

30-039-31036

WELL NAME AND NUMBER: JICARILLA WEST #8M

LOCATION: **SEC. 6, TOWNSHIP 26N, RANGE 5W NMPM; RIO ARRIBA COUNTY, NEW MEXICO**
(New Mexico give U, S, T, & R)

OPERATOR: **ENERGEN**

DRILLING CONTRACTOR: **AZTEC WELL SERVICING COMPANY INC.**

The undersigned hereby certifies that he is an authorized representative of the drilling contractor who drilled the above described well and that the deviation tests obtained the following results:

Degrees @ Depth

2.5 ° @	255
1.5 ° @	4715
2.5 ° @	5701
2 ° @	6217
2 ° @	6715
2.25 ° @	7605
° @	
° @	
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Degrees @ Depth

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RCVD NOV 22 '11

OIL CONS. DIV.

DIST. 3

DRILLING CONTRACTOR **AZTEC WELL SERVICING CO. INC.**

BY *[Signature]*

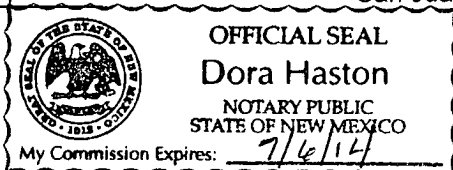
Subscribed and sworn to before me this 21 day of November, 2011.

My Commission Expires:

7/6/14

[Signature]
Notary Public

San Juan County, New Mexico



A

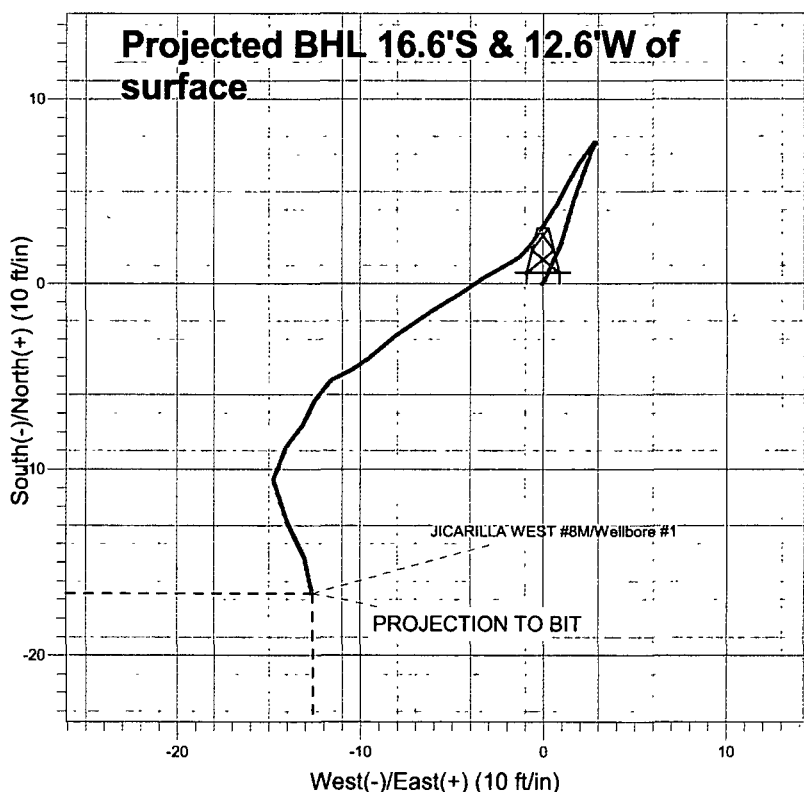
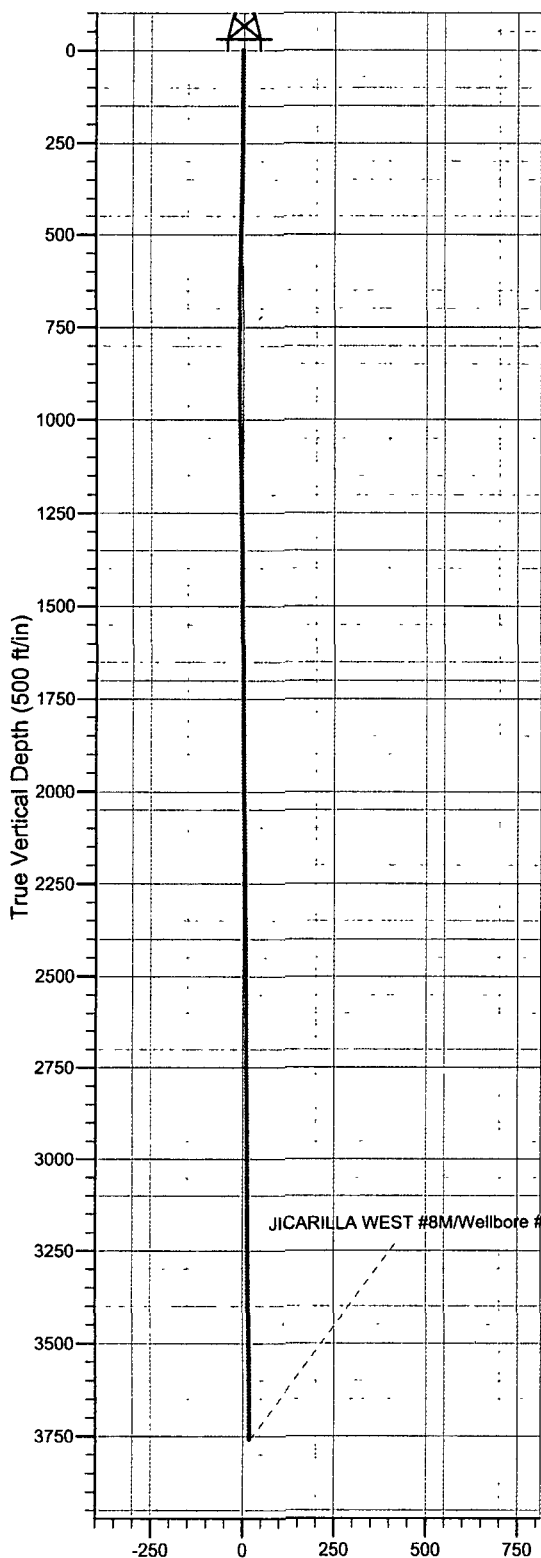


