



SURVEY CALCULATION PROGRAM

Minimum Curvature

File:

OPERATOR: Lime Rock Resources		VS Referenced to Offset from Surface	
WELL: UL FI 7HD		TARGET TVD	10723.93
LOCATION: Andrews, TX		TARGET INCL:	89.64
RIG: Precision 601		TARGET AZM:	188.24
JOB NUMBER: TX-19-026			
SURVEY COMPANY		DIRECTIONAL COMPANY	
Accel Directional		RPM Consulting	
Directional Drillers		COORDINATORS	
Matt Rutland		Nick Thayer	
Dallas Carson/ Dan Thompson			
Lime Rock Resources		UL FI 7HD	
		PROPOSED DIRECTION: 188.01	
		Dec / Total Corr.(+/-): 8.55	
		COMMENTS:	

Lime Rock Resources						GULF PRO				Surface		CLOSURE		DLS/	BUR/	TVD AT 0'	ABOVE (+)	RIGHT(+)
SVY	MD	INC	TRUE AZM	TEMP °F	API Gamma	Course Length	TVD	N-S	E-W	Vert Sect	DIST	DIR	100'	100'	V. SEC.	BELOW (-)	LEFT(-)	
TIE IN	0.0	0.00	0.00			0	0.00	0.00	0.00		0.00	0.00	N/A	N/A				
1	220	1.30	75.00			220	219.98	0.65	2.41	-0.04	2.50	75.00	0.59	0.59	219.98	10503.95	417.19	
2	404	0.50	56.50			184	403.96	1.63	5.10	-0.35	5.35	72.27	0.46	-0.43	403.96	10319.97	414.37	
3	591	0.40	85.70			187	590.95	2.13	6.43	-0.51	6.77	71.68	0.13	-0.05	590.95	10132.98	412.97	
4	776	0.40	85.90			185	775.95	2.22	7.72	-0.29	8.03	73.93	0.00	0.00	775.95	9947.98	411.69	
5	956	0.30	71.40			180	955.94	2.42	8.79	-0.22	9.12	74.62	0.07	-0.06	955.95	9767.98	410.60	
6	1,135	0.50	70.90			179	1134.94	2.82	9.97	-0.33	10.36	74.19	0.11	0.11	1134.94	9588.99	409.36	
7	1,314	0.40	250.10			179	1313.94	2.87	10.12	-0.33	10.52	74.19	0.50	-0.06	1313.94	9409.99	409.20	
8	1,493	0.20	209.90			179	1492.94	2.38	9.38	-0.04	9.68	75.74	0.16	-0.11	1492.94	9230.99	410.02	
9	1,673	0.40	118.20			180	1672.93	1.81	9.78	0.60	9.94	79.49	0.25	0.11	1672.93	9051.00	409.74	
10	1,716	0.70	120.30			43	1715.93	1.61	10.13	0.89	10.26	80.97	0.70	0.70	1715.93	9008.00	409.43	
11	1,846	1.50	159.10	86	14	130	1845.91	-0.38	11.43	3.13	11.43	91.91	0.81	0.62	1845.89	8878.04	408.53	
12	1,936	1.30	151.50	87	42	90	1935.88	-2.38	12.33	5.29	12.56	100.91	0.30	-0.22	1935.85	8788.08	408.01	
13	2,025	1.20	148.50	92	21	89	2024.86	-4.06	13.30	7.16	13.91	106.97	0.13	-0.11	2024.81	8699.12	407.37	
14	2,115	1.20	143.30	96	14	90	2114.84	-5.62	14.36	8.92	15.42	111.37	0.12	0.00	2114.78	8609.15	406.63	
15	2,205	1.10	136.70	99	28	90	2204.82	-7.00	15.51	10.55	17.02	114.29	0.18	-0.11	2204.76	8519.17	405.75	
16	2,294	1.10	139.10	103	70	89	2293.81	-8.27	16.66	12.05	18.60	116.40	0.05	0.00	2293.73	8430.20	404.86	
17	2,384	1.00	126.90	108	21	90	2383.79	-9.40	17.85	13.43	20.17	117.75	0.27	-0.11	2383.71	8340.22	403.90	
18	2,474	1.10	104.20	108	14	90	2473.78	-10.08	19.32	14.45	21.79	117.55	0.47	0.11	2473.69	8250.24	402.58	
19	2,563	1.30	97.00	111	21	89	2562.76	-10.41	21.15	15.22	23.57	116.21	0.28	0.22	2562.66	8161.27	400.85	
20	2,653	0.90	27.30	113	21	90	2652.74	-9.91	22.49	15.05	24.57	113.78	1.44	-0.44	2652.65	8071.28	399.44	
21	2,743	1.10	17.50	117	14	90	2742.73	-8.46	23.07	13.78	24.57	110.13	0.29	0.22	2742.64	7981.29	398.60	
22	2,832	0.70	359.10	119	42	89	2831.72	-7.10	23.32	12.52	24.38	106.93	0.55	-0.45	2831.64	7892.29	398.10	
23	2,922	1.00	329.30	120	14	90	2921.71	-5.87	22.91	11.24	23.65	104.38	0.58	0.33	2921.64	7802.29	398.27	
24	3,011	1.10	329.20	122	14	89	3010.69	-4.47	22.08	9.67	22.52	101.45	0.11	0.11	3010.63	7713.30	398.83	
25	3,101	1.10	328.30	124	14	90	3100.68	-2.99	21.18	8.02	21.39	98.04	0.02	0.00	3100.63	7623.30	399.43	
26	3,191	1.20	331.10	127	28	90	3190.66	-1.43	20.27	6.29	20.32	94.05	0.13	0.11	3190.62	7533.31	400.04	
