



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

Job Number: 71286
Company: Black Hills Gas Resources
Lease/Well: Jicarilla 464-31 #11
Location: Rio Arriba County, NM
Rig Name: Patt 744
RKB: 13'
G.L. or M.S.L.: 7138'

State/Country: NM/USA
Declination: 10.10688
Grid: -0.32
File name: C:\CURREN-1\712864-1\46431#11.SVY
Date/Time: 02-Sep-07 / 08:09
Curve Name: Jic 464-31 #11 surveys

30-039-27731

Surface: 660/N 1050/W
Lat. origin 1635/N 1799/W md 4633 TVJ 3835
Latent B.H. 1481/N 195/E md 6934 TVJ 3808
Jic 464-31 #11 surveys

JIC 464-31 #11

SURF 660 FN 1050 FW
(C) +1321 3071
1981' FN 4121 FW
-4316
195' FE

WINSERVE SURVEY CALCULATIONS

Minimum Curvature Method

Vertical Section Plane 112.62

Vertical Section Referenced to Wellhead

Rectangular Coordinates Referenced to Wellh (H)

Need AS Drilled
C-102

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										
Surface Tie-In											
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		
First Nevis MWD Survey											
280.00	2.70	345.00	279.90	-4.03	6.37	-1.71	6.60	345.00	.96		
340.00	2.50	.80	339.84	-5.38	9.04	-2.05	9.28	347.20	1.24		
371.00	.80	29.60	370.82	-5.60	9.91	-1.94	10.10	348.93	5.93		
400.00	1.00	113.80	399.82	-5.32	9.98	-1.61	10.11	350.86	4.19		
432.00	2.60	127.00	431.80	-4.34	9.43	-.77	9.47	355.32	5.13		
463.00	4.70	123.40	462.74	-2.41	8.31	.85	8.35	5.84	6.81		
494.00	6.20	146.90	493.60	.22	6.21	2.83	6.82	24.47	8.58		
526.00	6.60	148.10	525.40	3.15	3.20	4.74	5.72	55.98	1.32		
558.00	6.50	147.70	557.19	6.12	.11	6.68	6.68	89.07	.34		
589.00	6.50	154.00	587.99	8.88	-2.95	8.39	8.89	109.39	2.30		
621.00	6.50	154.00	619.79	11.60	-6.21	9.98	11.75	121.90	.00		
653.00	6.30	146.30	651.59	14.42	-9.30	11.74	14.98	128.37	2.75		
734.00	6.10	147.20	732.12	21.66	-16.61	16.54	23.44	135.12	.27		
828.00	4.70	142.10	825.70	29.12	-23.85	21.61	32.18	137.82	1.57		
923.00	4.20	152.80	920.41	35.17	-30.01	25.59	39.44	139.55	1.02		
1019.00	1.70	161.40	1016.28	38.79	-34.49	27.65	44.21	141.28	2.64		
1113.00	1.40	165.20	1110.24	40.41	-36.92	28.39	46.58	142.44	.34		
1207.00	.30	121.60	1204.23	41.35	-38.16	28.90	47.87	142.87	1.28		
1302.00	.60	149.90	1299.23	41.99	-38.72	29.36	48.59	142.83	.38		
1396.00	.60	128.20	1393.22	42.86	-39.45	29.99	49.56	142.76	.24		

