

**Provide Signature Page for
Directional Survey**



XTO ENERGY, INC.

Eddy County, NM

Sec. 6, T25S, R29E

ROADHOUSE FEDERAL #2H

Wellbore #1

30-015-44279

Design: Wellbore #1

QES Survey Report

22 May, 2018





Survey Report



Company:	XTO ENERGY, INC.	Local Co-ordinate Reference:	Well ROADHOUSE FEDERAL #2H
Project:	Eddy County, NM	TVD Reference:	WELL @ 2932.0usft (Frontier #27)
Site:	Sec. 6, T25S, R29E	MD Reference:	WELL @ 2932.0usft (Frontier #27)
Well:	ROADHOUSE FEDERAL #2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Project	Eddy County, NM		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Sec. 6, T25S, R29E				
Site Position:		Northing:	419,324.05 usft	Latitude:	32° 9' 8.798 N
From:	Map	Easting:	597,806.00 usft	Longitude:	104° 1' 2.285 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.17 °

Well	ROADHOUSE FEDERAL #2H					
Well Position	+N/-S	0.0 usft	Northing:	419,281.87 usft	Latitude:	32° 9' 8.417 N
	+E/-W	0.0 usft	Easting:	596,566.15 usft	Longitude:	104° 1' 16.709 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	2,905.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	4/24/2018	7.06	59.91	47,763.91343803

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	0.06	

Survey Program	Date 5/21/2018				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
98.0	17,355.0	QES MWD Surveys (Wellbore #1)	MWD	OWSG MWD - Standard	

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
First MWD Survey @ 98.0' MD / 98.0' TVD									
98.0	0.30	235.90	98.0	-0.1	-0.2	-0.1	0.31	0.31	0.00
146.0	0.30	250.40	146.0	-0.3	-0.4	-0.3	0.16	0.00	30.21
206.0	0.20	278.70	206.0	-0.3	-0.7	-0.3	0.26	-0.17	47.17
298.0	0.20	234.90	298.0	-0.4	-1.0	-0.4	0.16	0.00	-47.61
358.0	0.10	261.60	358.0	-0.4	-1.1	-0.4	0.20	-0.17	44.50
419.0	0.40	201.00	419.0	-0.6	-1.2	-0.6	0.59	0.49	-99.34
512.0	0.60	180.40	512.0	-1.4	-1.4	-1.4	0.29	0.22	-22.15
611.0	0.50	185.10	611.0	-2.4	-1.4	-2.4	0.11	-0.10	4.75
639.0	0.60	191.30	639.0	-2.6	-1.4	-2.6	0.42	0.36	22.14



