



Field: Rio Arriba, NM
Site: Carracas Canyon Section 23 T32N R35W
Well: Carracas 23A#4
Wellpath: 01
Survey: MWD2(ST)

ENERGEN.

TARGET DETAILS

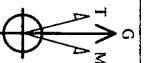
Name	TV	+N/S	+E/W	Shape
HL	0.00	0.00	0.00	Polygon
#23A#4 BHL	3906.00	400.00	1460.00	Point
TGT	3906.00	390.00	1160.00	Point

WELL DETAILS

Name	+N/S	+E/W	Northing	Easting	Latitude	Longitude	Spot
Carracas 23A#4	0.00	0.00	2172726.94	645254.81	36°58'12.000"N	107°20'09.990"W	N/A

LEGEND

01
Surface 1060/m 1170/m
BHL 688/m 2526/m



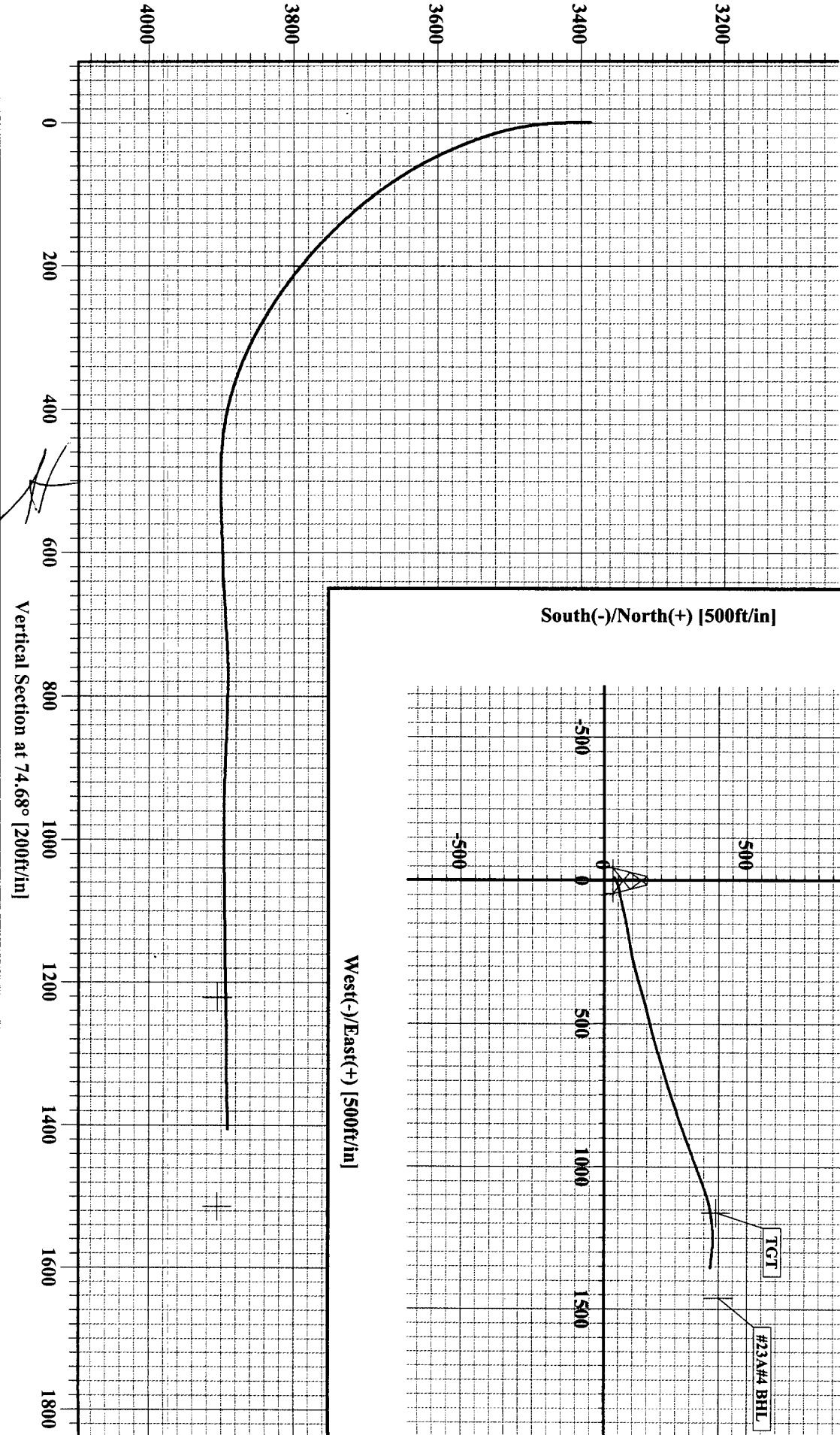
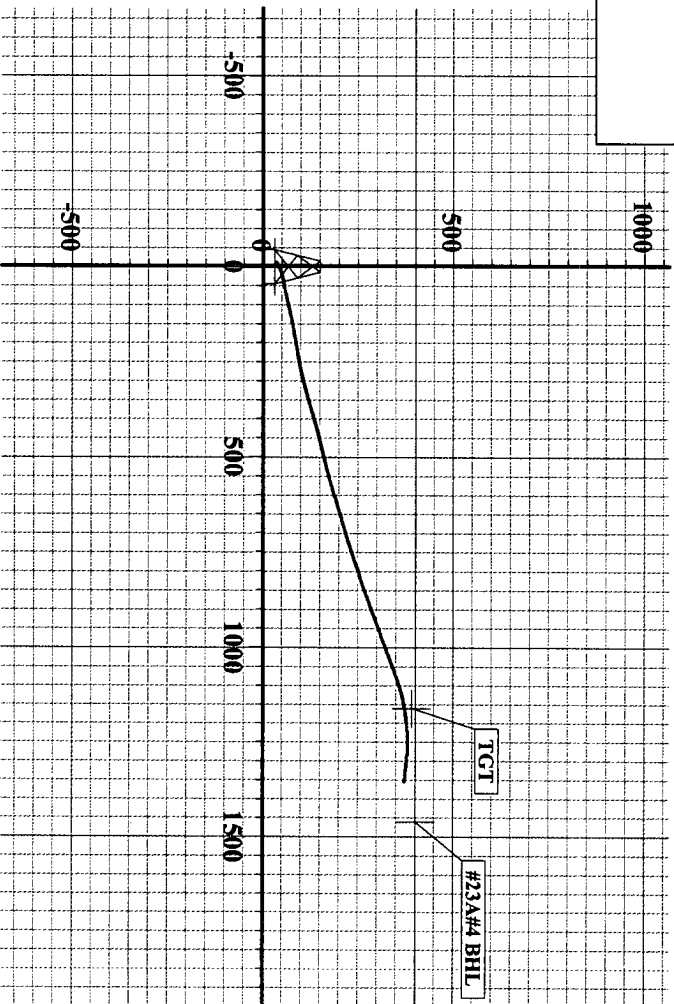
Azimuths to Grid North
True North: -0.30°
Magnetic North: 10.17°
Magnetic Field
Strength: 5158nT
Dip Angle: 63.89°
Date: 2005-05-31
Model: jwr2005