27	3,281	0.70	318.00	127	21	90	3280.65	-0.20	19.45	4.90	19.45	90.59	0.60	-0.56	3280.62	7443.31	400.62	
28	3,370	0.60	316.00	129	49	89	3369.64	0.54	18.76	4.01	18.77	88.35	0.12	-0.11	3369.62	7354.31	401.15	
29	3,460	0.70	328.60	131	14	90	3459.64	1.35	18.15	3.08	18.20	85.75	0.19	0.11	3459.62	7264.31	401.60	
30	3,550	0.70	330.90	131	14	90	3549.63	2.30	17.59	2.02	17.74	82.56	0.03	0.00	3549.62	7174.31	401.97	
31	3,639	0.40	353.70	131	14	89	3638.62	3.08	17.29	1.19	17.57	79.90	0.41	-0.34	3638.62	7085.31	402.12	
32	3,729	0.50	19.70	134	14	90	3728.62	3.76	17.39	0.55	17.79	77.79	0.25	0.11	3728.62	6995.31	401.89	
33	3,819	0.40	284.10	138	14	90	3818.62	4.21	17.22	0.08	17.73	76.26	0.74	-0.11	3818.62	6905.31	401.98	
34	3,908	0.50	269.10	138	49	89	3907.62	4.28	16.53	-0.16	17.07	75.49	0.17	0.11	3907.62	6816.31	402.65	
35	3,998	0.40	263.50	134	49	90	3997.61	4.24	15.82	-0.29	16.38	75.01	0.12	-0.11	3997.62	6726.31	403.35	
36	4,087	0.30	260.80	134	56	89	4086.61	4.16	15.29	-0.35	15.84	74.76	0.11	-0.11	4086.61	6637.32	403.89	
37	4,177	0.30	269.00	136	14	90	4176.61	4.12	14.82	-0.42	15.38	74.45	0.05	0.00	4176.61	6547.32	404.36	
38	4,267	0.40	262.60	136	28	90	4266.61	4.08	14.27	-0.51	14.84	74.05	0.12	0.11	4266.61	6457.32	404.90	
39	4,356	0.40	266.20	138	21	89	4355.61	4.02	13.65	-0.60	14.23	73.60	0.03	0.00	4355.61	6368.32	405.52	
40	4,446	0.40	267.90	141	21	90	4445.61	3.99	13.02	-0.72	13.62	72.99	0.01	0.00	4445.61	6278.32	406.14	
41	4,535	0.40	258.10	141	14	89	4534.60	3.91	12.41	-0.79	13.01	72.51	0.08	0.00	4534.61	6189.32	406.76	
42	4,625	0.30	265.50	141	14	90	4624.60	3.83	11.87	-0.84	12.47	72.13	0.12	-0.11	4624.61	6099.32	407.31	
43	4,714	0.30	273.80	141	21	89	4713.60	3.82	11.40	-0.95	12.03	71.46	0.05	0.00	4713.61	6010.32	407.77	
44	4,804	0.30	287.00	141	28	90	4803.60	3.91	10.94	-1.15	11.62	70.35	0.08	0.00	4803.61	5920.32	408.20	
45	4,893	0.20	276.90	143	28	89	4892.60	4.00	10.57	-1.32	11.30	69.29	0.12	-0.11	4892.61	5831.32	408.56	
46	4,983	0.80	296.30	143	21	90	4982.59	4.29	9.85	-1.78	10.74	66.45	0.68	0.67	4982.61	5741.32	409.21	
47	5,072	1.30	309.80	143	42	89	5071.58	5.21	8.51	-3.00	9.98	58.52	0.62	0.56	5071.60	5652.33	410.34	
48	5,162	2.10	316.00	138	21	90	5161.54	7.05	6.58	-5.25	9.65	43.03	0.91	0.89	5161.57	5562.36	411.90	
49	5,251	2.90	314.50	141	21	89	5250.45	9.80	3.85	-8.58	10.53	21.42	0.90	0.90	5250.51	5473.42	414.07	
50	5,341	3.20	315.70	129	28	90	5340.33	13.20	0.47	-12.69	13.21	2.03	0.34	0.33	5340.41	5383.52	416.76	
51	5,430	2.80	316.40	129	35	89	5429.20	16.55	-2.77	-16.73	16.78	350.51	0.45	-0.45	5429.31	5294.62	419.31	
52	5,520	3.80	311.20	131	42	90	5519.05	20.11	-6.53	-21.09	21.14	342.02	1.16	1.11	5519.19	5204.74	422.34	
53	5,609	4.40	314.10	134	42	89	5607.83	24.43	-11.20	-26.41	26.87	335.37	0.71	0.67	5607.99	5115.94	426.12	
54	5,699	5.00	313.00	136	21	90	5697.52	29.50	-16.55	-32.63	33.83	330.72	0.67	0.67	5697.73	5026.20	430.43	
55	5,788	5.10	309.80	139	21	89	5786.18	34.68	-22.42	-39.07	41.30	327.12	0.34	0.11	5786.42	4937.51	435.23	
56	5,811	5.30	310.20	117	28	23	5809.08	36.02	-24.02	-40.76	43.29	326.31	0.88	0.87	5809.34	4914.59	436.55	
57	5,900	6.60	310.30	129	28	89	5897.60	41.98	-31.06	-48.24	52.22	323.51	1.46	1.46	5897.90	4826.03	442.36	
58	5,990	7.20	313.30	129	21	90	5986.95	49.19	-39.11	-57.19	62.85	321.52	0.78	0.67	5987.31	4736.62	448.92	
59	6,079	7.50	316.90	134	21	89	6075.22	57.26	-47.14	-66.96	74.17	320.54	0.62	0.34	6075.64	4648.29	455.30	