RCVD SEP 6 '07
OIL CONS. DIV.
DIST. 3

File "As Drilled" plat

By

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	
1487.00	.80	122.30	1484.22	43.94	-40.09	30.90	50.62	142.37	.23
1579.00	.60	126.50	1576.21	45.04	-40.72	31.83	51.68	141.98	.22
1670.00	.60	133.00	1667.20	45.95	-41.33	32.56	52.61	141.76	.07
1761.00	.60	124.60	1758.20	46.87	-41.92	33.30	53.54	141.53	.10
1851.00	.70	123.00	1848.19	47.87	-42.49	34.15	54.51	141.21	.11
1940.00	.80	115.30	1937.19	49.02	-43.05	35.17	55.59	140.75	.16
2031.00	.80	122.00	2028.18	50.28	-43.66	36.28	56.77	140.27	.10
2122.00	.90	129.70	2119.17	51.59	-44.45	37.37	58.07	139.94	.17
2212.00	.90	109.50	2209.16	52.98	-45.14	38.58	59.38	139.48	.35
2302.00	.90	106.20	2299.15	54.38	-45.57	39.93	60.59	138.78	.06
2390.00	.90	106.80	2387.13	55.76	-45.96	41.25	61.76	138.09	.01
2482.00	.90	98.60	2479.12	57.18	-46.28	42.66	62.94	137.33	.14
2573.00	.90	97.70	2570.11	58.56	-46.48	44.07	64.06	136.52	.02
2668.00	1.00	100.00	2665.10	60.09	-46.73	45.63	65.31	135.68	.11
2763.00	1.10	109.30	2760.08	61.81	-47.17	47.31	66.81	134.92	.21
2858.00	1.00	102.40	2855.07	63.54	-47.65	48.98	68.33	134.21	.17
2922.00	1.00	96.10	2919.06	64.62	-47.83	50.08	69.25	133.69	.17
2953.00	1.00	96.00	2950.05	65.14	-47.89	50.62	69.68	133.41	.01
2985.00	1.50	124.60	2982.04	65.82	-48.16	51.24	70.32	133.22	2.45
3016.00	3.80	145.00	3013.01	67.08	-49.23	52.16	71.72	133.34	7.90
3049.00	5.90	149.80	3045.89	69.36	-51.59	53.64	74.42	133.88	6.48
3080.00	6.30	149.80	3076.71	71.98	-54.44	55.30	77.60	134.55	1.29
3112.00	7.90	147.90	3108.47	75.18	-57.82	57.35	81.44	135.23	5.05
3143.00	10.10	147.30	3139.08	79.15	-61.91	59.95	86.18	135.92	7.10
3175.00	12.00	146.40	3170.49	84.22	-67.04	63.31	92.21	136.64	5.96
3206.00	14.10	147.00	3200.69	90.02	-72.89	67.15	99.11	137.35	6.79
3238.00	15.70	144.40	3231.61	96.92	-79.68	71.79	107.26	137.98	5.42
3269.00	17.40	142.10	3261.33	104.52	-86.75	77.08	116.05	138.38	5.88
3301.00	19.30	141.70	3291.70	113.31	-94.68	83.30	126.11	138.66	5.95
3333.00	21.70	140.60	3321.67	123.15	-103.40	90.33	137.30	138.86	7.60
3363.00	23.70	141.50	3349.34	133.33	-112.41	97.61	148.87	139.03	6.77
3394.00	25.50	142.60	3377.53	144.57	-122.58	105.54	161.76	139.27	5.99
3425.00	27.60	143.20	3405.26	156.53	-133.64	113.90	175.59	139.56	6.83
3457.00	30.00	144.00	3433.30	169.75	-146.05	123.04	190.97	139.89	7.60
3488.00	32.30	144.90	3459.83	183.37	-159.09	132.36	206.95	140.24	7.57
3519.00	34.40	144.50	3485.72	197.81	-173.00	142.21	223.95	140.58	6.81
3550.00	36.80	144.90	3510.93	213.10	-187.73	152.63	241.95	140.89	7.78
3581.00	38.60	144.90	3535.45	229.12	-203.24	163.53	260.86	141.18	5.81
3613.00	41.30	143.90	3559.98	246.59	-219.94	175.50	281.38	141.41	8.67
3645.00	45.10	143.60	3583.30	265.34	-237.60	188.45	303.26	141.58	11.89
3676.00	47.90	144.00	3604.64	284.57	-255.75	201.73	325.73	141.73	9.08
3708.00	51.10	145.00	3625.42	305.23	-275.56	215.85	350.03	141.93	10.28
3739.00	53.00	144.50	3644.48	325.93	-295.52	229.96	374.45	142.11	6.26
3771.00	55.10	143.60	3663.27	348.04	-316.49	245.17	400.34	142.24	6.95
3802.00	57.10	142.80	3680.56	370.19	-337.09	260.58	426.06	142.29	6.80

