



Energen Resources

Carson Nat'l Forest-S28, T32N, R4W

Carracas Mesa

Carracas 28 B #13

OH

30-039-30206

H
8-17-07

Survey: OH

End of Well Survey

09 August, 2007

J Surface	1790/S	1900/E	S28, 32N, 4W
K Start Lateral	1205/S	1661/W	md 5168 Tvd 4141
m BHL	727/S	711/W	md 6229 Tvd 4137

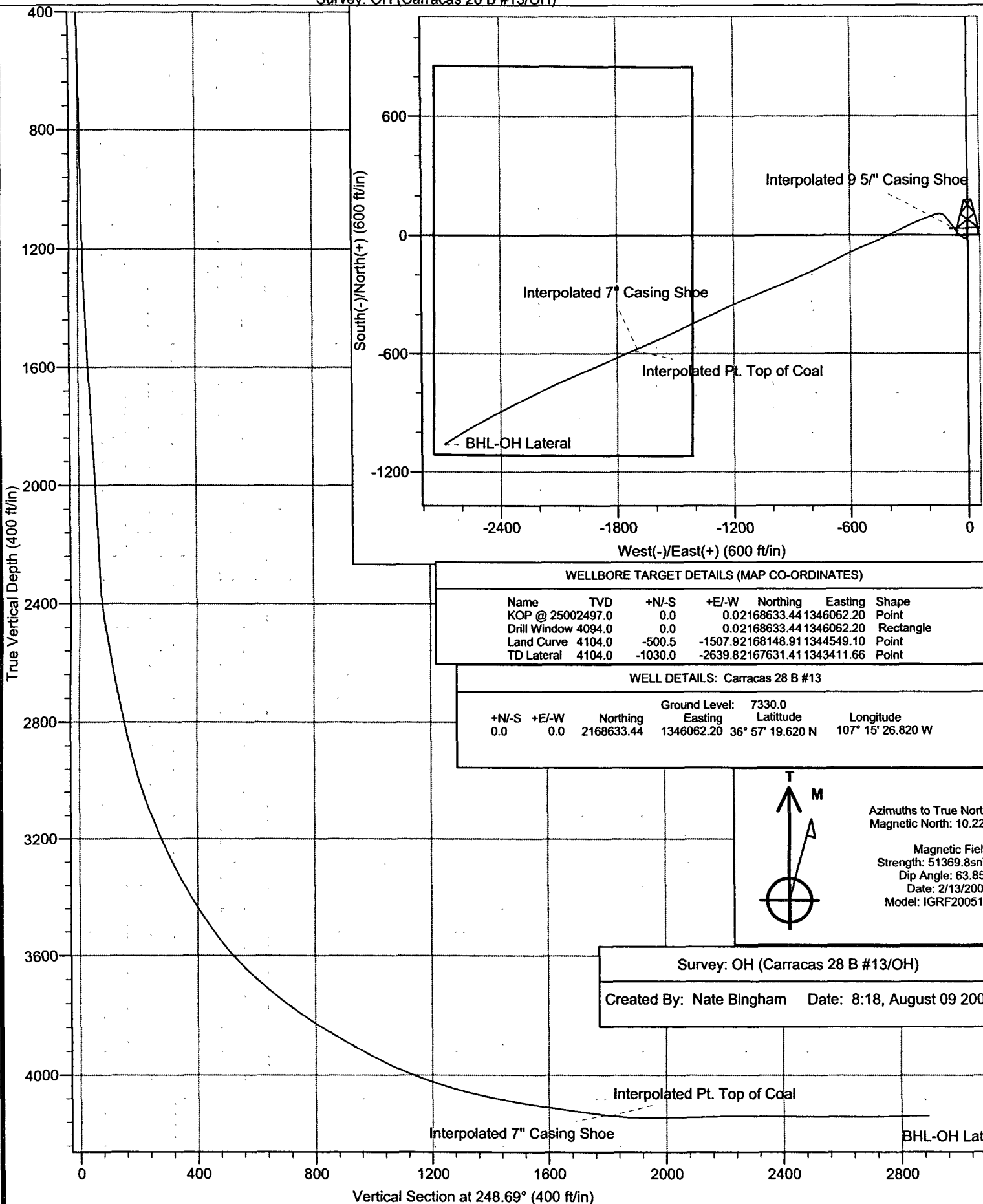
RCVD AUG 17 '07
OIL CONS. DIV.

