

Multi-Shot

(A BWWC COMPANY)

**P. O. BOX 630
BROUSSARD, LOUISIANA 70518
(318) 839-8400**

SAGE ENERGY

Company

NVANU # 163 (Leg 1)

Well Name

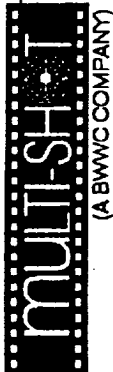
752/N 9 476/E
A-2-17-34

LEA COUNTY, NEW MEXICO

Well Location

NORTON # 8

Rig Name



P. O. Drawer 630
Broussard, LA 70518
Phone: 318-839-8400
Fax: 318-839-8401

Job Number: 9922435-32
Company: Sage Energy
Lease/Well: NVANU # 163 - Leg 1
Location: Lea County
Rig Name: Norton # 8
RKB:
G.L. or M.S.L.: GL

State/Country: New Mexico, USA

Declination: 9.06 Degrees East to True

Grid:

File name: C:\SURV-99\SAGEEN-1\NV163-L1.SVY

Date/Time: 25-Oct-99 / 15:40

Curve Name: Sage Energy; NVANU # 163; Lea County, New Mexico; Norton # 8

WINSERVE SURVEY CALCULATIONS

Minimum Curvature Method

Vertical Section Plane 220.00

Vertical Section Referenced to Wellhead

Rectangular Coordinates Referenced to Wellhead

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Course Length FT	Subsea TVD FT	N-S FT	E-W FT	CLOSURE		Dogleg Severity Deg/100
								Distance FT	Direction Deg	
100.00	.73	261.21	100.00		-100.00	-.10	-.63	.64	261.21	.00
200.00	.60	231.24	199.99	100.00	-199.99	-.52	-1.67	1.75	252.60	.37
300.00	.72	217.44	299.98	100.00	-299.98	-1.35	-2.46	2.80	241.23	.20
400.00	.85	227.85	399.97	100.00	-399.97	-2.35	-3.39	4.12	235.31	.19
500.00	.84	214.92	499.96	100.00	-499.96	-3.44	-4.36	5.56	231.68	.19
600.00	.89	221.36	599.95	100.00	-599.95	-4.63	-5.29	7.03	228.83	.11
700.00	1.03	209.61	699.94	100.00	-699.94	-5.99	-6.25	8.66	226.20	.24
800.00	.98	199.16	799.92	100.00	-799.92	-7.58	-6.97	10.30	222.61	.19
900.00	.87	201.61	899.91	100.00	-899.91	-9.10	-7.53	11.81	219.64	.12
1000.00	.89	197.59	999.90	100.00	-999.90	-10.54	-8.05	13.26	217.36	.06