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	
3833.00	59.60	142.60	3696.82	393.02	-358.08	276.57	452.45	142.32	8.08
3865.00	62.20	143.10	3712.39	417.18	-380.36	293.46	480.41	142.35	8.24
3897.00	65.20	143.00	3726.56	441.91	-403.28	310.70	509.09	142.39	9.38
3928.00	67.70	143.10	3738.95	466.41	-425.99	327.78	537.50	142.42	8.07
3960.00	70.70	143.30	3750.31	492.16	-449.94	345.70	567.41	142.46	9.39
3991.00	73.60	143.50	3759.81	517.51	-473.63	363.29	596.91	142.51	9.37
4023.00	75.70	144.40	3768.28	543.87	-498.58	381.45	627.76	142.58	7.10
4055.00	78.00	144.90	3775.56	570.28	-523.99	399.47	658.90	142.68	7.35
4087.00	80.00	144.70	3781.67	596.87	-549.66	417.58	690.29	142.78	6.28
4118.00	81.80	144.30	3786.57	622.86	-574.58	435.35	720.88	142.85	5.94
4149.00	83.00	143.40	3790.67	649.13	-599.39	453.48	751.61	142.89	4.82
4181.00	82.90	143.70	3794.60	676.37	-624.94	472.35	783.36	142.92	.98
4213.00	84.30	143.00	3798.16	703.71	-650.45	491.33	815.16	142.93	4.89
4244.00	84.50	142.60	3801.19	730.38	-675.02	509.98	846.01	142.93	1.44
4276.00	83.60	141.90	3804.51	758.04	-700.19	529.47	877.84	142.90	3.56
4307.00	82.90	141.80	3808.15	784.91	-724.40	548.48	908.62	142.87	2.28
4339.00	83.20	141.20	3812.02	812.72	-749.26	568.26	940.37	142.82	2.08
4371.00	83.20	141.30	3815.81	840.61	-774.04	588.15	972.14	142.77	.31
4402.00	85.20	141.30	3818.94	867.67	-798.11	607.43	1002.97	142.73	6.45
4434.00	85.10	141.50	3821.65	895.62	-823.02	627.32	1034.84	142.68	.70
4465.00	85.30	141.60	3824.24	922.65	-847.22	646.53	1065.73	142.65	.72
4497.00	85.50	141.40	3826.81	950.58	-872.18	666.39	1097.62	142.62	.88
4528.00	85.90	141.30	3829.13	977.69	-896.32	685.69	1128.53	142.58	1.33
4560.00	85.90	141.10	3831.42	1005.72	-921.20	705.69	1160.43	142.55	.62
4591.00	86.20	141.50	3833.56	1032.85	-945.33	725.03	1191.35	142.51	1.61
4633			3835		-975	749			
4667.00	86.60	139.80	3838.33	1099.80	-1003.98	773.12	1267.16	142.40	2.29
4697.00	86.50	140.30	3840.14	1126.38	-1026.94	792.35	1297.08	142.35	1.70
4726.00	87.40	138.10	3841.68	1152.28	-1048.86	811.27	1326.00	142.28	8.19
4756.00	88.90	133.90	3842.65	1179.79	-1070.42	832.10	1355.80	142.14	14.86
4785.00	89.80	130.30	3842.98	1207.13	-1089.86	853.61	1384.36	141.93	12.79
4814.00	89.00	126.50	3843.28	1235.03	-1107.87	876.33	1412.56	141.66	13.39
4843.00	87.70	122.10	3844.12	1263.41	-1124.20	900.27	1440.25	141.31	15.81
4873.00	88.60	119.00	3845.08	1293.10	-1139.44	926.09	1468.32	140.90	10.75
4902.00	90.40	115.30	3845.34	1322.00	-1152.67	951.89	1494.90	140.45	14.19
4931.00	91.80	111.50	3844.78	1350.99	-1164.18	978.49	1520.78	139.95	13.96
4961.00	92.90	107.30	3843.55	1380.91	-1174.14	1006.76	1546.66	139.39	14.46
4990.00	92.90	104.30	3842.08	1409.66	-1182.02	1034.62	1570.87	138.80	10.33
5019.00	93.40	101.20	3840.49	1438.19	-1188.41	1062.86	1594.36	138.19	10.81
5050.00	92.50	96.60	3838.89	1468.25	-1193.20	1093.44	1618.44	137.50	15.10
5082.00	92.40	95.40	3837.52	1498.89	-1196.54	1125.23	1642.52	136.76	3.76
5114.00	93.30	94.50	3835.93	1529.34	-1199.30	1157.07	1666.48	136.03	3.97
5145.00	93.50	94.80	3834.09	1558.78	-1201.81	1187.92	1689.82	135.33	1.16
5207.00	93.80	94.60	3830.15	1617.65	-1206.88	1249.58	1737.24	134.00	.58
5238.00	94.30	94.10	3827.96	1647.01	-1209.22	1280.42	1761.16	133.36	2.28
5270.00	92.30	94.80	3826.12	1677.36	-1211.70	1312.27	1786.13	132.72	6.62

