

Job Number: SVGJ-110856 State/Country: Colorado/USA (N 40 10 9.8) (W 104 38 16.7)
 Company: Anadarko Petroleum Corporation Declination: 8.70° East To True - NAD 27
 Lease/Well: HARKIS 12-2 Grid: Referenced To True North
 Location: Weld County, CO File name: F:\SURVEY\2011SU~1\ANADARKO\LORENZ\HARK122.SVY
 Rig Name: Cable Wireline Date/Time: 22-Sep-11 / 10:03
 RKB: 0' Curve Name: Surface - 7500' M.D. (Rate Gyro) (API 05-123-21565)
 G.L. or M.S.L.: GL

WINSERVE SURVEY CALCULATIONS

Minimum Curvature Method

Vertical Section Plane .00

Vertical Section Referenced to offset from Wellhead: EW =.00 Ft , NS=.00 Ft

Rectangular Coordinates Referenced to Wellhead

Measured	Incl	Drift	TRUE	N-S	E-W	Vertical	CLOSURE	CLOSURE	Dogleg
Depth	Angle	Direction	Vertical	FT	FT	Section	Distance	Direction	Severity
FT	Deg	Deg	Depth			FT	FT	Deg	Deg/100
0	0	0	0	0	0	0	0	0	0
100	0.85	78.23	100	0.15	0.73	0.15	0.74	78.23	0.85
200	0.15	29.29	199.99	0.42	1.52	0.42	1.57	74.63	0.76
300	0.03	82.32	299.99	0.53	1.61	0.53	1.69	71.6	0.13
400	0.2	141.58	399.99	0.4	1.74	0.4	1.79	77.02	0.19
500	0.13	184.03	499.99	0.15	1.84	0.15	1.85	85.3	0.14
600	0.06	192.73	599.99	-0.01	1.82	-0.01	1.82	90.41	0.07
700	0.22	235.76	699.99	-0.17	1.65	-0.17	1.66	95.95	0.18
800	0.27	268.02	799.99	-0.29	1.26	-0.29	1.29	102.91	0.14
900	0.32	299.18	899.99	-0.16	0.78	-0.16	0.79	101.63	0.17
1000	0.36	326.41	999.99	0.24	0.36	0.24	0.43	56.6	0.16
1100	0.4	339.13	1099.98	0.83	0.06	0.83	0.83	4.31	0.09
1200	0.43	344.58	1199.98	1.51	-0.16	1.51	1.52	353.89	0.05
1300	0.51	352.71	1299.98	2.32	-0.32	2.32	2.34	352.18	0.1
1400	0.51	355.96	1399.97	3.2	-0.41	3.2	3.23	352.77	0.03
1500	0.51	2.56	1499.97	4.09	-0.42	4.09	4.11	354.17	0.06
1600	0.51	5.58	1599.97	4.98	-0.35	4.98	4.99	355.93	0.03
1700	0.42	3.34	1699.96	5.79	-0.29	5.79	5.79	357.13	0.09
1800	0.34	21.3	1799.96	6.43	-0.16	6.43	6.43	358.57	0.14
1900	0.27	32.48	1899.96	6.9	0.07	6.9	6.9	0.61	0.09
2000	0.28	29.72	1999.96	7.32	0.32	7.32	7.32	2.52	0.02
2100	0.62	35.03	2099.96	7.97	0.75	7.97	8.01	5.4	0.34
2200	1.13	34.73	2199.94	9.22	1.63	9.22	9.37	9.99	0.51
2300	1.71	20.39	2299.91	11.43	2.71	11.43	11.75	13.32	0.68
2400	1.84	22.91	2399.86	14.31	3.85	14.31	14.82	15.06	0.15
2500	1.81	19.87	2499.81	17.27	5.01	17.27	17.99	16.18	0.1
2600	1.97	16.42	2599.76	20.41	6.04	20.41	21.28	16.48	0.2
2700	2.18	9.4	2699.69	23.93	6.83	23.93	24.89	15.93	0.33
2800	2.44	9.24	2799.61	27.91	7.49	27.91	28.9	15.01	0.26