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Course Length FT	Subsea TVD FT	N-S FT	E-W FT	Vertical Section FT	CLOSURE Distance FT	Direction Deg	Dogleg Severity Deg/100
1100.00	.89	209.23	1099.89	100.00	-1099.89	-11.96	-8.66	14.73	14.77	215.92	.18
1200.00	.82	200.73	1199.88	100.00	-1199.88	-13.31	-9.29	16.17	16.23	214.93	.14
1300.00	.87	206.66	1299.86	100.00	-1299.86	-14.65	-9.89	17.58	17.68	214.01	.10
1400.00	1.01	208.76	1399.85	100.00	-1399.85	-16.11	-10.65	19.19	19.31	213.48	.14
1500.00	1.08	209.32	1499.83	100.00	-1499.83	-17.70	-11.54	20.98	21.13	213.10	.07
1600.00	1.17	209.26	1599.82	100.00	-1599.82	-19.41	-12.50	22.91	23.09	212.78	.09
1700.00	1.36	218.55	1699.79	100.00	-1699.79	-21.23	-13.74	25.09	25.29	212.91	.28
1800.00	1.23	211.32	1799.77	100.00	-1799.77	-23.08	-15.04	27.34	27.54	213.09	.21
1900.00	1.36	208.21	1899.74	100.00	-1899.74	-25.04	-16.15	29.56	29.80	212.83	.15
2000.00	1.49	210.64	1999.71	100.00	-1999.71	-27.20	-17.38	32.01	32.28	212.57	.14
2100.00	1.69	208.33	2099.67	100.00	-2099.67	-29.62	-18.74	34.74	35.05	212.32	.21
2200.00	1.64	217.55	2199.63	100.00	-2199.63	-32.05	-20.31	37.61	37.95	212.36	.27
2300.00	1.68	224.70	2299.59	100.00	-2299.59	-34.23	-22.22	40.50	40.81	212.98	.21
2400.00	1.47	231.63	2399.55	100.00	-2399.55	-36.07	-24.25	43.22	43.46	213.92	.28
2500.00	1.60	243.44	2499.51	100.00	-2499.51	-37.49	-26.51	45.76	45.91	215.26	.34
2600.00	1.68	256.57	2599.47	100.00	-2599.47	-38.45	-29.18	48.21	48.27	217.19	.38
2700.00	1.30	271.29	2699.44	100.00	-2699.44	-38.77	-31.74	50.10	50.10	219.31	.54
2800.00	1.25	279.69	2799.41	100.00	-2799.41	-38.56	-33.95	51.36	51.37	221.36	.19
2900.00	.97	291.23	2899.40	100.00	-2899.40	-38.07	-35.81	52.18	52.27	223.25	.36
3000.00	.91	305.21	2999.38	100.00	-2999.38	-37.30	-37.25	52.52	52.72	224.96	.24
3100.00	.52	295.27	3099.37	100.00	-3099.37	-36.65	-38.31	52.70	53.02	226.27	.41
3200.00	.48	280.41	3199.37	100.00	-3199.37	-36.38	-39.13	53.03	53.43	227.09	.14
3300.00	.46	289.76	3299.37	100.00	-3299.37	-36.17	-39.92	53.37	53.87	227.82	.08
3400.00	.29	282.41	3399.36	100.00	-3399.36	-35.98	-40.55	53.63	54.21	228.42	.18
3500.00	.31	322.71	3499.36	100.00	-3499.36	-35.71	-40.96	53.68	54.34	228.92	.21
3600.00	.36	298.06	3599.36	100.00	-3599.36	-35.35	-41.40	53.69	54.44	229.51	.15
3700.00	.49	317.34	3699.36	100.00	-3699.36	-34.89	-41.97	53.70	54.57	230.26	.19
3800.00	.34	312.63	3799.36	100.00	-3799.36	-34.37	-42.48	53.63	54.64	231.02	.15
3900.00	.40	322.38	3899.35	100.00	-3899.35	-33.89	-42.91	53.54	54.68	231.69	.09
4000.00	.29	292.90	3999.35	100.00	-3999.35	-33.52	-43.35	53.54	54.80	232.29	.21

