

San Juan County, New Mexico



Scientific Drilling

Energen Resources Corp.

Rio Arriba County, NM

Jicarilla 115E

Jicarilla 115E #13A

OH

Design: OH

Standard Survey Report

09 August, 2011



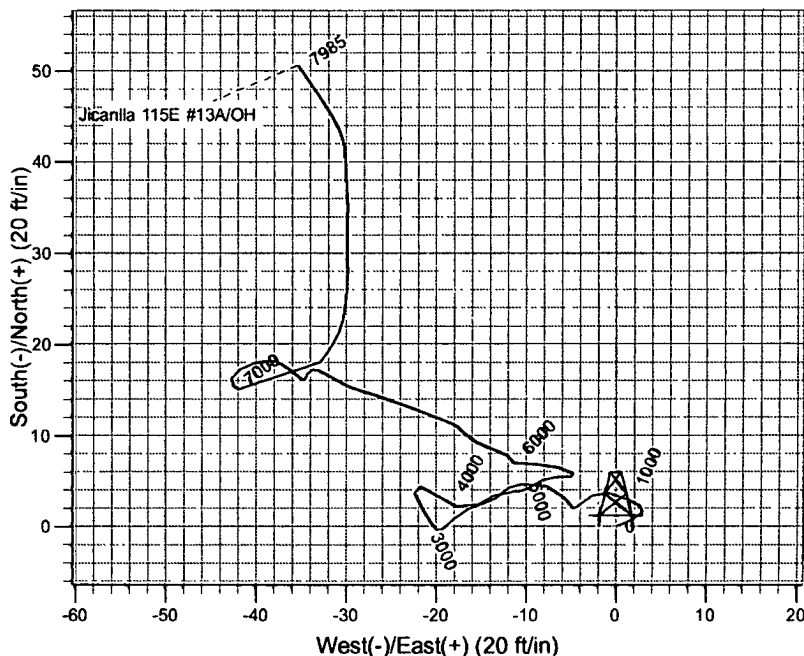
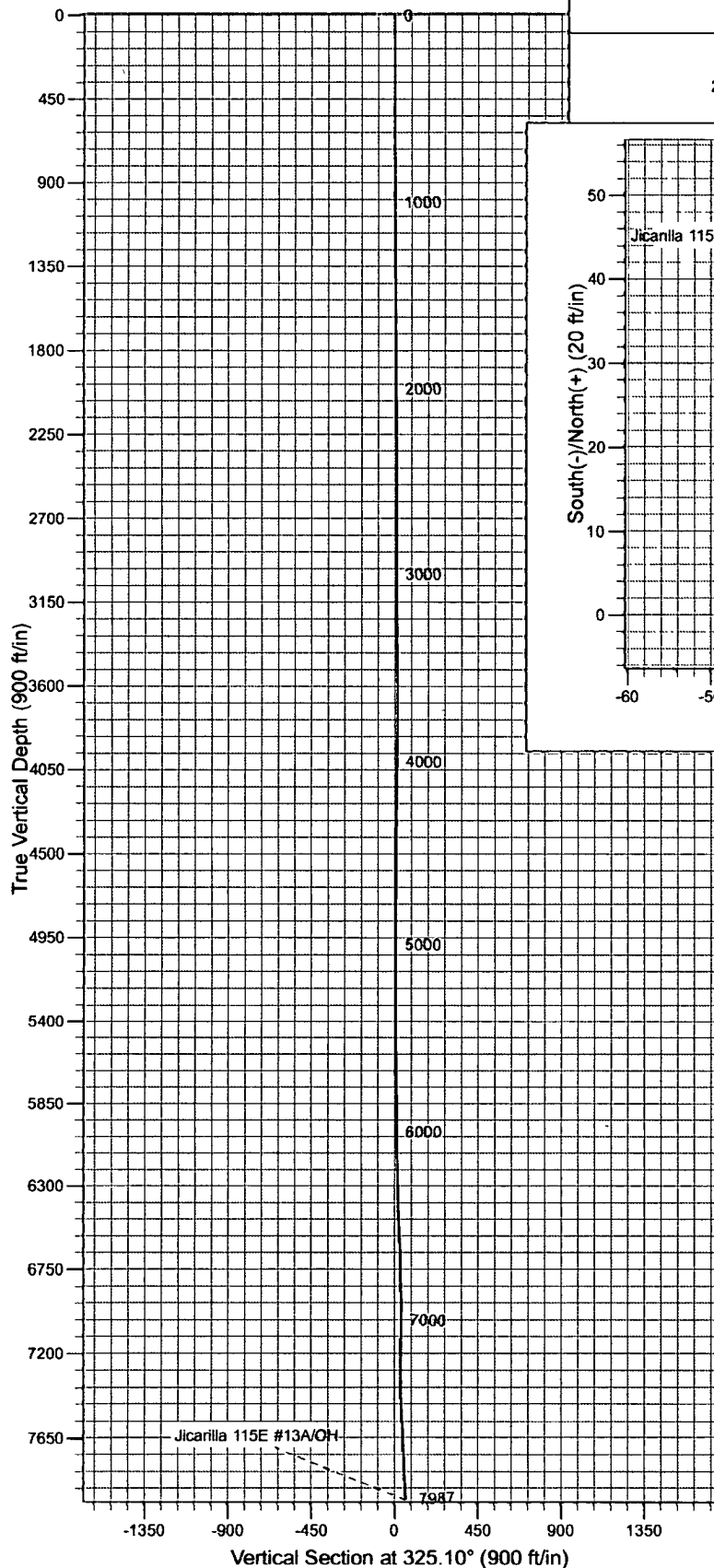
Energen Resources Corp.