SURVEY CALCULATION PROGRAM

Minimum Curvature

File:

OPERATOR: Lime Rock Resources		VS Referenced to Offset from Surface	
WELL: UL FI 7HD		TARGET TVD	10723.93
LOCATION: Andrews, TX		TARGET INCL:	88.64
RIG: Precision 601		TARGET AZM:	169.24
JOB NUMBER: TX-19-026		(Enter 0° N and 0° E for Surface)	
SURVEY COMPANY		PROPOSED DIRECTION:	166.01
Accel Directional		Dec / Total Corr.(+/-):	
Directional Drillers		COMMENTS:	
Matt Rutland		8.55	
Dallas Carson/ Dan Thompson			

Line Rock Resources						UL FI 7HD				Target Calculations							
			TRUE	TEMP	API	Course		Surface		CLOSURE		DLS/	BUR/	TVD AT 0'	ABOVE (+)	RIGHT(+)	
SVY	MD	INC	AZM	°F	Gamma	Length	TVD	N-S	E-W	Vert Sect	DIST	DIR	100'	100'	V. SEC.	BELOW (-)	LEFT(-)
65	6,616	6.90	311.80	147	35	90	6608.02	104.84	-94.25	-124.51	140.97	318.05	0.52	-0.22	6608.80	4115.13	492.70
66	6,705	6.20	311.90	149	21	89	6696.44	111.61	-101.81	-132.91	151.07	317.63	0.79	-0.79	6697.28	4026.65	498.86
67	6,795	6.30	313.80	149	35	90	6785.91	118.27	-108.99	-141.11	160.83	317.34	0.26	0.11	6786.79	3937.14	504.67
68	6,885	6.40	316.40	150	28	90	6875.35	125.32	-116.01	-149.65	170.78	317.21	0.34	0.11	6876.29	3847.64	510.26
69	6,974	6.50	314.70	152	21	89	6963.79	132.46	-123.01	-158.27	180.77	317.12	0.24	0.11	6964.78	3759.15	515.80
70	7,064	6.80	316.90	152	21	90	7053.18	139.93	-130.28	-167.28	191.19	317.05	0.44	0.33	7054.24	3669.69	521.54
71	7,153	6.50	308.30	152	21	89	7141.59	146.90	-137.83	-175.87	201.44	316.83	1.17	-0.34	7142.69	3581.24	527.66
72	7,242	6.90	309.10	154	21	89	7229.98	153.40	-145.93	-184.13	211.72	316.43	0.46	0.45	7231.14	3492.79	534.41
73	7,332	7.30	311.90	154	28	90	7319.29	160.63	-154.38	-193.18	222.79	316.14	0.59	0.44	7320.50	3403.43	541.36
74	7,421	7.40	304.40	154	14	89	7407.56	167.64	-163.32	-202.15	234.04	315.75	1.08	0.11	7408.83	3315.10	548.83
75	7,511	6.50	300.70	150	21	90	7496.90	173.52	-172.48	-210.07	244.66	315.17	1.12	-1.00	7498.22	3225.71	556.74
76	7,600	6.40	303.20	155	28	89	7585.34	178.80	-180.97	-217.25	254.40	314.66	0.33	-0.11	7586.70	3137.23	564.09
78	7,690	6.60	307.80	155	28	90	7674.76	184.72	-189.25	-224.99	264.46	314.31	0.62	0.22	7676.17	3047.76	571.12
79	7,779	6.80	311.00	157	28	89	7763.15	191.31	-197.27	-233.33	274.80	314.12	0.48	0.22	7764.62	2959.31	577.77
80	7,869	6.90	313.40	157	28	90	7852.51	198.52	-205.22	-242.25	285.53	314.05	0.34	0.11	7854.03	2869.90	584.23
81	7,958	6.70	312.80	157	28	89	7940.88	205.72	-212.91	-251.09	296.06	314.02	0.24	-0.22	7942.46	2781.47	590.44
82	8,048	6.70	313.30	155	21	90	8030.27	212.89	-220.58	-259.90	306.56	313.98	0.06	0.00	8031.90	2692.03	596.64
83	8,137	6.70	315.50	152	21	89	8118.66	220.15	-228.00	-268.74	316.94	314.00	0.29	0.00	8120.35	2603.58	602.57
