

# MARKSMEN DIRECTIONAL, INC.

OPERATOR: WELL: LOCATION: Rig:	ENDURING RESORUCES, LLC University 49#0903H Reagan County Texas Ensign 760	START: FINISH: DIR. DRILLER CO. REP.	4/15/13    	1ST TARGET TVD Vertical Sect. Az. DIP DEG  2ND TARGET TVD DIP AZ DIP DEG	<div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">7140.00</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">180.80</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">0.25</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;"></div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;"></div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;"></div>
TIE-IN SURVEY PROVIDED BY: <span style="color: red;">YES</span>		DECLINATION (+E / -W): <span style="color: blue;">6.4</span>			
Comments: <span style="color: blue;">Directional by Marksmen Directional</span>		<span style="color: blue;">Grid Conv.</span>			

## MINIMUM CURVATURE CALCULATIONS(SPE-3362)

\*\*\*\*\*Survey Input\*\*\*\*\*

Survey	No.	Measured Depth	INC	TRUE AZM	TVD	North + - South	East + - West	Vertical Section	DLS/ 100	1ST TARGET TVD	TVD TO TARGET	RIGHT (+) LEFT (-)	TEMP (°F)
Tie in		0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7140.0	7140.0	0.00	
Gyro		132.0	0.08	127.93	132.00	-0.06	0.07	0.06	0.06	7140.0	7008.0	-0.07	
Gyro		224.8	0.47	129.28	224.84	-0.34	0.42	0.33	0.42	7140.0	6915.2	-0.42	
Gyro		317.7	0.40	139.79	317.68	-0.83	0.92	0.81	0.11	7140.0	6822.3	-0.93	
Gyro		410.5	0.19	116.55	410.51	-1.14	1.27	1.12	0.26	7140.0	6729.5	-1.29	
Gyro		503.4	0.18	59.39	503.35	-1.14	1.53	1.12	0.19	7140.0	6636.6	-1.55	
Gyro		596.2	0.25	47.45	596.19	-0.93	1.81	0.90	0.09	7140.0	6543.8	-1.82	
Gyro		689.0	0.12	351.48	689.03	-0.69	1.94	0.67	0.22	7140.0	6451.0	-1.95	
Gyro		781.9	0.33	264.88	781.87	-0.62	1.66	0.60	0.37	7140.0	6358.1	-1.67	
Gyro		874.7	0.18	292.97	874.71	-0.59	1.26	0.57	0.21	7140.0	6265.3	-1.27	
Gyro		967.6	0.13	301.15	967.55	-0.48	1.04	0.46	0.06	7140.0	6172.4	-1.04	
Gyro		1060.4	0.44	279.22	1060.39	-0.36	0.59	0.36	0.35	7140.0	6079.6	-0.60	
Gyro		1153.2	0.45	194.71	1153.23	-0.66	0.15	0.66	0.64	7140.0	5986.8	-0.16	
Gyro		1246.1	0.32	258.88	1246.07	-1.06	-0.20	1.07	0.46	7140.0	5893.9	0.18	
Gyro		1338.9	0.53	258.89	1338.90	-1.20	-0.87	1.21	0.23	7140.0	5801.1	0.86	
Gyro		1431.8	0.49	260.22	1431.74	-1.35	-1.69	1.37	0.04	7140.0	5708.3	1.67	
Gyro		1524.6	0.60	268.33	1524.58	-1.43	-2.56	1.46	0.14	7140.0	5615.4	2.54	
Gyro		1617.4	0.69	274.21	1617.41	-1.40	-3.61	1.45	0.12	7140.0	5522.6	3.59	
Gyro		1710.3	0.15	266.36	1710.25	-1.37	-4.28	1.43	0.58	7140.0	5429.7	4.26	
Gyro		1803.1	0.56	258.22	1803.09	-1.47	-4.85	1.53	0.44	7140.0	5336.9	4.83	
Gyro		1896.0	0.58	252.31	1895.92	-1.70	-5.74	1.78	0.07	7140.0	5244.1	5.72	
Gyro		1988.8	0.71	198.49	1988.76	-2.39	-6.37	2.48	0.64	7140.0	5151.2	6.34	
Gyro		2081.6	0.70	257.95	2081.59	-3.05	-7.11	3.15	0.75	7140.0	5058.4	7.07	
Gyro		2174.5	0.76	263.42	2174.42	-3.24	-8.28	3.36	0.10	7140.0	4965.6	8.23	
Gyro		2267.3	0.76	272.80	2267.25	-3.28	-9.50	3.42	0.13	7140.0	4872.7	9.46	