Project: Rio Arriba County, NM
 Site: Jicarilla 115E
 Well: Jicarilla 115E #13A
 Wellbore: OH
 Design: OH



WELL DETAILS: Jicarilla 115E #13A

Ground Level: GL 7070' & KB 12' @ 7082.00ft (AWS 545)
 Northing: 2008860.70 Easting: 1380332.00 Latitude: 36° 31' 3.216 N Longitude: 107° 8' 6.432 W



REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Jicarilla 115E #13A, True North
 Vertical (TVD) Reference: GL 7070' & KB 12' @ 7082.00ft (AWS 545)
 Section (VS) Reference: Slot - (0.00N, 0.00E)
 Measured Depth Reference: GL 7070' & KB 12' @ 7082.00ft (AWS 545)
 Calculation Method: Minimum Curvature
 Local North: True
 Location:

PROJECT DETAILS: Rio Arriba County, NM

Geodetic System: US State Plane 1983
 Datum: North American Datum 1983
 Ellipsoid: GRS 1980
 Zone: New Mexico Central Zone

Design: OH (Jicarilla 115E #13A/OH)

Created By: Julie Cruse Date: 2011-11-08



Scientific Drilling

Survey Report

Company: Energen Resources Corp.
Project: Rio Arriba County, NM
Site: Jicarilla 115E
Well: Jicarilla 115E #13A
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well Jicarilla 115E #13A
TVD Reference: GL 7070' & KB 12' @ 7082.00ft (AWS 545)
MD Reference: GL 7070' & KB 12' @ 7082.00ft (AWS 545)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: Rockies Compass Server

Project Rio Arriba County, NM

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

System Datum: Mean Sea Level

Site Jicarilla 115E

Site Position: Northing: 2,008,860.71 usft Latitude: 36° 31' 3.216 N
From: Lat/Long Easting: 1,380,332.00 usft Longitude: 107° 8' 6.432 W
Position Uncertainty: 0.00 ft Slot Radius: 13.200 in Grid Convergence: -0.53 °

Well Jicarilla 115E #13A, 1835' FNL 1760' FWL Sec 3 T26N R3W

Well Position +N-S 0.00 ft Northing: 2,008,860.71 usft Latitude: 36° 31' 3.216 N
 +E-W 0.00 ft Easting: 1,380,332.00 usft Longitude: 107° 8' 6.432 W
Position Uncertainty 0.00 ft Wellhead Elevation: ft Ground Level: 7,070.00 ft

