

039-25789



Gyroscopic Survey Report
for
Black Hills

Well Location	Jicarilla 464-30 #9
Well Name	Jicarilla 464-30 #9
Rig Name	A + #14
Survey Date	05/10/13
Latitude	36°46'34.600"N
North Reference	True North
Grid Correction	None
Depth Reference	RKB (12.00 ft)
Calculation Method	Minimum Curvature
Section (VS) Ref	0.00N (ft), 0.00E (ft), 92.58Azim (deg)
Definitive Survey	Out Run Definitive
Operator(s)	B. Willhight

Well Notes

Survey from RKB to 3400' in 5.5" Casing

OIL CONS. DIV DIST. 3
APR 23 2014



Well Name: Jicarilla 464-30 #9
Survey: Out Run Definitive
Survey Date: 05/10/13

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS 7100ft
0.00	0.00	0.00	0.00	0.00	0.00	0.00	Invalid
25.00	0.04	359.38	25.00	0.00	0.01	0.00	0.16
50.00	0.08	359.38	50.00	0.00	0.04	0.00	0.16
75.00	0.12	359.38	75.00	0.00	0.08	0.00	0.16
100.00	0.16	359.38	100.00	-0.01	0.14	0.00	0.16
125.00	0.16	16.18	125.00	0.00	0.21	0.01	0.19
150.00	0.16	20.83	150.00	0.02	0.28	0.03	0.05
175.00	0.21	350.14	175.00	0.02	0.36	0.04	0.43
200.00	0.25	13.78	200.00	0.02	0.46	0.04	0.41
225.00	0.35	14.20	225.00	0.05	0.58	0.07	0.42
250.00	0.33	359.52	250.00	0.06	0.73	0.09	0.36
275.00	0.42	16.81	275.00	0.08	0.89	0.12	0.58
300.00	0.63	27.31	300.00	0.16	1.10	0.21	0.91
325.00	0.76	27.12	325.00	0.28	1.37	0.35	0.53
350.00	0.83	28.45	349.99	0.43	1.68	0.51	0.26
375.00	0.91	33.51	374.99	0.61	2.00	0.70	0.47
400.00	0.93	33.72	399.99	0.82	2.34	0.93	0.07
425.00	1.08	46.09	424.98	1.09	2.67	1.21	1.04
450.00	1.27	52.03	449.98	1.46	3.00	1.60	0.90
475.00	1.42	57.90	474.97	1.92	3.34	2.08	0.83
500.00	1.45	56.62	499.96	2.43	3.68	2.60	0.17
525.00	1.52	61.00	524.95	2.97	4.01	3.16	0.52
550.00	1.54	56.52	549.95	3.53	4.36	3.73	0.48
575.00	1.53	57.94	574.94	4.07	4.72	4.29	0.15
600.00	1.56	58.49	599.93	4.63	5.08	4.86	0.14
625.00	1.65	58.42	624.92	5.21	5.44	5.46	0.34
650.00	1.64	60.93	649.91	5.81	5.81	6.08	0.29
675.00	1.63	61.71	674.90	6.42	6.15	6.71	0.11
700.00	1.71	64.95	699.89	7.06	6.47	7.36	0.49
725.00	1.67	65.39	724.88	7.71	6.78	8.02	0.15
750.00	1.58	65.23	749.87	8.34	7.08	8.67	0.37
775.00	1.68	69.10	774.86	8.98	7.35	9.32	0.59
800.00	1.61	67.40	799.85	9.64	7.62	9.99	0.32
825.00	1.70	71.43	824.83	10.30	7.87	10.67	0.59
850.00	1.64	73.32	849.82	10.98	8.09	11.36	0.35
875.00	1.70	76.14	874.81	11.68	8.29	12.06	0.42
900.00	1.73	77.92	899.80	12.40	8.45	12.79	0.24
925.00	1.75	81.03	924.79	13.14	8.59	13.54	0.39
950.00	1.81	81.89	949.78	13.90	8.71	14.31	0.25



