	1.25	1.16		
145	8,915	90.60	165.20	4468.18	-4224.16	1715.64	4553.05	4559.27		157.90	1.24	1.06		
146	8,958	90.10	164.50	4467.91	-4265.67	1726.88	4595.94	4601.96		157.96	2.00	-1.16		
147	9,002	90.50	164.40	4467.68	-4308.06	1738.67	4639.86	4645.68		158.02	0.94	0.91		
148	9,045	91.30	164.50	4467.01	-4349.48	1750.20	4682.77	4688.40		158.08	1.87	1.86		
149	9,087	90.90	164.90	4466.20	-4389.98	1761.28	4724.67	4730.12		158.14	1.35	-0.95		
150	9,130	90.20	165.10	4465.79	-4431.51	1772.41	4767.56	4772.81		158.20	1.69	-1.63		
151	9,174	90.80	165.20	4465.40	-4474.04	1783.68	4811.43	4816.49		158.26	1.38	1.36		
152	9,220	91.80	165.20	4464.36	-4518.50	1795.43	4857.29	4862.14		158.33	2.17	2.17		
153	9,266	90.40	166.20	4463.48	-4563.07	1806.79	4903.12	4907.76		158.40	3.74	-3.04		
154	9,309	91.10	166.30	4462.91	-4604.83	1817.01	4945.93	4950.35		158.47	1.64	1.63		
155	9,353	92.00	166.00	4461.72	-4647.54	1827.54	4989.72	4993.95		158.53	2.16	2.05		
156	9,396	90.90	167.00	4460.64	-4689.33	1837.57	5032.50	5036.52		158.60	3.46	-2.56		
157	9,438	91.40	167.20	4459.79	-4730.27	1846.95	5074.25	5078.05		158.67	1.28	1.19		
158	9,482	90.00	168.20	4459.26	-4773.25	1856.32	5117.93	5121.51		158.75	3.91	-3.18		
159	9,525	90.40	168.60	4459.11	-4815.37	1864.97	5160.56	5163.90		158.83	1.32	0.93		
160	9,571	88.80	169.50	4459.43	-4860.53	1873.70	5206.09	5209.18		158.92	3.99	-3.48		
161	9,614	89.20	169.40	4460.18	-4902.80	1881.57	5248.61	5251.45		159.00	0.96	0.93		
162	9,656	89.70	169.10	4460.58	-4944.06	1889.41	5290.16	5292.79		159.09	1.39	1.19		
163	9,699	90.10	169.30	4460.66	-4986.30	1897.47	5332.71	5335.12		159.17	1.04	0.93		
164	9,742	90.50	169.30	4460.43	-5028.55	1905.45	5375.25	5377.46		159.25	0.93	0.93		
165	9,786	91.20	169.40	4459.78	-5071.79	1913.58	5418.76	5420.77		159.33	1.61	1.59		
166	9,830	91.80	169.30	4458.63	-5115.01	1921.71	5462.27	5464.09		159.41	1.38	1.36		
167	9,872	90.50	168.40	4457.78	-5156.21	1929.83	5503.85	5505.52		159.48	3.76	-3.10		
168	9,915	90.40	168.40	4457.45	-5198.33	1938.47	5546.48	5548.00		159.55	0.23	-0.23		
169	9,958	90.90	168.70	4456.96	-5240.47	1947.01	5589.10	5590.47		159.62	1.36	1.16		

