



Job Number: 810161
Company: Black Hills Gas Resources
Lease/Well: Jicarilla 464-31 #233
Location: Rio Arriba County, NM
Rig Name: Patt 744
RKB: 13
G.L. or M.S.L.: 7015

State/Country: NM/USA
Declination: 10.48953
Grid: -0.32
File name: C:\CURRENT-1\081026-1\46431233.SVY
Date/Time: 30-Jun-08 / 08:52
Curve Name: Jicarilla 464-31 #233 surveys

SURF: 1840' FS 1725' FE SEC 31
1725' FE (SEC 31)
1840' FS 6359'
451' 4634' FW (SEC 32)
2291 FS (SEC 32) 5216'
582' FE (SEC 32)
BOTTOM HOLE:

Jicarilla 464-31 #233 surveys

API # 30-039-30195

RCVD JUL 7 '08
OIL CONS. DIV.

WINSERVE SURVEY CALCULATIONS
Minimum Curvature Method
Vertical Section Plane 85.35
Vertical Section Referenced to Wellhead
Rectangular Coordinates Referenced to Wellhead

DIST. 3

At 7-9-08

Origin 642/E 1901/S SEC 31

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Vertical Section FT	N-S FT	E-W FT	CLOSURE Distance FT	Direction Deg	Dogleg Severity Deg/100
Surface									
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
First Nevis MWD Survey									
367.00	.20	165.00	367.00	.12	-.62	.17	.64	165.00	.05
556.00	.60	159.10	555.99	.45	-1.86	.60	1.96	162.02	.21
745.00	.50	141.60	744.99	1.19	-3.43	1.47	3.73	156.82	.10
935.00	.70	150.90	934.98	2.13	-5.10	2.55	5.70	153.43	.12
1123.00	.40	158.60	1122.97	2.79	-6.71	3.35	7.50	153.49	.16
1310.00	.30	117.80	1309.96	3.39	-7.55	4.02	8.55	151.97	.14
1498.00	.60	153.10	1497.96	4.18	-8.65	4.90	9.94	150.49	.21
1687.00	.40	115.40	1686.95	5.13	-9.82	5.94	11.48	148.82	.20
1875.00	.30	96.60	1874.95	6.18	-10.16	7.02	12.35	145.34	.08
2063.00	.20	147.30	2062.95	6.81	-10.49	7.69	13.01	143.76	.12
2250.00	.20	187.40	2249.94	6.90	-11.09	7.82	13.57	144.79	.07
2429.00	.10	140.60	2428.94	6.92	-11.52	7.88	13.96	145.61	.08
2629.00	.50	35.60	2628.94	7.59	-10.94	8.50	13.86	142.16	.27
2709.00	.50	87.20	2708.94	8.16	-10.64	9.05	13.97	139.61	.54
2739.00	1.50	95.20	2738.93	8.68	-10.67	9.58	14.34	138.10	3.36
2768.00	2.80	89.40	2767.91	9.76	-10.70	10.66	15.11	135.10	4.54
2798.00	4.40	81.10	2797.85	11.64	-10.51	12.53	16.36	130.00	5.60
2828.00	6.40	78.90	2827.72	14.45	-10.01	15.31	18.29	123.19	6.70
2859.00	8.40	82.80	2858.46	18.43	-9.40	19.25	21.42	116.02	6.65
2889.00	10.60	87.30	2888.05	23.37	-8.99	24.18	25.80	110.40	7.73