Well Name:		Jicarilla 464-30 #9					
Survey:		Out Run Definitive					
Survey Date:		05/10/13					
MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS 7100ft
975.00	1.73	82.48	974.77	14.66	8.81	15.07	0.32
1000.00	1.69	85.34	999.76	15.40	8.89	15.81	0.38
1025.00	1.70	87.53	1024.74	16.13	8.94	16.55	0.26
1050.00	1.72	87.36	1049.73	16.88	8.97	17.30	0.07
1075.00	1.71	86.60	1074.72	17.62	9.01	18.04	0.10
1100.00	1.80	85.88	1099.71	18.38	9.06	18.81	0.40
1125.00	1.77	87.22	1124.70	19.15	9.11	19.58	0.22
1150.00	1.74	85.96	1149.69	19.92	9.15	20.35	0.18
1175.00	1.85	88.58	1174.67	20.70	9.19	21.13	0.54
1200.00	1.96	90.42	1199.66	21.53	9.20	21.96	0.49
1225.00	1.92	91.44	1224.65	22.37	9.18	22.81	0.20
1250.00	1.95	92.38	1249.63	23.22	9.15	23.65	0.16
1275.00	2.00	94.35	1274.62	24.08	9.10	24.51	0.35
1300.00	2.09	96.09	1299.60	24.97	9.02	25.40	0.41
1325.00	2.16	95.89	1324.58	25.89	8.93	26.32	0.29
1350.00	2.23	97.06	1349.57	26.85	8.82	27.27	0.33
1375.00	2.29	97.02	1374.55	27.83	8.70	28.25	0.26
1400.00	2.29	98.96	1399.53	28.82	8.56	29.24	0.31
1425.00	2.32	97.65	1424.51	29.83	8.41	30.24	0.24
1450.00	2.30	99.00	1449.49	30.83	8.27	31.23	0.24
1475.00	2.36	99.96	1474.47	31.84	8.10	32.24	0.29
1500.00	2.41	102.95	1499.44	32.86	7.89	33.25	0.53
1525.00	2.38	105.34	1524.42	33.89	7.64	34.27	0.42
1550.00	2.49	105.18	1549.40	34.92	7.36	35.29	0.45
1575.00	2.41	106.72	1574.38	35.96	7.06	36.32	0.41
1600.00	2.45	107.88	1599.35	36.99	6.75	37.33	0.26
1625.00	2.47	108.57	1624.33	38.02	6.41	38.35	0.13
1650.00	2.37	110.23	1649.31	39.03	6.06	39.34	0.48
1675.00	2.49	112.14	1674.29	40.03	5.68	40.33	0.58
1700.00	2.35	112.22	1699.26	41.03	5.28	41.31	0.56
1725.00	2.19	113.37	1724.24	41.96	4.90	42.22	0.67
1750.00	2.09	114.60	1749.23	42.83	4.52	43.07	0.43
1775.00	2.03	113.74	1774.21	43.66	4.15	43.89	0.26
1800.00	2.14	113.25	1799.19	44.51	3.79	44.73	0.43
1825.00	2.00	114.33	1824.18	45.35	3.42	45.56	0.56
1850.00	2.05	112.87	1849.16	46.18	3.07	46.37	0.28
1875.00	2.05	114.59	1874.15	47.02	2.71	47.19	0.25
1900.00	1.98	114.22	1899.13	47.83	2.35	47.99	0.28



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Survey: Out Run Definitive
Survey Date: 05/10/13