True Vertical Depth [200ft/in]

South(-)/North(+) [500ft/in]

West(-)/East(+) [500ft/in]

Vertical Section at 74.68° [200ft/in]





Scientific Drilling Survey

Company: ENERGEN.	Date: 2005-08-22	Time: 11:34:50	Page: 1
Field: Rio Arriba, NM	Co-ordinate(NE) Reference:	Well: Carracas 23A#4, Grid North	
Site: Carracas Canyon Section 23 T32N R5W	Vertical (TVD) Reference:	GL 7339.0	
Well: Carracas 23A#4	Section (VS) Reference:	Well (0.00N,0.00E,74.68Azi)	
Wellpath: 01	Survey Calculation Method:	Minimum Curvature	Db: Sybase

Field: Rio Arriba, NM

Map System: US State Plane Coordinate System 1927
Geo Datum: NAD27 (Clarke 1866)
Sys Datum: Mean Sea Level

Map Zone: New Mexico, Western Zone
Coordinate System: Well Centre
Geomagnetic Model: igrf2005

Site: Carracas Canyon Section 23 T32N R5W
 Section 23 T32N R5W

Site Position:	Northing:	ft	Latitude:
From: Lease Line	Easting:	ft	Longitude:
Position Uncertainty:	0.00 ft		North Reference: Grid
Ground Level:	0.00 ft		Grid Convergence: 0.30 deg

Well: Carracas 23A#4

Slot Name:

Well Position:	+N/-S	0.00 ft	Northing:	2172726.94 ft	Latitude:	36 58 12.000 N
	+E/-W	0.00 ft	Easting :	645254.81 ft	Longitude:	107 20 9.990 W
Position Uncertainty:	0.00 ft					