Survey Report



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Project: Eddy County, NM
Site: Sec. 6, T25S, R29E
Well: ROADHOUSE FEDERAL #2H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well ROADHOUSE FEDERAL #2H
TVD Reference: WELL @ 2932.0usft (Frontier #27)
MD Reference: WELL @ 2932.0usft (Frontier #27)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
718.0	0.60	192.00	718.0	-3.5	-1.6	-3.5	0.01	0.00	0.89
813.0	0.80	195.50	813.0	-4.6	-1.9	-4.6	0.22	0.21	3.68
908.0	0.70	206.20	908.0	-5.7	-2.3	-5.7	0.18	-0.11	11.26
1,003.0	0.60	209.40	1,003.0	-6.7	-2.8	-6.7	0.11	-0.11	3.37
1,098.0	0.40	228.70	1,098.0	-7.3	-3.3	-7.3	0.27	-0.21	20.32
1,193.0	0.80	239.60	1,193.0	-7.9	-4.1	-7.9	0.44	0.42	11.47
1,289.0	1.00	239.50	1,288.9	-8.7	-5.4	-8.7	0.21	0.21	-0.10
1,384.0	1.30	253.50	1,383.9	-9.4	-7.2	-9.4	0.43	0.32	14.74
1,479.0	1.10	279.00	1,478.9	-9.6	-9.1	-9.6	0.59	-0.21	26.84
1,572.0	1.10	283.10	1,571.9	-9.2	-10.9	-9.2	0.08	0.00	4.41
1,668.0	1.30	288.10	1,667.9	-8.7	-12.8	-8.7	0.23	0.21	5.21
1,763.0	0.80	348.30	1,762.8	-7.7	-14.0	-7.7	1.20	-0.53	63.37
1,858.0	1.00	354.60	1,857.8	-6.2	-14.2	-6.2	0.23	0.21	6.63
1,953.0	0.80	1.80	1,952.8	-4.7	-14.2	-4.7	0.24	-0.21	7.58
2,048.0	0.70	44.50	2,047.8	-3.6	-13.8	-3.7	0.58	-0.11	44.95
2,142.0	1.60	80.60	2,141.8	-3.0	-12.1	-3.0	1.18	0.96	38.40
2,238.0	1.80	83.00	2,237.8	-2.6	-9.3	-2.6	0.22	0.21	2.50
2,332.0	1.90	77.90	2,331.7	-2.1	-6.3	-2.1	0.20	0.11	-5.43
2,427.0	1.60	117.50	2,426.7	-2.4	-3.6	-2.4	1.28	-0.32	41.68
2,522.0	1.50	145.40	2,521.6	-4.0	-1.7	-4.0	0.79	-0.11	29.37
2,618.0	0.70	4.40	2,617.6	-4.5	-0.9	-4.5	2.18	-0.83	-146.88
2,712.0	0.90	354.60	2,711.6	-3.2	-1.0	-3.2	0.26	0.21	-10.43
2,807.0	0.20	217.80	2,806.6	-2.6	-1.1	-2.6	1.11	-0.74	-144.00
2,903.0	0.30	166.00	2,902.6	-2.9	-1.2	-2.9	0.25	0.10	-53.96
2,998.0	0.40	196.20	2,997.6	-3.5	-1.2	-3.5	0.22	0.11	31.79
3,093.0	0.20	183.70	3,092.6	-4.0	-1.3	-4.0	0.22	-0.21	-13.16
3,189.0	0.20	166.70	3,188.8	-4.3	-1.3	-4.3	0.06	0.00	-17.71
3,285.0	0.20	214.80	3,284.6	-4.6	-1.3	-4.6	0.17	0.00	50.10
3,380.0	0.10	137.50	3,379.6	-4.8	-1.4	-4.8	0.21	-0.11	-81.37
3,475.0	0.20	151.70	3,474.6	-5.0	-1.3	-5.0	0.11	0.11	14.95
3,571.0	0.20	117.50	3,570.6	-5.2	-1.0	-5.2	0.12	0.00	-35.63
3,666.0	0.30	150.70	3,665.6	-5.5	-0.8	-5.5	0.18	0.11	34.95
3,762.0	0.30	148.20	3,761.6	-6.0	-0.5	-6.0	0.01	0.00	-2.60
3,857.0	0.20	171.80	3,856.6	-6.3	-0.3	-6.3	0.15	-0.11	24.84
3,950.0	0.20	174.90	3,949.6	-6.7	-0.3	-6.7	0.01	0.00	3.33
4,046.0	0.20	170.00	4,045.6	-7.0	-0.3	-7.0	0.02	0.00	-5.10
4,141.0	0.10	125.60	4,140.6	-7.2	-0.2	-7.2	0.15	-0.11	-46.74
4,237.0	0.20	165.60	4,236.6	-7.4	-0.1	-7.4	0.14	0.10	41.67
4,332.0	0.30	181.60	4,331.6	-7.8	0.0	-7.8	0.13	0.11	16.84
4,428.0	0.30	182.20	4,427.6	-8.3	0.0	-8.3	0.00	0.00	0.63
4,524.0	0.30	187.10	4,523.6	-8.8	-0.1	-8.8	0.03	0.00	5.10
4,619.0	0.20	200.10	4,618.6	-9.2	-0.2	-9.2	0.12	-0.11	13.68
4,715.0	0.20	144.90	4,714.6	-9.5	-0.1	-9.5	0.19	0.00	-57.50