Wellbore OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2011-06-02	9.60	63.39	50,689

Design OH

Audit Notes:

Version: 1.0 **Phase:** ACTUAL **Tie On Depth:** 0.00

Vertical Section:	Depth From (TVD) (ft)	+N-S (ft)	+E-W (ft)	Direction (°)
	0.00	0.00	0.00	325.10

Survey Program Date 2011-08-09

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
300.00	4,082.00	Survey #1 (OH)	MWD	MWD - Standard
4,279.00	7,987.00	Survey #2 (OH)	MWD SDI	MWD - Standard ver 1.0.1

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
322.00	0.60	70.70	322.00	0.04	0.11	-0.03	2.73	2.73	0.00
414.00	0.60	67.30	413.99	0.38	1.01	-0.26	0.04	0.00	-3.70
504.00	0.70	67.20	503.99	0.78	1.95	-0.48	0.11	0.11	-0.11
663.00	0.30	21.10	662.98	1.54	2.99	-0.45	0.34	-0.25	-28.99
822.00	0.40	302.50	821.98	2.23	2.68	0.30	0.28	0.06	-49.43
980.00	0.70	294.80	979.97	2.93	1.33	1.64	0.20	0.19	-4.87
1,139.00	0.30	271.60	1,138.97	3.35	0.04	2.73	0.28	-0.25	-14.59
1,298.00	0.40	300.10	1,297.96	3.64	-0.86	3.48	0.12	0.06	17.92



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Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well Jicarilla 115E #13A
TVD Reference: GL 7070' & KB 12' @ 7082.00ft (AWS 545)
MD Reference: GL 7070' & KB 12' @ 7082.00ft (AWS 545)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: Rockies Compass Server

