

May 30, 2017



**END OF WELL
REPORT
FOR**

**Steward Energy
Heisenberg State 3H
Lea County, NM
DM-2017-53-SED-TX**



PLAN vs ACTUAL

SURVEYS

BOTTOM HOLE ASSEMBLIES

SLIDE REPORTS

DAILY REPORTS

Steward Energy II, LLC

DrilTech, LLC

Lea County, NM (NAD 83)
Section 3: T14S-R38E (Sur.Loc.)
Section 3: T14S-R38E (Sur.Loc.)
Heisenberg State 3H
Heisenberg St.3H Lateral (STK)
Plan #3
McVay 5

SURFACE LOCATION

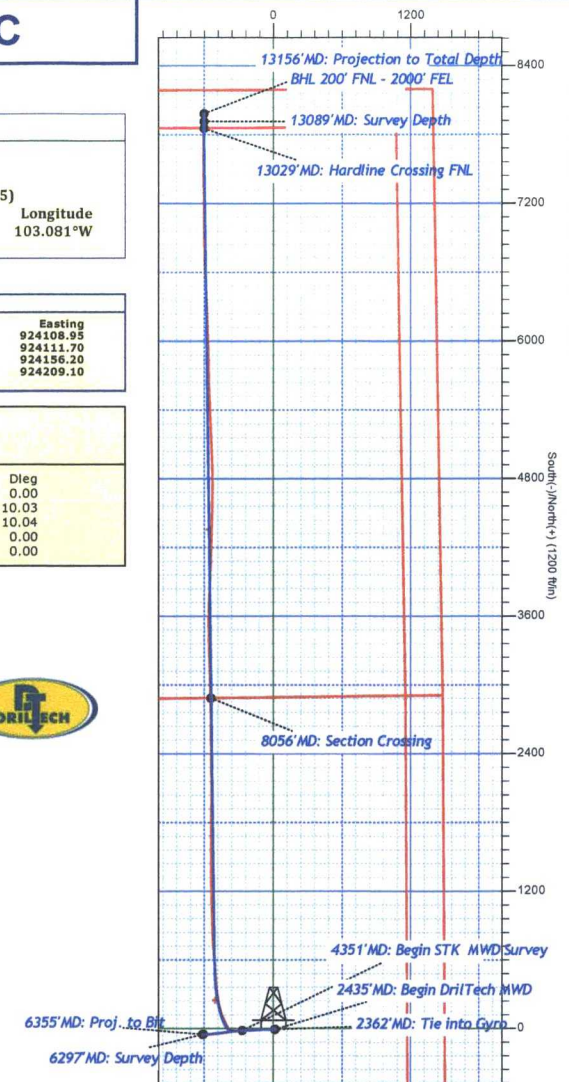
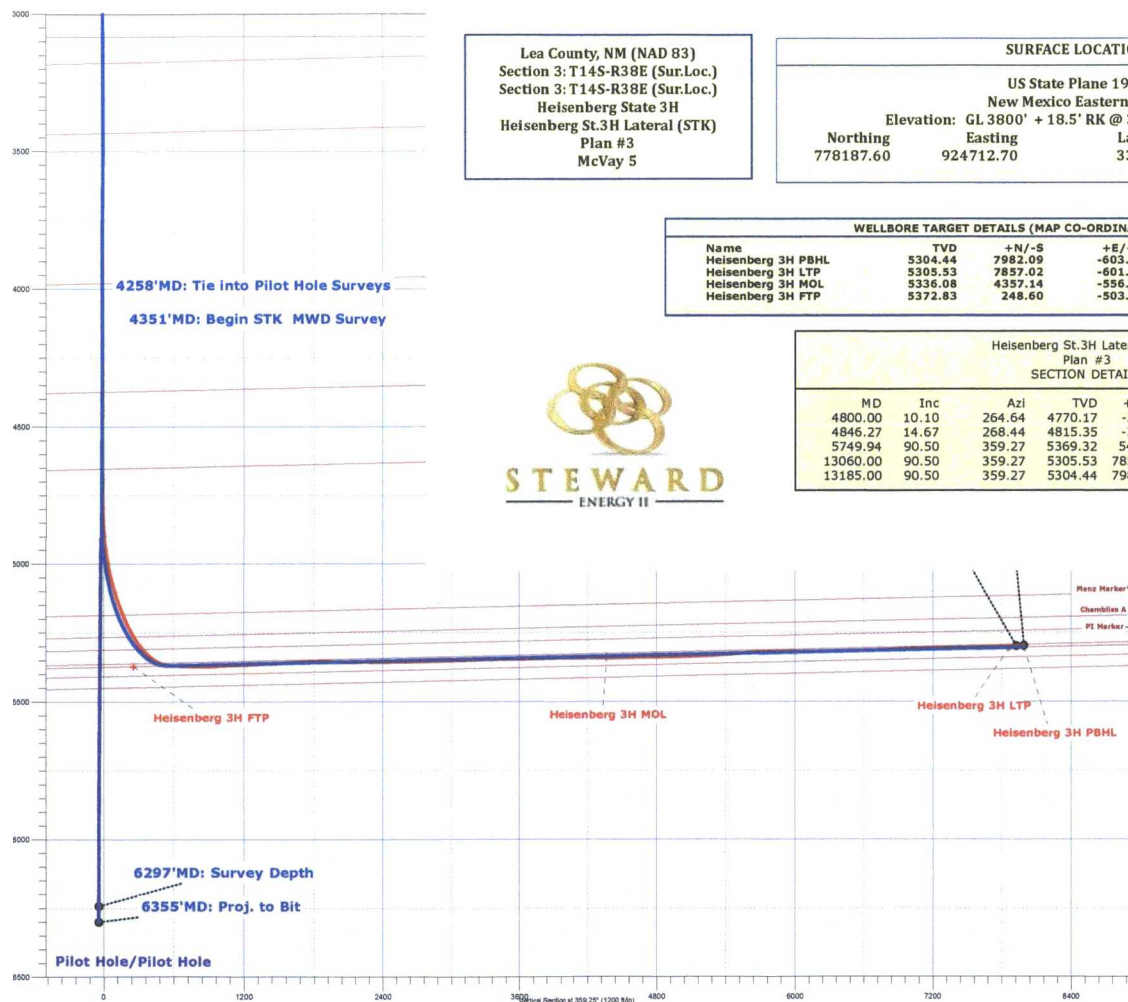
US State Plane 1983
New Mexico Eastern Zone
Elevation: GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Northing 778187.60 Easting 924712.70 Latitude 33.133°N Longitude 103.081°W