84	8,227	6.70	319.20	154	21	90	8208.05	227.87	-235.11	-277.95	327.42	314.10	0.48	0.00	8209.79	2514.14	608.12
85	8,316	6.70	319.30	157	35	89	8296.44	235.74	-241.89	-287.22	337.76	314.26	0.01	0.00	8298.24	2425.69	613.31
86	8,406	6.30	317.50	157	21	90	8385.86	243.36	-248.65	-296.25	347.92	314.38	0.50	-0.44	8387.72	2336.21	618.53
87	8,495	5.80	314.00	135	28	89	8474.36	250.08	-255.18	-304.36	357.30	314.42	0.70	-0.56	8476.28	2247.65	623.69
88	8,585	5.40	316.30	141	28	90	8563.93	256.31	-261.38	-311.89	366.08	314.44	0.51	-0.44	8565.89	2158.04	628.62
89	8,674	5.10	318.30	143	35	89	8652.56	262.29	-266.91	-319.03	374.21	314.50	0.39	-0.34	8654.56	2069.37	632.93
90	8,764	5.60	312.50	147	91	90	8742.17	268.24	-272.80	-326.24	382.59	314.52	0.82	0.56	8744.22	1979.71	637.61
91	8,853	5.10	312.30	147	28	89	8830.78	273.84	-278.93	-333.15	390.88	314.47	0.56	-0.56	8832.87	1891.06	642.59
92	8,943	4.90	313.30	147	35	90	8920.44	279.16	-284.69	-339.71	398.72	314.44	0.24	-0.22	8922.57	1801.36	647.25
93	9,032	4.80	314.50	147	28	89	9009.12	284.38	-290.11	-346.08	406.25	314.43	0.16	-0.11	9011.29	1712.64	651.60
94	9,121	4.70	318.10	150	28	89	9097.81	289.71	-295.20	-352.48	413.61	314.46	0.35	-0.11	9100.03	1623.90	655.61
95	9,211	4.80	310.90	152	42	90	9187.51	294.92	-300.51	-358.82	421.05	314.46	0.67	0.11	9189.76	1534.17	659.85
96	9,300	4.20	306.70	156	63	89	9276.23	299.30	-305.94	-364.38	427.99	314.37	0.77	-0.67	9278.52	1445.41	664.36
97	9,390	3.10	310.90	156	28	90	9366.05	302.86	-310.42	-368.93	433.69	314.29	1.26	-1.22	9368.37	1355.56	668.10
98	9,479	2.90	309.30	157	42	89	9454.93	305.87	-313.98	-372.70	438.34	314.25	0.24	-0.22	9457.27	1266.66	671.04
99	9,569	2.10	325.60	159	70	90	9544.84	308.67	-316.67	-376.07	442.22	314.27	1.18	-0.89	9547.20	1176.73	673.16
100	9,658	1.80	324.50	159	91	89	9633.79	311.15	-318.41	-378.90	445.20	314.34	0.34	-0.34	9636.17	1087.76	674.40
101	9,748	1.80	312.20	159	98	90	9723.74	313.25	-320.28	-381.39	448.00	314.36	0.43	0.00	9726.14	997.79	675.84
102	9,837	0.90	284.10	157	91	89	9812.72	314.36	-321.99	-382.88	450.00	314.31	1.23	-1.01	9815.13	908.80	677.32
103	9,927	1.30	281.90	157	98	90	9902.70	314.74	-323.67	-383.66	451.47	314.20	0.45	0.44	9905.11	818.82	678.90
104	10,016	1.30	287.90	156	21	89	9991.68	315.26	-325.62	-384.63	453.23	314.07	0.15	0.00	9994.10	729.83	680.72
105	10,094	1.90	188.60	145	68	78	10069.66	314.26	-326.66	-383.90	453.28	313.89	3.17	0.77	10072.07	651.86	681.93
106	10,124	4.60	174.80	157	14	30	10099.61	312.57	-326.62	-382.26	452.08	313.74	9.31	9.00	10102.01	621.92	682.21
107	10,154	7.50	169.00	157	14	30	10129.44	309.45	-326.14	-379.11	449.58	313.50	9.87	9.67	10131.82	592.11	682.32