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
1,457.00	1.00	247.20	1,456.95	3.38	-2.62	4.27	0.52	0.38	-33.27
1,551.00	1.30	222.90	1,550.93	2.28	-4.10	4.22	0.60	0.32	-25.85
1,615.00	0.30	330.30	1,614.93	1.89	-4.68	4.23	2.22	-1.56	167.81
1,774.00	0.90	317.10	1,773.92	3.17	-5.73	5.88	0.38	0.38	-8.30
1,933.00	0.80	286.00	1,932.90	4.39	-7.65	7.98	0.29	-0.06	-19.56
2,090.00	1.30	267.00	2,089.88	4.60	-10.48	9.77	0.38	0.32	-12.10
2,185.00	0.60	225.40	2,184.86	4.20	-11.91	10.26	0.99	-0.74	-43.79
2,345.00	0.70	237.00	2,344.85	3.07	-13.33	10.15	0.10	0.06	7.25
2,504.00	0.40	263.20	2,503.85	2.48	-14.70	10.44	0.24	-0.19	16.48
2,662.00	0.80	246.10	2,661.84	1.97	-16.25	10.91	0.27	0.25	-10.82
2,820.00	0.80	224.70	2,819.82	0.74	-18.04	10.92	0.19	0.00	-13.54
2,980.00	0.30	238.00	2,979.81	-0.28	-19.18	10.74	0.32	-0.31	8.31
3,137.00	0.30	291.50	3,136.81	-0.35	-19.91	11.11	0.17	0.00	34.08
3,295.00	0.40	342.60	3,294.81	0.33	-20.46	11.98	0.20	0.06	32.34
3,455.00	0.80	319.80	3,454.80	1.72	-21.35	13.62	0.29	0.25	-14.25
3,613.00	0.80	345.80	3,612.79	3.63	-22.33	15.75	0.23	0.00	16.46
3,772.00	0.70	110.40	3,771.78	4.37	-21.69	15.99	0.84	-0.06	78.36
3,931.00	0.90	124.80	3,930.76	3.32	-19.75	14.02	0.18	0.13	9.06
4,082.00	0.90	112.90	4,081.75	2.18	-17.69	11.91	0.12	0.00	-7.88
TIP									
4,279.00	0.75	51.90	4,278.73	2.37	-15.25	10.67	0.43	-0.08	-30.96
First SDI MWD Survey									
4,437.00	0.71	69.45	4,436.72	3.35	-13.52	10.48	0.14	-0.03	11.11
4,596.00	0.98	85.22	4,595.70	3.81	-11.24	9.56	0.22	0.17	9.92
4,659.00	0.38	90.40	4,658.69	3.86	-10.49	9.17	0.96	-0.95	8.22
4,818.00	0.51	47.51	4,817.69	4.33	-9.45	8.95	0.22	0.08	-26.97
4,977.00	0.57	73.30	4,976.68	5.03	-8.17	8.80	0.16	0.04	16.22
5,136.00	0.54	79.73	5,135.68	5.40	-6.67	8.24	0.04	-0.02	4.04
5,297.00	0.45	94.96	5,296.67	5.48	-5.29	7.52	0.10	-0.06	9.46
5,361.00	0.33	99.20	5,360.67	5.43	-4.86	7.23	0.19	-0.19	6.63
5,519.00	0.41	324.83	5,518.67	5.81	-4.74	7.48	0.43	0.05	-85.04
5,678.00	0.98	279.09	5,677.66	6.49	-6.41	8.99	0.47	0.36	-28.77
5,773.00	1.79	277.86	5,772.63	6.83	-8.68	10.56	0.85	0.85	-1.29
5,837.00	1.54	269.19	5,836.60	6.95	-10.53	11.73	0.55	-0.39	-13.55
5,900.00	0.20	13.27	5,899.59	7.05	-11.35	12.27	2.54	-2.13	165.21
6,059.00	0.58	303.49	6,058.59	7.76	-11.96	13.21	0.34	0.24	-43.89
6,186.00	1.56	289.26	6,185.57	8.68	-14.13	15.21	0.79	0.77	-11.20
6,250.00	1.05	300.78	6,249.55	9.27	-15.45	16.45	0.89	-0.80	18.00
6,345.00	1.00	310.87	6,344.53	10.26	-16.83	18.04	0.20	-0.05	10.62
6,409.00	0.79	313.83	6,408.53	10.93	-17.57	19.02	0.34	-0.33	4.63
6,472.00	3.92	289.93	6,471.47	11.97	-19.91	21.20	5.10	4.97	-37.94
6,504.00	4.72	291.91	6,503.37	12.83	-22.16	23.20	2.54	2.50	6.19
6,536.00	4.09	287.57	6,535.28	13.67	-24.47	25.21	2.23	-1.97	-13.56



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 Design: OH

Local Co-ordinate Reference: Well Jicarilla 115E #13A
 TVD Reference: GL 7070' & KB 12' @ 7082.00ft (AWS 545)
 MD Reference: GL 7070' & KB 12' @ 7082.00ft (AWS 545)
 North Reference: True
 Survey Calculation Method: Minimum Curvature
 Database: Rockies Compass Server