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting
Heisenberg 3H PBHL	5304.44	7982.09	-603.75	786169.67	924108.95
Heisenberg 3H LTP	5305.53	7857.02	-601.00	786044.60	924111.70
Heisenberg 3H MOL	5336.08	4357.14	-556.50	782544.73	924156.20
Heisenberg 3H FTP	5372.83	248.60	-503.60	778436.20	924209.10

Heisenberg St.3H Lateral (STK) Plan #3 SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg
4800.00	10.10	264.64	4770.17	-25.34	-345.48	0.00
4846.27	14.67	268.44	4815.35	-25.88	-355.38	10.03
5749.94	90.50	359.27	5369.32	547.92	-509.02	10.04
13060.00	90.50	359.27	5305.53	7857.10	-602.15	0.00
13185.00	90.50	359.27	5304.44	7982.09	-603.75	0.00





Steward Energy II, LLC

Lea County, NM (NAD 83)

Heisenberg State 3H

Heisenberg State 3H

Pilot Hole

Design: Pilot Hole

Standard Survey Report

27 May, 2017



Survey Report

Company:	Steward Energy II, LLC	Local Co-ordinate Reference:	Well Heisenberg State 3H
Project:	Lea County, NM (NAD 83)	TVD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Site:	Heisenberg State 3H	MD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Well:	Heisenberg State 3H	North Reference:	Grid
Wellbore:	Pilot Hole	Survey Calculation Method:	Minimum Curvature
Design:	Pilot Hole	Database:	EDM 5000.14 Single User Db

Project	Lea County, NM (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site		Heisenberg State 3H			
Site Position:		Northing:	778,187.60 usft	Latitude:	33.133°N
From:	Map	Easting:	924,712.70 usft	Longitude:	103.081°W
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	0.68 °

Well	Heisenberg State 3H					
Well Position	+N/-S	0.00 ft	Northing:	778,187.60 usft	Latitude:	33.133°N
	+E/-W	0.00 ft	Easting:	924,712.70 usft	Longitude:	103.081°W
Position Uncertainty	0.00 ft		Wellhead Elevation:	ft	Ground Level:	3,800.00 ft

Wellbore	Pilot Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	4/25/2017	6.80	60.97	48,539.74746058

Design	Pilot Hole				
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	265.00	

Survey Program	Date 5/27/2017				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
97.76	2,362.00	VES Gyro Corrected to NAD 83 (Pilot Hole)	CB_Film_GMS	Camera Based Film Gyro Multi-Shot	
2,435.00	6,355.00	DrilTech MWD (Pilot Hole)	MWD	MWD - Standard	