108	10,184	9.40	169.90	159	18	30	10159.11	305.11	-325.34	-374.71	446.02	313.16	6.35	6.33	10161.47	562.46	682.34
109	10,214	12.40	170.70	161	32	30	10188.57	299.52	-324.39	-369.06	441.52	312.72	10.01	10.00	10190.89	533.04	682.45
110	10,244	15.60	168.50	163	27	30	10217.67	292.39	-323.06	-361.81	435.73	312.15	10.81	10.67	10219.95	503.98	682.48
111	10,274	19.30	164.70	163	32	30	10246.29	283.65	-320.95	-352.82	428.33	311.47	12.90	12.33	10248.51	475.42	682.03
112	10,304	22.60	161.70	150	18	30	10274.30	273.39	-317.83	-342.12	419.23	310.70	11.56	11.00	10276.45	447.48	680.88
113	10,334	26.00	159.80	154	23	30	10301.64	261.74	-313.75	-329.83	408.59	309.84	11.63	11.33	10303.71	420.22	679.05
114	10,364	29.20	162.40	159	87	30	10328.22	248.59	-309.26	-315.98	396.79	308.79	11.40	10.67	10330.21	393.72	677.10
115	10,393	31.80	167.10	159	182	29	10353.21	234.40	-305.42	-301.28	384.99	307.50	12.16	8.97	10355.11	368.82	675.97
116	10,423	33.70	171.10	161	360	30	10378.45	218.47	-302.36	-285.08	373.03	305.85	9.60	6.33	10380.24	343.69	675.94
117	10,453	36.00	171.40	161	223	30	10403.06	201.52	-299.76	-268.01	361.20	303.91	7.69	7.67	10404.75	319.18	676.55
118	10,483	38.00	171.20	163	114	30	10427.02	183.68	-297.03	-250.04	349.23	301.73	6.68	6.67	10428.59	295.34	677.19
119	10,504	39.50	170.40	163	155	21	10443.40	170.70	-294.92	-236.94	340.76	300.06	7.53	7.14	10444.89	279.04	677.55
120	10,570	43.20	167.80	136	11	66	10492.94	127.91	-286.65	-193.41	313.89	294.05	6.18	5.61	10494.16	229.77	677.41
121	10,601	45.40	168.50	138	8	31	10515.13	106.72	-282.20	-171.78	301.71	290.72	7.27	7.10	10516.20	207.73	677.00
122	10,633	47.60	170.40	141	8	32	10537.15	83.90	-277.96	-148.61	290.35	286.80	8.11	6.88	10538.09	185.84	677.09
123	10,664	51.00	171.40	141	8	31	10557.36	60.70	-274.25	-125.20	280.89	282.48	11.24	10.97	10558.15	165.78	677.78
124	10,695	54.50	172.20	143	8	31	10576.13	36.28	-270.73	-100.65	273.15	277.63	11.48	11.29	10576.76	147.17	678.88
125	10,727	57.70	172.50	149	6	32	10593.97	9.96	-267.20	-74.26	267.38	272.13	10.03	10.00	10594.44	129.49	680.32
126	10,758	57.80	172.70	147	6	31	10610.51	-16.04	-263.82	-48.21	264.31	266.52	0.63	0.32	10610.82	113.11	681.86
127	10,790	58.40	172.50	141	6	32	10627.42	-42.98	-260.32	-21.23	263.85	260.62	1.95	1.88	10627.56	96.37	683.45
128	10,822	61.50	172.20	145	6	32	10643.45	-70.43	-256.64	6.30	266.12	254.65	9.72	9.69	10643.41	80.52	684.95
129	10,854	64.40	171.10	147	8	32	10658.00	-98.62	-252.49	34.66	271.07	248.66	9.57	9.06	10657.78	66.15	686.15
130	10,886	68.10	170.10	147	8	32	10670.88	-127.51	-247.71	63.85	278.60	242.76	11.91	11.56	10670.48	53.45	686.84



