

039-27462



Scientific Drilling

Gyroscopic Survey Report
for
Black Hills

Well Location	Jicarilla
Well Name	Jicarilla 29-02-16 #4
Rig Name	Blue Jet Wireline
Survey Date	04/23/13
Latitude	36°43'49.240"N
North Reference	True North
Grid Correction	None
Depth Reference	KB (13.00 ft)
Calculation Method	Minimum Curvature
Section (VS) Ref	0.00N (ft), 0.00E (ft), 312.04Azim (deg)
Definitive Survey	In - Definitive
Operator(s)	B. Willhight

Well Notes

Survey from RKB to 3000' in 2 7/8" Tubing (Tagged at 3010')

OIL CONS. DIV DIST. 3

APR 23 2014



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Survey: In - Definitive

Survey Date: 04/23/13

MD	Inc	Azim	TVD	VS	+N/-S	+E/-W	DLS
ft	deg	deg	ft	ft	ft	ft	7100ft
0.00	0.00	0.00	0.00	0.00	0.00	0.00	Invalid
50.00	0.83	339.55	50.00	0.32	0.34	-0.13	1.66
100.00	1.66	339.55	99.99	1.28	1.35	-0.50	1.66
150.00	0.98	340.17	149.97	2.30	2.44	-0.90	1.34
200.00	0.89	332.65	199.97	3.04	3.18	-1.23	0.31
250.00	1.09	328.54	249.96	3.86	3.93	-1.65	0.44
300.00	0.87	333.25	299.95	4.67	4.68	-2.07	0.48
350.00	0.90	334.63	349.95	5.39	5.37	-2.41	0.08
400.00	0.90	335.86	399.94	6.11	6.08	-2.74	0.04
450.00	0.98	341.60	449.93	6.84	6.85	-3.03	0.25
500.00	0.98	344.35	499.92	7.57	7.66	-3.29	0.09
550.00	0.92	350.81	549.92	8.25	8.47	-3.46	0.25
600.00	0.89	349.61	599.91	8.87	9.25	-3.60	0.08
650.00	0.71	349.35	649.91	9.42	9.93	-3.73	0.35
700.00	0.78	340.79	699.90	9.96	10.56	-3.89	0.26
750.00	0.92	333.76	749.90	10.63	11.24	-4.18	0.35
800.00	1.11	330.19	799.89	11.47	12.02	-4.60	0.40
850.00	1.22	339.02	849.88	12.40	12.93	-5.03	0.42
900.00	1.12	333.05	899.87	13.33	13.87	-5.44	0.31
950.00	1.14	325.05	949.86	14.27	14.71	-5.95	0.32
1000.00	1.27	321.81	999.85	15.30	15.56	-6.58	0.29
1050.00	1.53	326.56	1049.83	16.49	16.55	-7.29	0.57
1100.00	1.53	330.15	1099.82	17.77	17.68	-7.99	0.19
1150.00	1.42	335.64	1149.80	18.97	18.82	-8.57	0.35
1200.00	1.06	343.30	1199.79	19.94	19.83	-8.96	0.79
1250.00	1.03	342.02	1249.78	20.72	20.70	-9.23	0.08
1300.00	1.03	333.29	1299.77	21.53	21.53	-9.58	0.31
1350.00	1.30	331.63	1349.76	22.49	22.44	-10.05	0.54
1400.00	1.47	338.09	1399.75	23.60	23.53	-10.56	0.45
1450.00	1.02	342.86	1449.73	24.56	24.55	-10.93	0.92
1500.00	0.72	347.46	1499.73	25.20	25.28	-11.13	0.61
1550.00	0.94	340.08	1549.72	25.81	25.98	-11.34	0.49
1600.00	0.84	328.55	1599.72	26.53	26.68	-11.67	0.41
1650.00	1.11	333.15	1649.71	27.34	27.42	-12.08	0.56
1700.00	1.02	336.78	1699.70	28.19	28.26	-12.47	0.23
1750.00	0.83	336.32	1749.69	28.93	29.00	-12.79	0.37
1800.00	0.90	330.66	1799.69	29.63	29.68	-13.13	0.22
1850.00	0.79	334.87	1849.68	30.32	30.33	-13.47	0.26
1900.00	0.59	331.61	1899.68	30.88	30.87	-13.74	0.39



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Survey Date:	04/23/13						
MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS 7100ft
1950.00	0.43	317.72	1949.68	31.31	31.24	-13.99	0.41
2000.00	0.48	292.37	1999.68	31.69	31.46	-14.31	0.41
2050.00	0.49	269.44	2049.67	32.05	31.53	-14.71	0.39
2100.00	0.62	255.93	2099.67	32.35	31.47	-15.19	0.37
2150.00	0.65	256.20	2149.67	32.66	31.33	-15.72	0.08
2200.00	0.67	253.10	2199.67	32.97	31.18	-16.28	0.08
2250.00	0.73	244.72	2249.66	33.24	30.96	-16.85	0.24
2300.00	0.85	244.41	2299.66	33.51	30.66	-17.47	0.25
2350.00	0.97	236.54	2349.65	33.76	30.27	-18.16	0.34
2400.00	1.10	244.96	2399.64	34.05	29.83	-18.95	0.40
2450.00	1.11	249.02	2449.63	34.46	29.45	-19.84	0.16
2500.00	0.98	258.62	2499.62	34.93	29.20	-20.71	0.44
2550.00	0.98	268.29	2549.62	35.49	29.10	-21.55	0.33
2600.00	0.94	270.31	2599.61	36.11	29.09	-22.39	0.10
2650.00	1.22	255.60	2649.60	36.71	28.96	-23.31	0.78
2700.00	1.27	269.08	2699.59	37.41	28.82	-24.39	0.60
2750.00	1.43	254.41	2749.58	38.15	28.64	-25.54	0.75
2800.00	1.33	272.03	2799.56	38.93	28.50	-26.72	0.87
2850.00	1.68	269.92	2849.54	39.92	28.51	-28.04	0.70
2900.00	1.29	267.00	2899.53	40.86	28.48	-29.33	0.80
2950.00	1.37	284.38	2949.51	41.78	28.60	-30.47	0.82
3000.00	1.50	253.33	2999.50	42.65	28.56	-31.67	1.55