Well Name: **JICARILLA WEST #8M**
 Surface Location: JICARILLA WEST #8M PAD
 North American Datum 1983 , US State Plane 1983 , New Mexico Western Zone
 Ground Elevation: 6578.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	0.00	0.00	30.710010	-116.482851	

 AZTEC 545 RKB @ 6590.0ft (AZTEC 545)

ENERGEN RESOURCES CORP



LEGEND

—□— Wellbore #1

RCVD NOV 22 '11

Final Survey Plot

OIL CONS. DIV.

Projected Final Survey -
3760'MD & 3759.7'TVD
@ 20.9 VS 0.7 deg Inc 167.1 deg AZ

DIST. 3

Project: SEC 6-T26N-R5W
 Site: JICARILLA WEST #8M PAD
 Well: JICARILLA WEST #8M
 Plan: Wellbore #1



MESA WEST
DIRECTIONAL
TECHNOLOGIES USA I LLC

ENERGEN RESOURCES CORP

SEC.6-T26N-R5W

JICARILLA WEST #8M PAD

JICARILLA WEST #8M

Wellbore #1

Design: Wellbore #1

Standard Survey Report

21 November, 2011



Survey Report

Company: ENERGEN RESOURCES CORP
Project: SEC.6-T26N-R5W
Site: JICARILLA WEST #8M PAD
Well: JICARILLA WEST #8M
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well JICARILLA WEST #8M
TVD Reference: RKB @ 6590.0ft (AZTEC 545)
MD Reference: RKB @ 6590.0ft (AZTEC 545)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: Landmark

Project	SEC.6-T26N-R5W		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	New Mexico Western Zone		Using geodetic scale factor

Site	JICARILLA WEST #8M PAD		
Site Position:		Northing:	ft
From:	None	Easting:	ft
Position Uncertainty:	0.0 ft	Slot Radius:	"
		Latitude:	
		Longitude:	
		Grid Convergence:	0.00 °

Well	JICARILLA WEST #8M		
Well Position	+N/-S	0.0 ft	Northing: 0.00 ft
	+E/-W	0.0 ft	Easting: 0.00 ft
Position Uncertainty	0.0 ft	Wellhead Elevation:	ft
		Latitude:	30.710010
		Longitude:	-116.482851
		Ground Level:	6,578.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	User Defined	11/18/2011	0.00	0.00	0