DIST. 3

PATHFINDER
ENERGY SERVICES

18

Survey: OH (Carracas 28 B #13/OH)



WELLBORE TARGET DETAILS (MAP CO-ORDINATES)						
Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
KOP @ 2500	2497.0	0.0	0.02168633.44	1346062.20		Point
Drill Window	4094.0	0.0	0.02168633.44	1346062.20		Rectangle
Land Curve	4104.0	-500.5	-1507.92168148.91	1344549.10		Point
TD Lateral	4104.0	-1030.0	-2639.82167631.41	1343411.66		Point

WELL DETAILS: Carracas 28 B #13

+N/-S	+E/-W	Northing	Easting	Ground Level:	Latitude	Longitude
0.0	0.0	2168633.44	1346062.20	7330.0	36° 57' 19.620 N	107° 15' 26.820 W



Azimuths to True North
Magnetic North: 10.22°

Magnetic Field
Strength: 51369.8snT
Dip Angle: 63.85°
Date: 2/13/2007
Model: IGRF200510

Survey: OH (Carracas 28 B #13/OH)
Created By: Nate Bingham Date: 8:18, August 09 2007



Company: Energen Resources
 Project: Carson Nat'l Forest-S28, T32N, R4W
 Site: Carracas Mesa
 Well: Carracas 28 B #13
 Wellbore: OH
 Design: OH

Local Co-ordinate Reference: Well Carracas 28 B #13
 TVD Reference: KB @ 7342.0ft (AWS 289)
 MD Reference: KB @ 7342.0ft (AWS 289)
 North Reference: True
 Survey Calculation Method: Minimum Curvature
 Database: EDM 2003.16 Single User Db

Project Carson Nat'l Forest-S28, T32N, R4W

Map System: US State Plane 1983
Geo Datum: North American Datum 1983
Map Zone: New Mexico Central Zone

System Datum: Mean Sea Level

Site Carracas Mesa

Site Position:
From: Lat/Long **Northing:** 2,168,633.44 **ft** **Latitude:** 36° 57' 19.620 N
Position Uncertainty: 0.0 **ft** **Easting:** 1,346,062.20 **ft** **Longitude:** 107° 15' 26.820 W
Slot Radius: " **Grid Convergence:** -0.61

Well Carracas 28 B #13

Well Position +N/-S 0.0 **ft** **Northing:** 2,168,633.44 **ft** **Latitude:** 36° 57' 19.620 N
 +E/-W 0.0 **ft** **Easting:** 1,346,062.20 **ft** **Longitude:** 107° 15' 26.820 W
Position Uncertainty 0.0 **ft** **Wellhead Elevation:** 7,330.0 **ft** **Ground Level:** 7,330.0 **ft**

Wellbore OH

Magnetics **Model Name** **Sample Date** **Declination** **Dip Angle** **Field Strength**
 (°) (°) (nT)
 IGRF200510 2/13/2007 10.22 63.85 51,370

Design OH

Audit Notes:

Version: 1.0 **Phase:** ACTUAL **Tie On Depth:** 0.0

Vertical Section: **Depth From (TVD)** **+N/-S** **+E/-W** **Direction**
 (ft) (ft) (ft) (°)
 0.0 0.0 0.0 248.69

Survey Program **Date** 8/9/2007

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
480.0	6,229.0	OH (OH)	Pathfinder	Pathfinder MWD

Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.0
242.0	0.40	193.77	242.0	-0.8	-0.2	0.16	0.5
Interpolated 9 5/8" Casing Shoe							
480.0	0.79	193.77	480.0	-3.2	-0.8	0.16	1.9
919.0	1.76	212.76	918.9	-11.8	-5.2	0.24	9.1
1,166.0	1.49	255.06	1,165.8	-15.8	-10.3	0.49	15.4
1,320.0	2.90	285.61	1,319.7	-15.3	-16.0	1.16	20.5
1,441.0	4.22	292.26	1,440.4	-12.8	-23.1	1.14	26.1
1,562.0	6.16	309.05	1,560.9	-7.0	-32.2	2.02	32.6
1,683.0	8.53	316.25	1,680.9	3.6	-43.5	2.10	39.2
1,805.0	11.34	322.91	1,801.1	19.7	-57.0	2.48	45.9
1,843.0	12.31	324.32	1,838.3	25.9	-61.6	2.66	47.9