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	
97.76	0.60	23.99	97.76	0.47	0.21	-0.25	0.61	0.61	0.00	
192.12	0.40	75.15	192.12	1.00	0.73	-0.81	0.50	-0.21	54.22	
286.48	0.63	115.87	286.47	0.86	1.51	-1.58	0.44	0.24	43.15	
380.84	0.27	165.82	380.83	0.42	2.03	-2.06	0.53	-0.38	52.94	
475.20	0.50	47.66	475.19	0.48	2.39	-2.43	0.71	0.24	-125.22	
569.56	0.68	93.94	569.54	0.72	3.26	-3.31	0.52	0.19	49.05	
663.92	0.67	97.46	663.90	0.61	4.36	-4.40	0.05	-0.01	3.73	
758.28	0.72	116.49	758.25	0.27	5.44	-5.44	0.25	0.05	20.17	
852.64	0.76	132.76	852.60	-0.42	6.43	-6.37	0.23	0.04	17.24	



Survey Report

Company:	Steward Energy II, LLC	Local Co-ordinate Reference:	Well Heisenberg State 3H
Project:	Lea County, NM (NAD 83)	TVD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Site:	Heisenberg State 3H	MD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Well:	Heisenberg State 3H	North Reference:	Grid
Wellbore:	Pilot Hole	Survey Calculation Method:	Minimum Curvature
Design:	Pilot Hole	Database:	EDM 5000.14 Single User Db

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)
947.00	0.51	152.26	946.96	-1.21	7.08	-6.95	0.35	-0.26	20.67
1,041.36	0.50	186.98	1,041.31	-1.99	7.23	-7.03	0.32	-0.01	36.80
1,135.72	0.54	257.27	1,135.67	-2.50	6.75	-6.50	0.64	0.04	74.49
1,230.08	0.47	283.19	1,230.03	-2.51	5.93	-5.69	0.25	-0.07	27.47
1,324.44	0.74	328.11	1,324.38	-1.90	5.24	-5.05	0.56	0.29	47.60
1,418.80	0.85	34.29	1,418.73	-0.81	5.31	-5.22	0.93	0.12	70.14
1,513.16	1.25	70.95	1,513.08	0.11	6.68	-6.66	0.81	0.42	38.85
1,607.52	0.84	80.92	1,607.42	0.55	8.33	-8.35	0.47	-0.43	10.57
1,701.88	0.97	124.59	1,701.77	0.21	9.67	-9.65	0.72	0.14	46.28
1,796.24	0.95	80.36	1,796.12	-0.11	11.10	-11.05	0.77	-0.02	-46.87
1,890.60	0.87	108.97	1,890.47	-0.22	12.55	-12.48	0.48	-0.08	30.32
1,984.96	0.89	127.25	1,984.82	-0.89	13.81	-13.68	0.30	0.02	19.37
2,079.32	0.92	180.00	2,079.17	-2.09	14.39	-14.16	0.85	0.03	55.90
2,173.68	1.25	198.19	2,173.51	-3.83	14.07	-13.69	0.50	0.35	19.28
2,268.04	1.77	185.58	2,267.84	-6.26	13.61	-13.01	0.65	0.55	-13.36
2,362.00	1.28	213.05	2,361.77	-8.58	12.90	-12.10	0.92	-0.52	29.24
2362'MD: Tie into Gyro									
2,435.00	0.88	205.80	2,434.75	-9.77	12.21	-11.31	0.58	-0.55	-9.93
2435'MD: Begin DrilTech MWD									
2,466.00	0.70	217.05	2,465.75	-10.14	11.99	-11.06	0.76	-0.58	36.29
2,561.00	1.49	261.26	2,560.73	-10.79	10.42	-9.44	1.16	0.83	46.54
2,655.00	4.13	274.70	2,654.61	-10.69	5.84	-4.88	2.88	2.81	14.30
2,749.00	6.95	269.25	2,748.16	-10.49	-3.23	4.13	3.05	3.00	-5.80
2,843.00	8.88	271.80	2,841.27	-10.34	-16.16	17.00	2.09	2.05	2.71
2,937.00	10.11	269.87	2,933.98	-10.13	-31.67	32.43	1.35	1.31	-2.05
3,031.00	10.02	270.22	3,026.53	-10.12	-48.10	48.79	0.12	-0.10	0.37
3,126.00	9.58	271.89	3,120.14	-9.82	-64.26	64.87	0.55	-0.46	1.76
3,220.00	9.94	268.29	3,212.78	-9.81	-80.19	80.74	0.75	0.38	-3.83
3,314.00	9.58	269.90	3,305.42	-10.06	-96.12	96.63	0.48	-0.38	1.71
3,409.00	9.32	269.25	3,399.13	-10.18	-111.72	112.18	0.30	-0.27	-0.68
3,503.00	8.53	268.20	3,491.99	-10.50	-126.30	126.73	0.86	-0.84	-1.12
3,597.00	9.67	262.40	3,584.81	-11.76	-141.09	141.58	1.56	1.21	-6.17
3,691.00	9.58	261.87	3,677.49	-13.91	-156.66	157.27	0.13	-0.10	-0.56
3,786.00	8.97	262.14	3,771.25	-16.04	-171.82	172.56	0.64	-0.64	0.28
3,880.00	10.46	269.34	3,863.90	-17.14	-187.61	188.39	2.04	1.59	7.66
3,974.00	9.94	272.07	3,956.41	-16.95	-204.25	204.95	0.76	-0.55	2.90
4,069.00	10.55	268.64	4,049.90	-16.86	-221.14	221.77	0.91	0.64	-3.61
4,163.00	10.46	268.20	4,142.32	-17.33	-238.27	238.88	0.13	-0.10	-0.47
4,258.00	10.02	267.06	4,235.81	-18.02	-255.15	255.75	0.51	-0.46	-1.20
4,351.00	9.85	264.95	4,327.42	-19.14	-271.15	271.79	0.43	-0.18	-2.27
4,446.00	8.79	263.72	4,421.16	-20.65	-286.46	287.17	1.14	-1.12	-1.29
4,540.00	9.50	265.39	4,513.97	-22.06	-301.33	302.11	0.81	0.76	1.78
4,634.00	10.11	266.62	4,606.59	-23.17	-317.30	318.11	0.69	0.65	1.31



