

VERTICAL HOLE

Job Number: 9917809385

Company: Sage Energy

Lease/Well: NVANU, Well #163

Location: Lea County

Rig Name: Norton 8

RKB:

G.L. or M.S.L.:

State/Country: NM/USA

Declination: 9.06° East To True

Grid:

File name: C:\SVY\SAGE\NVANU3.SVY

Date/Time: 05-Oct-99 / 14:33

Curve Name:



A BWHC COMPANY

SUR: 660/5 & 660/6

NR-36-16-34 30-025-34353

MULTI-SHOT

WINSERVE SURVEY CALCULATIONS

Minimum Curvature Method

Vertical Section Plane .00

Vertical Section Referenced to Wellhead

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE Distance FT	Direction Deg	Dogleg Severity Deg/100
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
100.00	.73	261.21	100.00	-10	-.63	-.10	.64	261.21	.73
200.00	.60	231.24	199.99	-.52	-1.67	-.52	1.75	252.60	.37
300.00	.72	217.44	299.98	-1.35	-2.46	-1.35	2.80	241.23	.20
400.00	.85	227.85	399.97	-2.35	-3.39	-2.35	4.12	235.31	.19
500.00	.84	214.92	499.96	-3.44	-4.36	-3.44	5.56	231.68	.19
600.00	.89	221.36	599.95	-4.63	-5.29	-4.63	7.03	228.83	.11
700.00	1.03	209.61	699.94	-5.99	-6.25	-5.99	8.66	226.20	.24
800.00	.98	199.16	799.92	-7.58	-6.97	-7.58	10.30	222.61	.19
900.00	.87	201.61	899.91	-9.10	-7.53	-9.10	11.81	219.64	.12
1000.00	.89	197.59	999.90	-10.54	-8.05	-10.54	13.26	217.36	.06
1100.00	.89	209.23	1099.89	-11.96	-8.66	-11.96	14.77	215.92	.18
1200.00	.82	200.73	1199.88	-13.31	-9.29	-13.31	16.23	214.93	.14

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
1300.00	.87	206.66	1299.86	-14.65	-9.89	-14.65	17.68	214.01	.10
1400.00	1.01	208.76	1399.85	-16.11	-10.65	-16.11	19.31	213.48	.14
1500.00	1.08	209.32	1499.83	-17.70	-11.54	-17.70	21.13	213.10	.07
1600.00	1.17	209.26	1599.82	-19.41	-12.50	-19.41	23.09	212.78	.09
1700.00	1.36	218.55	1699.79	-21.23	-13.74	-21.23	25.29	212.91	.28
1800.00	1.23	211.32	1799.77	-23.08	-15.04	-23.08	27.54	213.09	.21
1900.00	1.36	208.21	1899.74	-25.04	-16.15	-25.04	29.80	212.83	.15
2000.00	1.49	210.64	1999.71	-27.20	-17.38	-27.20	32.28	212.57	.14
2100.00	1.69	208.33	2099.67	-29.62	-18.74	-29.62	35.05	212.32	.21
2200.00	1.64	217.55	2199.63	-32.05	-20.31	-32.05	37.95	212.36	.27
2300.00	1.68	224.70	2299.59	-34.23	-22.22	-34.23	40.81	212.98	.21
2400.00	1.47	231.63	2399.55	-36.07	-24.25	-36.07	43.46	213.92	.28
2500.00	1.60	243.44	2499.51	-37.49	-26.51	-37.49	45.91	215.26	.34
2600.00	1.68	256.57	2599.47	-38.45	-29.18	-38.45	48.27	217.19	.38
2700.00	1.30	271.29	2699.44	-38.77	-31.74	-38.77	50.10	219.31	.54
2800.00	1.25	279.69	2799.41	-38.56	-33.95	-38.56	51.37	221.36	.19
2900.00	.97	291.23	2899.40	-38.07	-35.81	-38.07	52.27	223.25	.36
3000.00	.91	305.21	2999.38	-37.30	-37.25	-37.30	52.72	224.96	.24
3100.00	.52	295.27	3099.37	-36.65	-38.31	-36.65	53.02	226.27	.41
3200.00	.48	280.41	3199.37	-36.38	-39.13	-36.38	53.43	227.09	.14
3300.00	.46	289.76	3299.37	-36.17	-39.92	-36.17	53.87	227.82	.08
3400.00	.29	282.41	3399.36	-35.98	-40.55	-35.98	54.21	228.42	.18
3500.00	.31	322.71	3499.36	-35.71	-40.96	-35.71	54.34	228.92	.21
3600.00	.36	298.06	3599.36	-35.35	-41.40	-35.35	54.44	229.51	.15
3700.00	.49	317.34	3699.36	-34.89	-41.97	-34.89	54.57	230.26	.19
3800.00	.34	312.63	3799.36	-34.37	-42.48	-34.37	54.64	231.02	.15
3900.00	.40	322.38	3899.35	-33.89	-42.91	-33.89	54.68	231.69	.09
4000.00	.29	292.90	3999.35	-33.52	-43.35	-33.52	54.80	232.29	.21
4100.00	.34	267.89	4099.35	-33.43	-43.88	-33.43	55.17	232.70	.14
4200.00	.28	256.61	4199.35	-33.50	-44.42	-33.50	55.63	232.98	.09