Pathfinder Energy Services

End of Well Survey



Company: Energen Resources
 Project: Carson Nat'l Forest-S28, T32N, R4W
 Site: Carracas Mesa
 Well: Carracas 28 B #13
 Wellbore: OH
 Design: OH

Local Co-ordinate Reference: Well Carracas 28 B #13
 TVD Reference: KB @ 7342.0ft (AWS 289)
 MD Reference: KB @ 7342.0ft (AWS 289)
 North Reference: True
 Survey Calculation Method: Minimum Curvature
 Database: EDM 2003.16 Single User Db

Survey							
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)
1,990.0	10.99	323.41	1,982.3	49.9	-79.1	0.91	55.5
2,112.0	9.85	322.16	2,102.3	67.5	-92.4	0.95	61.6
2,312.0	8.97	319.88	2,299.6	92.9	-113.0	0.48	71.5
2,323.0	8.71	320.15	2,310.4	94.2	-114.0	2.39	72.0
2,352.0	8.53	320.23	2,339.1	97.6	-116.8	0.62	73.4
2,383.0	8.71	313.03	2,369.8	100.9	-120.0	3.53	75.1
2,413.0	9.50	298.64	2,399.4	103.7	-123.8	8.01	77.7
2,444.0	10.64	288.58	2,429.9	105.8	-128.8	6.75	81.5
2,474.0	11.61	281.68	2,459.3	107.3	-134.4	5.49	86.2
2,505.0	11.70	274.59	2,489.7	108.2	-140.6	4.63	91.6
2,534.0	11.52	267.63	2,518.1	108.3	-146.4	4.87	97.0
2,565.0	11.34	261.09	2,548.5	107.7	-152.5	4.22	102.9
2,595.0	10.90	253.49	2,577.9	106.4	-158.1	5.10	108.6
2,625.0	11.17	250.21	2,607.4	104.6	-163.6	2.28	114.4
2,655.0	11.43	249.80	2,636.8	102.6	-169.1	0.91	120.2
2,687.0	11.52	250.08	2,668.2	100.4	-175.1	0.33	126.6
2,718.0	11.70	250.90	2,698.5	98.4	-181.0	0.79	132.8
2,749.0	11.87	251.11	2,728.9	96.3	-187.0	0.57	139.2
2,781.0	12.13	250.94	2,760.2	94.1	-193.3	0.82	145.8
2,812.0	12.22	249.32	2,790.5	91.9	-199.4	1.14	152.4
2,844.0	12.40	249.73	2,821.7	89.5	-205.8	0.63	159.2
2,875.0	12.47	250.49	2,852.0	87.3	-212.1	0.57	165.8
2,907.0	13.10	248.29	2,883.2	84.8	-218.7	2.49	172.9
2,938.0	14.25	245.98	2,913.3	81.9	-225.4	4.11	180.3
2,969.0	15.39	245.02	2,943.3	78.6	-232.7	3.76	188.2
3,000.0	16.44	244.83	2,973.1	75.0	-240.4	3.39	196.6
3,032.0	17.24	246.04	3,003.7	71.2	-248.8	2.73	205.9
3,063.0	18.03	246.94	3,033.3	67.4	-257.4	2.70	215.3
3,095.0	18.91	247.10	3,063.6	63.5	-266.7	2.75	225.4
3,126.0	20.14	246.36	3,092.9	59.4	-276.3	4.05	235.8
3,157.0	21.46	245.99	3,121.8	54.9	-286.3	4.28	246.8
3,189.0	22.51	245.38	3,151.5	50.0	-297.2	3.36	258.7
3,221.0	23.30	245.60	3,181.0	44.8	-308.6	2.48	271.2
3,252.0	23.74	245.26	3,209.4	39.7	-319.8	1.49	283.5
3,284.0	24.71	244.75	3,238.6	34.1	-331.7	3.10	296.6
3,314.0	25.68	244.62	3,265.7	28.7	-343.3	3.25	309.4
3,346.0	26.56	244.46	3,294.5	22.6	-356.0	2.75	323.4
3,377.0	27.08	244.46	3,322.1	16.6	-368.6	1.68	337.4
3,406.0	27.79	244.60	3,347.9	10.8	-380.7	2.46	350.7
3,438.0	28.49	244.19	3,376.1	4.3	-394.3	2.27	365.7
3,469.0	30.51	243.85	3,403.1	-2.4	-408.0	6.54	381.0
3,501.0	32.45	244.65	3,430.4	-9.6	-423.1	6.20	397.6
3,532.0	33.77	244.99	3,456.3	-16.8	-438.4	4.30	414.5
3,564.0	34.47	246.18	3,482.8	-24.3	-454.7	3.02	432.4