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TIE-IN SURVEY PROVIDED BY: <span style="color: red;">YES</span>		DECLINATION (+E / -W): <span style="color: blue;">6.4</span>			
Comments: <span style="color: blue;">Directional by Marksmen Directional</span>		<span style="color: blue;">Grid Conv.</span>			

## MINIMUM CURVATURE CALCULATIONS(SPE-3362)

\*\*\*\*\*Survey Input\*\*\*\*\*

Survey	No.	Measured Depth	INC	TRUE AZM	TVD	North + - South	East + - West	Vertical Section	DLS/ 100	1ST TARGET TVD	TVD TO TARGET	RIGHT (+) LEFT (-)	TEMP (°F)
Gyro		2360.2	0.74	263.28	2360.09	-3.32	-10.71	3.47	0.14	7140.0	4779.9	10.66	
Gyro		2453.0	0.74	268.46	2452.92	-3.41	-11.91	3.58	0.07	7140.0	4687.1	11.86	
Gyro		2545.8	0.75	266.00	2545.75	-3.47	-13.11	3.65	0.04	7140.0	4594.2	13.06	
Gyro		2638.7	0.69	300.26	2638.58	-3.23	-14.20	3.43	0.46	7140.0	4501.4	14.15	
Gyro		2731.5	0.71	280.09	2731.42	-2.85	-15.25	3.06	0.26	7140.0	4408.6	15.21	
Gyro		2824.4	0.61	312.75	2824.25	-2.41	-16.18	2.64	0.41	7140.0	4315.7	16.14	
Gyro		2917.2	0.50	268.46	2917.09	-2.09	-16.95	2.32	0.46	7140.0	4222.9	16.92	
Gyro		3010.0	0.43	292.85	3009.92	-1.96	-17.67	2.21	0.22	7140.0	4130.1	17.64	
Gyro		3102.9	0.48	279.25	3102.76	-1.76	-18.38	2.02	0.13	7140.0	4037.2	18.35	
Gyro		3195.7	0.46	301.68	3195.60	-1.51	-19.08	1.77	0.20	7140.0	3944.4	19.06	
Gyro		3288.6	0.42	301.01	3288.44	-1.13	-19.69	1.41	0.04	7140.0	3851.6	19.67	
Gyro		3381.4	0.46	272.35	3381.27	-0.94	-20.35	1.23	0.24	7140.0	3758.7	20.34	
Gyro		3474.2	0.52	298.30	3474.11	-0.73	-21.10	1.02	0.25	7140.0	3665.9	21.08	
Gyro		3567.1	0.50	295.51	3566.95	-0.36	-21.83	0.66	0.03	7140.0	3573.1	21.82	
Gyro		3659.9	0.46	297.47	3659.78	-0.01	-22.53	0.32	0.05	7140.0	3480.2	22.53	
Gyro		3752.8	0.35	289.08	3752.62	0.26	-23.13	0.07	0.13	7140.0	3387.4	23.13	
Gyro		3845.6	0.30	283.06	3845.46	0.40	-23.63	-0.07	0.07	7140.0	3294.5	23.63	
Gyro		3938.4	0.24	0.38	3938.30	0.65	-23.87	-0.32	0.37	7140.0	3201.7	23.87	
Gyro		4031.3	0.31	323.35	4031.14	1.05	-24.02	-0.71	0.20	7140.0	3108.9	24.03	
Gyro		4124.1	0.23	321.11	4123.98	1.40	-24.28	-1.06	0.09	7140.0	3016.0	24.30	
Gyro		4217.0	0.17	313.46	4216.82	1.64	-24.50	-1.29	0.07	7140.0	2923.2	24.52	
Gyro		4309.8	0.12	331.31	4309.66	1.82	-24.65	-1.47	0.07	7140.0	2830.4	24.67	
Gyro		4402.6	0.10	316.21	4402.49	1.96	-24.75	-1.61	0.04	7140.0	2737.5	24.77	
Gyro		4495.5	0.06	199.84	4495.33	1.97	-24.82	-1.62	0.15	7140.0	2644.7	24.85	
Gyro		4588.3	0.04	161.48	4588.17	1.90	-24.83	-1.55	0.04	7140.0	2551.8	24.85	

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## MINIMUM CURVATURE CALCULATIONS(SPE-3362)