Survey Report

Company:	Steward Energy II, LLC	Local Co-ordinate Reference:	Well Heisenberg State 3H
Project:	Lea County, NM (NAD 83)	TVD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Site:	Heisenberg State 3H	MD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Well:	Heisenberg State 3H	North Reference:	Grid
Wellbore:	Pilot Hole	Survey Calculation Method:	Minimum Curvature
Design:	Pilot Hole	Database:	EDM 5000.14 Single User Db

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)
4,729.00	9.50	265.39	4,700.20	-24.29	-333.44	334.29	0.68	-0.64	-1.29
4,823.00	10.29	264.42	4,792.81	-25.73	-349.53	350.44	0.86	0.84	-1.03
4,917.00	10.11	261.70	4,885.32	-27.74	-366.05	367.07	0.55	-0.19	-2.89
5,011.00	11.34	262.84	4,977.68	-30.08	-383.38	384.54	1.33	1.31	1.21
5,105.00	10.99	263.19	5,069.90	-32.29	-401.45	402.73	0.38	-0.37	0.37
5,199.00	10.38	261.52	5,162.27	-34.60	-418.72	420.14	0.73	-0.65	-1.78
5,294.00	10.11	260.38	5,255.75	-37.26	-435.41	437.00	0.36	-0.28	-1.20
5,388.00	9.76	259.94	5,348.34	-40.03	-451.39	453.16	0.38	-0.37	-0.47
5,482.00	11.17	266.00	5,440.78	-42.06	-468.31	470.20	1.90	1.50	6.45
5,577.00	11.43	264.51	5,533.94	-43.60	-486.86	488.81	0.41	0.27	-1.57
5,671.00	11.17	264.33	5,626.12	-45.39	-505.20	507.23	0.28	-0.28	-0.19
5,765.00	10.55	265.65	5,718.43	-46.94	-522.84	524.94	0.71	-0.66	1.40
5,859.00	10.20	265.56	5,810.90	-48.24	-539.72	541.87	0.37	-0.37	-0.10
5,954.00	9.85	265.74	5,904.44	-49.50	-556.20	558.40	0.37	-0.37	0.19
6,048.00	9.50	266.71	5,997.11	-50.54	-571.97	574.20	0.41	-0.37	1.03
6,142.00	8.88	267.58	6,089.90	-51.29	-586.96	589.20	0.68	-0.66	0.93
6,237.00	8.09	268.11	6,183.86	-51.82	-600.97	603.20	0.84	-0.83	0.56
6,297.00	7.65	266.44	6,243.29	-52.21	-609.17	611.41	0.83	-0.73	-2.78
6297'MD: Survey Depth									
6,355.00	7.65	266.44	6,300.78	-52.69	-616.88	619.12	0.00	0.00	0.00
6355'MD: Proj. to TD									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
2,362.00	2,361.77	-8.58	12.90	2362'MD: Tie into Gyro
2,435.00	2,434.75	-9.77	12.21	2435'MD: Begin DrilTech MWD
6,297.00	6,243.29	-52.21	-609.17	6297'MD: Survey Depth
6,355.00	6,300.78	-52.69	-616.88	6355'MD: Proj. to TD

Checked By: _____ Approved By: _____ Date: _____



Steward Energy II, LLC

Lea County, NM (NAD 83)

Heisenberg State 3H

Heisenberg State 3H

Pilot Hole

Design: Pilot Hole

Survey Report - Geographic

27 May, 2017



Survey Report - Geographic

Company:	Steward Energy II, LLC	Local Co-ordinate Reference:	Well Heisenberg State 3H
Project:	Lea County, NM (NAD 83)	TVD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Site:	Heisenberg State 3H	MD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Well:	Heisenberg State 3H	North Reference:	Grid
Wellbore:	Pilot Hole	Survey Calculation Method:	Minimum Curvature
Design:	Pilot Hole	Database:	EDM 5000.14 Single User Db