Company: Energen Resources
Project: Carson Nat'l Forest-S28, T32N, R4W
Site: Carracas Mesa
Well: Carracas 28 B #13
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well Carracas 28 B #13
TVD Reference: KB @ 7342.0ft (AWS 289)
MD Reference: KB @ 7342.0ft (AWS 289)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)
1,990.0	10.99	323.41	1,982.3	49.9	-79.1	0.91	55.5
2,112.0	9.85	322.16	2,102.3	67.5	-92.4	0.95	61.6
2,312.0	8.97	319.88	2,299.6	92.9	-113.0	0.48	71.5
2,323.0	8.71	320.15	2,310.4	94.2	-114.0	2.39	72.0
2,352.0	8.53	320.23	2,339.1	97.6	-116.8	0.62	73.4
2,383.0	8.71	313.03	2,369.8	100.9	-120.0	3.53	75.1
2,413.0	9.50	298.64	2,399.4	103.7	-123.8	8.01	77.7
2,444.0	10.64	288.58	2,429.9	105.8	-128.8	6.75	81.5
2,474.0	11.61	281.68	2,459.3	107.3	-134.4	5.49	86.2
2,505.0	11.70	274.59	2,489.7	108.2	-140.6	4.63	91.6
2,534.0	11.52	267.63	2,518.1	108.3	-146.4	4.87	97.0
2,565.0	11.34	261.09	2,548.5	107.7	-152.5	4.22	102.9
2,595.0	10.90	253.49	2,577.9	106.4	-158.1	5.10	108.6
2,625.0	11.17	250.21	2,607.4	104.6	-163.6	2.28	114.4
2,655.0	11.43	249.80	2,636.8	102.6	-169.1	0.91	120.2
2,687.0	11.52	250.08	2,668.2	100.4	-175.1	0.33	126.6
2,718.0	11.70	250.90	2,698.5	98.4	-181.0	0.79	132.8
2,749.0	11.87	251.11	2,728.9	96.3	-187.0	0.57	139.2
2,781.0	12.13	250.94	2,760.2	94.1	-193.3	0.82	145.8
2,812.0	12.22	249.32	2,790.5	91.9	-199.4	1.14	152.4
2,844.0	12.40	249.73	2,821.7	89.5	-205.8	0.63	159.2
2,875.0	12.47	250.49	2,852.0	87.3	-212.1	0.57	165.8
2,907.0	13.10	248.29	2,883.2	84.8	-218.7	2.49	172.9
2,938.0	14.25	245.98	2,913.3	81.9	-225.4	4.11	180.3
2,969.0	15.39	245.02	2,943.3	78.6	-232.7	3.76	188.2
3,000.0	16.44	244.83	2,973.1	75.0	-240.4	3.39	196.6
3,032.0	17.24	246.04	3,003.7	71.2	-248.8	2.73	205.9
3,063.0	18.03	246.94	3,033.3	67.4	-257.4	2.70	215.3
3,095.0	18.91	247.10	3,063.6	63.5	-266.7	2.75	225.4
3,126.0	20.14	246.36	3,092.9	59.4	-276.3	4.05	235.8
3,157.0	21.46	245.99	3,121.8	54.9	-286.3	4.28	246.8
3,189.0	22.51	245.38	3,151.5	50.0	-297.2	3.36	258.7
3,221.0	23.30	245.60	3,181.0	44.8	-308.6	2.48	271.2
3,252.0	23.74	245.26	3,209.4	39.7	-319.8	1.49	283.5
3,284.0	24.71	244.75	3,238.6	34.1	-331.7	3.10	296.6
3,314.0	25.68	244.62	3,265.7	28.7	-343.3	3.25	309.4
3,346.0	26.56	244.46	3,294.5	22.6	-356.0	2.75	323.4
3,377.0	27.08	244.46	3,322.1	16.6	-368.6	1.68	337.4
3,406.0	27.79	244.60	3,347.9	10.8	-380.7	2.46	350.7
3,438.0	28.49	244.19	3,376.1	4.3	-394.3	2.27	365.7
3,469.0	30.51	243.85	3,403.1	-2.4	-408.0	6.54	381.0
3,501.0	32.45	244.65	3,430.4	-9.6	-423.1	6.20	397.6
3,532.0	33.77	244.99	3,456.3	-16.8	-438.4	4.30	414.5
3,564.0	34.47	246.18	3,482.8	-24.3	-454.7	3.02	432.4