\*\*\*\*\*Survey Input\*\*\*\*\*

Survey	No.	Measured Depth	INC	TRUE AZM	TVD	North + - South	East + - West	Vertical Section	DLS/ 100	1ST TARGET TVD	TVD TO TARGET	RIGHT (+) LEFT (-)	TEMP (°F)
Gyro		4681.2	0.06	54.15	4681.01	1.89	-24.78	-1.55	0.09	7140.0	2459.0	24.80	
Gyro		4774.0	0.08	13.16	4773.85	1.98	-24.72	-1.64	0.06	7140.0	2366.2	24.75	
1		4890.0	0.30	28.40	4889.85	2.33	-24.56	-1.99	0.19	7140.0	2250.2	24.59	93°F
2		5079.0	0.40	33.20	5078.85	3.32	-23.96	-2.98	0.06	7140.0	2061.2	24.01	95°F
3		5268.0	0.50	55.40	5267.84	4.34	-22.92	-4.02	0.11	7140.0	1872.2	22.98	96°F
4		5457.0	0.40	58.90	5456.84	5.15	-21.68	-4.84	0.05	7140.0	1683.2	21.75	97°F
5		5646.0	0.40	60.20	5645.83	5.82	-20.54	-5.53	0.00	7140.0	1494.2	20.62	99°F
6		5741.0	0.40	63.00	5740.83	6.13	-19.96	-5.85	0.02	7140.0	1399.2	20.04	99°F
7		5835.0	0.40	71.40	5834.83	6.38	-19.36	-6.11	0.06	7140.0	1305.2	19.44	100°F
8		5929.0	0.30	93.10	5928.83	6.48	-18.80	-6.21	0.17	7140.0	1211.2	18.89	100°F
9		6024.0	0.40	117.60	6023.83	6.31	-18.26	-6.05	0.19	7140.0	1116.2	18.34	102°F
10		6118.0	0.40	119.80	6117.82	5.99	-17.68	-5.75	0.02	7140.0	1022.2	17.76	105°F
11		6213.0	0.50	114.80	6212.82	5.66	-17.02	-5.42	0.11	7140.0	927.2	17.10	107°F
12		6307.0	0.60	96.80	6306.82	5.42	-16.16	-5.20	0.21	7140.0	833.2	16.23	108°F
13		6401.0	0.50	81.20	6400.81	5.43	-15.26	-5.22	0.19	7140.0	739.2	15.34	109°F
14		6496.0	0.50	66.50	6495.81	5.66	-14.47	-5.46	0.13	7140.0	644.2	14.55	109°F
15		6527.0	0.50	76.50	6526.81	5.74	-14.22	-5.54	0.28	7140.0	613.2	14.30	109°F
16		6558.0	2.20	167.00	6557.80	5.20	-13.95	-5.00	7.29	7140.0	582.2	14.02	109°F
17		6590.0	5.60	173.90	6589.72	3.04	-13.65	-2.85	10.71	7140.0	550.3	13.69	109°F
18		6622.0	9.10	176.60	6621.45	-1.04	-13.33	1.22	10.99	7140.0	518.5	13.32	109°F
19		6653.0	12.40	183.00	6651.91	-6.81	-13.36	6.99	11.30	7140.0	488.1	13.26	109°F
20		6685.0	15.30	186.40	6682.97	-14.44	-14.01	14.63	9.41	7139.9	457.0	13.81	109°F
21		6716.0	18.50	185.40	6712.63	-23.40	-14.93	23.61	10.36	7139.9	427.3	14.60	108°F
22		6748.0	21.50	183.00	6742.70	-34.31	-15.72	34.53	9.72	7139.8	397.2	15.23	108°F
23		6779.0	24.40	182.50	6771.24	-46.39	-16.29	46.61	9.38	7139.8	368.6	15.64	106°F

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## MINIMUM CURVATURE CALCULATIONS(SPE-3362)