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.0	0.0	0.0	217.13	

Survey Program	Date 11/18/2011				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
255.0	3,760.0	Survey #1 (Wellbore #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)
	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
	255.0	0.00	0.00	255.0	0.0	0.0	0.0	0.00	0.00	0.00
	291.0	0.80	29.60	291.0	0.2	0.1	-0.2	2.22	2.22	0.00
	443.0	0.90	19.60	443.0	2.3	1.0	-2.4	0.12	0.07	-6.58
	601.0	0.90	13.40	601.0	4.6	1.8	-4.8	0.06	0.00	-3.92
	759.0	1.10	25.40	758.9	7.2	2.7	-7.4	0.18	0.13	7.59
	824.0	0.30	224.20	823.9	7.7	2.8	-7.8	2.13	-1.23	-248.00
	980.0	0.90	213.00	979.9	6.3	1.9	-6.2	0.39	0.38	-7.18
	1,138.0	0.80	203.50	1,137.9	4.3	0.8	-3.9	0.11	-0.06	-6.01
	1,295.0	1.10	219.50	1,294.9	2.1	-0.6	-1.3	0.25	0.19	10.19
	1,361.0	0.50	234.40	1,360.9	1.5	-1.3	-0.4	0.95	-0.91	22.58
	1,520.0	0.30	246.80	1,519.9	0.9	-2.2	0.6	0.14	-0.13	7.80
	1,678.0	0.50	237.70	1,677.9	0.4	-3.2	1.6	0.13	0.13	-5.76



Survey Report

Company: ENERGEN RESOURCES CORP
Project: SEC.6-T26N-R5W
Site: JICARILLA WEST #8M PAD
Well: JICARILLA WEST #8M
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well JICARILLA WEST #8M
TVD Reference: RKB @ 6590.0ft (AZTEC 545)
MD Reference: RKB @ 6590.0ft (AZTEC 545)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: Landmark

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)
1,837.0	0.60	235.00	1,836.9	-0.5	-4.4	3.1	0.06	0.06	-1.70
1,997.0	0.80	242.30	1,996.9	-1.5	-6.1	4.9	0.14	0.13	4.56
2,157.0	0.90	230.60	2,156.8	-2.8	-8.1	7.1	0.12	0.06	-7.31
2,315.0	0.50	228.20	2,314.8	-4.0	-9.5	9.0	0.25	-0.25	-1.52
2,474.0	0.30	250.60	2,473.8	-4.6	-10.5	10.0	0.16	-0.13	14.09
2,632.0	0.60	240.70	2,631.8	-5.2	-11.6	11.1	0.20	0.19	-6.27
2,790.0	0.60	197.70	2,789.8	-6.4	-12.5	12.7	0.28	0.00	-27.22
2,949.0	0.40	216.70	2,948.8	-7.6	-13.1	14.0	0.16	-0.13	11.95
3,107.0	0.70	217.60	3,106.8	-8.8	-14.0	15.5	0.19	0.19	0.57
3,266.0	0.70	185.20	3,265.8	-10.6	-14.7	17.3	0.25	0.00	-20.38
3,424.0	1.10	147.10	3,423.8	-12.8	-14.0	18.6	0.44	0.25	-24.11
3,583.0	0.50	168.90	3,582.7	-14.8	-13.0	19.6	0.42	-0.38	13.71
3,710.0	0.70	167.10	3,709.7	-16.1	-12.7	20.5	0.16	0.16	-1.42
3,760.0	0.70	167.10	3,759.7	-16.7	-12.6	20.9	0.00	0.00	0.00
PROJECTION TO BIT									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
3,760.0	3,759.7	-16.7	-12.6	PROJECTION TO BIT

Checked By: _____ Approved By: _____ Date: _____

Energen Resources Corp.

Rio Arriba County, NM

Jicarilla West

Jicarilla West #8M

OH

Design: OH

Standard Survey Report

08 November, 2011

RCVD NOV 22 '11

OIL CONS. DIV.

DIST. 3

This survey is correct to the best of my knowledge and is supported by actual field data.

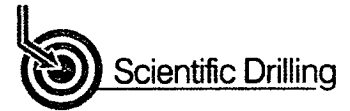
Notarized this date _____ of _____, 2011.