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Course Length FT	Subsea TVD FT	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
									Distance FT	Direction Deg	
4100.00	.34	267.89	4099.35	100.00	-4099.35	-33.43	-43.88	53.82	55.17	232.70	.14
4200.00	.28	256.61	4199.35	100.00	-4199.35	-33.50	-44.42	54.21	55.63	232.98	.09
4300.00	.35	245.41	4299.35	100.00	-4299.35	-33.68	-44.93	54.68	56.16	233.14	.09
4400.00	.47	237.99	4399.35	100.00	-4399.35	-34.03	-45.56	55.35	56.86	233.24	.13
4500.00	.47	250.39	4499.34	100.00	-4499.34	-34.38	-46.29	56.09	57.66	233.40	.10
4600.00	.56	251.45	4599.34	100.00	-4599.34	-34.67	-47.14	56.86	58.52	233.66	.09
4700.00	.65	255.53	4699.33	100.00	-4699.33	-34.97	-48.15	57.74	59.51	234.01	.10
4800.00	.77	256.81	4799.33	100.00	-4799.33	-35.27	-49.36	58.74	60.66	234.45	.12
4900.00	.72	256.64	4899.32	100.00	-4899.32	-35.57	-50.62	59.78	61.87	234.91	.05
5000.00	.68	260.55	4999.31	100.00	-4999.31	-35.81	-51.82	60.74	62.99	235.36	.06
5100.00	.82	268.15	5099.30	100.00	-5099.30	-35.93	-53.12	61.67	64.13	235.93	.17
5200.00	.75	268.88	5199.29	100.00	-5199.29	-35.96	-54.49	62.58	65.29	236.57	.07
5300.00	.77	272.38	5299.28	100.00	-5299.28	-35.95	-55.82	63.42	66.39	237.22	.05
5400.00	.87	276.00	5399.27	100.00	-5399.27	-35.84	-57.24	64.25	67.54	237.95	.11
5500.00	.67	274.72	5499.26	100.00	-5499.26	-35.71	-58.58	65.01	68.61	238.63	.20
5600.00	.72	274.51	5599.26	100.00	-5599.26	-35.62	-59.79	65.72	69.59	239.22	.05
5700.00	.76	265.12	5699.25	100.00	-5699.25	-35.62	-61.08	66.55	70.71	239.75	.13
5800.00	.77	276.57	5799.24	100.00	-5799.24	-35.60	-62.40	67.39	71.85	240.29	.15
5900.00	.71	254.12	5899.23	100.00	-5899.23	-35.70	-63.67	68.27	72.99	240.72	.29
6000.00	.90	257.85	5999.22	100.00	-5999.22	-36.03	-65.03	69.40	74.35	241.01	.20
6100.00	.80	241.37	6099.21	100.00	-6099.21	-36.53	-66.41	70.67	75.80	241.19	.26
6200.00	.87	241.60	6199.20	100.00	-6199.20	-37.23	-67.69	72.03	77.25	241.19	.07
6300.00	1.04	233.04	6299.19	100.00	-6299.19	-38.13	-69.09	73.62	78.91	241.10	.22
6400.00	.99	238.59	6399.17	100.00	-6399.17	-39.13	-70.55	75.32	80.67	240.99	.11
6500.00	1.03	230.75	6499.15	100.00	-6499.15	-40.15	-71.98	77.02	82.42	240.85	.14
6600.00	1.08	230.47	6599.14	100.00	-6599.14	-41.32	-73.40	78.83	84.23	240.63	.05
6700.00	.97	226.24	6699.12	100.00	-6699.12	-42.50	-74.74	80.60	85.98	240.38	.13
6800.00	.93	226.70	6799.11	100.00	-6799.11	-43.64	-75.94	82.25	87.59	240.11	.04
6900.00	1.01	231.81	6899.09	100.00	-6899.09	-44.75	-77.23	83.92	89.25	239.91	.12
7000.00	.89	222.02	6999.08	100.00	-6999.08	-45.87	-78.44	85.56	90.87	239.68	.20