\*\*\*\*\*Survey Input\*\*\*\*\*

Survey	No.	Measured Depth	INC	TRUE AZM	TVD	North + - South	East + - West	Vertical Section	DLS/ 100	1ST TARGET TVD	TVD TO TARGET	RIGHT (+) LEFT (-)	TEMP (°F)
	24	6811.0	27.60	182.00	6800.00	-60.40	-16.84	60.63	10.02	7139.7	339.7	15.99	106°F
	25	6842.0	30.70	180.90	6827.07	-75.49	-17.21	75.73	10.15	7139.7	312.6	16.16	106°F
	26	6873.0	33.60	179.60	6853.31	-91.99	-17.28	92.22	9.62	7139.6	286.3	15.99	104°F
	27	6905.0	36.50	179.60	6879.51	-110.36	-17.15	110.59	9.06	7139.5	260.0	15.61	104°F
	28	6936.0	39.50	179.70	6903.93	-129.45	-17.03	129.67	9.68	7139.4	235.5	15.23	104°F
	29	6968.0	42.40	180.10	6928.10	-150.42	-17.00	150.64	9.10	7139.3	211.2	14.90	104°F
	30	7000.0	45.50	179.00	6951.13	-172.62	-16.82	172.84	9.98	7139.2	188.1	14.41	106°F
	40	7032.0	48.30	178.60	6973.00	-195.98	-16.33	196.19	8.80	7139.1	166.1	13.59	106°F
	41	7063.0	51.30	179.70	6993.00	-219.65	-15.98	219.85	10.05	7139.0	146.0	12.91	108°F
	42	7094.0	54.70	180.70	7011.66	-244.40	-16.07	244.60	11.27	7138.9	127.3	12.66	108°F
	43	7126.0	57.80	181.70	7029.44	-271.00	-16.63	271.21	10.03	7138.8	109.4	12.85	108°F
	44	7158.0	60.10	181.90	7045.94	-298.40	-17.50	298.62	7.21	7138.7	92.8	13.33	109°F
	45	7189.0	63.00	181.60	7060.71	-325.64	-18.33	325.87	9.39	7138.6	77.9	13.78	109°F
	46	7220.0	66.20	181.20	7074.00	-353.63	-19.01	353.86	10.39	7138.5	64.5	14.07	109°F
	47	7252.0	69.00	180.00	7086.19	-383.21	-19.32	383.45	9.41	7138.3	52.1	13.96	109°F
	48	7284.0	71.70	179.00	7096.95	-413.34	-19.05	413.57	8.94	7138.2	41.2	13.28	109°F
	49	7315.0	74.10	178.80	7106.07	-442.97	-18.48	443.18	7.77	7138.1	32.0	12.30	109°F
	50	7347.0	76.40	180.00	7114.22	-473.91	-18.16	474.12	8.05	7137.9	23.7	11.54	108°F
	51	7378.0	78.40	179.70	7120.98	-504.16	-18.08	504.36	6.52	7137.8	16.8	11.04	108°F
	52	7410.0	81.50	180.20	7126.56	-535.66	-18.05	535.86	9.81	7137.7	11.1	10.57	107°F
	53	7441.0	84.50	180.00	7130.34	-566.43	-18.11	566.63	9.70	7137.5	7.2	10.20	109°F
	54	7473.0	86.00	179.70	7132.99	-598.32	-18.02	598.51	4.78	7137.4	4.4	9.67	109°F
	55	7504.0	86.50	179.80	7135.02	-629.25	-17.89	629.44	1.64	7137.3	2.2	9.10	109°F
	56	7534.0	88.30	178.90	7136.38	-659.22	-17.55	659.40	6.71	7137.1	0.7	8.34	109°F
	57	7565.0	89.80	177.90	7136.89	-690.20	-16.68	690.37	5.82	7137.0	0.1	7.05	109°F

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	58	7629.0	89.90	178.90	7137.06	-754.17	-14.90	754.31	1.57	7136.7	-0.4	4.37	118°F
	59	7724.0	89.50	178.70	7137.56	-849.15	-12.91	849.25	0.47	7136.3	-1.3	1.05	115°F
	60	7818.0	88.90	178.50	7138.87	-943.11	-10.61	943.17	0.67	7135.9	-3.0	-2.56	115°F
	61	7912.0	90.20	179.80	7139.61	-1037.10	-9.22	1037.12	1.96	7135.5	-4.1	-5.26	113°F
	62	8006.0	89.90	179.80	7139.53	-1131.10	-8.89	1131.11	0.32	7135.1	-4.5	-6.90	113°F
	63	8101.0	89.60	179.50	7139.94	-1226.09	-8.31	1226.09	0.45	7134.7	-5.3	-8.81	115°F
	64	8195.0	90.30	179.50	7140.02	-1320.09	-7.49	1320.07	0.74	7134.2	-5.8	-10.94	115°F
	65	8289.0	89.20	178.90	7140.43	-1414.08	-6.18	1414.03	1.33	7133.8	-6.6	-13.57	116°F
	66	8383.0	90.20	179.30	7140.92	-1508.06	-4.70	1507.98	1.15	7133.4	-7.5	-16.36	115°F
	67	8477.0	91.10	179.00	7139.86	-1602.05	-3.30	1601.94	1.01	7133.0	-6.8	-19.06	116°F
	68	8571.0	88.80	178.00	7139.94	-1696.01	-0.84	1695.85	2.67	7132.6	-7.3	-22.84	116°F
	69	8666.0	90.60	179.60	7140.44	-1790.98	1.14	1790.79	2.54	7132.2	-8.3	-26.15	116°F
	70	8760.0	90.80	180.10	7139.29	-1884.97	1.39	1884.77	0.57	7131.8	-7.5	-27.71	115°F
	71	8854.0	90.20	180.20	7138.47	-1978.96	1.14	1978.76	0.65	7131.4	-7.1	-28.78	116°F
	72	8949.0	89.80	180.20	7138.47	-2073.96	0.81	2073.75	0.42	7131.0	-7.5	-29.77	116°F
	73	9044.0	91.30	182.50	7137.56	-2168.92	-1.42	2168.73	2.89	7130.5	-7.0	-28.86	116°F
	74	9138.0	90.40	182.20	7136.16	-2262.83	-5.28	2262.69	1.01	7130.1	-6.0	-26.32	118°F
	75	9232.0	89.70	182.20	7136.08	-2356.76	-8.89	2356.66	0.74	7129.7	-6.4	-24.02	118°F
	76	9327.0	91.90	181.60	7134.75	-2451.70	-12.04	2451.62	2.40	7129.3	-5.5	-22.20	118°F
	77	9421.0	89.70	180.30	7133.44	-2545.67	-13.59	2545.61	2.72	7128.9	-4.5	-21.95	120°F
	78	9515.0	90.70	181.10	7133.11	-2639.66	-14.74	2639.61	1.36	7128.5	-4.6	-22.11	120°F
	79	9609.0	90.80	180.80	7131.88	-2733.64	-16.30	2733.60	0.34	7128.1	-3.8	-21.87	122°F
	80	9703.0	90.50	180.20	7130.82	-2827.63	-17.12	2827.59	0.71	7127.7	-3.2	-22.36	122°F
	81	9797.0	90.50	180.60	7130.00	-2921.62	-17.78	2921.58	0.43	7127.3	-2.7	-23.02	123°F
	82	9892.0	90.80	180.80	7128.92	-3016.61	-18.94	3016.58	0.38	7126.8	-2.1	-23.18	123°F