SURVEY CALCULATION PROGRAM

Minimum Curvature

File:

OPERATOR: Lime Rock Resources														VS Referenced to Offset from Surface			
WELL: UL FI 7HD										TARGET TVD		10723.93		NORTH/SOUTH:		-7227.32	
LOCATION: Andrews, TX										TARGET INCL:		89.64		EAST/WEST		1800.65	
RIG: Precision 601										TARGET AZM:		188.24		(Enter 0° N and 0° E for Surface)			
JOB NUMBER: TX-19-026																	
SURVEY COMPANY						DIRECTIONAL COMPANY				PROPOSED DIRECTION:		168.01		Dec / Total Corr.(+/-):		8.55	
Accel Directional						RPM Consulting				COMMENTS:							
Directional Drillers						COORDINATORS											
Matt Rutland						Nick Thayer											
Dallas Carson/ Dan Thompson																	
Lime Rock Resources						UL FI 7HD				Target Calculations							
			TRUE	TEMP	API	Course				Surface	CLOSURE		DLS/	BUR/	TVD AT 0'	ABOVE (+)	RIGHT(+)
SVY	MD	INC	AZM	°F	Gamma	Length	TVD	N-S	E-W	Vert Sect	DIST	DIR	100	100'	V. SEC.	BELOW (-)	LEFT(-)
131	10,917	71.20	169.60	145	6	31	10681.66	-156.12	-242.58	92.84	288.48	237.24	10.11	10.00	10681.08	42.85	687.15
132	10,949	73.30	169.80	147	6	32	10691.42	-186.10	-237.14	123.26	301.44	231.88	6.59	6.56	10690.64	33.29	687.39
133	10,980	74.30	169.10	147	6	31	10700.07	-215.37	-231.69	152.97	316.33	227.09	3.89	3.23	10699.10	24.83	687.50
134	11,012	76.20	168.80	147	6	32	10708.21	-245.74	-225.75	183.87	333.70	222.57	6.01	5.94	10707.06	16.87	687.35
135	11,044	78.70	168.40	145	6	32	10715.17	-276.36	-219.58	215.08	352.97	218.47	7.91	7.81	10713.81	10.12	687.00
136	11,075	81.50	168.10	145	6	31	10720.50	-306.25	-213.36	245.59	373.25	214.86	9.08	9.03	10718.95	4.98	686.47
137	11,138	83.50	169.80	138	6	63	10728.72	-367.55	-201.39	307.96	419.11	208.72	4.15	3.17	10726.78	-2.85	686.15
138	11,170	83.40	170.10	143	6	32	10732.37	-398.85	-195.85	339.68	444.34	206.15	0.98	-0.31	10730.23	-6.30	686.55
139	11,202	84.80	169.70	145	8	32	10735.66	-430.19	-190.26	371.43	470.39	203.86	4.55	4.37	10733.32	-9.39	686.91
140	11,233	87.40	169.70	150	6	31	10737.77	-460.62	-184.73	402.29	496.28	201.85	8.39	8.39	10735.24	-11.31	687.16
141	11,329	89.90	169.10	150	3	96	10740.03	-554.94	-167.08	498.09	579.55	196.76	2.68	2.60	10736.90	-12.97	687.43
142	11,424	89.80	167.50	152	6	95	10740.28	-647.97	-147.82	593.01	664.61	192.85	1.69	-0.11	10736.55	-12.62	685.87
143	11,518	90.20	167.50	154	8	94	10740.28	-739.74	-127.47	686.98	750.64	189.78	0.43	0.43	10735.96	-12.03	683.02
144	11,614	89.90	167.60	156	6	96	10740.19	-833.48	-106.77	782.95	840.29	187.30	0.33	-0.31	10735.27	-11.34	680.19
145	11,708	89.80	167.00	154	6	94	10740.44	-925.18	-86.11	876.92	929.18	185.32	0.65	-0.11	10734.93	-11.00	677.00
146	11,803	90.60	166.10	156	6	95	10740.11	-1017.57	-64.01	971.91	1019.58	183.60	1.27	0.84	10734.00	-10.07	672.55
147	11,898	90.60	166.70	159	6	95	10739.11	-1109.90	-41.68	1066.91	1110.69	182.15	0.63	0.00	10732.41	-8.48	667.84
148	11,993	91.30	165.00	161	6	95	10737.54	-1202.00	-18.46	1161.89	1202.15	180.88	1.94	0.74	10730.24	-6.31	662.22
149	12,088	89.90	163.90	152	6	95	10736.54	-1293.52	7.01	1256.84	1293.54	179.69	1.87	-1.47	10728.65	-4.72	654.29
150	12,183	89.40	162.10	159	6	95	10737.12	-1384.36	34.78	1351.71	1384.80	178.56	1.97	-0.53	10728.63	-4.70	643.97
151	12,277	90.00	161.40	159	6	94	10737.61	-1473.63	64.22	1445.45	1475.03	177.50	0.98	0.64	10728.53	-4.60	631.71
152	12,371	89.60	161.50	163	8	94	10737.94	-1562.75	94.12	1539.15	1565.58	176.55	0.44	-0.43	10728.27	-4.34	618.97
153	12,466	88.70	162.00	163	3	95	10739.35	-1652.96	123.87	1633.87	1657.59	175.71	1.08	-0.95	10729.09	-5.16	606.59