Company: Energen Resources
Project: Carson Nat'l Forest-S28, T32N, R4W
Site: Carracas Mesa
Well: Carracas 28 B #13
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well Carracas 28 B #13
TVD Reference: KB @ 7342.0ft (AWS 289)
MD Reference: KB @ 7342.0ft (AWS 289)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)
3,595.0	35.35	247.44	3,508.2	-31.2	-471.0	3.67	450.2
3,626.0	36.58	247.89	3,533.3	-38.2	-487.9	4.06	468.4
3,657.0	38.69	247.76	3,557.9	-45.3	-505.4	6.81	487.3
3,687.0	40.80	247.06	3,580.9	-52.7	-523.1	7.19	506.5
3,718.0	42.74	246.18	3,604.1	-60.9	-542.1	6.54	527.1
3,751.0	44.23	245.89	3,628.0	-70.1	-562.8	4.56	549.8
3,777.0	45.55	245.12	3,646.4	-77.7	-579.5	5.49	568.1
3,808.0	47.13	244.60	3,667.8	-87.2	-599.8	5.24	590.5
3,840.0	48.63	244.05	3,689.3	-97.5	-621.2	4.86	614.1
3,871.0	50.12	243.42	3,709.5	-107.9	-642.3	5.05	637.6
3,903.0	51.79	244.70	3,729.6	-118.8	-664.6	6.07	662.4
3,935.0	53.29	243.44	3,749.1	-129.9	-687.5	5.63	687.7
3,966.0	54.26	243.83	3,767.4	-141.0	-709.9	3.29	712.6
3,998.0	55.40	244.71	3,785.8	-152.4	-733.5	4.21	738.7
4,029.0	55.93	244.98	3,803.3	-163.2	-756.6	1.85	764.2
4,060.0	56.81	245.22	3,820.5	-174.1	-780.0	2.91	790.0
4,090.0	57.86	245.58	3,836.7	-184.6	-803.0	3.64	815.2
4,121.0	58.83	245.87	3,853.0	-195.5	-827.1	3.23	841.5
4,153.0	59.71	246.34	3,869.3	-206.6	-852.2	3.03	869.0
4,184.0	60.59	246.96	3,884.7	-217.3	-876.9	3.33	895.9
4,216.0	61.47	247.01	3,900.2	-228.2	-902.7	2.75	923.9
4,247.0	62.43	247.43	3,914.8	-238.8	-927.9	3.32	951.2
4,277.0	62.52	247.77	3,928.7	-248.9	-952.5	1.05	977.8
4,309.0	63.05	248.10	3,943.3	-259.6	-978.9	1.89	1,006.3
4,340.0	64.28	248.17	3,957.1	-270.0	-1,004.6	3.97	1,034.0
4,371.0	65.86	247.70	3,970.1	-280.5	-1,030.7	5.28	1,062.2
4,402.0	67.01	248.09	3,982.5	-291.2	-1,057.0	3.88	1,090.6
4,433.0	67.97	248.23	3,994.4	-301.9	-1,083.6	3.12	1,119.2
4,464.0	68.94	248.23	4,005.8	-312.6	-1,110.4	3.13	1,148.0
4,495.0	70.00	247.71	4,016.6	-323.5	-1,137.3	3.76	1,177.1
4,527.0	71.84	246.31	4,027.1	-335.3	-1,165.1	7.08	1,207.3
4,558.0	73.51	245.84	4,036.3	-347.3	-1,192.2	5.58	1,236.9
4,589.0	74.66	245.46	4,044.8	-359.6	-1,219.3	3.89	1,266.6
4,621.0	75.53	245.21	4,053.1	-372.5	-1,247.4	2.82	1,297.5
4,651.0	76.41	245.43	4,060.3	-384.6	-1,273.9	3.02	1,326.5
4,682.0	77.21	245.07	4,067.4	-397.3	-1,301.3	2.82	1,356.7
4,712.0	78.52	245.15	4,073.7	-409.6	-1,327.9	4.37	1,385.9
4,742.0	79.23	245.54	4,079.5	-421.9	-1,354.6	2.69	1,415.3
4,773.0	79.23	245.30	4,085.3	-434.6	-1,382.3	0.76	1,445.7
4,804.0	80.11	244.99	4,090.9	-447.4	-1,410.0	3.00	1,476.2
4,835.0	80.72	245.10	4,096.0	-460.3	-1,437.7	2.00	1,506.7
4,864.0	80.90	245.03	4,100.7	-472.3	-1,463.7	0.66	1,535.3
4,896.0	80.72	245.22	4,105.8	-485.6	-1,492.3	0.81	1,566.8
4,928.0	81.43	245.84	4,110.7	-498.7	-1,521.1	2.93	1,598.3
4,959.0	82.13	246.01	4,115.2	-511.2	-1,549.1	2.32	1,629.0