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Course Length FT	Subsea TVD FT	N-S FT	E-W FT	Vertical Section FT	CLOSURE Distance FT	Direction Deg	Dogleg Severity Deg/100
7100.00	.97	228.96	7099.07	100.00	-7099.07	-47.00	-79.60	87.17	92.44	239.44	.14
7200.00	1.06	221.18	7199.05	100.00	-7199.05	-48.25	-80.85	88.93	94.15	239.17	.16
7300.00	1.11	221.50	7299.03	100.00	-7299.03	-49.67	-82.10	90.82	95.96	238.82	.05
7400.00	.93	224.27	7399.02	100.00	-7399.02	-50.98	-83.31	92.60	97.67	238.53	.19
7500.00	1.16	227.11	7499.00	100.00	-7499.00	-52.25	-84.61	94.41	99.45	238.30	.24
7600.00	1.08	220.70	7598.98	100.00	-7598.98	-53.65	-85.97	96.36	101.34	238.03	.15
7700.00	1.18	214.93	7698.96	100.00	-7698.96	-55.21	-87.17	98.33	103.19	237.65	.15
7800.00	1.29	224.45	7798.94	100.00	-7798.94	-56.86	-88.55	100.48	105.24	237.30	.23
7900.00	1.08	226.52	7898.92	100.00	-7898.92	-58.31	-90.02	102.54	107.26	237.07	.21
8000.00	1.07	212.60	7998.90	100.00	-7998.90	-59.75	-91.21	104.40	109.04	236.77	.26
8100.00	1.19	216.86	8098.88	100.00	-8098.88	-61.36	-92.34	106.36	110.87	236.39	.15
8200.00	1.23	214.70	8198.86	100.00	-8198.86	-63.08	-93.57	108.47	112.85	236.02	.06
8300.00	1.19	211.95	8298.84	100.00	-8298.84	-64.84	-94.73	110.56	114.80	235.61	.07
8400.00	1.43	211.77	8398.81	100.00	-8398.81	-66.78	-95.94	112.83	116.89	235.16	.24
8500.00	1.59	211.20	8498.77	100.00	-8498.77	-69.03	-97.31	115.43	119.31	234.65	.16

Tie In to Multi-Shot Gyroscopic Multiple shot survey.

8600.00	1.40	199.50	8598.74	100.00	-8598.74	-71.37	-98.44	117.95	121.59	234.06	.36
8656.00	3.10	216.40	8654.70	56.00	-8654.70	-73.23	-99.57	120.10	123.60	233.67	3.23
8672.00	11.60	232.80	8670.55	16.00	-8670.55	-74.56	-101.11	122.10	125.62	233.60	54.19
8703.00	30.80	235.50	8699.32	31.00	-8699.32	-81.00	-110.22	132.89	136.78	233.69	62.00
8735.00	50.30	229.40	8723.53	32.00	-8723.53	-93.78	-126.48	153.14	157.45	233.45	62.12
8763.00	65.60	222.70	8738.35	28.00	-8738.35	-110.27	-143.42	176.66	180.91	232.45	58.24
8795.00	72.60	221.80	8749.76	32.00	-8749.76	-132.39	-163.50	206.51	210.38	231.00	22.03
8826.00	78.60	220.40	8757.47	31.00	-8757.47	-155.00	-183.23	236.52	240.00	229.77	19.84
8858.00	79.20	217.50	8763.63	32.00	-8763.63	-179.42	-202.96	267.91	270.90	228.52	9.09
8888.00	81.50	217.70	8768.66	30.00	-8768.66	-202.85	-221.01	297.46	299.99	227.45	7.69
8920.00	84.50	218.00	8772.56	32.00	-8772.56	-227.93	-240.49	329.19	331.35	226.54	9.42
8952.00	87.20	217.00	8774.87	32.00	-8774.87	-253.25	-259.92	361.07	362.90	225.75	8.99
8983.00	86.90	217.90	8776.47	31.00	-8776.47	-277.83	-278.75	392.00	393.56	225.09	3.06
9015.00	87.20	217.70	8778.11	32.00	-8778.11	-303.08	-298.33	423.94	425.27	224.55	1.13