# MARKSMEN DIRECTIONAL, INC.

OPERATOR:	ENDURING RESORUCES, LLC	START:	4/15/13	1ST TARGET TVD	7140.00
WELL:	University 49#0903H	FINISH:		Vertical Sect. Az.	180.80
LOCATION:	Reagan County Texas	DIR. DRILLER		DIP DEG	0.25
Rig:	Ensign 760	CO. REP.		2ND TARGET TVD	
TIE-IN SURVEY PROVIDED BY:	VES			DIP AZ	
Comments:	Directional by Marksmen Directional	DECLINATION (+E / -W):	6.4	DIP DEG	
			Grid Conv.		

## MINIMUM CURVATURE CALCULATIONS(SPE-3362)

\*\*\*\*\*Survey Input\*\*\*\*\*

Survey	No.	Measured Depth	INC	TRUE AZM	TVD	North + - South	East + - West	Vertical Section	DLS/ 100	1ST TARGET TVD	TVD TO TARGET	RIGHT (+) LEFT (-)	TEMP (°F)
83		9986.0	90.50	180.70	7127.85	-3110.59	-20.17	3110.57	0.34	7126.4	-1.4	-23.26	124°F
84		10080.0	90.80	180.90	7126.79	-3204.58	-21.48	3204.56	0.38	7126.0	-0.8	-23.26	126°F
85		10174.0	90.60	181.40	7125.64	-3298.55	-23.37	3298.55	0.57	7125.6	0.0	-22.69	125°F
86		10268.0	90.40	181.30	7124.82	-3392.52	-25.58	3392.55	0.24	7125.2	0.4	-21.79	125°F
87		10363.0	90.20	183.00	7124.32	-3487.45	-29.15	3487.52	1.80	7124.8	0.5	-19.55	126°F
88		10457.0	90.10	184.00	7124.07	-3581.27	-34.88	3581.41	1.07	7124.4	0.3	-15.12	126°F
89		10551.0	89.90	182.40	7124.07	-3675.12	-40.13	3675.32	1.72	7124.0	-0.1	-11.19	125°F
90		10646.0	89.70	183.00	7124.40	-3770.02	-44.61	3770.27	0.67	7123.5	-0.9	-8.04	125°F
91		10740.0	89.80	183.80	7124.81	-3863.85	-50.18	3864.17	0.86	7123.1	-1.7	-3.77	125°F
92		10834.0	90.40	182.00	7124.65	-3957.72	-54.94	3958.10	2.02	7122.7	-1.9	-0.33	127°F
93		10929.0	91.70	182.20	7122.91	-4052.64	-58.42	4053.06	1.38	7122.3	-0.6	1.83	127°F
94		11023.0	91.70	182.40	7120.12	-4146.52	-62.19	4146.99	0.21	7121.9	1.8	4.29	127°F
95		11118.0	90.90	180.60	7117.97	-4241.46	-64.67	4241.95	2.07	7121.5	3.5	5.45	127°F
96		11212.0	90.50	181.90	7116.82	-4335.43	-66.72	4335.94	1.45	7121.1	4.3	6.18	127°F
97		11306.0	90.80	182.40	7115.75	-4429.36	-70.25	4429.91	0.62	7120.7	4.9	8.40	128°F
98		11401.0	90.50	184.10	7114.67	-4524.20	-75.63	4524.81	1.82	7120.3	5.6	12.46	129°F
99		11495.0	89.70	182.80	7114.51	-4618.02	-81.29	4618.71	1.62	7119.8	5.3	16.81	129°F
100		11590.0	89.50	182.90	7115.17	-4712.90	-86.01	4713.64	0.24	7119.4	4.3	20.20	129°F
101		11685.0	91.10	181.40	7114.68	-4807.83	-89.58	4808.61	2.31	7119.0	4.3	22.44	129°F
102		11779.0	91.50	181.40	7112.54	-4901.78	-91.87	4902.58	0.43	7118.6	6.1	23.43	129°F
103		11874.0	90.00	180.40	7111.30	-4996.75	-93.37	4997.57	1.90	7118.2	6.9	23.59	129°F
104		11968.0	90.10	180.70	7111.22	-5090.75	-94.27	5091.57	0.34	7117.8	6.6	23.18	131°F
105		12063.0	89.90	181.10	7111.22	-5185.74	-95.76	5186.57	0.47	7117.4	6.2	23.35	132°F
106		12157.0	90.10	180.20	7111.22	-5279.73	-96.83	5280.57	0.98	7117.0	5.7	23.10	132°F
107		12251.0	90.50	180.50	7110.72	-5373.73	-97.40	5374.56	0.53	7116.5	5.8	22.36	134°F