Notary Signature
County of Natrona
State of Wyoming



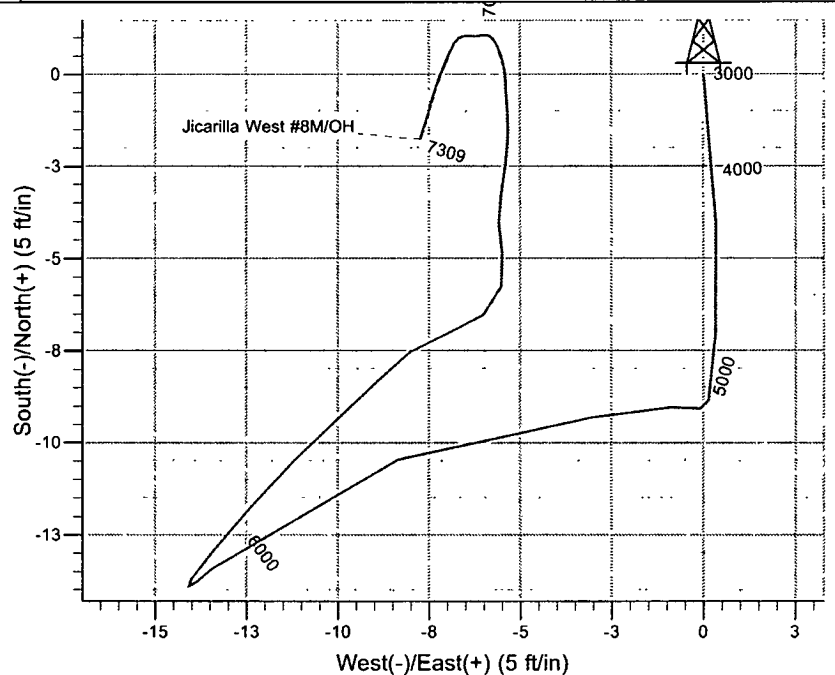
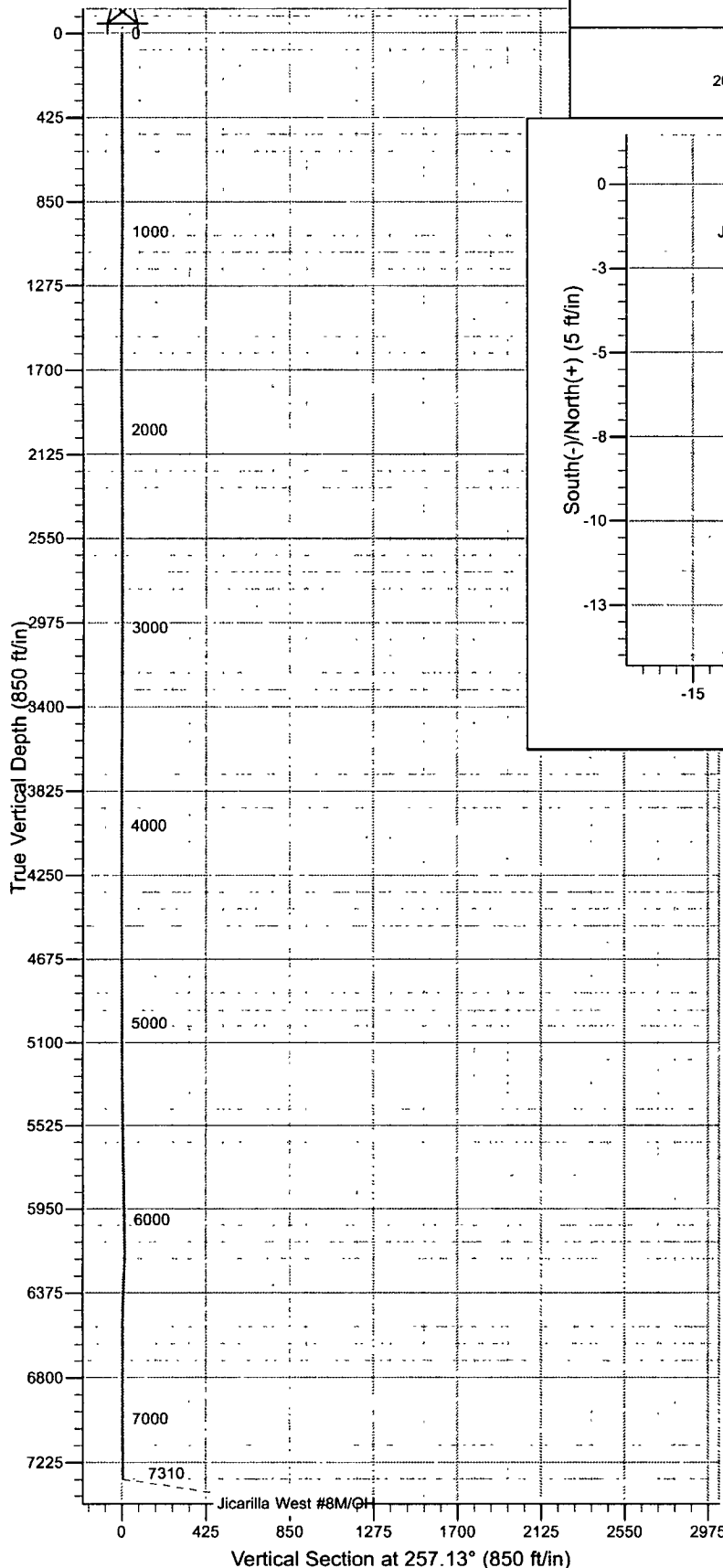
Energen Resources Corp.