2900	2.54	11.14	2899.52	32.19	8.26	32.19	33.23	14.39	0.13
3000	2.47	13.57	2999.42	36.45	9.19	36.45	37.6	14.15	0.13
3100	2.53	17	3099.33	40.66	10.34	40.66	41.95	14.27	0.16
3200	2.57	16.95	3199.23	44.92	11.64	44.92	46.4	14.53	0.04
3300	2.65	18.07	3299.13	49.26	13.01	49.26	50.95	14.79	0.09
3400	2.6	22.82	3399.02	53.55	14.61	53.55	55.5	15.26	0.22
3500	2.63	23.73	3498.92	57.74	16.41	57.74	60.02	15.87	0.05
3600	2.6	23.59	3598.81	61.92	18.24	61.92	64.55	16.41	0.03
3700	2.56	23.21	3698.71	66.05	20.03	66.05	69.02	16.87	0.04
3800	2.59	23.75	3798.61	70.17	21.82	70.17	73.48	17.27	0.04
3900	2.44	30.65	3898.51	74.07	23.81	74.07	77.8	17.82	0.34
4000	2.27	41.56	3998.43	77.38	26.21	77.38	81.7	18.71	0.48
4100	2.21	45.3	4098.35	80.22	28.9	80.22	85.26	19.81	0.16
4200	2.06	50.74	4198.28	82.71	31.66	82.71	88.56	20.94	0.25
4300	1.68	57.81	4298.23	84.63	34.29	84.63	91.31	22.06	0.44
4400	1.61	56.38	4398.19	86.19	36.7	86.19	93.68	23.07	0.08
4500	1.35	44.1	4498.16	87.81	38.69	87.81	95.96	23.78	0.41
4600	1.2	18.57	4598.13	89.65	39.84	89.65	98.11	23.96	0.58
4700	1.11	15.22	4698.11	91.58	40.43	91.58	100.11	23.82	0.11
4800	1.24	25.29	4798.09	93.49	41.15	93.49	102.15	23.76	0.24
4900	1.52	57.13	4898.06	95.19	42.72	95.19	104.34	24.17	0.8
5000	1.43	84.25	4998.03	96.03	45.08	96.03	106.09	25.15	0.7
5100	1.22	104.97	5098.01	95.88	47.35	95.88	106.94	26.28	0.52
5200	1.18	124.74	5197.98	95.02	49.22	95.02	107.02	27.39	0.41
5300	1.3	128.96	5297.96	93.72	50.95	93.72	106.68	28.53	0.15
5400	1.11	138.75	5397.94	92.28	52.47	92.28	106.16	29.62	0.28
5500	1.02	143.73	5497.92	90.84	53.64	90.84	105.49	30.56	0.13
5600	0.77	143.69	5597.91	89.58	54.56	89.58	104.89	31.35	0.25
5700	0.7	139.3	5697.9	88.57	55.36	88.57	104.45	32.01	0.09
5800	0.47	144.67	5797.9	87.77	55.99	87.77	104.11	32.54	0.24
5900	0.39	139.91	5897.89	87.18	56.45	87.18	103.86	32.92	0.09
6000	0.62	77.28	5997.89	87.04	57.2	87.04	104.15	33.31	0.56
6100	0.66	61.86	6097.88	87.43	58.23	87.43	105.05	33.67	0.18
6200	0.75	55.05	6197.88	88.08	59.28	88.08	106.17	33.94	0.12
6300	0.8	56.49	6297.87	88.84	60.4	88.84	107.42	34.21	0.05
6400	0.75	58.86	6397.86	89.56	61.54	89.56	108.66	34.49	0.06
6500	0.84	48.95	6497.85	90.38	62.65	90.38	109.97	34.73	0.16
6600	0.84	50.81	6597.84	91.32	63.77	91.32	111.39	34.93	0.03
6700	0.91	60.33	6697.83	92.18	65.03	92.18	112.81	35.2	0.16
6800	0.96	65.41	6797.81	92.92	66.48	92.92	114.26	35.58	0.1
6900	1.11	63.99	6897.8	93.7	68.11	93.7	115.84	36.02	0.15
7000	1.23	60.08	6997.77	94.66	69.92	94.66	117.68	36.45	0.14
7100	1.94	37.43	7097.74	96.53	71.87	96.53	120.35	36.67	0.93
7200	2.57	58.09	7197.66	99.06	74.81	99.06	124.14	37.06	1.02
7300	3.27	92.77	7297.54	100.11	79.56	100.11	127.87	38.47	1.86
7400	5.13	102.3	7397.27	99.02	86.78	99.02	131.66	41.23	1.98
7500	4.87	103.1	7496.89	97.11	95.28	97.11	136.04	44.46	0.27