Project	Lea County, NM (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Heisenberg State 3H				
Site Position:		Northing:	778,187.60 usft	Latitude:	33.133°N
From:	Map	Easting:	924,712.70 usft	Longitude:	103.081°W
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	0.68 °

Well	Heisenberg State 3H					
Well Position	+N/-S	0.00 ft	Northing:	778,187.60 usft	Latitude:	33.133°N
	+E/-W	0.00 ft	Easting:	924,712.70 usft	Longitude:	103.081°W
Position Uncertainty	0.00 ft		Wellhead Elevation:	ft	Ground Level:	3,800.00 ft

Wellbore	Pilot Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	4/25/2017	6.80	60.97	48,539.74746058

Design	Pilot Hole				
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	265.00	

Survey Program	Date 5/27/2017				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
97.76	2,362.00	VES Gyro Corrected to NAD 83 (Pilot Hole)	CB_Film_GMS	Camera Based Film Gyro Multi-Shot	
2,435.00	6,355.00	DrilTech MWD (Pilot Hole)	MWD	MWD - Standard	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	778,187.60	924,712.70	33.133°N	103.081°W	
97.76	0.60	23.99	97.76	0.47	0.21	778,188.07	924,712.91	33.133°N	103.081°W	
192.12	0.40	75.15	192.12	1.00	0.73	778,188.60	924,713.43	33.133°N	103.081°W	
286.48	0.63	115.87	286.47	0.86	1.51	778,188.46	924,714.21	33.133°N	103.081°W	
380.84	0.27	165.82	380.83	0.42	2.03	778,188.02	924,714.73	33.133°N	103.081°W	
475.20	0.50	47.66	475.19	0.48	2.39	778,188.08	924,715.09	33.133°N	103.081°W	
569.56	0.68	93.94	569.54	0.72	3.26	778,188.32	924,715.96	33.133°N	103.081°W	
663.92	0.67	97.46	663.90	0.61	4.36	778,188.21	924,717.06	33.133°N	103.081°W	
758.28	0.72	116.49	758.25	0.27	5.44	778,187.87	924,718.14	33.133°N	103.081°W	
852.64	0.76	132.76	852.60	-0.42	6.43	778,187.18	924,719.13	33.133°N	103.081°W	
947.00	0.51	152.26	946.96	-1.21	7.08	778,186.39	924,719.78	33.133°N	103.081°W	