Project: Rio Arriba County, NM
 Site: Jicarilla West
 Well: Jicarilla West #8M
 Wellbore: OH
 Design: OH



WELL DETAILS: Jicarilla West #8M

Ground Level: GL 6580' & KB 12' @ 6592.00ft (AWS 545)
 Northing 2009214 30 Easting 1304277 95 Latitude 36° 30' 58 788 N Longitude 107° 23' 38 112 W



REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Jicarilla West #8M, True North
 Vertical (TVD) Reference: GL 6580' & KB 12' @ 6592.00ft (AWS 545)
 Section (VS) Reference: Slot - (0.00N, 0.00E)
 Measured Depth Reference: GL 6580' & KB 12' @ 6592.00ft (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 West #8M/OH)

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

Scientific Drilling Survey Report



Company:	Energen Resources Corp.	Local Co-ordinate Reference:	Well Jicarilla West #8M
Project:	Rio Arriba County, NM	TVD Reference:	GL 6580' & KB 12' @ 6592.00ft (AWS 545)
Site:	Jicarilla West	MD Reference:	GL 6580' & KB 12' @ 6592.00ft (AWS 545)
Well:	Jicarilla West #8M	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Rockies Compass Server

Project	Rio Arriba County, NM		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Central Zone		

Site	Jicarilla West				
Site Position:		Northing:	2,009,214.31 usft	Latitude:	36° 30' 58.788 N
From:	Lat/Long	Easting:	1,304,277.95 usft	Longitude:	107° 23' 38.112 W
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	-0.68 °

Well	Jicarilla West #8M, 2619' FSL 721' FEL Sec 6 T26N R5W					
Well Position	+N/-S	0.00 ft	Northing:	2,009,214.31 usft	Latitude:	36° 30' 58.788 N
	+E/-W	0.00 ft	Easting:	1,304,277.95 usft	Longitude:	107° 23' 38.112 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	6,580.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2011/09/28	9.68	63.33	50,626

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	257.13	

Survey Program		Date	2011/11/08		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
3,763.00	7,310.00	Survey #1 (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)	Buidl 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
3,763.00	0.00	0.00	3,763.00	0.00	0.00	0.00	0.00	0.00	0.00
Assumed Vertical									
3,812.00	0.71	173.43	3,812.00	-0.30	0.03	0.03	1.45	1.45	0.00
First SDI MWD Survey									
4,130.00	0.62	177.26	4,129.98	-3.98	0.34	0.55	0.03	-0.03	1.20
4,448.00	0.50	183.86	4,447.96	-7.08	0.33	1.25	0.04	-0.04	2.08
4,765.00	0.15	193.58	4,764.96	-8.86	0.14	1.84	0.11	-0.11	3.07
5,083.00	0.08	328.06	5,082.96	-9.08	-0.07	2.10	0.07	-0.02	42.29
5,400.00	1.04	261.37	5,399.94	-9.32	-3.04	5.04	0.32	0.30	-21.04