HOLD CDM FOR ASDrilled C-102

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Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Vertical Section FT	N-S FT	E-W FT	CLOSURE		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
2919.00	13.70	91.70	2917.37	29.66	-8.97	30.49	31.78	106.39	10.78
2950.00	14.90	88.50	2947.41	37.29	-8.97	38.15	39.19	103.24	4.63
2980.00	16.10	87.40	2976.32	45.30	-8.68	46.16	46.97	100.65	4.12
3011.00	16.60	87.60	3006.06	54.02	-8.30	54.88	55.50	98.60	1.62
3042.00	18.00	85.40	3035.66	63.24	-7.73	64.07	64.54	96.88	4.98
3072.00	20.00	86.20	3064.03	73.00	-7.02	73.82	74.15	95.43	6.72
3102.00	22.00	84.80	3092.03	83.75	-6.17	84.53	84.76	94.18	6.87
3133.00	23.60	83.30	3120.61	95.76	-4.92	96.48	96.60	92.92	5.49
3162.00	25.00	82.10	3147.04	107.68	-3.40	108.31	108.37	91.80	5.12
3191.00	26.90	84.40	3173.12	120.36	-1.92	120.91	120.93	90.91	7.41
3221.00	28.30	87.00	3199.70	134.26	-.89	134.77	134.77	90.38	6.16
3252.00	29.40	86.90	3226.85	149.21	-.09	149.71	149.71	90.03	3.55
3282.00	31.30	85.60	3252.74	164.36	.91	164.83	164.83	89.68	6.70
3312.00	33.70	85.20	3278.04	180.48	2.20	180.90	180.91	89.30	8.03
3342.00	36.70	84.60	3302.55	197.77	3.74	198.12	198.15	88.92	10.07
3373.00	39.80	84.00	3326.90	216.96	5.65	217.21	217.29	88.51	10.07
3403.00	42.30	84.90	3349.52	236.65	7.55	236.82	236.94	88.17	8.56
3431.00	43.80	85.70	3369.98	255.77	9.12	255.87	256.03	87.96	5.70
3463.00	45.70	86.60	3392.70	278.29	10.63	278.35	278.55	87.81	6.26
3494.00	47.90	85.80	3413.92	300.89	12.13	300.89	301.14	87.69	7.34
3525.00	50.10	86.00	3434.26	324.28	13.80	324.23	324.52	87.56	7.11
3557.00	52.30	86.60	3454.31	349.21	15.41	349.11	349.45	87.47	7.03
3588.00	54.30	87.40	3472.84	374.06	16.70	373.93	374.31	87.44	6.78
3620.00	55.90	88.10	3491.14	400.28	17.73	400.16	400.55	87.46	5.31
3652.00	57.70	87.90	3508.67	427.02	18.67	426.91	427.32	87.50	5.65
3683.00	59.40	86.30	3524.84	453.45	20.01	453.32	453.77	87.47	7.03
3714.00	61.40	85.90	3540.15	480.41	21.84	480.21	480.71	87.40	6.55
3746.00	62.60	88.00	3555.18	508.65	23.34	508.43	508.96	87.37	6.90
3778.00	63.50	87.30	3569.68	537.15	24.51	536.93	537.49	87.39	3.42
3809.00	64.60	85.80	3583.24	565.01	26.19	564.75	565.36	87.34	5.61
3841.00	65.70	86.70	3596.69	594.05	28.09	593.72	594.39	87.29	4.28
3873.00	66.90	88.20	3609.55	623.33	29.39	622.99	623.69	87.30	5.70
3904.00	69.10	88.60	3621.17	652.03	30.19	651.72	652.42	87.35	7.20
3935.00	70.70	88.10	3631.82	681.10	31.03	680.82	681.53	87.39	5.38
3967.00	71.90	86.60	3642.08	711.39	32.44	711.10	711.84	87.39	5.81
3998.00	73.50	85.40	3651.30	740.98	34.50	740.62	741.43	87.33	6.35
4029.00	76.10	85.40	3659.43	770.90	36.90	770.44	771.32	87.26	8.39
4061.00	79.10	85.10	3666.30	802.14	39.49	801.58	802.55	87.18	9.42
4092.00	81.80	85.90	3671.44	832.71	41.89	832.06	833.11	87.12	9.07
4124.00	81.80	85.30	3676.00	864.38	44.32	863.63	864.77	87.06	1.86
4155.00	82.00	85.40	3680.37	895.08	46.80	894.22	895.45	87.00	.72
4187.00	82.40	85.30	3684.71	926.78	49.38	925.82	927.14	86.95	1.29
4218.00	82.60	85.50	3688.76	957.51	51.84	956.46	957.86	86.90	.91
4315.00	83.00	86.20	3700.92	1053.74	58.80	1052.44	1054.08	86.80	.83
4346.00	85.10	86.70	3704.13	1084.57	60.71	1083.21	1084.91	86.79	6.96