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North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,811.0	0.30	170.90	4,810.6	-9.9	0.0	-9.9	0.16	0.10	27.08
4,906.0	0.20	141.50	4,905.6	-10.3	0.1	-10.3	0.17	-0.11	-30.95
5,001.0	0.30	129.20	5,000.6	-10.6	0.4	-10.6	0.12	0.11	-12.95
5,096.0	0.40	135.00	5,095.6	-11.0	0.9	-11.0	0.11	0.11	6.11
5,191.0	0.40	234.20	5,190.6	-11.4	0.8	-11.4	0.64	0.00	104.42
5,286.0	0.60	249.50	5,285.6	-11.8	0.1	-11.8	0.25	0.21	16.11
5,381.0	0.40	233.70	5,380.6	-12.1	-0.6	-12.1	0.25	-0.21	-16.63
5,477.0	0.70	233.30	5,476.6	-12.7	-1.4	-12.7	0.31	0.31	-0.42
5,572.0	0.50	224.00	5,571.6	-13.3	-2.1	-13.3	0.23	-0.21	-9.79
5,668.0	0.80	237.20	5,667.6	-14.0	-3.0	-14.0	0.35	0.31	13.75
5,763.0	0.90	243.30	5,762.6	-14.7	-4.2	-14.7	0.14	0.11	6.42
5,858.0	0.80	242.30	5,857.5	-15.3	-5.5	-15.3	0.11	-0.11	-1.05
5,954.0	0.70	316.80	5,953.5	-15.2	-6.5	-15.2	0.95	-0.10	77.60
6,050.0	0.90	315.40	6,049.5	-14.2	-7.4	-14.3	0.21	0.21	-1.46
6,145.0	0.80	319.30	6,144.5	-13.2	-8.3	-13.2	0.12	-0.11	4.11
6,241.0	0.80	317.90	6,240.5	-12.2	-9.2	-12.2	0.02	0.00	-1.46
6,337.0	0.40	314.30	6,336.5	-11.5	-9.9	-11.5	0.42	-0.42	-3.75
6,431.0	0.40	312.80	6,430.5	-11.0	-10.4	-11.0	0.01	0.00	-1.60
6,527.0	0.70	301.70	6,526.5	-10.5	-11.1	-10.5	0.33	0.31	-11.56
6,623.0	0.60	302.90	6,622.5	-9.9	-12.1	-9.9	0.11	-0.10	1.25
6,719.0	1.10	293.20	6,718.5	-9.3	-13.3	-9.3	0.54	0.52	-10.10
6,814.0	1.10	290.10	6,813.5	-8.6	-15.0	-8.6	0.06	0.00	-3.26
6,910.0	1.10	298.30	6,909.4	-7.8	-16.7	-7.9	0.16	0.00	8.54
7,006.0	0.70	314.00	7,005.4	-7.0	-17.9	-7.0	0.49	-0.42	16.35
7,099.0	0.20	273.40	7,098.4	-6.6	-18.5	-6.6	0.61	-0.54	-43.66
7,195.0	0.50	193.10	7,194.4	-7.0	-18.8	-7.0	0.53	0.31	-83.65
7,291.0	0.80	191.30	7,290.4	-8.1	-19.0	-8.1	0.31	0.31	-1.88
7,386.0	0.90	179.90	7,385.4	-9.5	-19.1	-9.5	0.21	0.11	-12.00
7,481.0	1.10	174.90	7,480.4	-11.1	-19.0	-11.1	0.23	0.21	-5.26
7,577.0	0.40	176.70	7,576.4	-12.4	-18.9	-12.4	0.73	-0.73	1.88
7,672.0	0.20	172.70	7,671.4	-12.9	-18.9	-12.9	0.21	-0.21	-4.21
7,767.0	0.40	112.40	7,766.4	-13.1	-18.6	-13.2	0.37	0.21	-63.47
7,863.0	0.40	164.80	7,862.4	-13.6	-18.2	-13.6	0.37	0.00	54.58
7,959.0	0.80	194.50	7,958.4	-14.6	-18.2	-14.6	0.51	0.42	30.94
8,055.0	1.60	184.60	8,054.4	-16.6	-18.5	-16.6	0.86	0.83	-10.31
8,150.0	1.80	156.80	8,149.3	-19.2	-18.0	-19.3	0.88	0.21	-29.26
8,246.0	1.30	136.30	8,245.3	-21.4	-16.7	-21.4	0.77	-0.52	-21.35
8,342.0	0.80	122.40	8,341.3	-22.6	-15.4	-22.6	0.58	-0.52	-14.48
8,436.0	0.30	138.20	8,435.3	-23.1	-14.7	-23.1	0.55	-0.53	16.81
8,530.0	0.40	71.40	8,529.3	-23.2	-14.2	-23.2	0.42	0.11	-71.06
8,626.0	0.40	336.70	8,625.3	-22.8	-14.0	-22.8	0.61	0.00	-98.65
8,721.0	1.40	288.70	8,720.2	-22.1	-15.2	-22.1	1.23	1.05	-50.53
8,817.0	0.40	340.40	8,816.2	-21.4	-16.5	-21.4	1.24	-1.04	53.85