Scientific Drilling Survey Report



Company: Energen Resources Corp.
Project: Rio Arriba County, NM
Site: Jicarilla West
Well: Jicarilla West #8M
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well Jicarilla West #8M
TVD Reference: GL 6580' & KB 12' @ 6592.00ft (AWS 545)
MD Reference: GL 6580' & KB 12' @ 6592.00ft (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)
5,717.00	0.93	253.91	5,716.89	-10.47	-8.35	10.47	0.05	-0.03	-2.35
6,099.00	0.89	225.10	6,098.85	-13.42	-13.43	16.08	0.12	-0.01	-7.54
6,139.00	0.67	235.90	6,138.84	-13.77	-13.85	16.57	0.66	-0.55	27.00
6,171.00	0.32	244.30	6,170.84	-13.92	-14.08	16.83	1.11	-1.09	26.25
6,203.00	0.98	32.53	6,202.84	-13.72	-14.01	16.72	3.95	2.06	463.22
6,234.00	2.43	40.03	6,233.82	-13.00	-13.45	16.01	4.72	4.68	24.19
6,266.00	3.32	41.29	6,265.78	-11.78	-12.40	14.71	2.79	2.78	3.94
6,298.00	3.10	45.15	6,297.73	-10.48	-11.18	13.23	0.96	-0.69	12.06
6,330.00	2.73	48.19	6,329.69	-9.36	-10.00	11.83	1.25	-1.16	9.50
6,362.00	2.41	44.97	6,361.66	-8.37	-8.95	10.59	1.10	-1.00	-10.06
6,393.00	2.19	52.32	6,392.64	-7.55	-8.02	9.50	1.19	-0.71	23.71
6,425.00	2.14	75.73	6,424.61	-7.03	-6.96	8.35	2.75	-0.16	73.16
6,457.00	1.80	47.79	6,456.59	-6.54	-6.01	7.31	3.15	-1.06	-87.31
6,489.00	1.61	15.24	6,488.58	-5.77	-5.52	6.66	3.04	-0.59	-101.72
6,521.00	1.65	348.09	6,520.57	-4.89	-5.49	6.45	2.39	0.13	-84.84
6,552.00	1.49	0.00	6,551.56	-4.05	-5.59	6.35	1.17	-0.52	38.42
6,584.00	1.22	11.16	6,583.55	-3.30	-5.52	6.12	1.18	-0.84	34.88
6,616.00	1.16	6.33	6,615.54	-2.64	-5.42	5.87	0.37	-0.19	-15.09
6,648.00	1.04	6.28	6,647.54	-2.03	-5.35	5.67	0.38	-0.38	-0.16
6,679.00	0.84	358.95	6,678.53	-1.52	-5.33	5.53	0.75	-0.65	-23.65
6,711.00	0.99	357.96	6,710.53	-1.01	-5.34	5.43	0.47	0.47	-3.09
6,743.00	0.68	352.91	6,742.52	-0.55	-5.37	5.36	0.99	-0.97	-15.78
6,774.00	0.57	0.95	6,773.52	-0.21	-5.39	5.30	0.45	-0.35	25.94
6,806.00	0.67	350.06	6,805.52	0.13	-5.42	5.26	0.48	0.31	-34.03
6,838.00	0.62	339.19	6,837.52	0.48	-5.52	5.27	0.41	-0.16	-33.97
6,869.00	0.51	340.28	6,868.52	0.76	-5.62	5.31	0.36	-0.35	3.52
6,901.00	0.31	307.16	6,900.52	0.95	-5.74	5.38	0.94	-0.63	-103.50
6,932.00	0.26	309.23	6,931.52	1.05	-5.86	5.48	0.16	-0.16	6.68
6,964.00	0.38	248.60	6,963.52	1.05	-6.02	5.63	1.06	0.38	-189.47
6,995.00	0.34	270.10	6,994.51	1.02	-6.20	5.82	0.45	-0.13	69.35
7,027.00	0.26	281.53	7,026.51	1.03	-6.37	5.98	0.31	-0.25	35.72
7,058.00	0.32	255.12	7,057.51	1.02	-6.52	6.13	0.47	0.19	-85.19
7,090.00	0.24	246.01	7,089.51	0.97	-6.67	6.29	0.29	-0.25	-28.47
7,121.00	0.44	214.26	7,120.51	0.85	-6.80	6.44	0.86	0.65	-102.42
7,153.00	0.67	200.15	7,152.51	0.57	-6.93	6.63	0.83	0.72	-44.09
7,185.00	0.86	206.55	7,184.51	0.18	-7.10	6.88	0.65	0.59	20.00
7,217.00	0.95	196.73	7,216.50	-0.29	-7.28	7.17	0.56	0.28	-30.69
Last SDI MWD Survey									
7,310.00	0.95	196.73	7,309.49	-1.77	-7.73	7.93	0.00	0.00	0.00
Projection to TD									

Scientific Drilling
Survey Report



Company: Energen Resources Corp.
Project: Rio Arriba County, NM
Site: Jicarilla West
Well: Jicarilla West #8M
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well Jicarilla West #8M
TVD Reference: GL 6580' & KB 12' @ 6592.00ft (AWS 545)
MD Reference: GL 6580' & KB 12' @ 6592.00ft (AWS 545)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: Rockies Compass Server

Checked By: _____	Approved By: _____	Date: _____
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