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Vertical Section FT	N-S FT	E-W FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
4378.00	87.30	86.10	3706.25	1116.49	62.72	1115.08	1116.84	86.78	7.12
4409.00	89.70	85.80	3707.06	1147.48	64.91	1145.99	1147.82	86.76	7.80
4440.00	91.40	84.50	3706.77	1178.47	67.53	1176.87	1178.81	86.72	6.90
4470.00	91.30	84.90	3706.06	1208.46	70.30	1206.74	1208.78	86.67	1.37
4565.00	91.90	84.00	3703.41	1303.41	79.48	1301.25	1303.68	86.50	1.14
4658.00	92.60	84.80	3699.75	1396.33	88.55	1393.74	1396.55	86.36	1.14
4753.00	92.20	84.20	3695.78	1491.23	97.65	1488.22	1491.42	86.25	.76
4847.00	90.80	84.90	3693.32	1585.19	106.57	1581.76	1585.34	86.15	1.67
4941.00	91.20	84.60	3691.68	1679.17	115.17	1675.35	1679.30	86.07	.53
5036.00	91.50	84.70	3689.44	1774.14	124.03	1769.91	1774.25	85.99	.33
5130.00	91.90	83.90	3686.65	1868.08	133.36	1863.40	1868.17	85.91	.95
5224.00	90.60	84.70	3684.60	1962.04	142.69	1956.91	1962.11	85.83	1.62
5317.00	91.00	85.20	3683.30	2055.02	150.88	2049.54	2055.09	85.79	.69
5411.00	91.10	84.70	3681.58	2149.01	159.15	2143.16	2149.06	85.75	.54
5504.00	91.20	84.40	3679.71	2241.98	167.98	2235.72	2242.02	85.70	.34
5599.00	91.20	84.30	3677.72	2336.94	177.33	2330.24	2336.97	85.65	.11
5693.00	91.10	83.60	3675.83	2430.90	187.24	2423.69	2430.92	85.58	.75
5786.00	91.00	83.40	3674.13	2523.83	197.76	2516.08	2523.84	85.51	.24
5880.00	91.10	82.90	3672.41	2617.75	208.97	2609.39	2617.75	85.42	.54
5973.00	90.20	83.70	3671.35	2710.68	219.82	2701.75	2710.68	85.35	1.29
6067.00	89.80	85.90	3671.35	2804.67	228.34	2795.36	2804.67	85.33	2.38
6160.00	90.00	85.70	3671.51	2897.67	235.15	2888.11	2897.67	85.35	.30
6254.00	91.70	85.00	3670.12	2991.65	242.77	2981.78	2991.65	85.35	1.96
6348.00	90.80	86.60	3668.07	3085.62	249.65	3075.51	3085.62	85.36	1.95
6442.00	90.70	86.00	3666.84	3179.60	255.72	3169.30	3179.60	85.39	.65
6536.00	91.00	85.90	3665.44	3273.58	262.36	3263.06	3273.59	85.40	.34
6630.00	91.00	85.70	3663.80	3367.57	269.24	3356.79	3367.57	85.41	.21
6724.00	91.40	85.80	3661.84	3461.54	276.21	3450.51	3461.55	85.42	.44
6818.00	91.70	84.60	3659.29	3555.51	284.07	3544.14	3555.51	85.42	1.32
6911.00	91.70	84.30	3656.53	3648.46	293.06	3636.67	3648.46	85.39	.32
7010.00	91.70	81.90	3653.60	3747.33	304.95	3734.90	3747.33	85.33	2.42
7099.00	90.20	83.30	3652.12	3836.21	316.41	3823.14	3836.21	85.27	2.31
7189.00	90.80	83.30	3651.34	3926.15	326.91	3912.52	3926.16	85.22	.67
7280.00	90.40	88.50	3650.38	4017.11	333.41	4003.25	4017.11	85.24	5.73
7369.00	90.30	88.90	3649.84	4105.95	335.43	4092.23	4105.95	85.31	.46
7458.00	90.10	88.90	3649.53	4194.78	337.14	4181.21	4194.78	85.39	.22
7548.00	90.90	88.90	3648.74	4284.60	338.87	4271.19	4284.61	85.46	.89
7639.00	91.00	88.60	3647.23	4375.43	340.85	4362.16	4375.45	85.53	.35
7731.00	90.10	88.40	3646.35	4467.29	343.26	4454.12	4467.33	85.59	1.00
7822.00	90.20	86.80	3646.11	4558.21	347.07	4545.04	4558.27	85.63	1.76
7911.00	91.70	87.10	3644.64	4647.16	351.80	4633.90	4647.23	85.66	1.72
8002.00	92.40	87.10	3641.38	4738.06	356.40	4724.72	4738.15	85.69	.77
8092.00	92.40	87.20	3637.61	4827.94	360.88	4814.53	4828.04	85.71	.11
8184.00	93.70	88.70	3632.72	4919.71	364.16	4906.34	4919.83	85.76	2.16
8276.00	91.90	87.70	3628.22	5011.48	367.05	4998.18	5011.64	85.80	2.24

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Vertical Section FT	N-S FT	E-W FT	CLOSURE		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
8369.00	92.50	88.60	3624.65	5104.30	370.05	5091.06	5104.49	85.84	1.16
8462.00	89.20	87.50	3623.27	5197.17	373.21	5183.98	5197.40	85.88	3.74
8559.00	88.00	87.00	3625.64	5294.09	377.87	5280.84	5294.34	85.91	1.34
8652.00	88.60	86.50	3628.40	5387.02	383.14	5373.65	5387.29	85.92	.84
8747.00	89.10	86.10	3630.31	5481.99	389.27	5468.43	5482.27	85.93	.67
8842.00	90.50	86.90	3630.64	5576.96	395.06	5563.25	5577.26	85.94	1.70
9029.00	90.80	86.20	3628.52	5763.91	406.32	5749.90	5764.23	85.96	.41
9123.00	91.50	86.20	3626.63	5857.88	412.55	5843.67	5858.21	85.96	.74
9217.00	92.20	86.40	3623.60	5951.82	418.61	5937.42	5952.16	85.97	.77
9279.00	93.00	87.10	3620.79	6013.73	422.12	5999.26	6014.09	85.98	1.71
9373.00	92.20	85.20	3616.52	6107.62	428.42	6092.95	6107.99	85.98	2.19
9470.00	92.20	85.00	3612.80	6204.55	436.70	6189.52	6204.91	85.96	.21
Last Nevis MWD Survey									
9560.00	92.20	85.00	3609.34	6294.48	444.54	6279.11	6294.83	85.95	.00
Survey Projection to TD									
9640.00	92.20	85.00	3606.27	6374.42	451.51	6358.75	6374.76	85.94	.00