Survey Report



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 Project: Eddy County, NM
 Site: Sec. 6, T25S, R29E
 Well: ROADHOUSE FEDERAL #2H
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well ROADHOUSE FEDERAL #2H
 TVD Reference: WELL @ 2932.0usft (Frontier #27)
 MD Reference: WELL @ 2932.0usft (Frontier #27)
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Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,911.0	0.30	284.10	8,910.2	-21.0	-16.8	-21.0	0.36	-0.11	-59.89
9,007.0	0.70	271.60	9,006.2	-21.0	-17.6	-21.0	0.43	0.42	-13.02
9,102.0	0.50	253.20	9,101.2	-21.1	-18.6	-21.1	0.29	-0.21	-19.37
9,133.0	0.50	256.50	9,132.2	-21.1	-18.9	-21.1	0.09	0.00	10.65
9,188.0	0.40	230.00	9,187.2	-21.3	-19.2	-21.3	0.41	-0.18	-48.18
9,282.0	0.50	261.40	9,281.2	-21.6	-19.9	-21.6	0.28	0.11	33.40
9,377.0	0.50	282.50	9,376.2	-21.5	-20.7	-21.6	0.19	0.00	22.21
9,425.0	2.30	6.20	9,424.2	-20.5	-20.8	-20.6	4.79	3.75	174.38
9,473.0	5.50	11.60	9,472.1	-17.3	-20.3	-17.4	6.70	6.67	11.25
9,521.0	9.50	17.60	9,519.7	-11.3	-18.6	-11.3	8.48	8.33	12.50
9,567.0	13.60	19.20	9,564.7	-2.6	-15.7	-2.6	8.94	8.91	3.48
9,615.0	17.80	23.20	9,610.9	9.5	-10.9	9.5	9.03	8.75	8.33
9,663.0	22.10	22.50	9,656.0	24.6	-4.6	24.6	8.97	8.96	-1.46
9,711.0	26.60	21.70	9,699.8	42.9	2.9	42.9	9.40	9.38	-1.67
9,758.0	29.90	23.10	9,741.1	63.5	11.4	63.5	7.16	7.02	2.98
9,806.0	33.80	22.90	9,781.9	86.8	21.2	86.8	8.13	8.13	-0.42
9,852.0	38.40	19.00	9,819.1	112.1	30.9	112.1	11.17	10.00	-8.48
9,900.0	43.00	15.50	9,855.5	142.0	40.1	142.0	10.70	9.58	-7.29
Crossed 330' HL @ 9913.3' MD / 9865.1' TVD									
9,913.3	43.91	15.21	9,865.1	150.8	42.5	150.9	7.03	6.87	-2.17
9,948.0	46.30	14.50	9,889.6	174.6	48.8	174.6	7.03	6.88	-2.05
9,980.0	48.80	11.50	9,911.2	197.6	54.1	197.6	10.43	7.81	-9.38
10,011.0	52.70	6.50	9,930.8	221.3	57.9	221.3	17.72	12.58	-16.13
10,043.0	58.40	2.70	9,948.9	247.6	59.9	247.6	20.32	17.81	-11.88
10,075.0	64.90	0.40	9,964.1	275.7	60.7	275.8	21.27	20.31	-7.19
10,106.0	71.80	358.60	9,975.5	304.5	60.4	304.6	22.90	22.26	-5.81
10,138.0	75.90	357.60	9,984.4	335.2	59.4	335.3	13.16	12.81	-3.13
10,170.0	79.90	357.20	9,991.1	366.5	58.0	366.5	12.56	12.50	-1.25
10,201.0	82.70	356.90	9,995.8	397.1	56.4	397.1	9.08	9.03	-0.97
10,233.0	84.20	357.10	9,999.5	428.8	54.7	428.9	4.73	4.69	0.63
10,281.0	84.80	356.90	10,004.1	476.5	52.2	476.6	1.32	1.25	-0.42
10,329.0	84.70	356.20	10,008.5	524.2	49.4	524.3	1.47	-0.21	-1.46
10,424.0	84.20	354.90	10,017.7	618.5	42.0	618.5	1.46	-0.53	-1.37
10,519.0	85.80	356.20	10,025.9	712.8	34.7	712.9	2.17	1.68	1.37
10,614.0	87.10	357.20	10,031.8	807.5	29.2	807.5	1.73	1.37	1.05
10,709.0	88.70	358.50	10,035.3	902.4	25.7	902.4	2.17	1.68	1.37
10,805.0	90.10	359.30	10,036.3	998.3	23.8	998.4	1.68	1.46	0.83
10,901.0	90.70	358.80	10,035.6	1,094.3	22.2	1,094.4	0.81	0.63	-0.52
10,996.0	91.50	359.20	10,033.8	1,189.3	20.6	1,189.3	0.94	0.84	0.42
11,088.0	92.00	357.80	10,031.0	1,281.2	18.2	1,281.2	1.62	0.54	-1.52
11,183.0	91.50	357.60	10,028.1	1,376.1	14.4	1,376.1	0.57	-0.53	-0.21
11,279.0	90.20	356.70	10,026.7	1,472.0	9.6	1,472.0	1.65	-1.35	-0.94
11,375.0	88.70	356.90	10,027.6	1,567.8	4.2	1,567.8	1.58	-1.56	0.21
11,472.0	88.60	356.90	10,029.9	1,664.6	-1.0	1,664.6	0.10	-0.10	0.00



