

DIST. 3



1724-B Townhurst Dr, Houston, Tx 77043
(713) 827-8302
www.nevisenergy.com

Job Number: 71099
Company: Black Hills Gas Resources
Lease/Well: Jicarilla 451-09 #131
Location: Rio Arriba County, NM
Rig Name: Patt. 744
RKB: 13'
G.L. or M.S.L.: 7063'

State/Country: NM/USA
Declination: 10.12919
Grid: -0.34
File name: Z:\BLACKH-1171099J-1148109131.SVY
Date/Time: 07-May-07 / 09:52
Curve Name: Actual Surveys ST

5-22-07

JIC 451-09 #131

API #30-039-29444

SURF: 1645 FS
29
1674 FS

1210 FW
~~2947~~
4182 FW
-2645
-2640
1129 FE

Actual Surveys ST

WINSERVE SURVEY CALCULATIONS
Minimum Curvature Method
Vertical Section Plane 90.00
Vertical Section Referenced to Wellhead
Angular Coordinates Referenced to Wellhead

Surface 1645/5 1210/W
BHL-start 1607/5 1994/W
BHL end 1674/5 1127/E
MD start 4111 Tvd start 3640
MD End 6278 Tvd end 3640

BH:

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 Tie-In									
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
First Nevis MWD Survey - BHA #1									
436.00	.00	308.50	436.00	.00	.00	.00	.00	.00	.00
623.00	.10	280.00	623.00	-.16	.03	-.16	.16	280.00	.05
811.00	.30	313.20	811.00	-.68	.39	-.68	.79	300.03	.12
999.00	.20	354.60	999.00	-1.07	1.06	-1.07	1.50	314.64	.11
1186.00	.40	138.60	1186.00	-.67	.89	-.67	1.12	323.12	.31
1372.00	.70	147.30	1371.99	.37	-.55	.37	.67	145.85	.17
1551.00	.80	153.50	1550.97	1.52	-2.59	1.52	3.00	149.55	.07
1729.00	1.10	142.80	1728.95	3.11	-5.06	3.11	5.94	148.44	.20
1908.00	.70	166.20	1907.93	4.41	-7.49	4.41	8.69	149.53	.30
2031.00	.60	154.10	2030.92	4.87	-8.80	4.87	10.06	151.05	.14
2220.00	.90	179.70	2219.90	5.31	-11.18	5.31	12.37	154.59	.23
2409.00	1.50	180.10	2408.86	5.31	-15.13	5.31	16.04	160.66	.32
2597.00	1.00	180.10	2596.81	5.31	-19.24	5.31	19.95	164.58	.27
2849.00	1.80	145.10	2848.74	7.57	-24.68	7.57	25.81	162.96	.45
2879.00	2.30	128.00	2878.72	8.31	-25.44	8.31	26.76	161.91	2.62
2910.00	4.10	118.10	2909.67	9.78	-26.34	9.78	28.10	159.64	6.05
2940.00	6.10	113.80	2939.55	12.18	-27.49	12.18	30.07	156.10	6.78
2970.00	8.30	111.00	2969.31	15.66	-28.91	15.66	32.88	151.55	7.42
3001.00	10.50	107.30	2999.90	20.45	-30.55	20.45	36.76	146.20	7.36
3033.00	12.90	105.90	3031.23	26.67	-32.40	26.67	41.96	140.54	7.55