154	12,561	89.60	161.20	164	6	95	10740.76	-1743.09	153.85	1728.58	1749.87	174.96	1.27	0.95	10729.90	-5.97	593.96
155	12,656	89.20	160.90	161	6	95	10741.76	-1832.93	184.70	1823.22	1842.22	174.25	0.53	-0.42	10730.30	-6.37	580.43
156	12,752	89.20	161.20	163	6	96	10743.10	-1923.72	215.87	1918.85	1935.80	173.60	0.31	0.00	10731.04	-7.11	566.75
157	12,846	89.10	161.70	164	6	94	10744.49	-2012.83	245.77	2012.54	2027.78	173.04	0.54	-0.11	10731.85	-7.92	554.02
158	12,942	90.90	161.70	166	6	96	10744.49	-2103.97	275.92	2108.27	2121.99	172.53	1.88	1.88	10731.24	-7.31	541.42
159	13,037	88.60	162.70	166	8	95	10744.91	-2194.41	304.96	2203.05	2215.50	172.09	2.64	-2.42	10731.06	-7.13	529.78
160	13,131	90.00	162.10	163	6	94	10746.05	-2284.01	333.38	2296.85	2308.21	171.70	1.62	1.49	10731.62	-7.69	518.58
161	13,226	89.90	162.60	166	6	95	10746.14	-2374.53	362.18	2391.66	2402.00	171.33	0.54	-0.11	10731.11	-7.18	507.19
162	13,321	89.80	160.50	168	3	95	10746.39	-2464.64	392.24	2486.36	2495.66	170.96	2.21	-0.11	10730.76	-6.83	494.47
163	13,416	88.90	160.00	168	6	95	10747.46	-2554.05	424.34	2580.88	2589.06	170.57	1.08	-0.95	10731.25	-7.32	479.63
164	13,511	92.10	158.70	168	6	95	10746.63	-2642.93	457.84	2675.22	2682.29	170.17	3.64	3.37	10729.83	-5.90	463.32
165	13,607	90.90	157.10	168	6	96	10744.12	-2731.84	493.94	2770.22	2776.14	169.75	2.08	-1.25	10726.72	-2.79	444.45
166	13,702	90.50	155.60	163	6	95	10742.96	-2818.85	532.05	2863.86	2868.62	169.31	1.63	-0.42	10724.97	-1.04	423.26
167	13,797	89.20	155.40	161	6	95	10743.21	-2905.30	571.44	2957.27	2960.96	168.87	1.38	-1.37	10724.63	-0.70	400.69
168	13,892	89.20	155.20	173	6	95	10744.54	-2991.60	611.14	3050.60	3053.38	168.45	0.21	0.00	10725.37	-1.44	377.81
169	13,987	89.30	154.70	164	8	95	10745.78	-3077.65	651.36	3143.83	3145.82	168.05	0.54	0.11	10726.03	-2.10	354.36
170	14,082	89.90	153.70	168	6	95	10746.44	-3163.18	692.70	3236.82	3238.14	167.65	1.23	0.63	10726.10	-2.17	329.71
171	14,177	89.70	154.30	161	8	95	10746.77	-3248.56	734.35	3329.74	3330.53	167.26	0.67	-0.21	10725.85	-1.92	304.74
172	14,272	89.40	153.70	161	8	95	10747.52	-3333.95	775.99	3422.65	3423.06	166.90	0.71	-0.32	10726.01	-2.08	279.77
173	14,368	90.20	153.80	168	6	96	10747.86	-3420.05	818.45	3516.46	3516.61	166.54	0.84	0.83	10725.76	-1.83	254.13
174	14,463	89.90	154.00	171	6	95	10747.77	-3505.36	860.24	3609.35	3609.37	166.21	0.38	-0.32	10725.09	-1.16	229.00
175	14,557	88.80	154.00	171	6	94	10748.84	-3589.84	901.45	3701.28	3701.29	165.90	1.17	-1.17	10725.58	-1.65	204.29
176	14,652	90.70	154.00	171	8	95	10749.25	-3675.22	943.09	3794.20	3794.29	165.61	2.00	2.00	10725.41	-1.48	179.32
177	14,747	90.70	154.20	180	6	95	10748.09	-3760.67	984.58	3887.15	3887.42	165.33	0.21	0.00	10723.67	0.26	154.51
178	14,842	90.30	154.40	182	6	95	10747.26	-3846.27	1025.78	3980.16	3980.70	165.07	0.47	-0.42	10722.26	1.67	130.02
179	14,937	90.60	153.90	184	6	95	10746.52	-3931.76	1067.20	4073.13	4074.02	164.81	0.61	0.32	10720.93	3.00	105.29
180	15,031	91.50	155.40	177	8	94	10744.80	-4016.69	1107.44	4165.27	4166.56	164.59	1.86	0.96	10718.62	5.31	81.62
181	15,126	91.40	158.40	177	6	95	10742.39	-4104.04	1144.69	4259.03	4260.68	164.42	3.16	-0.11	10715.63	8.30	61.32
182	15,220	90.90	159.40	179	6	94	10740.50	-4191.71	1178.52	4352.29	4354.24	164.30	1.19	-0.53	10713.16	10.77	44.45
183	15,315	91.30	160.80	180	8	95	10738.68	-4281.02	1210.85	4446.77	4448.97	164.21	1.53	0.42	10710.74	13.19	29.37
184	15,410	92.70	161.70	180	6	95	10735.36	-4370.92	1241.37	4541.38	4543.78	164.15	1.75	1.47	10706.83	17.1	



