

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy

Lease/Well: Lari12-33

Location: S33 T11N R61W

Rig Name: Production

State/County: Colorado/Weld

Latitude: 40.88, Longitude: -104.22

GRID North is 0.83 Degrees East of True North

VS-Azi: 0.00 Degrees

GTI

GYRO TECHNOLOGIES INC

FIELD COPY ONLY (NOT DEFINITIVE)

Elevation : 5066 feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: lari12-33-01_ed.ut

Minimum Curvature Method

Report Date/Time: 1/15/2011 / 17:43

Vaughn Energy Services

Fort Worth, Texas

817-741-3610

Ray Seago

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.74	144.81	100.00	-0.53	0.37	-0.53	0.65	144.81	0.74
200.00	0.83	156.78	199.99	-1.73	1.03	-1.73	2.01	149.11	0.19
300.00	0.43	158.88	299.98	-2.75	1.46	-2.75	3.11	152.07	0.41
400.00	0.55	153.04	399.98	-3.53	1.81	-3.53	3.96	152.83	0.14
500.00	0.34	195.48	499.97	-4.24	1.95	-4.24	4.67	155.31	0.38
600.00	0.16	156.92	599.97	-4.65	1.92	-4.65	5.03	157.52	0.24
700.00	0.31	188.34	699.97	-5.05	1.94	-5.05	5.41	158.99	0.20
800.00	0.09	170.32	799.97	-5.39	1.91	-5.39	5.72	160.48	0.23
900.00	0.28	135.93	899.97	-5.64	2.10	-5.64	6.02	159.63	0.22
1000.00	0.10	172.26	999.97	-5.91	2.28	-5.91	6.34	158.92	0.21
1100.00	0.38	193.21	1099.97	-6.33	2.21	-6.33	6.71	160.71	0.29
1200.00	0.22	197.82	1199.97	-6.83	2.08	-6.83	7.14	163.07	0.17
1300.00	0.25	210.93	1299.97	-7.20	1.91	-7.20	7.45	165.15	0.07
1400.00	0.32	191.99	1399.97	-7.66	1.74	-7.66	7.86	167.22	0.11
1500.00	0.37	197.79	1499.97	-8.24	1.58	-8.24	8.39	169.13	0.06
1600.00	0.34	183.16	1599.96	-8.85	1.47	-8.85	8.97	170.59	0.09
1700.00	0.25	165.15	1699.96	-9.36	1.51	-9.36	9.48	170.85	0.13
1800.00	0.05	215.94	1799.96	-9.61	1.54	-9.61	9.73	170.91	0.22
1900.00	0.23	165.92	1899.96	-9.84	1.56	-9.84	9.97	170.98	0.21
2000.00	0.11	273.71	1999.96	-10.04	1.52	-10.04	10.15	171.38	0.29
2100.00	0.21	160.74	2099.96	-10.20	1.49	-10.20	10.31	171.70	0.27
2200.00	0.04	266.76	2199.96	-10.37	1.52	-10.37	10.48	171.69	0.22
2300.00	0.23	220.69	2299.96	-10.53	1.35	-10.53	10.61	172.68	0.21
2400.00	0.48	244.06	2399.96	-10.86	0.84	-10.86	10.89	175.57	0.28
2500.00	0.89	236.18	2499.95	-11.48	-0.18	-11.48	11.48	180.91	0.42
2600.00	1.04	242.58	2599.94	-12.33	-1.64	-12.33	12.44	187.55	0.18
2700.00	1.02	229.39	2699.92	-13.33	-3.12	-13.33	13.69	193.17	0.24
2800.00	1.23	231.35	2799.90	-14.58	-4.63	-14.58	15.30	197.63	0.21
2900.00	0.92	218.51	2899.88	-15.88	-5.97	-15.88	16.96	200.61	0.39
3000.00	0.93	222.04	2999.87	-17.11	-7.01	-17.11	18.49	202.29	0.06
3100.00	0.63	229.29	3099.86	-18.07	-7.97	-18.07	19.75	203.81	0.32
3200.00	0.73	215.00	3199.85	-18.95	-8.75	-18.95	20.87	204.79	0.20
3300.00	0.65	229.52	3299.85	-19.84	-9.55	-19.84	22.02	205.71	0.19
3400.00	0.68	217.83	3399.84	-20.68	-10.35	-20.68	23.12	206.58	0.14