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS 7100ft
1925.00	2.07	114.16	1924.11	48.65	1.98	48.79	0.34
1950.00	2.06	112.31	1949.10	49.50	1.63	49.62	0.27
1975.00	2.00	113.99	1974.08	50.33	1.28	50.44	0.33
2000.00	1.83	112.26	1999.07	51.11	0.95	51.20	0.75
2025.00	1.80	112.44	2024.06	51.85	0.65	51.93	0.12
2050.00	1.72	109.50	2049.04	52.58	0.38	52.65	0.48
2075.00	1.70	109.15	2074.03	53.29	0.13	53.35	0.09
2100.00	1.54	106.58	2099.02	53.97	-0.09	54.03	0.68
2125.00	1.44	110.18	2124.02	54.60	-0.29	54.64	0.55
2150.00	1.25	106.91	2149.01	55.17	-0.48	55.20	0.83
2175.00	1.14	107.80	2174.00	55.67	-0.64	55.70	0.45
2200.00	0.81	109.06	2199.00	56.08	-0.77	56.10	1.33
2225.00	0.94	104.05	2224.00	56.45	-0.88	56.47	0.61
2250.00	0.72	109.54	2248.99	56.80	-0.98	56.82	0.92
2275.00	0.85	107.35	2273.99	57.13	-1.09	57.14	0.53
2300.00	0.63	111.09	2298.99	57.44	-1.19	57.45	0.92
2325.00	0.54	111.07	2323.99	57.69	-1.28	57.69	0.35
2350.00	0.42	108.73	2348.99	57.89	-1.36	57.88	0.48
2375.00	0.33	106.04	2373.99	58.04	-1.41	58.04	0.38
2400.00	0.28	95.67	2398.99	58.17	-1.43	58.17	0.31
2425.00	0.30	104.23	2423.99	58.30	-1.45	58.29	0.20
2450.00	0.26	100.92	2448.99	58.42	-1.48	58.41	0.17
2475.00	0.33	104.63	2473.99	58.55	-1.51	58.54	0.31
2500.00	0.30	91.59	2498.98	58.68	-1.53	58.67	0.32
2525.00	0.27	74.78	2523.98	58.81	-1.52	58.80	0.36
2550.00	0.31	81.27	2548.98	58.93	-1.49	58.92	0.22
2575.00	0.33	83.57	2573.98	59.06	-1.47	59.06	0.08
2600.00	0.48	79.42	2598.98	59.24	-1.45	59.23	0.62
2625.00	0.58	84.85	2623.98	59.46	-1.41	59.46	0.47
2650.00	0.64	91.52	2648.98	59.73	-1.41	59.73	0.37
2675.00	0.75	93.42	2673.98	60.03	-1.42	60.03	0.46
2700.00	0.80	88.30	2698.98	60.37	-1.43	60.37	0.32
2725.00	0.87	91.24	2723.97	60.73	-1.42	60.73	0.33
2750.00	0.88	92.97	2748.97	61.12	-1.44	61.11	0.12
2775.00	1.04	95.79	2773.97	61.53	-1.47	61.53	0.65
2800.00	0.94	94.54	2798.96	61.96	-1.51	61.96	0.42
2825.00	0.99	100.24	2823.96	62.38	-1.56	62.38	0.44
2850.00	0.98	102.70	2848.96	62.81	-1.65	62.80	0.18



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Survey: Out Run Definitive

Survey Date: 05/10/13

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS 7100ft
2875.00	1.00	107.50	2873.95	63.23	-1.76	63.21	0.34
2900.00	1.03	106.76	2898.95	63.66	-1.89	63.64	0.12
2925.00	1.03	108.50	2923.94	64.09	-2.03	64.06	0.13
2950.00	0.89	108.05	2948.94	64.49	-2.16	64.46	0.55
2975.00	0.80	111.96	2973.94	64.85	-2.29	64.81	0.45
3000.00	0.61	119.03	2998.94	65.13	-2.42	65.09	0.81
3025.00	0.48	117.48	3023.94	65.35	-2.53	65.30	0.52
3050.00	0.50	112.69	3048.93	65.54	-2.62	65.49	0.18
3075.00	0.57	114.09	3073.93	65.76	-2.71	65.71	0.29
3100.00	0.57	125.84	3098.93	65.98	-2.84	65.92	0.47
3125.00	0.50	127.31	3123.93	66.18	-2.98	66.11	0.30
3150.00	0.50	131.79	3148.93	66.35	-3.11	66.28	0.16
3175.00	0.63	123.67	3173.93	66.55	-3.26	66.47	0.61
3200.00	0.55	119.41	3198.93	66.78	-3.40	66.69	0.35
3225.00	0.57	113.99	3223.93	67.00	-3.51	66.91	0.22
3250.00	0.44	84.42	3248.93	67.21	-3.55	67.12	1.14
3275.00	0.58	64.82	3273.92	67.42	-3.48	67.33	0.90
3300.00	0.63	80.12	3298.92	67.66	-3.41	67.58	0.68
3325.00	0.56	74.53	3323.92	67.92	-3.35	67.83	0.38
3350.00	0.61	73.47	3348.92	68.16	-3.28	68.08	0.19
3375.00	0.49	60.65	3373.92	68.37	-3.19	68.30	0.68
3400.00	0.67	70.81	3398.92	68.60	-3.09	68.53	0.82