Wellpath: 01

Current Datum: GL	Height	7339.00 ft	Drilled From: Surface
Magnetic Data: 2005-05-31			Tie-on Depth: 0.00 ft
Field Strength: 51589 nT			Above System Datum: Mean Sea Level
Vertical Section: Depth From (TVD)	+N/-S		Declination: 10.47 deg
ft	ft		Mag Dip Angle: 63.89 deg
			+E/-W
			ft
			Direction
			deg
0.00	0.00	0.00	74.68

Survey Program for Definitive Wellpath

Date: 2005-08-22 **Validated:** No
Actual From **To**
 ft ft **Survey**

Version: 2

Toolcode

Tool Name

Survey

MD ft	Incl deg	Azim deg	TVD ft	N/S ft	E/W ft	VS ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft	ClsA deg	ClsD ft	Tool
3387.00	2.19	329.01	3386.30	34.60	-10.40	-0.89	0.00	0.00	0.00	343.27	36.13	MWD
3418.00	1.86	5.57	3417.28	35.61	-10.66	-0.87	4.22	-1.06	117.94	343.34	37.17	MWD
3449.00	4.85	64.27	3448.23	36.68	-9.43	0.60	13.53	9.65	189.35	345.59	37.87	MWD
3480.00	9.80	68.98	3478.97	38.19	-5.78	4.52	16.07	15.97	15.19	351.39	38.63	MWD
3508.00	14.66	64.46	3506.33	40.58	-0.36	10.38	17.68	17.36	-16.14	359.50	40.58	MWD
3537.00	19.20	60.63	3534.06	44.50	7.11	18.62	16.11	15.66	-13.21	9.08	45.07	MWD
3567.00	22.18	70.34	3562.13	48.83	16.75	29.06	15.12	9.93	32.37	18.94	51.62	MWD
3599.00	24.94	78.57	3591.47	52.20	29.06	41.82	13.40	8.62	25.72	29.10	59.74	MWD
3628.00	28.14	80.05	3617.41	54.59	41.79	54.73	11.27	11.03	5.10	37.43	68.75	MWD
3657.00	31.55	78.86	3642.56	57.24	55.97	69.11	11.93	11.76	-4.10	44.36	80.06	MWD
3688.00	35.24	78.10	3668.44	60.65	72.69	86.13	11.98	11.90	-2.45	50.16	94.67	MWD
3719.00	38.28	77.54	3693.27	64.57	90.82	104.65	9.87	9.81	-1.81	54.59	111.44	MWD
3750.00	41.11	76.35	3717.12	69.05	110.10	124.44	9.45	9.13	-3.84	57.91	129.96	MWD
3780.00	44.15	77.36	3739.19	73.66	129.89	144.74	10.39	10.13	3.37	60.44	149.32	MWD
3811.00	46.92	79.26	3760.91	78.14	151.55	166.81	9.95	8.94	6.13	62.73	170.51	MWD
3841.00	49.76	80.27	3780.85	82.11	173.61	189.13	9.79	9.47	3.37	64.69	192.05	MWD
3873.00	52.78	80.53	3800.87	86.28	198.22	213.97	9.46	9.44	0.81	66.48	216.18	MWD
3905.00	55.80	80.02	3819.54	90.67	223.82	239.83	9.53	9.44	-1.59	67.95	241.49	MWD
3936.00	58.81	79.66	3836.28	95.27	249.50	265.81	9.76	9.71	-1.16	69.10	267.07	MWD
3967.00	61.85	77.76	3851.63	100.55	275.91	292.67	11.16	9.81	-6.13	69.98	293.66	MWD
3999.00	65.71	75.25	3865.77	107.26	303.81	321.35	13.96	12.06	-7.84	70.56	322.19	MWD
4031.00	70.14	74.45	3877.79	115.01	332.43	351.00	14.04	13.84	-2.50	70.92	351.76	MWD
4062.00	74.53	73.48	3887.19	123.17	360.81	380.53	14.47	14.16	-3.13	71.15	381.25	MWD



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Survey Calculation Method: Minimum Curvature Db: Sybase