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	
5302.00	92.60	95.00	3824.75	1707.82	-1214.43	1344.12	1811.49	132.10	1.13
5333.00	91.60	96.10	3823.61	1737.43	-1217.43	1374.95	1836.47	131.52	4.79
5365.00	92.10	96.10	3822.58	1768.09	-1220.83	1406.76	1862.63	130.95	1.56
5396.00	89.90	96.40	3822.04	1797.83	-1224.20	1437.56	1888.19	130.42	7.16
5427.00	88.40	97.00	3822.50	1827.64	-1227.82	1468.35	1914.05	129.90	5.21
5458.00	88.80	96.40	3823.26	1857.44	-1231.43	1499.13	1940.06	129.40	2.33
5490.00	89.10	96.20	3823.84	1888.15	-1234.95	1530.93	1966.94	128.89	1.13
5521.00	89.10	96.60	3824.33	1917.91	-1238.40	1561.73	1993.15	128.41	1.29
5553.00	89.60	96.20	3824.69	1948.63	-1241.97	1593.53	2020.35	127.93	2.00
5584.00	89.90	96.60	3824.83	1978.40	-1245.42	1624.34	2046.84	127.48	1.61
5615.00	90.30	95.70	3824.77	2008.13	-1248.74	1655.16	2073.38	127.03	3.18
5647.00	90.40	95.60	3824.58	2038.73	-1251.89	1687.00	2100.77	126.58	.44
5678.00	90.40	96.00	3824.36	2068.40	-1255.03	1717.84	2127.46	126.15	1.29
5710.00	90.50	95.60	3824.11	2099.03	-1258.26	1749.68	2155.13	125.72	1.29
5742.00	90.60	95.70	3823.80	2129.64	-1261.41	1781.52	2182.88	125.30	.44
5773.00	90.50	95.30	3823.51	2159.26	-1264.38	1812.38	2209.83	124.90	1.33
5804.00	90.50	95.20	3823.23	2188.85	-1267.22	1843.24	2236.83	124.51	.32
5836.00	90.70	94.30	3822.90	2219.30	-1269.87	1875.13	2264.66	124.11	2.88
5867.00	90.50	93.90	3822.57	2248.70	-1272.08	1906.05	2291.56	123.72	1.44
5898.00	90.40	93.90	3822.33	2278.06	-1274.19	1936.98	2318.50	123.34	.32
5930.00	90.60	93.40	3822.05	2308.32	-1276.23	1968.91	2346.35	122.95	1.68
5961.00	90.50	93.50	3821.75	2337.60	-1278.10	1999.86	2373.38	122.58	.46
5992.00	90.90	93.40	3821.38	2366.88	-1279.96	2030.80	2400.51	122.22	1.33
6024.00	90.80	93.00	3820.90	2397.05	-1281.75	2062.74	2428.54	121.86	1.29
6055.00	90.70	92.50	3820.50	2426.20	-1283.23	2093.70	2455.66	121.50	1.64
6086.00	90.70	93.70	3820.12	2455.42	-1284.91	2124.66	2482.97	121.16	3.87
6118.00	90.70	93.60	3819.73	2485.68	-1286.95	2156.59	2511.40	120.83	.31
6149.00	90.50	93.80	3819.40	2515.00	-1288.95	2187.52	2539.02	120.51	.91
6181.00	90.50	93.70	3819.12	2545.28	-1291.04	2219.45	2567.64	120.19	.31
6212.00	90.20	93.40	3818.93	2574.58	-1292.96	2250.39	2595.38	119.88	1.37
6243.00	90.40	93.40	3818.77	2603.85	-1294.80	2281.34	2623.17	119.58	.65
6275.00	90.50	92.50	3818.52	2633.98	-1296.45	2313.29	2651.81	119.27	2.83
6307.00	90.60	92.90	3818.21	2664.07	-1297.95	2345.26	2680.47	118.96	1.29
6338.00	90.80	92.60	3817.83	2693.22	-1299.44	2376.22	2708.31	118.67	1.16
6369.00	90.60	92.10	3817.45	2722.30	-1300.71	2407.19	2736.13	118.38	1.74
6401.00	90.50	92.50	3817.15	2752.30	-1302.00	2439.16	2764.91	118.09	1.29
6432.00	90.00	92.10	3817.01	2781.37	-1303.24	2470.14	2792.85	117.82	2.07
6464.00	90.20	91.40	3816.96	2811.27	-1304.22	2502.12	2821.63	117.53	2.28
6494.00	90.00	90.90	3816.90	2839.19	-1304.82	2532.12	2848.54	117.26	1.80
6527.00	89.80	90.10	3816.96	2869.76	-1305.11	2565.11	2878.04	116.97	2.50
6558.00	90.90	91.80	3816.77	2898.57	-1305.62	2596.11	2905.93	116.70	6.53
6589.00	90.90	92.50	3816.28	2927.61	-1306.78	2627.08	2934.15	116.45	2.26
6620.00	91.20	92.10	3815.72	2956.67	-1308.03	2658.05	2962.46	116.20	1.61
6652.00	91.30	92.00	3815.02	2986.63	-1309.17	2690.02	2991.68	115.95	.44
6683.00	91.40	91.80	3814.29	3015.61	-1310.20	2721.00	3020.01	115.71	.72

