



Job Number: SVGJ-141350  
 Company: PDC  
 Lease/Well: National Hog Farm 42-17  
 Location: Weld County, CO  
 Rig Name: MS Energy Wireline  
 RKB: 0'  
 G.L. or M.S.L.: GL

State/Country: Colorado/USA  
 Declination: 8.23°  
 Grid: East To True North  
 File name: S:\2014SU-1\PDC\GJ\NATION-1\4217.SVY  
 Date/Time: 21-Nov-14 / 13:21  
 Curve Name: Surface - 6700' M.D. (Rate Gyro)

### MS SURVEY

WINSERVE SURVEY CALCULATIONS  
 Minimum Curvature Method  
 Vertical Section Plane .00  
 Vertical Section Referenced to Wellhead  
 Rectangular Coordinates Referenced to Wellhead

<i>Measured Depth FT</i>	<i>Incl Angle Deg</i>	<i>Drift Direction Deg</i>	<i>True Vertical Depth</i>	<i>N-S FT</i>	<i>E-W FT</i>	<i>Vertical Section FT</i>	<i>C L O S U R E</i>		<i>Dogleg Severity Deg/100</i>
							<i>Distance FT</i>	<i>Direction Deg</i>	
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
100.00	1.47	323.40	99.99	1.03	-76	1.03	1.28	323.40	1.47
200.00	2.22	317.18	199.94	3.48	-2.85	3.48	4.50	320.72	.78
300.00	1.92	174.12	299.91	3.23	-3.99	3.23	5.14	309.02	3.93
400.00	3.01	231.19	399.83	-.08	-5.87	-.08	5.87	269.24	2.54
500.00	3.37	240.53	499.68	-3.17	-10.47	-3.17	10.94	253.16	.63
600.00	3.48	237.72	599.50	-6.24	-15.60	-6.24	16.80	248.20	.20
700.00	3.15	242.70	699.33	-9.12	-20.60	-9.12	22.53	246.13	.44
800.00	3.10	241.84	799.18	-11.65	-25.43	-11.65	27.97	245.38	.07
900.00	2.76	249.39	899.05	-13.78	-30.07	-13.78	33.07	245.38	.51

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	
1000.00	2.98	248.94	998.92	-15.56	-34.75	-15.56	38.07	245.88	.22
1100.00	2.83	246.98	1098.80	-17.46	-39.44	-17.46	43.13	246.12	.18
1200.00	2.59	250.21	1198.68	-19.19	-43.84	-19.19	47.86	246.36	.28
1300.00	2.37	251.35	1298.59	-20.61	-47.93	-20.61	52.17	246.73	.23
1400.00	2.44	249.96	1398.50	-22.01	-51.88	-22.01	56.36	247.02	.09
1500.00	2.17	252.18	1498.42	-23.31	-55.69	-23.31	60.37	247.28	.28
1600.00	2.08	248.56	1598.35	-24.56	-59.18	-24.56	64.07	247.46	.16
1700.00	1.39	249.28	1698.31	-25.65	-62.00	-25.65	67.10	247.53	.69
1800.00	1.62	258.15	1798.27	-26.37	-64.52	-26.37	69.70	247.77	.33
1900.00	1.70	252.14	1898.23	-27.11	-67.32	-27.11	72.57	248.06	.19
2000.00	1.36	251.73	1998.19	-27.94	-69.85	-27.94	75.23	248.20	.34
2100.00	1.46	259.71	2098.16	-28.54	-72.23	-28.54	77.67	248.44	.22
2200.00	1.35	249.24	2198.13	-29.19	-74.59	-29.19	80.10	248.63	.28
2300.00	.72	251.80	2298.12	-29.80	-76.29	-29.80	81.90	248.66	.63
2400.00	.58	266.56	2398.11	-30.03	-77.39	-30.03	83.01	248.79	.22
2500.00	.52	268.73	2498.11	-30.07	-78.35	-30.07	83.92	249.01	.06
2600.00	.53	271.30	2598.10	-30.07	-79.26	-30.07	84.78	249.23	.03
2700.00	.41	250.82	2698.10	-30.17	-80.07	-30.17	85.56	249.35	.20
2800.00	.29	240.62	2798.10	-30.41	-80.62	-30.41	86.17	249.33	.13
2900.00	.09	322.23	2898.10	-30.48	-80.89	-30.48	86.44	249.36	.29
3000.00	.28	276.08	2998.10	-30.39	-81.18	-30.39	86.68	249.48	.23
3100.00	.41	227.92	3098.09	-30.60	-81.69	-30.60	87.24	249.46	.31
3200.00	.20	230.03	3198.09	-30.95	-82.09	-30.95	87.73	249.34	.21
3300.00	.61	286.04	3298.09	-30.92	-82.74	-30.92	88.33	249.51	.53
3400.00	.83	257.48	3398.08	-30.93	-83.96	-30.93	89.47	249.78	.41
3500.00	.58	261.08	3498.07	-31.17	-85.16	-31.17	90.69	249.90	.25
3600.00	.41	271.71	3598.07	-31.23	-86.02	-31.23	91.51	250.04	.19
3700.00	.62	275.49	3698.07	-31.17	-86.92	-31.17	92.34	250.27	.21
3800.00	.75	243.74	3798.06	-31.41	-88.04	-31.41	93.48	250.37	.40