V09.04.02

Company:		Lime Rock Resources IV-A, LP												
Well Name:		UL 10 Livingston 3H												
Location:		Andrews County, TX												
Rig:		HWD #12				Magnetic Declination:		6.29		REFERENCED TO GRID NORTH				
Job Number:		MSMO-69067												
API #:		42-003-48092												
Vertical Section Azimuth:		160.89				Proposed Direction:		160.89						
Survey Calculation Method:		Minimum Curvature												
PTB:	MD		INC		AZM		TVD		N/S		E/W		VS	
	11,858		92.4		163.7		4430.65		-7068.47		2461.74		7484.87	
#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure Distance		Azm	DLS/ 100	BUR/ 100'		
170	10,002	91.50	168.40	4456.04	-5283.59	1955.74	5632.69	5633.93		159.69	1.52	1.36		
171	10,045	92.00	168.30	4454.72	-5325.68	1964.42	5675.31	5676.43		159.75	1.19	1.16		
172	10,088	91.40	167.70	4453.45	-5367.72	1973.36	5717.96	5718.97		159.81	1.97	-1.40		
173	10,174	90.50	165.80	4452.02	-5451.42	1993.07	5803.49	5804.33		159.92	2.44	-1.05		
174	10,217	90.90	164.30	4451.50	-5492.96	2004.16	5846.38	5847.16		159.96	3.61	0.93		
175	10,259	91.50	163.60	4450.62	-5533.31	2015.77	5888.31	5889.04		159.98	2.19	1.43		
176	10,302	91.90	163.70	4449.34	-5574.55	2027.87	5931.24	5931.94		160.01	0.96	0.93		
177	10,346	92.50	163.70	4447.65	-5616.75	2040.21	5975.15	5975.81		160.04	1.36	1.36		
178	10,389	91.30	163.70	4446.23	-5658.00	2052.27	6018.08	6018.70		160.06	2.79	-2.79		
179	10,433	90.10	163.80	4445.69	-5700.24	2064.58	6062.02	6062.61		160.09	2.74	-2.73		
180	10,479	90.70	163.80	4445.37	-5744.41	2077.41	6107.96	6108.51		160.12	1.30	1.30		
181	10,525	91.30	163.70	4444.56	-5788.57	2090.28	6153.89	6154.41		160.15	1.32	1.30		
182	10,571	92.10	163.30	4443.20	-5832.65	2103.34	6199.82	6200.31		160.17	1.94	1.74		
183	10,615	90.70	163.60	4442.12	-5874.82	2115.87	6243.77	6244.23		160.19	3.25	-3.18		
184	10,659	90.50	163.60	4441.66	-5917.02	2128.29	6287.71	6288.15		160.22	0.45	-0.45		
185	10,702	89.60	164.10	4441.63	-5958.33	2140.25	6330.66	6331.06		160.24	2.39	-2.09		
186	10,746	89.80	164.10	4441.86	-6000.64	2152.31	6374.59	6374.96		160.27	0.45	0.45		
187	10,790	88.90	164.10	4442.36	-6042.96	2164.36	6418.51	6418.86		160.29	2.05	-2.05		
188	10,833	89.20	164.00	4443.07	-6084.30	2176.18	6461.44	6461.76		160.32	0.74	0.70		
189	10,877	89.50	164.10	4443.57	-6126.60	2188.27	6505.37	6505.67		160.34	0.72	0.68		
190	10,921	90.10	164.00	4443.72	-6168.90	2200.36	6549.31	6549.58		160.37	1.38	1.36		
191	10,967	90.50	164.10	4443.48	-6213.13	2213.00	6595.24	6595.48		160.40	0.90	0.87		
192	11,010	89.00	164.30	4443.67	-6254.51	2224.70	6638.16	6638.39		160.42	3.52	-3.49		
193	11,054	89.20	164.50	4444.36	-6296.88	2236.54	6682.07	6682.27		160.45	0.64	0.45		
194	11,100	89.70	164.00	4444.80	-6341.15	2249.02	6727.99	6728.17		160.47	1.54	1.09		
195	11,142	90.00	164.10	4444.91	-6381.53	2260.56	6769.93	6770.09		160.49	0.75	0.71		
196	11,189	90.80	163.70	4444.58	-6426.69	2273.60	6816.86	6817.01		160.52	1.90	1.70		
197	11,232	91.20	164.50	4443.83	-6468.04	2285.37	6859.79	6859.92		160.54	2.08	0.93		
198	11,276	91.80	163.40	4442.68	-6510.31	2297.54	6903.71	6903.82		160.56	2.85	1.36		
199	11,319	90.70	163.20	4441.74	-6551.48	2309.89	6946.66	6946.76		160.58	2.60	-2.56		
200	11,361	91.00	163.40	4441.12	-6591.71	2321.96	6988.62	6988.71		160.59	0.86	0.71		
201	11,405	89.70	163.90	4440.85	-6633.93	2334.34	7032.57	7032.65		160.61	3.17	-2.95		
202	11,447	89.80	163.70	4441.03	-6674.26	2346.06	7074.51	7074.58		160.63	0.53	0.24		
203	11,491	90.50	163.50	4440.92	-6716.47	2358.48	7118.46	7118.52		160.65	1.65	1.59		

V09.04.02

Company:	Lime Rock Resources IV-A, LP										
Well Name:	UL 10 Livingston 3H										
Location:	Andrews County, TX										
Rig:	HWD #12					Magnetic Declination:	6.29		REFERENCED TO GRID NORTH ▼		
Job Number:	MSMO-69067										
API #:	42-003-48092										
Vertical Section Azimuth:				160.89		Proposed Direction:		160.89			
Survey Calculation Method:				Minimum Curvature							
PTB:	MD	INC	AZM	TVD	N/S	E/W	VS				
	11,858	92.4	163.7	4430.65	-7068.47	2461.74	7484.87				
#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure Distance	Azm	DLS/ 100	BUR/ 100'
204	11,537	90.90	163.70	4440.36	-6760.59	2371.47	7164.41	7164.46	160.67	0.97	0.87
205	11,580	91.30	163.40	4439.53	-6801.82	2383.64	7207.35	7207.40	160.69	1.16	0.93
206	11,622	91.80	163.50	4438.40	-6842.07	2395.60	7249.29	7249.33	160.70	1.21	1.19
207	11,666	91.20	163.70	4437.24	-6884.26	2408.02	7293.23	7293.26	160.72	1.44	-1.36
208	11,710	91.40	164.00	4436.25	-6926.52	2420.26	7337.16	7337.18	160.74	0.82	0.45
209	11,752	92.10	163.60	4434.96	-6966.83	2431.97	7379.09	7379.11	160.76	1.92	1.67
210	11,801	92.40	163.70	4433.04	-7013.81	2445.75	7427.99	7428.01	160.78	0.65	0.61
PTB:	11,858	92.40	163.70	4430.65	-7068.47	2461.74	7484.87	7484.88	160.80	0.00	0.00

MS Directional Survey Data Certification

MS Directional Job Number: MSMO-69067
Survey Type: Lime Rock Resources IV-A, LP
Well Name & Number: UL 10 Livingston 3H
Location: Andrews County, TX
API Number: 42-003-48092
Tie In Depth: Surface
Surveyed Depths: 199' – 11,801' MD
Projected TD Survey: 11,858' MD
Dates Performed: 08/16/2019 – 09/09/2019

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: 
The signature is a handwritten name "Louis Orgeron" in black ink, written over a horizontal line.

MWD Surveyor Name: Louis Orgeron

Date: 10-02-2019

Email: Louis.Orgeron@msdir.com

CONFIDENTIALITY NOTICE: This document contains MS Directional's proprietary and confidential information and may not be copied, published, distributed or transmitted, in whole or in part, by any medium or in any form without MS Directional's prior written consent. The information contained in this document is not to be used by or disclosed to any individuals other than those who need to know such information and who have been given notice that such information is proprietary and confidential.