# MARKSMEN DIRECTIONAL, INC.

OPERATOR:	<u>ENDURING RESORUCES, LLC</u>		1ST TARGET TVD	<b>7140.00</b>
WELL:	<u>University 49#0903H</u>	<div style="background-color: yellow; border: 1px solid black; width: 150px; height: 20px; margin: 0 auto;"></div>	Vertical Sect. Az.	<b>180.80</b>
LOCATION:	<u>Reagan County Texas</u>	START: <u>4/15/13</u>	DIP DEG	<b>0.25</b>
Rig:	<u>Ensign 760</u>	FINISH: _____		
TIE-IN SURVEY PROVIDED BY: <b>VES</b>		DIR. DRILLER _____	2ND TARGET TVD	
Comments: <u>Directional by Marksmen Directional</u>		CO. REP. _____	DIP AZ	
			DIP DEG	
		DECLINATION (+E / -W): <u>6.4</u>		
		<u>Grid Conv.</u>		

## MINIMUM CURVATURE CALCULATIONS(SPE-3362)

\*\*\*\*\*Survey Input\*\*\*\*\*

Survey	No.	Measured Depth	INC	TRUE AZM	TVD	North + - South	East + - West	Vertical Section	DLS/ 100	1ST TARGET TVD	TVD TO TARGET	RIGHT (+) LEFT (-)	TEMP (°F)
108		12346.0	90.40	180.70	7109.98	-5468.72	-98.40	5469.56	0.24	7116.1	6.2	22.03	136°F
109		12441.0	90.20	180.00	7109.48	-5563.71	-98.98	5564.55	0.77	7115.7	6.2	21.29	136°F
110		12535.0	90.50	180.20	7108.91	-5657.71	-99.14	5658.54	0.38	7115.3	6.4	20.14	138°F
111		12630.0	90.50	180.50	7108.08	-5752.71	-99.72	5753.54	0.32	7114.9	6.8	19.39	138°F
112		12724.0	90.50	180.90	7107.26	-5846.70	-100.87	5847.53	0.43	7114.5	7.2	19.23	138°F
113		12818.0	88.50	180.10	7108.08	-5940.68	-101.69	5941.52	2.29	7114.1	6.0	18.73	138°F
114		12913.0	88.00	180.70	7110.98	-6035.64	-102.35	6036.48	0.82	7113.7	2.7	18.07	138°F
115		13007.0	88.30	178.90	7114.01	-6129.58	-102.02	6130.41	1.94	7113.3	-0.8	16.43	138°F
116		13102.0	88.40	179.50	7116.75	-6224.53	-100.70	6225.33	0.64	7112.8	-3.9	13.78	138°F
117		13196.0	89.80	178.70	7118.23	-6318.51	-99.22	6319.28	1.72	7112.4	-5.8	10.99	138°F
118		13290.0	90.10	180.60	7118.31	-6412.50	-98.65	6413.25	2.05	7112.0	-6.3	9.11	138°F
119		13384.0	89.90	179.80	7118.31	-6506.50	-98.98	6507.25	0.88	7111.6	-6.7	8.12	136°F
120		13479.0	90.00	179.00	7118.39	-6601.49	-97.98	6602.22	0.85	7111.2	-7.2	5.80	138°F
121		13573.0	89.70	177.30	7118.64	-6695.44	-94.95	6696.11	1.84	7110.8	-7.9	1.45	138°F
122		13667.0	91.00	177.70	7118.06	-6789.35	-90.85	6789.95	1.45	7110.4	-7.7	-3.96	136°F
123		13761.0	89.80	176.60	7117.41	-6883.23	-86.17	6883.76	1.73	7110.0	-7.4	-9.94	138°F
124		13855.0	89.80	177.20	7117.73	-6977.09	-81.09	6977.54	0.64	7109.6	-8.2	-16.33	138°F
125		13950.0	91.00	176.10	7117.07	-7071.92	-75.54	7072.28	1.71	7109.1	-7.9	-23.21	138°F
126		14044.0	91.60	178.80	7114.94	-7165.79	-71.36	7166.09	2.94	7108.7	-6.2	-28.70	138°F
127		14137.0	91.40	179.80	7112.50	-7258.75	-70.22	7259.03	1.10	7108.3	-4.2	-31.13	138°F
128		14231.0	91.30	180.40	7110.29	-7352.73	-70.39	7352.99	0.65	7107.9	-2.4	-32.28	138°F
129		14326.0	89.30	180.20	7109.79	-7447.72	-70.88	7447.98	2.12	7107.5	-2.3	-33.11	138°F
130		14420.0	88.90	180.50	7111.27	-7541.70	-71.46	7541.97	0.53	7107.1	-4.2	-33.85	138°F
131		14514.0	91.80	181.90	7110.69	-7635.67	-73.43	7635.95	3.43	7106.7	-4.0	-33.19	138°F
132		14609.0	91.40	182.00	7108.04	-7730.58	-76.66	7730.89	0.43	7106.3	-1.8	-31.29	138°F