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	
3900.00	.81	197.12	3898.05	-32.37	-88.84	-32.37	94.55	249.98	.62
4000.00	.74	211.67	3998.04	-33.60	-89.38	-33.60	95.49	249.40	.21
4100.00	.95	229.71	4098.03	-34.68	-90.36	-34.68	96.78	249.00	.34
4200.00	1.19	219.44	4198.01	-36.02	-91.65	-36.02	98.47	248.54	.31
4300.00	1.18	221.62	4297.99	-37.59	-92.99	-37.59	100.30	247.99	.05
4400.00	1.36	229.47	4397.97	-39.13	-94.58	-39.13	102.35	247.52	.25
4500.00	1.78	231.37	4497.93	-40.88	-96.69	-40.88	104.98	247.08	.42
4600.00	1.83	224.89	4597.88	-42.98	-99.03	-42.98	107.96	246.54	.21
4700.00	1.10	225.38	4697.85	-44.78	-100.84	-44.78	110.34	246.05	.73
4800.00	.40	142.12	4797.84	-45.73	-101.31	-45.73	111.15	245.71	1.13
4900.00	.76	124.89	4897.84	-46.39	-100.55	-46.39	110.74	245.24	.40
5000.00	1.07	140.20	4997.82	-47.48	-99.41	-47.48	110.17	244.47	.39
5100.00	1.47	166.37	5097.80	-49.45	-98.51	-49.45	110.22	243.35	.69
5200.00	1.74	165.34	5197.76	-52.16	-97.82	-52.16	110.86	241.93	.27
5300.00	1.34	160.43	5297.72	-54.73	-97.05	-54.73	111.42	240.58	.42
5400.00	1.12	168.37	5397.70	-56.79	-96.46	-56.79	111.94	239.51	.28
5500.00	1.16	154.02	5497.68	-58.66	-95.82	-58.66	112.35	238.53	.29
5600.00	.99	138.99	5597.66	-60.22	-94.81	-60.22	112.32	237.58	.33
5700.00	.66	117.29	5697.65	-61.14	-93.73	-61.14	111.91	236.89	.45
5800.00	.79	127.23	5797.65	-61.82	-92.67	-61.82	111.40	236.29	.18
5900.00	1.00	108.52	5897.63	-62.51	-91.29	-62.51	110.64	235.60	.36
6000.00	.71	94.57	5997.62	-62.84	-89.85	-62.84	109.64	235.03	.35
6100.00	.46	122.12	6097.62	-63.10	-88.89	-63.10	109.01	234.63	.37
6200.00	.45	151.36	6197.61	-63.66	-88.36	-63.66	108.91	234.23	.23
6300.00	.15	173.04	6297.61	-64.13	-88.16	-64.13	109.02	233.96	.32
6400.00	.33	211.59	6397.61	-64.51	-88.29	-64.51	109.35	233.85	.23
6500.00	.64	189.33	6497.61	-65.31	-88.53	-65.31	110.01	233.59	.36
6600.00	.57	173.54	6597.60	-66.35	-88.57	-66.35	110.67	233.16	.18

**Last Survey Depth Recorded**

6700.00	.34	149.10	6697.60	-67.10	-88.36	-67.10	110.95	232.79	.30
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