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	
6715.00	91.20	91.90	3813.56	3045.53	-1311.23	2752.97	3049.29	115.47	.70
6746.00	91.50	91.80	3812.83	3074.50	-1312.23	2783.95	3077.71	115.24	1.02
6777.00	91.20	92.00	3812.10	3103.49	-1313.26	2814.92	3106.19	115.01	1.16
6808.00	91.50	91.50	3811.37	3132.45	-1314.21	2845.90	3134.69	114.79	1.88
6839.00	91.70	91.10	3810.51	3161.32	-1314.91	2876.88	3163.14	114.56	1.44
6871.00	91.30	92.20	3809.67	3191.19	-1315.83	2908.86	3192.62	114.34	3.66
6902.00	90.60	92.70	3809.15	3220.28	-1317.16	2939.82	3221.41	114.13	2.77
6934.00	90.60	92.30	3808.82	3250.33	-1318.55	2971.79	3251.17	113.93	1.25
Last Nevis MWD Survey									
6966.00	89.50	91.20	3808.79	3280.23	-1319.53	3003.77	3280.83	113.72	4.86
Survey Proj. to TD									
7033.00	89.50	91.20	3809.38	3342.60	-1320.93	3070.76	3342.81	113.28	.00

9/4/2007

JIC 464-31 #11
Well Bore Diagram
Wellbore Diagram
API # 30-039-27731
NE NE, Sec 31, T30N, R3W Rio Arriba, NM