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
6,568.00	3.24	288.71	6,567.21	14.30	-26.41	26.84	2.67	-2.66	3.56
6,600.00	3.04	283.90	6,599.17	14.79	-28.09	28.21	1.03	-0.63	-15.03
6,629.00	3.22	295.13	6,628.12	15.32	-29.58	29.49	2.20	0.62	38.72
6,661.00	2.88	297.72	6,660.08	16.08	-31.10	30.98	1.15	-1.06	8.09
6,693.00	3.06	299.47	6,692.03	16.87	-32.56	32.47	0.63	0.56	5.47
6,725.00	1.51	258.01	6,724.01	17.21	-33.71	33.40	6.79	-4.84	-129.56
6,757.00	1.36	200.80	6,756.00	16.76	-34.26	33.35	4.31	-0.47	-178.78
6,789.00	0.93	210.55	6,788.00	16.19	-34.53	33.03	1.47	-1.34	30.47
6,821.00	2.25	308.29	6,819.99	16.35	-35.15	33.52	7.96	4.13	305.44
6,852.00	3.65	309.44	6,850.94	17.36	-36.39	35.05	4.52	4.52	3.71
6,884.00	3.28	277.70	6,882.89	18.13	-38.09	36.66	6.02	-1.16	-99.19
6,916.00	3.52	255.71	6,914.83	18.01	-39.94	37.62	4.12	0.75	-68.72
6,948.00	3.43	237.01	6,946.78	17.24	-41.70	38.00	3.54	-0.28	-58.44
6,979.00	1.98	199.60	6,977.74	16.23	-42.66	37.72	7.14	-4.68	-120.68
7,011.00	2.05	124.94	7,009.73	15.38	-42.37	36.86	7.64	0.22	-233.31
7,028.00	2.05	113.84	7,026.72	15.09	-41.85	36.31	2.33	0.00	-65.29
7,337.00	2.42	37.31	7,335.54	18.04	-32.84	33.58	0.90	0.12	-24.77
7,361.00	2.55	37.57	7,359.52	18.87	-32.20	33.90	0.54	0.54	1.08
7,393.00	2.56	29.69	7,391.49	20.05	-31.41	34.42	1.10	0.03	-24.63
7,424.00	2.39	25.93	7,422.46	21.24	-30.79	35.03	0.76	-0.55	-12.13
7,456.00	3.07	11.32	7,454.42	22.68	-30.33	35.95	3.02	2.13	-45.66
7,488.00	3.05	6.09	7,486.38	24.36	-30.07	37.19	0.87	-0.06	-16.34
7,520.00	3.12	6.13	7,518.33	26.08	-29.89	38.49	0.22	0.22	0.13
7,552.00	3.44	0.36	7,550.28	27.90	-29.79	39.93	1.44	1.00	-18.03
7,583.00	3.63	356.15	7,581.22	29.81	-29.85	41.53	1.04	0.61	-13.58
7,615.00	3.69	3.05	7,613.15	31.85	-29.86	43.21	1.39	0.19	21.56
7,647.00	2.82	359.68	7,645.10	33.66	-29.81	44.67	2.78	-2.72	-10.53
7,679.00	2.78	1.28	7,677.06	35.23	-29.80	45.94	0.27	-0.13	5.00
7,710.00	3.20	354.03	7,708.02	36.84	-29.87	47.30	1.82	1.35	-23.39
7,742.00	3.63	357.26	7,739.96	38.74	-30.01	48.94	1.47	1.34	10.09
7,774.00	3.77	356.73	7,771.90	40.80	-30.12	50.70	0.45	0.44	-1.66
7,805.00	2.57	341.86	7,802.85	42.48	-30.40	52.23	4.66	-3.87	-47.97
7,837.00	2.00	339.56	7,834.82	43.69	-30.81	53.46	1.80	-1.78	-7.19
7,869.00	2.89	326.91	7,866.80	44.88	-31.45	54.81	3.24	2.78	-39.53
7,900.00	2.97	328.01	7,897.75	46.22	-32.30	56.39	0.32	0.26	3.55
7,932.00	3.64	325.20	7,929.70	47.76	-33.32	58.23	2.15	2.09	-8.78
Last SDI MWD Survey									
7,987.00	3.64	325.20	7,984.59	50.62	-35.31	61.72	0.00	0.00	0.00
Projection to TD									



Scientific Drilling

Survey Report

Company: Energen Resources Corp.
Project: Rio Arriba County, NM
Site: Jicarilla 115E
Well: Jicarilla 115E #13A
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well Jicarilla 115E #13A
TVD Reference: GL 7070' & KB 12' @ 7082.00ft (AWS 545)
MD Reference: GL 7070' & KB 12' @ 7082.00ft (AWS 545)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: Rockies Compass Server

Checked By: _____	Approved By: _____	Date: _____
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