Company: Energen Resources
 Project: Carson Nat'l Forest-S28, T32N, R4W
 Site: Carracas Mesa
 Well: Carracas 28 B #13
 Wellbore: OH
 Design: OH

Local Co-ordinate Reference: Well Carracas 28 B #13
 TVD Reference: KB @ 7342.0ft (AWS 289)
 MD Reference: KB @ 7342.0ft (AWS 289)
 North Reference: True
 Survey Calculation Method: Minimum Curvature
 Database: EDM 2003.16 Single User Db

Survey							
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)
4,989.0	82.48	246.05	4,119.2	-523.3	-1,576.3	1.17	1,658.7
5,019.0	82.48	245.69	4,123.1	-535.5	-1,603.4	1.19	1,688.4
5,049.0	82.83	246.02	4,126.9	-547.6	-1,630.6	1.60	1,718.1
5,076.0	83.45	246.06	4,130.2	-558.5	-1,655.1	2.30	1,744.9
5,122.0	83.56	246.11	4,135.4	-577.1	-1,696.9	0.26	1,790.6
Interpolated 7" Casing Shoe							
5,141.0	83.61	246.13	4,137.5	-584.7	-1,714.1	0.25	1,809.4
Interpolated Pt. Top of Coal							
5,168.0	83.67	246.15	4,140.5	-595.6	-1,738.7	0.25	1,836.2
5,200.0	86.26	247.08	4,143.3	-608.2	-1,767.9	8.60	1,868.1
5,231.0	88.90	247.65	4,144.6	-620.1	-1,796.5	8.71	1,899.0
5,262.0	90.48	247.10	4,144.8	-632.1	-1,825.1	5.40	1,930.0
5,294.0	90.57	246.22	4,144.5	-644.7	-1,854.5	2.76	1,962.0
5,325.0	90.40	246.57	4,144.2	-657.1	-1,882.9	1.26	1,993.0
5,356.0	90.66	247.01	4,143.9	-669.4	-1,911.4	1.65	2,023.9
5,388.0	90.66	247.02	4,143.6	-681.9	-1,940.8	0.03	2,055.9
5,419.0	91.10	246.65	4,143.1	-694.0	-1,969.3	1.85	2,086.9
5,450.0	92.15	247.11	4,142.2	-706.2	-1,997.8	3.70	2,117.9
5,481.0	91.80	246.59	4,141.1	-718.4	-2,026.3	2.02	2,148.8
5,512.0	91.45	246.63	4,140.3	-730.7	-2,054.8	1.14	2,179.8
5,543.0	90.92	246.07	4,139.6	-743.1	-2,083.2	2.49	2,210.8
5,574.0	89.96	245.52	4,139.4	-755.8	-2,111.4	3.57	2,241.7
5,606.0	89.69	244.43	4,139.5	-769.4	-2,140.4	3.51	2,273.7
5,637.0	90.40	244.30	4,139.4	-782.8	-2,168.4	2.33	2,304.6
5,668.0	89.43	244.86	4,139.5	-796.1	-2,196.4	3.61	2,335.5
5,700.0	89.25	244.52	4,139.9	-809.8	-2,225.3	1.20	2,367.4
5,731.0	90.22	243.99	4,140.0	-823.2	-2,253.2	3.57	2,398.3
5,762.0	90.31	244.17	4,139.9	-836.8	-2,281.1	0.65	2,429.2
5,793.0	89.43	243.94	4,139.9	-850.3	-2,309.0	2.93	2,460.1
5,825.0	89.78	242.90	4,140.2	-864.7	-2,337.6	3.43	2,492.0
5,856.0	90.04	242.30	4,140.2	-878.9	-2,365.1	2.11	2,522.8
5,888.0	89.96	242.49	4,140.2	-893.8	-2,393.5	0.64	2,554.6
5,919.0	89.25	242.76	4,140.4	-908.0	-2,421.0	2.45	2,585.5
5,950.0	89.87	242.26	4,140.7	-922.3	-2,448.5	2.57	2,616.3
5,981.0	90.22	241.90	4,140.6	-936.8	-2,475.9	1.62	2,647.1
6,013.0	90.40	242.03	4,140.5	-951.9	-2,504.1	0.69	2,678.8
6,044.0	90.57	240.90	4,140.2	-966.7	-2,531.4	3.69	2,709.6
6,076.0	90.66	240.00	4,139.9	-982.5	-2,559.2	2.83	2,741.3
6,106.0	91.19	238.08	4,139.4	-997.9	-2,584.9	6.64	2,770.8
6,137.0	91.36	237.83	4,138.7	-1,014.3	-2,611.2	0.98	2,801.3
6,160.0	91.36	238.17	4,138.1	-1,026.5	-2,630.7	1.48	2,823.9
6,229.0	91.36	238.17	4,136.5	-1,062.9	-2,689.3	0.00	2,891.7