Survey Report - Geographic

Company:	Steward Energy II, LLC	Local Co-ordinate Reference:	Well Heisenberg State 3H
Project:	Lea County, NM (NAD 83)	TVD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Site:	Heisenberg State 3H	MD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Well:	Heisenberg State 3H	North Reference:	Grid
Wellbore:	Pilot Hole	Survey Calculation Method:	Minimum Curvature
Design:	Pilot Hole	Database:	EDM 5000.14 Single User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,041.36	0.50	186.98	1,041.31	-1.99	7.23	778,185.61	924,719.93	33.133°N	103.081°W
1,135.72	0.54	257.27	1,135.67	-2.50	6.75	778,185.10	924,719.45	33.133°N	103.081°W
1,230.08	0.47	283.19	1,230.03	-2.51	5.93	778,185.09	924,718.64	33.133°N	103.081°W
1,324.44	0.74	328.11	1,324.38	-1.90	5.24	778,185.69	924,717.94	33.133°N	103.081°W
1,418.80	0.85	34.29	1,418.73	-0.81	5.31	778,186.79	924,718.01	33.133°N	103.081°W
1,513.16	1.25	70.95	1,513.08	0.11	6.68	778,187.70	924,719.38	33.133°N	103.081°W
1,607.52	0.84	80.92	1,607.42	0.55	8.33	778,188.15	924,721.03	33.133°N	103.081°W
1,701.88	0.97	124.59	1,701.77	0.21	9.67	778,187.81	924,722.37	33.133°N	103.081°W
1,796.24	0.95	80.36	1,796.12	-0.11	11.10	778,187.48	924,723.80	33.133°N	103.081°W
1,890.60	0.87	108.97	1,890.47	-0.22	12.55	778,187.38	924,725.25	33.133°N	103.081°W
1,984.96	0.89	127.25	1,984.82	-0.89	13.81	778,186.70	924,726.51	33.133°N	103.081°W
2,079.32	0.92	180.00	2,079.17	-2.09	14.39	778,185.50	924,727.09	33.133°N	103.081°W
2,173.68	1.25	198.19	2,173.51	-3.83	14.07	778,183.77	924,726.77	33.133°N	103.081°W
2,268.04	1.77	185.58	2,267.84	-6.26	13.61	778,181.34	924,726.31	33.133°N	103.081°W
2,362.00	1.28	213.05	2,361.77	-8.58	12.90	778,179.02	924,725.60	33.133°N	103.081°W
2362' MD: Tie into Gyro									
2,435.00	0.88	205.80	2,434.75	-9.77	12.21	778,177.83	924,724.91	33.133°N	103.081°W
2435' MD: Begin DrillTech MWD									
2,466.00	0.70	217.05	2,465.75	-10.14	11.99	778,177.46	924,724.69	33.133°N	103.081°W
2,561.00	1.49	261.26	2,560.73	-10.79	10.42	778,176.81	924,723.12	33.133°N	103.081°W
2,655.00	4.13	274.70	2,654.61	-10.69	5.84	778,176.90	924,718.54	33.133°N	103.081°W
2,749.00	6.95	269.25	2,748.16	-10.49	-3.23	778,177.11	924,709.48	33.133°N	103.081°W
2,843.00	8.88	271.80	2,841.27	-10.34	-16.16	778,177.26	924,696.54	33.133°N	103.081°W
2,937.00	10.11	269.87	2,933.98	-10.13	-31.67	778,177.47	924,681.03	33.133°N	103.081°W
3,031.00	10.02	270.22	3,026.53	-10.12	-48.10	778,177.48	924,664.61	33.133°N	103.081°W
3,126.00	9.58	271.89	3,120.14	-9.82	-64.26	778,177.77	924,648.44	33.133°N	103.081°W
3,220.00	9.94	268.29	3,212.78	-9.81	-80.19	778,177.79	924,632.51	33.133°N	103.081°W
3,314.00	9.58	269.90	3,305.42	-10.06	-96.12	778,177.53	924,616.58	33.133°N	103.081°W
3,409.00	9.32	269.25	3,399.13	-10.18	-111.72	778,177.42	924,600.98	33.133°N	103.081°W
3,503.00	8.53	268.20	3,491.99	-10.50	-126.30	778,177.10	924,586.41	33.133°N	103.081°W
3,597.00	9.67	262.40	3,584.81	-11.76	-141.09	778,175.84	924,571.61	33.133°N	103.081°W
3,691.00	9.58	261.87	3,677.49	-13.91	-156.66	778,173.69	924,556.04	33.133°N	103.081°W
3,786.00	8.97	262.14	3,771.25	-16.04	-171.82	778,171.56	924,540.88	33.133°N	103.082°W
3,880.00	10.46	269.34	3,863.90	-17.14	-187.61	778,170.46	924,525.09	33.133°N	103.082°W
3,974.00	9.94	272.07	3,956.41	-16.95	-204.25	778,170.65	924,508.45	33.133°N	103.082°W
4,069.00	10.55	268.64	4,049.90	-16.86	-221.14	778,170.74	924,491.56	33.133°N	103.082°W
4,163.00	10.46	268.20	4,142.32	-17.33	-238.27	778,170.27	924,474.43	33.133°N	103.082°W
4,258.00	10.02	267.06	4,235.81	-18.02	-255.15	778,169.57	924,457.55	33.133°N	103.082°W
4,351.00	9.85	264.95	4,327.42	-19.14	-271.15	778,168.46	924,441.55	33.133°N	103.082°W
4,446.00	8.79	263.72	4,421.16	-20.65	-286.46	778,166.95	924,426.24	33.133°N	103.082°W
4,540.00	9.50	265.39	4,513.97	-22.06	-301.33	778,165.54	924,411.37	33.133°N	103.082°W
4,634.00	10.11	266.62	4,606.59	-23.17	-317.30	778,164.43	924,395.40	33.133°N	103.082°W
4,729.00	9.50	265.39	4,700.20	-24.29	-333.44	778,163.31	924,379.26	33.133°N	103.082°W
4,823.00	10.29	264.42	4,792.81	-25.73	-349.53	778,161.87	924,363.17	33.133°N	103.082°W
4,917.00	10.11	261.70	4,885.32	-27.74	-366.05	778,159.86	924,346.65	33.133°N	103.082°W
5,011.00	11.34	262.84	4,977.68	-30.08	-383.38	778,157.52	924,329.32	33.133°N	103.082°W
5,105.00	10.99	263.19	5,069.90	-32.29	-401.45	778,155.30	924,311.25	33.133°N	103.082°W
5,199.00	10.38	261.52	5,162.27	-34.60	-418.72	778,152.99	924,293.98	33.133°N	103.082°W
5,294.00	10.11	260.38	5,255.75	-37.26	-435.41	778,150.34	924,277.30	33.133°N	103.082°W
5,388.00	9.76	259.94	5,348.34	-40.03	-451.39	778,147.57	924,261.32	33.133°N	103.082°W
5,482.00	11.17	266.00	5,440.78	-42.06	-468.31	778,145.54	924,244.39	33.133°N	103.083°W
5,577.00	11.43	264.51	5,533.94	-43.60	-486.86	778,144.00	924,225.84	33.133°N	103.083°W
5,671.00	11.17	264.33	5,626.12	-45.39	-505.20	778,142.21	924,207.51	33.133°N	103.083°W
5,765.00	10.55	265.65	5,718.43	-46.94	-522.84	778,140.65	924,189.87	33.133°N	103.083°W
5,859.00	10.20	265.56	5,810.90	-48.24	-539.72	778,139.36	924,172.99	33.133°N	103.083°W