Survey Report



Company: XTO ENERGY, INC.
Project: Eddy County, NM
Site: Sec. 6, T25S, R29E
Well: ROADHOUSE FEDERAL #2H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well ROADHOUSE FEDERAL #2H
TVD Reference: WELL @ 2932.0usft (Frontier #27)
MD Reference: WELL @ 2932.0usft (Frontier #27)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
11,568.0	89.20	355.80	10,031.7	1,760.4	-7.1	1,760.4	1.31	0.63	-1.15
11,663.0	88.00	356.70	10,034.1	1,855.2	-13.3	1,855.2	1.58	-1.26	0.95
11,759.0	88.70	356.50	10,036.8	1,951.0	-19.0	1,951.0	0.76	0.73	-0.21
11,854.0	89.00	355.80	10,038.7	2,045.7	-25.4	2,045.7	0.80	0.32	-0.74
11,949.0	89.70	358.60	10,039.8	2,140.6	-30.0	2,140.6	3.04	0.74	2.95
12,043.0	88.70	359.50	10,041.1	2,234.6	-31.6	2,234.6	1.43	-1.06	0.96
12,138.0	89.40	358.80	10,042.7	2,329.6	-33.0	2,329.5	1.04	0.74	-0.74
12,234.0	91.70	358.30	10,041.8	2,425.5	-35.4	2,425.5	2.45	2.40	-0.52
12,329.0	88.90	357.80	10,041.3	2,520.5	-38.7	2,520.4	2.99	-2.95	-0.53
12,425.0	90.60	356.90	10,041.7	2,616.4	-43.1	2,616.3	2.00	1.77	-0.94
12,520.0	92.40	356.20	10,039.2	2,711.1	-48.8	2,711.1	2.03	1.89	-0.74
12,616.0	91.80	356.00	10,035.7	2,806.9	-55.3	2,806.8	0.66	-0.63	-0.21
12,712.0	90.10	356.50	10,034.1	2,902.6	-61.6	2,902.6	1.85	-1.77	0.52
12,807.0	87.20	355.80	10,036.3	2,997.4	-68.0	2,997.3	3.14	-3.05	-0.74
12,903.0	89.40	357.90	10,039.2	3,093.2	-73.3	3,093.1	3.17	2.29	2.19
12,998.0	89.40	359.50	10,040.2	3,188.2	-75.4	3,188.1	1.68	0.00	1.68
13,094.0	90.70	0.20	10,040.1	3,284.1	-75.7	3,284.1	1.54	1.35	0.73
13,190.0	91.20	359.00	10,038.5	3,380.1	-76.4	3,380.0	1.35	0.52	-1.25
13,286.0	90.50	359.90	10,037.1	3,476.1	-77.3	3,476.0	1.19	-0.73	0.94