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Course Length FT	Subsea TVD FT	N-S FT	E-W FT	Vertical Section FT	CLOSURE Distance FT	Direction Deg	Dogleg Severity Deg/100
9047.00	88.60	218.00	8779.29	32.00	-8779.29	-328.33	-317.95	455.89	457.05	224.08	4.47
9080.00	88.20	216.90	8780.21	33.00	-8780.21	-354.51	-338.01	488.84	489.83	223.63	3.55
9112.00	88.30	216.60	8781.19	32.00	-8781.19	-380.14	-357.15	520.78	521.60	223.21	.99
9143.00	87.50	216.30	8782.32	31.00	-8782.32	-405.06	-375.56	551.70	552.37	222.84	2.76
9175.00	86.50	216.00	8784.00	32.00	-8784.00	-430.86	-394.41	583.58	584.12	222.47	3.26
9207.00	86.80	216.00	8785.87	32.00	-8785.87	-456.71	-413.18	615.45	615.88	222.14	.94
9238.00	91.40	214.60	8786.35	31.00	-8786.35	-482.00	-431.09	646.33	646.65	221.81	15.51
9270.00	91.00	214.60	8785.68	32.00	-8785.68	-508.33	-449.26	678.18	678.41	221.47	1.25
9301.00	90.80	214.60	8785.20	31.00	-8785.20	-533.85	-466.86	709.04	709.19	221.17	.65
9333.00	92.30	215.80	8784.33	32.00	-8784.33	-559.99	-485.30	740.92	741.01	220.91	6.00
9364.00	93.60	216.20	8782.74	31.00	-8782.74	-585.03	-503.49	771.80	771.86	220.72	4.39
9396.00	94.20	216.40	8780.56	32.00	-8780.56	-610.76	-522.39	803.66	803.69	220.54	1.98
9428.00	94.40	216.80	8778.16	32.00	-8778.16	-636.38	-541.42	835.51	835.53	220.39	1.39
9460.00	92.90	216.40	8776.12	32.00	-8776.12	-662.02	-560.46	867.39	867.40	220.25	4.85
9491.00	91.90	216.10	8774.82	31.00	-8774.82	-686.99	-578.77	898.30	898.30	220.11	3.37
9523.00	91.30	216.10	8773.93	32.00	-8773.93	-712.84	-597.62	930.21	930.21	219.98	1.88
9553.00	91.70	216.30	8773.15	30.00	-8773.15	-737.04	-615.33	960.13	960.14	219.86	1.49
9584.00	93.10	217.60	8771.85	31.00	-8771.85	-761.79	-633.95	991.06	991.07	219.77	6.16
9616.00	92.00	217.20	8770.42	32.00	-8770.42	-787.19	-653.36	1022.99	1023.01	219.69	3.66
9648.00	91.40	216.80	8769.47	32.00	-8769.47	-812.73	-672.61	1054.94	1054.96	219.61	2.25
9679.00	93.10	217.70	8768.26	31.00	-8768.26	-837.39	-691.36	1085.88	1085.91	219.54	6.20
9711.00	93.90	217.70	8766.30	32.00	-8766.30	-862.66	-710.89	1117.79	1117.83	219.49	2.50
9743.00	93.80	217.60	8764.16	32.00	-8764.16	-887.94	-730.40	1149.69	1149.75	219.44	.44
9773.00	92.10	219.00	8762.61	30.00	-8762.61	-911.45	-748.97	1179.64	1179.70	219.41	7.34
9805.00	92.90	219.60	8761.22	32.00	-8761.22	-936.19	-769.21	1211.60	1211.67	219.41	3.12
9836.00	91.70	220.30	8759.97	31.00	-8759.97	-959.93	-789.10	1242.58	1242.64	219.42	4.48
9868.00	90.00	220.40	8759.50	32.00	-8759.50	-984.32	-809.82	1274.57	1274.63	219.44	5.32
9899.00	90.60	219.30	8759.33	31.00	-8759.33	-1008.12	-829.68	1305.57	1305.63	219.45	4.04
9931.00	87.30	218.70	8759.92	32.00	-8759.92	-1032.98	-849.81	1337.56	1337.62	219.44	10.48
9962.00	86.80	217.50	8761.52	31.00	-8761.52	-1057.34	-868.92	1368.50	1368.57	219.41	4.19