Survey Report - Geographic

Company:	Steward Energy II, LLC	Local Co-ordinate Reference:	Well Heisenberg State 3H
Project:	Lea County, NM (NAD 83)	TVD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Site:	Heisenberg State 3H	MD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Well:	Heisenberg State 3H	North Reference:	Grid
Wellbore:	Pilot Hole	Survey Calculation Method:	Minimum Curvature
Design:	Pilot Hole	Database:	EDM 5000.14 Single User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,954.00	9.85	265.74	5,904.44	-49.50	-556.20	778,138.10	924,156.50	33.133°N	103.083°W
6,048.00	9.50	266.71	5,997.11	-50.54	-571.97	778,137.06	924,140.73	33.133°N	103.083°W
6,142.00	8.88	267.58	6,089.90	-51.29	-586.96	778,136.31	924,125.74	33.133°N	103.083°W
6,237.00	8.09	268.11	6,183.86	-51.82	-600.97	778,135.78	924,111.73	33.133°N	103.083°W
6,297.00	7.65	266.44	6,243.29	-52.21	-609.17	778,135.39	924,103.53	33.133°N	103.083°W
6297'MD: Survey Depth									
6,355.00	7.65	266.44	6,300.78	-52.69	-616.88	778,134.91	924,095.82	33.133°N	103.083°W
6355'MD: Proj. to TD									

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
2,362.00	2,361.77	-8.58	12.90	2362'MD: Tie into Gyro	
2,435.00	2,434.75	-9.77	12.21	2435'MD: Begin DriiTech MWD	
6,297.00	6,243.29	-52.21	-609.17	6297'MD: Survey Depth	
6,355.00	6,300.78	-52.69	-616.88	6355'MD: Proj. to TD	

Checked By: _____	Approved By: _____	Date: _____
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Steward Energy II, LLC

Lea County, NM (NAD 83)

Heisenberg State 3H

Heisenberg State 3H

Heisenberg St.3H Lateral (STK)

Design: Heisenberg St.3H Lateral (STK)

Standard Survey Report

27 May, 2017



Survey Report

Company:	Steward Energy II, LLC	Local Co-ordinate Reference:	Well Heisenberg State 3H
Project:	Lea County, NM (NAD 83)	TVD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Site:	Heisenberg State 3H	MD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Well:	Heisenberg State 3H	North Reference:	Grid
Wellbore:	Heisenberg St.3H Lateral (STK)	Survey Calculation Method:	Minimum Curvature
Design:	Heisenberg St.3H Lateral (STK)	Database:	EDM 5000.14 Single User Db

Project	Lea County, NM (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Heisenberg State 3H		
Site Position:		Northing:	778,187.60 usft
From:	Map	Easting:	924,712.70 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in
		Latitude:	33.133°N
		Longitude:	103.081°W
		Grid Convergence:	0.68 °

Well	Heisenberg State 3H		
Well Position	+N/-S	0.00 ft	Northing: 778,187.60 usft
	+E/-W	0.00 ft	Easting: 924,712.70 usft
Position Uncertainty	0.00 ft	Wellhead Elevation:	ft
		Latitude:	33.133°N
		Longitude:	103.081°W
		Ground Level:	3,800.00 ft

Wellbore	Heisenberg St.3H Lateral (STK)		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2015	5/8/2017	6.80
			Dip Angle (°) 60.97
			Field Strength (nT) 48,536.01308269

Design	Heisenberg St.3H Lateral (STK)		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	4,258.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)
	0.00	0.00	0.00
			Direction (°) 359.25

Survey Program	Date 5/27/2017		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name
97.76	2,362.00	VES Gyro Corrected to NAD 83 (Pilot Hole)	CB_Film_GMS
2,435.00	4,258.00	DrilTech MWD (Pilot Hole)	MWD
4,351.00	13,156.00	Driltech MWD - STK (Heisenberg St.3H Lateral)	MWD
			Description
			Camera Based Film Gyro Multi-Shot
			MWD - Standard
			MWD - Standard