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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	
3064.00	15.00	105.90	3061.31	33.86	-34.45	33.86	48.30	135.49	6.77
3095.00	17.00	106.00	3091.11	42.07	-36.79	42.07	55.89	131.17	6.45
3127.00	19.20	105.70	3121.53	51.64	-39.51	51.64	65.02	127.42	6.88
3158.00	21.00	104.10	3150.64	61.93	-42.24	61.93	74.96	124.30	6.07
3190.00	22.70	101.90	3180.34	73.53	-44.91	73.53	86.16	121.41	5.90
3220.00	25.00	99.70	3207.77	85.45	-47.17	85.45	97.61	118.90	8.22
3251.00	27.30	98.00	3235.60	98.95	-49.27	98.95	110.53	116.47	7.80
3282.00	29.50	96.30	3262.87	113.58	-51.09	113.58	124.54	114.22	7.56
3313.00	31.50	94.60	3289.58	129.24	-52.58	129.24	139.52	112.14	7.03
3345.00	33.30	93.00	3316.59	146.34	-53.71	146.34	155.89	110.15	6.23
3376.00	35.30	92.20	3342.20	163.80	-54.50	163.80	172.62	108.40	6.61
3407.00	37.70	92.20	3367.12	182.22	-55.21	182.22	190.40	106.86	7.74
3439.00	40.00	92.60	3392.04	202.27	-56.05	202.27	209.90	105.49	7.23
3470.00	42.20	92.20	3415.40	222.63	-56.90	222.63	229.79	104.34	7.15
3501.00	44.30	90.90	3437.98	243.86	-57.47	243.86	250.54	103.26	7.36
3533.00	46.60	89.30	3460.43	266.67	-57.51	266.67	272.80	102.17	8.02
3564.00	48.80	88.70	3481.29	289.59	-57.10	289.59	295.17	101.15	7.24
3596.00	50.50	88.30	3502.01	313.97	-56.46	313.97	319.00	100.20	5.40
3627.00	52.10	87.60	3521.39	338.14	-55.60	338.14	342.68	99.34	5.45
3658.00	53.70	87.10	3540.09	362.84	-54.45	362.84	366.90	98.53	5.32
3689.00	56.10	87.00	3557.91	388.17	-53.15	388.17	391.79	97.80	7.75
3720.00	58.20	87.40	3574.73	414.18	-51.88	414.18	417.41	97.14	6.86
3751.00	60.20	88.00	3590.60	440.78	-50.81	440.78	443.70	96.58	6.66
3782.00	62.10	87.80	3605.56	467.92	-49.81	467.92	470.56	96.08	6.16
3814.00	64.30	87.40	3619.98	496.45	-48.62	496.45	498.83	95.59	6.96
3846.00	67.20	86.90	3633.12	525.59	-47.16	525.59	527.70	95.13	9.17
3877.00	69.80	86.70	3644.48	554.38	-45.55	554.38	556.25	94.70	8.41
3908.00	72.60	87.00	3654.47	583.68	-43.94	583.68	585.34	94.31	9.08
3940.00	75.30	87.90	3663.32	614.40	-42.58	614.40	615.88	93.96	8.86
3978.00	78.50	88.60	3671.93	651.39	-41.45	651.39	652.71	93.64	8.61
4002.00	81.10	88.60	3676.18	675.00	-40.87	675.00	676.24	93.46	10.83
4033.00	83.20	88.60	3680.42	705.70	-40.12	705.70	706.84	93.25	6.77
4064.00	83.40	88.80	3684.03	736.48	-39.42	736.48	737.54	93.06	.91
Start BHA #2									
4111.00	83.11	87.77	3689.56	783.14	-38.03	783.14	784.06	92.78	2.26
4160.00	82.80	86.70	3695.57	831.71	-35.68	831.71	832.47	92.46	2.26
4191.00	83.30	86.50	3699.32	862.43	-33.86	862.43	863.09	92.25	1.74
4222.00	84.60	85.80	3702.59	893.18	-31.79	893.18	893.75	92.04	4.76
4253.00	86.30	87.00	3705.04	924.02	-29.85	924.02	924.50	91.85	6.71
4284.00	87.30	87.20	3706.78	954.93	-28.28	954.93	955.35	91.70	3.29
4316.00	88.40	87.70	3707.98	986.88	-26.86	986.88	987.24	91.56	3.78
4347.00	88.70	88.00	3708.76	1017.85	-25.69	1017.85	1018.17	91.45	1.37
4378.00	89.80	88.60	3709.17	1048.83	-24.78	1048.83	1049.12	91.35	4.04
4409.00	91.50	87.70	3708.81	1079.81	-23.77	1079.81	1080.07	91.26	6.20