SURF CSG
8 5/8" 24# @ 278' TOC = Surf

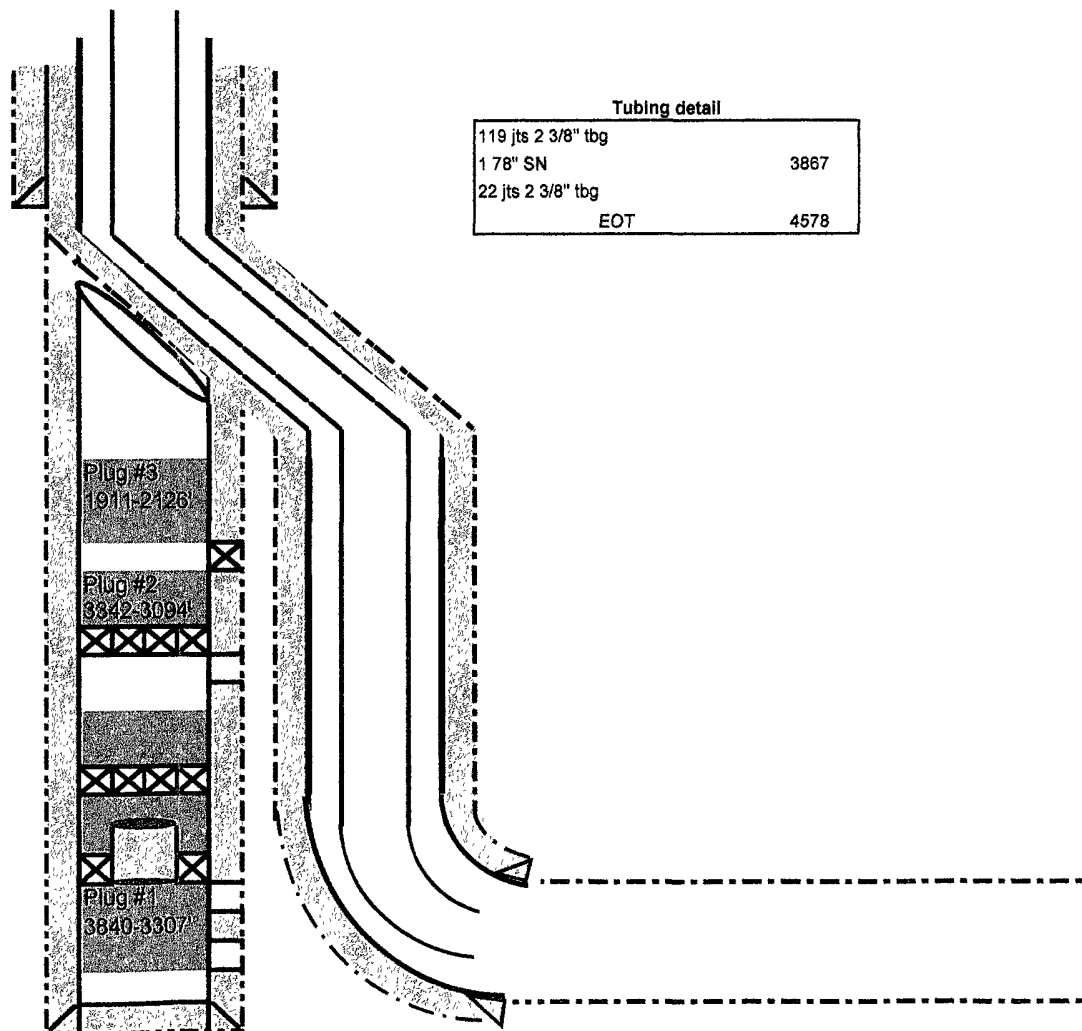
Old prod casing; 5 1/2" 15.5#
K-55 @ 3883'
5 1/2" casing washed over and
cut off @ 284', KO window cut
from 284 to 313'.

Nacimiento perms: 2778-3055,
SQ 2004

Ojo Alamo perms: 3292-3340

Fruitland Coal perms: 3756-
3766
Pictured Cliffs perms: 3820-
3840

New production casing: 5 1/2"
15.5# J-55 @ 4632'. Cement w/
375 sx 65/35 + 300 sx 50/50.
Circ 1 bbl to surf.



4632

7033