Survey

MD ft	Incl deg	Azim deg	TVD ft	N/S ft	E/W ft	VS ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft	ClsA deg	ClsD ft	Tool
4093.00	79.41	74.18	3894.18	131.57	389.81	410.72	15.89	15.74	2.26	71.35	411.41	MWD
4125.00	84.40	74.80	3898.69	140.04	420.32	442.39	15.71	15.59	1.94	71.57	443.04	MWD
4176.00	89.60	75.97	3901.36	152.89	469.59	493.30	10.45	10.20	2.29	71.97	493.85	MWD
4186.00	90.10	76.65	3901.38	155.25	479.30	503.29	8.44	5.00	6.80	72.05	503.82	MWD
4217.00	91.68	76.08	3900.90	162.56	509.43	534.27	5.42	5.10	-1.84	72.30	534.73	MWD
4248.00	91.88	74.94	3899.94	170.31	539.43	565.26	3.73	0.65	-3.68	72.48	565.67	MWD
4280.00	91.75	73.91	3898.92	178.90	570.23	597.24	3.24	-0.41	-3.22	72.58	597.64	MWD
4311.00	92.45	73.26	3897.79	187.65	599.95	628.21	3.08	2.26	-2.10	72.63	628.61	MWD
4343.00	92.93	73.14	3896.29	196.89	630.55	660.17	1.55	1.50	-0.37	72.66	660.58	MWD
4375.00	93.30	73.56	3894.55	206.05	661.16	692.11	1.75	1.16	1.31	72.69	692.53	MWD
4405.00	93.13	73.08	3892.86	214.65	689.86	722.05	1.70	-0.57	-1.60	72.72	722.48	MWD
4436.00	91.85	72.23	3891.52	223.88	719.42	753.00	4.96	-4.13	-2.74	72.71	753.45	MWD
4468.00	89.09	71.50	3891.25	233.84	749.82	784.96	8.92	-8.62	-2.28	72.68	785.44	MWD
4500.00	88.62	71.20	3891.89	244.07	780.14	816.90	1.74	-1.47	-0.94	72.63	817.42	MWD
4531.00	87.58	71.34	3892.92	254.02	809.48	847.83	3.39	-3.35	0.45	72.58	848.40	MWD
4563.00	88.02	71.26	3894.15	264.27	839.77	879.75	1.40	1.37	-0.25	72.53	880.37	MWD
4594.00	87.75	70.82	3895.29	274.33	869.07	910.67	1.66	-0.87	-1.42	72.48	911.34	MWD
4625.00	88.62	70.40	3896.28	284.62	898.29	941.57	3.12	2.81	-1.35	72.42	942.30	MWD
4656.00	90.30	69.92	3896.57	295.14	927.45	972.47	5.64	5.42	-1.55	72.35	973.28	MWD
4688.00	89.97	69.34	3896.49	306.28	957.45	1004.35	2.09	-1.03	-1.81	72.26	1005.24	MWD
4719.00	90.60	69.19	3896.34	317.26	986.44	1035.21	2.09	2.03	-0.48	72.17	1036.20	MWD
4751.00	91.18	69.84	3895.84	328.45	1016.41	1067.08	2.72	1.81	2.03	72.09	1068.16	MWD
4783.00	90.00	69.63	3895.51	339.54	1046.43	1098.95	3.75	-3.69	-0.66	72.02	1100.14	MWD
4814.00	90.24	69.82	3895.45	350.28	1075.51	1129.84	0.99	0.77	0.61	71.96	1131.11	MWD
4846.00	91.01	73.64	3895.10	360.31	1105.89	1161.79	12.18	2.41	11.94	71.95	1163.10	MWD
4878.00	91.04	77.72	3894.53	368.22	1136.88	1193.77	12.75	0.09	12.75	72.05	1195.03	MWD
4909.00	90.81	81.64	3894.02	373.77	1167.37	1224.64	12.67	-0.74	12.65	72.25	1225.75	MWD
4941.00	91.58	84.32	3893.36	377.68	1199.12	1256.30	8.71	2.41	8.37	72.52	1257.19	MWD
4972.00	90.24	87.33	3892.87	379.94	1230.03	1286.71	10.63	-4.32	9.71	72.83	1287.37	MWD
5004.00	89.60	91.00	3892.91	380.40	1262.02	1317.68	11.64	-2.00	11.47	73.23	1318.11	MWD
5035.00	91.08	95.69	3892.73	378.59	1292.96	1347.04	15.86	4.77	15.13	73.68	1347.25	MWD
5067.00	91.55	96.15	3891.99	375.30	1324.78	1376.86	2.05	1.47	1.44	74.18	1376.91	MWD
5098.00	91.62	95.95	3891.13	372.03	1355.59	1405.72	0.68	0.23	-0.65	74.65	1405.72	MWD