SURVEY CALCULATION PROGRAM

Minimum Curvature

File:

OPERATOR: Lime Rock Resources															VS Referenced to Offset from Surface						
WELL: UL FI 7HD										TARGET TVD					10723.93		NORTH/SOUTH:		-7227.32		
LOCATION: Andrews, TX										TARGET INCL:					89.64		EAST/WEST:		1800.65		
RIG: Precision 601										TARGET AZM:					169.24		(Enter 0° N and 0° E for Surface)				
JOB NUMBER: TX-19-026																					
SURVEY COMPANY							DIRECTIONAL COMPANY							PROPOSED DIRECTION:		166.01		Dec / Total Corr.(+/-):		8.55	
Accel Directional							RPM Consulting							COMMENTS:							
Directional Drillers							COORDINATORS														
Matt Rutland							Nick Thayer														
Dallas Carson/ Dan Thompson																					
Lime Rock Resources							UL FI 7HD							Target Calculations							
		TRUE		TEMP	API	Course			Surface		CLOSURE		DLS/	BUR/	TVD AT 0'		ABOVE (+)	RIGHT(+)			
SVY	MD	INC	AZM	°F	Gamma	Length	TVD	N-S	E-W	Vert Sect	DIST	DIR	100'	100'	V. SEC.	BELOW (-)	LEFT(-)				
196	16,544	89.20	170.40	187	6	94	10746.21	-5481.56	1466.87	5673.58	5674.43	165.02	2.15	-1.81	10710.56	13.37	1.98				
197	16,640	89.10	171.00	187	8	96	10747.63	-5576.29	1482.38	5769.25	5769.96	165.11	0.63	-0.10	10711.38	12.55	4.43				
198	16,734	88.70	170.90	189	6	94	10749.44	-5669.10	1497.17	5862.88	5863.46	165.21	0.44	-0.43	10712.60	11.33	7.23				
199	16,829	88.70	171.10	189	6	95	10751.59	-5762.90	1512.02	5957.50	5957.96	165.30	0.21	0.00	10714.16	9.77	10.15				
200	16,924	88.90	171.10	189	6	95	10753.58	-5856.74	1526.72	6052.10	6052.46	165.39	0.21	0.21	10715.55	8.38	13.23				
201	17,019	87.70	170.90	193	8	95	10756.40	-5950.53	1541.57	6146.70	6146.97	165.48	1.28	-1.26	10717.78	6.15	16.15				
202	17,114	88.10	171.10	193	6	95	10759.88	-6044.29	1556.42	6241.28	6241.47	165.56	0.47	0.42	10720.66	3.27	19.07				
203	17,208	87.60	170.60	188	6	94	10763.41	-6137.03	1571.36	6334.88	6335.01	165.64	0.75	-0.53	10723.60	0.33	21.71				
204	17,304	88.30	170.80	188	6	96	10766.84	-6231.71	1586.87	6430.49	6430.58	165.71	0.76	0.73	10726.44	-2.51	24.15				
205	17,399	88.80	170.40	188	6	95	10769.24	-6325.40	1602.38	6525.16	6525.21	165.78	0.67	0.53	10728.25	-4.32	26.40				
206	17,494	89.90	170.40	188	6	95	10770.32	-6419.07	1618.22	6619.87	6619.90	165.85	1.16	1.16	10728.73	-4.80	28.33				
207	17,588	90.00	170.40	193	3	94	10770.40	-6511.75	1633.89	6713.59	6713.60	165.91	0.11	0.11	10728.22	-4.29	30.23				
208	17,683	91.00	170.10	193	6	95	10769.58	-6605.37	1649.98	6808.33	6808.33	165.97	1.10	1.05	10726.80	-2.87	31.90				
209	17,777	91.20	169.70	193	8	94	10767.77	-6697.90	1666.46	6902.10	6902.10	166.03	0.48	0.21	10724.40	-0.47	32.99				
210	17,872	91.60	169.20	193	6	95	10765.45	-6791.26	1683.85	6996.90	6996.90	166.07	0.67	0.42	10721.49	2.44	33.34				
211	17,966	92.00	169.10	193	6	94	10762.50	-6883.54	1701.54	7090.71	7090.72	166.12	0.44	0.43	10717.94	5.99	33.19				
212	18,060	91.90	168.90	193	6	94	10759.30	-6975.76	1719.46	7184.53	7184.55	166.15	0.24	-0.11	10714.16	9.77	32.79				
213	18,155	90.50	169.10	193	6	95	10757.31	-7068.99	1737.59	7279.37	7279.41	166.19	1.49	-1.47	10711.57	12.36	32.40				
214	18,249	91.10	169.40	193	6	94	10756.00	-7161.33	1755.12	7373.21	7373.27	166.23	0.71	0.64	10709.67	14.26	32.41				
215	18,278	89.60	169.50	194	6	29	10755.82	-7189.84	1760.43	7402.16	7402.22	166.24	5.18	-5.17	10709.31	14.62	32.52				
PTB	18,335	89.60	169.50			57	10756.22	-7245.88	1770.81	7459.05	7459.13	166.27	0.00	0.00	10709.35	14.58	32.78				