13,381.0	90.60	359.90	10,036.2	3,571.1	-77.4	3,571.0	0.11	0.11	0.00
13,476.0	89.90	0.20	10,035.8	3,666.1	-77.4	3,666.0	0.80	-0.74	0.32
13,572.0	90.70	359.90	10,035.2	3,762.1	-77.3	3,762.0	0.89	0.83	-0.31
13,668.0	90.80	358.50	10,034.0	3,858.1	-78.6	3,858.0	1.46	0.10	-1.46
13,762.0	91.20	359.70	10,032.4	3,952.1	-80.1	3,952.0	1.35	0.43	1.28
13,858.0	90.10	0.60	10,031.3	4,048.0	-79.8	4,048.0	1.48	-1.15	0.94
13,951.0	92.00	2.00	10,029.6	4,141.0	-77.7	4,140.9	2.54	2.04	1.51
14,044.0	89.80	0.90	10,028.1	4,234.0	-75.4	4,233.9	2.64	-2.37	-1.18
14,140.0	87.10	1.10	10,030.7	4,329.9	-73.7	4,329.8	2.82	-2.81	0.21
14,235.0	87.10	1.10	10,035.5	4,424.8	-71.9	4,424.7	0.00	0.00	0.00
14,328.0	88.50	1.10	10,039.1	4,517.7	-70.1	4,517.6	1.51	1.51	0.00
14,424.0	89.40	0.70	10,040.8	4,613.6	-68.6	4,613.6	1.03	0.94	-0.42
14,519.0	88.70	359.00	10,042.4	4,708.6	-68.8	4,708.5	1.94	-0.74	-1.79
14,612.0	89.50	358.60	10,043.9	4,801.6	-70.8	4,801.5	0.96	0.86	-0.43
14,708.0	89.40	357.40	10,044.8	4,897.5	-74.1	4,897.4	1.25	-0.10	-1.25
14,802.0	88.30	358.30	10,046.7	4,991.4	-77.7	4,991.4	1.51	-1.17	0.96
14,897.0	86.60	359.20	10,050.9	5,086.3	-79.7	5,086.2	2.02	-1.79	0.95
14,992.0	85.70	0.70	10,057.3	5,181.1	-79.8	5,181.0	1.84	-0.95	1.58
15,088.0	89.30	2.70	10,061.5	5,276.9	-77.0	5,276.9	4.29	3.75	2.08
15,184.0	90.90	4.60	10,061.3	5,372.7	-70.9	5,372.7	2.59	1.67	1.98
15,278.0	90.10	3.60	10,060.5	5,466.5	-64.1	5,466.4	1.36	-0.85	-1.06
15,373.0	90.60	4.60	10,059.9	5,561.2	-57.3	5,561.2	1.18	0.53	1.05
15,469.0	91.00	4.10	10,058.6	5,657.0	-50.1	5,656.9	0.67	0.42	-0.52
15,564.0	93.30	3.90	10,055.0	5,751.7	-43.4	5,751.6	2.43	2.42	-0.21