# MARKSMEN DIRECTIONAL, INC.

OPERATOR: WELL: LOCATION: Rig:	ENDURING RESORUCES, LLC University 49#0903H Reagan County Texas Ensign 760	START: 4/15/13 FINISH: DIR. DRILLER CO. REP.	1ST TARGET TVD Vertical Sect. Az. DIP DEG  2ND TARGET TVD DIP AZ DIP DEG	<div style="border: 1px solid black; background-color: #d3d3d3; padding: 2px; margin-bottom: 2px;">7140.00</div> <div style="border: 1px solid black; background-color: #d3d3d3; padding: 2px; margin-bottom: 2px;">180.80</div> <div style="border: 1px solid black; background-color: #d3d3d3; padding: 2px; margin-bottom: 2px;">0.25</div> <div style="border: 1px solid black; background-color: #d3d3d3; padding: 2px; margin-bottom: 2px;"></div> <div style="border: 1px solid black; background-color: #d3d3d3; padding: 2px; margin-bottom: 2px;"></div> <div style="border: 1px solid black; background-color: #d3d3d3; padding: 2px; margin-bottom: 2px;"></div>
TIE-IN SURVEY PROVIDED BY: <span style="color: red;">YES</span>		DECLINATION (+E / -W): <span style="color: blue;">6.4</span>		
Comments: Directional by Marksmen Directional		Grid Conv.		