Company: Energen Resources
Project: Carson Nat'l Forest-S28, T32N, R4W
Site: Carracas Mesa
Well: Carracas 28 B #13
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well Carracas 28 B #13
TVD Reference: KB @ 7342.0ft (AWS 289)
MD Reference: KB @ 7342.0ft (AWS 289)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
KOP @ 2500' - survey misses by 175.9ft at 2481.0ft MD (2466.2 TVD, 107.6 N, -135.8 E) - Point	0.00	0.35	2,497.0	0.0	0.0	2,168,633.44	1,346,062.20	36° 57' 19.620 N	107° 15' 26.820 W
Land Curve - survey misses by 8.6ft at 4915.8ft MD (4108.9 TVD, -493.8 N, -1510.1 E) - Point	0.00	0.34	4,104.0	-500.5	-1,507.9	2,168,148.91	1,344,549.10	36° 57' 14.671 N	107° 15' 45.397 W
TD Lateral - survey misses by 35.5ft at 6160.0ft MD (4138.1 TVD, -1026.5 N, -2630.7 E) - Point	0.00	0.34	4,104.0	-1,030.0	-2,639.8	2,167,631.41	1,343,411.66	36° 57' 9.435 N	107° 15' 59.342 W
Drill Window - survey misses by 733.2ft at 3718.0ft MD (3604.1 TVD, -60.9 N, -542.1 E) - Rectangle (sides W1,970.0 H1,330.0 D0.0)	0.00	0.35	4,094.0	0.0	0.0	2,168,633.44	1,346,062.20	36° 57' 19.620 N	107° 15' 26.820 W

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
242.0	242.0	-0.8	-0.2	Interpolated 9 5/8" Casing Shoe
5,122.0	4,135.4	-577.1	-1,696.9	Interpolated 7" Casing Shoe
5,141.0	4,137.5	-584.7	-1,714.1	Interpolated Pt. Top of Coal
6,229.0	4,136.5	-1,062.9	-2,689.3	Interpolated Straight Line Projection To Bit

Checked By: _____ Approved By: _____ Date: _____