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	
4440.00	91.00	87.50	3708.14	1110.78	-22.48	1110.78	1111.00	91.16	1.74
End BHA #2, Start BHA #3									
4445.00	91.03	87.50	3708.05	1115.77	-22.26	1115.77	1115.99	91.14	.63
4472.00	91.20	87.50	3707.52	1142.74	-21.08	1142.74	1142.93	91.06	.62
4503.00	91.00	88.20	3706.93	1173.71	-19.92	1173.71	1173.88	90.97	2.35
4535.00	90.70	87.80	3706.45	1205.69	-18.80	1205.69	1205.84	90.89	1.56
4566.00	90.90	87.80	3706.02	1236.66	-17.61	1236.66	1236.79	90.82	.65
4597.00	91.10	87.80	3705.48	1267.64	-16.42	1267.64	1267.74	90.74	.65
4629.00	91.30	87.60	3704.81	1299.60	-15.14	1299.60	1299.69	90.67	.88
4661.00	91.60	87.60	3704.00	1331.56	-13.80	1331.56	1331.64	90.59	.94
4692.00	89.90	90.60	3703.59	1362.55	-13.31	1362.55	1362.62	90.56	11.12
4723.00	89.70	90.80	3703.70	1393.55	-13.69	1393.55	1393.62	90.56	.91
4755.00	89.50	90.10	3703.93	1425.55	-13.94	1425.55	1425.62	90.56	2.27
4787.00	89.10	88.90	3704.32	1457.54	-13.66	1457.54	1457.61	90.54	3.95
4818.00	89.20	89.00	3704.78	1488.54	-13.09	1488.54	1488.59	90.50	.46
4849.00	89.50	89.20	3705.13	1519.53	-12.61	1519.53	1519.58	90.48	1.16
4880.00	89.50	89.50	3705.40	1550.53	-12.26	1550.53	1550.57	90.45	.97
4912.00	89.30	89.10	3705.73	1582.52	-11.87	1582.52	1582.57	90.43	1.40
4944.00	89.00	89.10	3706.21	1614.51	-11.36	1614.51	1614.55	90.40	.94
4975.00	89.70	90.40	3706.56	1645.51	-11.23	1645.51	1645.55	90.39	4.76
5006.00	89.70	90.40	3706.72	1676.51	-11.44	1676.51	1676.55	90.39	.00
5038.00	90.60	91.10	3706.64	1708.51	-11.86	1708.51	1708.55	90.40	3.56
5070.00	91.60	90.70	3706.02	1740.50	-12.37	1740.50	1740.54	90.41	3.37
5101.00	91.90	91.30	3705.08	1771.48	-12.91	1771.48	1771.52	90.42	2.16
5133.00	92.30	90.90	3703.91	1803.45	-13.52	1803.45	1803.50	90.43	1.77
Start ST - BHA #4									
5164.00	91.33	90.90	3702.92	1834.43	-14.01	1834.43	1834.48	90.44	3.13
5165.00	91.30	90.90	3702.90	1835.43	-14.02	1835.43	1835.48	90.44	3.12
5196.00	91.80	87.10	3702.06	1866.41	-13.48	1866.41	1866.46	90.41	12.36
5227.00	93.20	87.20	3700.71	1897.34	-11.94	1897.34	1897.38	90.36	4.53
5259.00	94.10	87.40	3698.67	1929.24	-10.44	1929.24	1929.27	90.31	2.88
5291.00	93.30	86.20	3696.61	1961.12	-8.65	1961.12	1961.14	90.25	4.50
5322.00	89.90	85.00	3695.74	1992.01	-6.28	1992.01	1992.02	90.18	11.63
5354.00	89.90	85.00	3695.80	2023.89	-3.49	2023.89	2023.89	90.10	.00
5370.00	89.44	85.10	3695.89	2039.83	-2.11	2039.83	2039.83	90.06	2.97
5385.00	89.00	85.20	3696.09	2054.78	-.84	2054.78	2054.78	90.02	2.97
5417.00	89.30	85.10	3696.57	2086.66	1.86	2086.66	2086.66	89.95	.99
5449.00	88.70	84.60	3697.13	2118.52	4.74	2118.52	2118.53	89.87	2.44
5480.00	88.30	84.30	3697.94	2149.37	7.73	2149.37	2149.38	89.79	1.61
5511.00	89.20	84.50	3698.62	2180.21	10.76	2180.21	2180.24	89.72	2.97
5542.00	90.20	84.90	3698.78	2211.08	13.62	2211.08	2211.12	89.65	3.47
5573.00	89.90	85.40	3698.75	2241.97	16.24	2241.97	2242.03	89.58	1.88
5605.00	89.70	85.10	3698.86	2273.86	18.89	2273.86	2273.94	89.52	1.13
5637.00	90.50	86.30	3698.81	2305.77	21.29	2305.77	2305.86	89.47	4.51

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	
5668.00	90.50	86.80	3698.54	2336.71	23.16	2336.71	2336.82	89.43	1.61
5699.00	90.50	87.20	3698.27	2367.66	24.78	2367.66	2367.79	89.40	1.29
5730.00	91.10	88.50	3697.83	2398.64	25.94	2398.64	2398.78	89.38	4.62
5762.00	91.10	88.20	3697.22	2430.62	26.86	2430.62	2430.77	89.37	.94
5793.00	91.00	88.80	3696.65	2461.60	27.67	2461.60	2461.76	89.36	1.96
5825.00	90.70	89.00	3696.18	2493.59	28.29	2493.59	2493.75	89.35	1.13
5856.00	90.50	88.50	3695.85	2524.59	28.96	2524.59	2524.75	89.34	1.74
5887.00	90.50	89.10	3695.58	2555.58	29.61	2555.58	2555.75	89.34	1.94
5919.00	91.40	89.90	3695.05	2587.57	29.89	2587.57	2587.74	89.34	3.76
5950.00	91.60	90.30	3694.24	2618.56	29.84	2618.56	2618.73	89.35	1.44
5982.00	91.60	90.20	3693.35	2650.55	29.70	2650.55	2650.71	89.36	.31
6014.00	91.70	90.70	3692.42	2682.53	29.45	2682.53	2682.69	89.37	1.59
6045.00	91.40	90.30	3691.59	2713.52	29.18	2713.52	2713.68	89.38	1.61
6076.00	91.20	89.80	3690.88	2744.51	29.15	2744.51	2744.67	89.39	1.74
6108.00	90.70	90.40	3690.35	2776.51	29.09	2776.51	2776.66	89.40	2.44
6139.00	90.50	89.80	3690.03	2807.51	29.04	2807.51	2807.66	89.41	2.04
6171.00	90.20	90.20	3689.83	2839.51	29.04	2839.51	2839.65	89.41	1.56
6202.00	90.20	89.60	3689.72	2870.50	29.09	2870.50	2870.65	89.42	1.94
Last Nevis MWD Survey									
6233.00	89.80	89.70	3689.72	2901.50	29.28	2901.50	2901.65	89.42	1.33
Survey Projection to Bit - End BHA #4									
6278.00	89.80	89.70	3689.88	2946.50	29.52	2946.50	2946.65	89.43	.00