## MINIMUM CURVATURE CALCULATIONS(SPE-3362)

\*\*\*\*\*Survey Input\*\*\*\*\*

Survey	No.	Measured Depth	INC	TRUE AZM	TVD	North + - South	East + - West	Vertical Section	DLS/ 100	1ST TARGET TVD	TVD TO TARGET	RIGHT (+) LEFT (-)	TEMP (°F)
133		14703.0	91.40	182.50	7105.74	-7824.48	-80.35	7824.84	0.53	7105.9	0.1	-28.91	138°F
134		14796.0	91.40	182.40	7103.47	-7917.36	-84.32	7917.77	0.11	7105.5	2.0	-26.23	140°F
135		14890.0	90.10	181.90	7102.24	-8011.29	-87.85	8011.73	1.48	7105.0	2.8	-24.02	140°F
136		14984.0	88.50	181.30	7103.39	-8105.24	-90.47	8105.71	1.82	7104.6	1.2	-22.70	138°F
137		15079.0	88.90	182.20	7105.55	-8200.17	-93.37	8200.67	1.04	7104.2	-1.3	-21.13	138°F
138		15174.0	89.50	182.30	7106.87	-8295.09	-97.10	8295.63	0.64	7103.8	-3.1	-18.73	
139		15268.0	90.20	184.10	7107.12	-8388.94	-102.35	8389.55	2.05	7103.4	-3.7	-14.79	
140		15362.0	89.10	181.70	7107.69	-8482.81	-107.10	8483.47	2.81	7103.0	-4.7	-11.35	
141		15457.0	89.70	184.20	7108.69	-8577.67	-111.99	8578.39	2.71	7102.6	-6.1	-7.78	
142		15551.0	89.50	184.10	7109.34	-8671.42	-118.79	8672.23	0.24	7102.2	-7.2	-2.29	
143		15646.0	89.70	181.80	7110.01	-8766.28	-123.68	8767.16	2.43	7101.7	-8.3	1.27	
144		15740.0	90.40	180.60	7109.93	-8860.26	-125.65	8861.15	1.48	7101.3	-8.6	1.93	
145		15834.0	90.50	181.10	7109.19	-8954.25	-127.05	8955.15	0.54	7100.9	-8.3	2.01	
146		15928.0	90.40	181.50	7108.45	-9048.22	-129.18	9049.14	0.44	7100.5	-7.9	2.83	
147		16023.0	89.00	181.20	7108.95	-9143.19	-131.42	9144.13	1.51	7100.1	-8.8	3.74	
148		16117.0	90.30	180.70	7109.52	-9237.17	-132.98	9238.13	1.48	7099.7	-9.8	3.99	
149		16212.0	91.00	180.00	7108.44	-9332.16	-133.56	9333.12	1.04	7099.3	-9.2	3.24	
150		16306.0	91.20	180.30	7106.64	-9426.15	-133.80	9427.09	0.38	7098.9	-7.8	2.18	
151		16400.0	91.30	180.50	7104.59	-9520.12	-134.46	9521.07	0.24	7098.5	-6.1	1.52	
152		16495.0	88.50	179.40	7104.75	-9615.11	-134.37	9616.05	3.17	7098.0	-6.7	0.11	
153		16589.0	88.10	179.60	7107.54	-9709.06	-133.55	9709.98	0.48	7097.6	-9.9	-2.02	
154		16683.0	88.10	179.70	7110.66	-9803.01	-132.98	9803.91	0.11	7097.2	-13.4	-3.90	
155		16777.0	87.60	180.00	7114.18	-9896.94	-132.73	9897.83	0.62	7096.8	-17.4	-5.46	
156		16872.0	87.30	180.20	7118.41	-9991.85	-132.90	9992.73	0.38	7096.4	-22.0	-6.62	
157		16966.0	87.20	180.80	7122.92	-10085.74	-133.72	10086.62	0.65	7096.0	-26.9	-7.11	142°F



7140.00
180.80
0.25

START:	4/15/13
FINISH:	
DIR. DRILLER	
CO. REP.	

DIR. DRILLER \_\_\_\_\_  
CO. REP. \_\_\_\_\_

1ST TARGET TVD	7140.00
Vertical Sect. Az.	180.80
DIP DEG	0.25
2ND TARGET TVD	
DIP AZ	
DIP DEG	

**PROPOSED DIR.: 180.80**

1ST TARGET	TVD TO	RIGHT (+)	TEMP
TVD	TARGET	LEFT (-)	(°F)

Survey	Measured No. Depth	INC	TRUE AZM	TVD	North + - South	East + - West	Vertical Section	DLS/ 100				
158	17061.0	87.00	180.90	7127.73	-10180.61	-135.13	10181.50	0.24	7095.6	-32.2	-7.03	142°F
159	17155.0	86.90	181.50	7132.73	-10274.45	-137.09	10275.36	0.65	7095.2	-37.6	-6.37	
160	17249.0	86.50	181.70	7138.14	-10368.26	-139.71	10369.20	0.48	7094.8	-43.4	-5.06	
161	17344.0	86.10	182.30	7144.27	-10463.00	-143.02	10463.98	0.76	7094.3	-49.9	-3.08	
162	17438.0	85.70	182.40	7150.99	-10556.68	-146.87	10557.70	0.44	7093.9	-57.1	-0.54	145°F
163	17532.0	86.00	182.50	7157.79	-10650.35	-150.87	10651.42	0.34	7093.5	-64.3	2.16	
164	17627.0	85.80	182.30	7164.59	-10745.02	-154.84	10746.14	0.30	7093.1	-71.5	4.80	
165	17721.0	85.70	182.10	7171.55	-10838.70	-158.44	10839.85	0.24	7092.7	-78.9	7.09	
166	17815.0	85.60	182.20	7178.68	-10932.36	-161.96	10933.55	0.15	7092.3	-86.4	9.30	
PBHL/TD	18000.0	85.60	182.20	7192.88	-11116.68	-169.04	11117.95	0.00	7091.5	-101.4	13.81	