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
4300.00	.35	245.41	4299.35	-33.68	-44.93	-33.68	56.16	233.14	.09
4400.00	.47	237.99	4399.35	-34.03	-45.56	-34.03	56.86	233.24	.13
4500.00	.47	250.39	4499.34	-34.38	-46.29	-34.38	57.66	233.40	.10
4600.00	.56	251.45	4599.34	-34.67	-47.14	-34.67	58.52	233.66	.09
4700.00	.65	255.53	4699.33	-34.97	-48.15	-34.97	59.51	234.01	.10
4800.00	.77	256.81	4799.33	-35.27	-49.36	-35.27	60.66	234.45	.12
4900.00	.72	256.64	4899.32	-35.57	-50.62	-35.57	61.87	234.91	.05
5000.00	.68	260.55	4999.31	-35.81	-51.82	-35.81	62.99	235.36	.06
5100.00	.82	268.15	5099.30	-35.93	-53.12	-35.93	64.13	235.93	.17
5200.00	.75	268.88	5199.29	-35.96	-54.49	-35.96	65.29	236.57	.07
5300.00	.77	272.38	5299.28	-35.95	-55.82	-35.95	66.39	237.22	.05
5400.00	.87	276.00	5399.27	-35.84	-57.24	-35.84	67.54	237.95	.11
5500.00	.67	274.72	5499.26	-35.71	-58.58	-35.71	68.61	238.63	.20
5600.00	.72	274.51	5599.26	-35.62	-59.79	-35.62	69.59	239.22	.05
5700.00	.76	265.12	5699.25	-35.62	-61.08	-35.62	70.71	239.75	.13
5800.00	.77	276.57	5799.24	-35.60	-62.40	-35.60	71.85	240.29	.15
5900.00	.71	254.12	5899.23	-35.70	-63.67	-35.70	72.99	240.72	.29
6000.00	.90	257.85	5999.22	-36.03	-65.03	-36.03	74.35	241.01	.20
6100.00	.80	241.37	6099.21	-36.53	-66.41	-36.53	75.80	241.19	.26
6200.00	.87	241.60	6199.20	-37.23	-67.69	-37.23	77.25	241.19	.07
6300.00	1.04	233.04	6299.19	-38.13	-69.09	-38.13	78.91	241.10	.22
6400.00	.99	238.59	6399.17	-39.13	-70.55	-39.13	80.67	240.99	.11
6500.00	1.03	230.75	6499.15	-40.15	-71.98	-40.15	82.42	240.85	.14
6600.00	1.08	230.47	6599.14	-41.32	-73.40	-41.32	84.23	240.63	.05
6700.00	.97	226.24	6699.12	-42.50	-74.74	-42.50	85.98	240.38	.13
6800.00	.93	226.70	6799.11	-43.64	-75.94	-43.64	87.59	240.11	.04
6900.00	1.01	231.81	6899.09	-44.75	-77.23	-44.75	89.25	239.91	.12
7000.00	.89	222.02	6999.08	-45.87	-78.44	-45.87	90.87	239.68	.20
7100.00	.97	228.96	7099.07	-47.00	-79.60	-47.00	92.44	239.44	.14
7200.00	1.06	221.18	7199.05	-48.25	-80.85	-48.25	94.15	239.17	.16

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
7300.00	1.11	221.50	7299.03	-49.67	-82.10	-49.67	95.96	238.82	.05
7400.00	.93	224.27	7399.02	-50.98	-83.31	-50.98	97.67	238.53	.19
7500.00	1.16	227.11	7499.00	-52.25	-84.61	-52.25	99.45	238.30	.24
7600.00	1.08	220.70	7598.98	-53.65	-85.97	-53.65	101.34	238.03	.15
7700.00	1.18	214.93	7698.96	-55.21	-87.17	-55.21	103.19	237.65	.15
7800.00	1.29	224.45	7798.94	-56.86	-88.55	-56.86	105.24	237.30	.23
7900.00	1.08	226.52	7898.92	-58.31	-90.02	-58.31	107.26	237.07	.21
8000.00	1.07	212.60	7998.90	-59.75	-91.21	-59.75	109.04	236.77	.26
8100.00	1.19	216.86	8098.88	-61.36	-92.34	-61.36	110.87	236.39	.15
8200.00	1.23	214.70	8198.86	-63.08	-93.57	-63.08	112.85	236.02	.06
8300.00	1.19	211.95	8298.84	-64.84	-94.73	-64.84	114.80	235.61	.07
8400.00	1.43	211.77	8398.81	-66.78	-95.94	-66.78	116.89	235.16	.24
8500.00	1.59	211.20	8498.77	-69.03	-97.31	-69.03	119.31	234.65	.16
8600.00	1.39	199.46	8598.74	-71.36	-98.44	-71.36	121.58	234.06	.36
Projected Depth									
8655.00	1.39	199.46	8653.72	-72.62	-98.88	-72.62	122.68	233.71	.00