Survey Report



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Design: Wellbore #1

Local Co-ordinate Reference: Well ROADHOUSE FEDERAL #2H
TVD Reference: WELL @ 2932.0usft (Frontier #27)
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North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
15,659.0	95.00	3.60	10,048.1	5,846.2	-37.2	5,846.2	1.82	1.79	-0.32
15,753.0	94.60	1.60	10,040.3	5,939.8	-33.0	5,939.7	2.16	-0.43	-2.13
15,849.0	90.10	359.00	10,036.3	6,035.7	-32.5	6,035.6	5.41	-4.69	-2.71
15,945.0	90.80	359.00	10,035.6	6,131.6	-34.2	6,131.6	0.73	0.73	0.00
16,038.0	91.20	358.60	10,033.9	6,224.6	-36.1	6,224.6	0.61	0.43	-0.43
16,134.0	90.60	359.50	10,032.4	6,320.6	-37.7	6,320.5	1.13	-0.63	0.94
16,230.0	91.20	359.20	10,030.9	6,416.6	-38.8	6,416.5	0.70	0.63	-0.31
16,325.0	89.10	0.01	10,030.7	6,511.5	-39.5	6,511.5	2.37	-2.21	0.85
16,419.0	88.40	0.60	10,032.7	6,605.5	-39.0	6,605.5	0.98	-0.74	0.63
16,515.0	91.10	1.30	10,033.1	6,701.5	-37.4	6,701.5	2.91	2.81	0.73
16,610.0	90.70	1.50	10,031.7	6,796.5	-35.0	6,796.4	0.47	-0.42	0.21
16,705.0	89.60	2.50	10,031.4	6,891.4	-31.7	6,891.4	1.56	-1.16	1.05
16,799.0	90.40	2.30	10,031.4	6,985.3	-27.8	6,985.3	0.88	0.85	-0.21
16,895.0	87.20	1.10	10,033.4	7,081.2	-25.0	7,081.2	3.56	-3.33	-1.25
16,991.0	86.70	0.90	10,038.5	7,177.1	-23.3	7,177.1	0.56	-0.52	-0.21
17,086.0	87.10	0.90	10,043.7	7,271.9	-21.8	7,271.9	0.42	0.42	0.00
17,182.0	88.30	1.10	10,047.5	7,367.8	-20.1	7,367.8	1.27	1.25	0.21
Crossed 330' HL @ 17259.8' MD / 10048.3' TVD									
17,259.8	90.51	1.51	10,048.3	7,445.6	-18.3	7,445.6	2.89	2.84	0.53
17,277.0	91.00	1.60	10,048.1	7,462.8	-17.9	7,462.8	2.89	2.84	0.53
17,303.0	91.50	1.60	10,047.5	7,488.8	-17.1	7,488.8	1.92	1.92	0.00
TD @ 17355.0' MD / 10046.2' TVD									
17,355.0	91.50	1.60	10,046.2	7,540.8	-15.7	7,540.7	0.00	0.00	0.00

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
98.0	98.0	-0.1	-0.2	First MWD Survey @ 98.0' MD / 98.0' TVD
9,913.3	9,865.1	150.8	42.5	Crossed 330' HL @ 9913.3' MD / 9865.1' TVD
17,259.8	10,048.3	7,445.6	-18.3	Crossed 330' HL @ 17259.8' MD / 10048.3' TVD
17,355.0	10,046.2	7,540.8	-15.7	TD @ 17355.0' MD / 10046.2' TVD