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
3500.00	0.74	216.69	3499.83	-21.66	-11.10	-21.66	24.34	207.12	0.06
3600.00	0.62	214.18	3599.83	-22.63	-11.79	-22.63	25.52	207.51	0.12
3700.00	0.73	186.23	3699.82	-23.71	-12.16	-23.71	26.65	207.16	0.34
3800.00	1.29	145.22	3799.80	-25.27	-11.59	-25.27	27.80	204.64	0.88
3900.00	1.63	118.01	3899.77	-26.87	-9.69	-26.87	28.56	199.83	0.76
4000.00	1.62	125.46	3999.73	-28.35	-7.28	-28.35	29.27	194.40	0.21
4100.00	1.51	126.61	4099.70	-29.96	-5.08	-29.96	30.38	189.62	0.12
4200.00	1.73	112.27	4199.66	-31.31	-2.62	-31.31	31.42	184.78	0.46
4300.00	1.62	112.38	4299.61	-32.43	0.09	-32.43	32.43	179.85	0.11
4400.00	2.05	109.16	4399.56	-33.55	3.08	-33.55	33.69	174.75	0.43
4500.00	2.53	120.26	4499.48	-35.25	6.67	-35.25	35.87	169.28	0.65
4600.00	2.56	120.88	4599.38	-37.51	10.50	-37.51	38.95	164.36	0.04
4700.00	2.85	119.72	4699.27	-39.89	14.57	-39.89	42.47	159.93	0.29
4800.00	3.37	110.12	4799.12	-42.13	19.49	-42.13	46.42	155.17	0.74
4900.00	3.63	102.61	4898.94	-43.83	25.35	-43.83	50.63	149.96	0.53
5000.00	3.34	100.76	4998.75	-45.07	31.30	-45.07	54.87	145.22	0.32
5100.00	3.13	102.63	5098.59	-46.21	36.82	-46.21	59.08	141.45	0.24
5200.00	2.80	111.85	5198.46	-47.71	41.75	-47.71	63.40	138.82	0.58
5300.00	2.21	102.14	5298.37	-49.02	45.89	-49.02	67.15	136.89	0.73
5400.00	2.34	100.49	5398.29	-49.80	49.78	-49.80	70.42	135.01	0.15
5500.00	2.08	104.40	5498.21	-50.63	53.56	-50.63	73.70	133.39	0.30
5600.00	2.15	102.68	5598.14	-51.49	57.15	-51.49	76.93	132.02	0.09
5700.00	1.77	85.84	5698.09	-51.79	60.52	-51.79	79.66	130.55	0.69
5800.00	1.47	87.02	5798.05	-51.61	63.35	-51.61	81.71	129.17	0.30
5900.00	1.42	81.05	5898.01	-51.35	65.86	-51.35	83.51	127.95	0.16
6000.00	1.17	75.86	5997.99	-50.91	68.07	-50.91	85.01	126.79	0.28
6100.00	1.37	97.06	6097.96	-50.81	70.25	-50.81	86.70	125.88	0.51
6200.00	1.58	87.45	6197.93	-50.89	72.81	-50.89	88.84	124.95	0.33
6300.00	1.80	89.94	6297.89	-50.83	75.76	-50.83	91.23	123.86	0.22
6400.00	1.81	98.48	6397.84	-51.06	78.89	-51.06	93.97	122.91	0.27
6500.00	1.81	93.79	6497.79	-51.40	82.02	-51.40	96.80	122.07	0.15
6600.00	2.10	81.78	6597.73	-51.24	85.41	-51.24	99.60	120.96	0.50
6700.00	1.93	88.97	6697.67	-50.95	88.91	-50.95	102.47	119.81	0.30
6800.00	1.86	92.36	6797.61	-50.98	92.21	-50.98	105.37	118.94	0.13
6900.00	1.05	113.28	6897.58	-51.41	94.68	-51.41	107.74	118.50	0.95
7000.00	0.43	150.89	6997.57	-52.11	95.71	-52.11	108.97	118.57	0.76
7100.00	0.47	158.48	7097.57	-52.82	96.04	-52.82	109.61	118.81	0.07
7500.00	0.15	192.74	7497.56	-54.84	96.52	-54.84	111.01	119.60	0.09
7550.00	0.13	80.33	7547.56	-54.90	96.56	-54.90	111.08	119.62	0.46

HORIZONTAL DISPLACEMENT IS 111.08 FEET AT 119.62 DEGREES									
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