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	
97.76	0.60	23.99	97.76	0.47	0.21	0.46	0.61	0.61	0.00	
192.12	0.40	75.15	192.12	1.00	0.73	0.99	0.50	-0.21	54.22	
286.48	0.63	115.87	286.47	0.86	1.51	0.84	0.44	0.24	43.15	
380.84	0.27	165.82	380.83	0.42	2.03	0.39	0.53	-0.38	52.94	
475.20	0.50	47.66	475.19	0.48	2.39	0.45	0.71	0.24	-125.22	
569.56	0.68	93.94	569.54	0.72	3.26	0.68	0.52	0.19	49.05	
663.92	0.67	97.46	663.90	0.61	4.36	0.55	0.05	-0.01	3.73	
758.28	0.72	116.49	758.25	0.27	5.44	0.20	0.25	0.05	20.17	



Survey Report

Company:	Steward Energy II, LLC	Local Co-ordinate Reference:	Well Heisenberg State 3H
Project:	Lea County, NM (NAD 83)	TVD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Site:	Heisenberg State 3H	MD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Well:	Heisenberg State 3H	North Reference:	Grid
Wellbore:	Heisenberg St.3H Lateral (STK)	Survey Calculation Method:	Minimum Curvature
Design:	Heisenberg St.3H Lateral (STK)	Database:	EDM 5000.14 Single User Db

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)
852.64	0.76	132.76	852.60	-0.42	6.43	-0.50	0.23	0.04	17.24
947.00	0.51	152.26	946.96	-1.21	7.08	-1.30	0.35	-0.26	20.67
1,041.36	0.50	186.98	1,041.31	-1.99	7.23	-2.09	0.32	-0.01	36.80
1,135.72	0.54	257.27	1,135.67	-2.50	6.75	-2.59	0.64	0.04	74.49
1,230.08	0.47	283.19	1,230.03	-2.51	5.93	-2.59	0.25	-0.07	27.47
1,324.44	0.74	328.11	1,324.38	-1.90	5.24	-1.97	0.56	0.29	47.60
1,418.80	0.85	34.29	1,418.73	-0.81	5.31	-0.88	0.93	0.12	70.14
1,513.16	1.25	70.95	1,513.08	0.11	6.68	0.02	0.81	0.42	38.85
1,607.52	0.84	80.92	1,607.42	0.55	8.33	0.44	0.47	-0.43	10.57
1,701.88	0.97	124.59	1,701.77	0.21	9.67	0.08	0.72	0.14	46.28
1,796.24	0.95	80.36	1,796.12	-0.11	11.10	-0.26	0.77	-0.02	-46.87
1,890.60	0.87	108.97	1,890.47	-0.22	12.55	-0.38	0.48	-0.08	30.32
1,984.96	0.89	127.25	1,984.82	-0.89	13.81	-1.07	0.30	0.02	19.37
2,079.32	0.92	180.00	2,079.17	-2.09	14.39	-2.28	0.85	0.03	55.90
2,173.68	1.25	198.19	2,173.51	-3.83	14.07	-4.01	0.50	0.35	19.28
2,268.04	1.77	185.58	2,267.84	-6.26	13.61	-6.44	0.65	0.55	-13.36
2,362.00	1.28	213.05	2,361.77	-8.58	12.90	-8.75	0.92	-0.52	29.24
2,435.00	0.88	205.80	2,434.75	-9.77	12.21	-9.93	0.58	-0.55	-9.93
2,466.00	0.70	217.05	2,465.75	-10.14	11.99	-10.29	0.76	-0.58	36.29
2,561.00	1.49	261.26	2,560.73	-10.79	10.42	-10.92	1.16	0.83	46.54
2,655.00	4.13	274.70	2,654.61	-10.69	5.84	-10.77	2.88	2.81	14.30
2,749.00	6.95	269.25	2,748.16	-10.49	-3.23	-10.45	3.05	3.00	-5.80
2,843.00	8.88	271.80	2,841.27	-10.34	-16.16	-10.13	2.09	2.05	2.71
2,937.00	10.11	269.87	2,933.98	-10.13	-31.67	-9.71	1.35	1.31	-2.05
3,031.00	10.02	270.22	3,026.53	-10.12	-48.10	-9.49	0.12	-0.10	0.37
3,126.00	9.58	271.89	3,120.14	-9.82	-64.26	-8.98	0.55	-0.46	1.76
3,220.00	9.94	268.29	3,212.78	-9.81	-80.19	-8.76	0.75	0.38	-3.83
3,314.00	9.58	269.90	3,305.42	-10.06	-96.12	-8.80	0.48	-0.38	1.71
3,409.00	9.32	269.25	3,399.13	-10.18	-111.72	-8.71	0.30	-0.27	-0.68
3,503.00	8.53	268.20	3,491.99	-10.50	-126.30	-8.84	0.86	-0.84	-1.12
3,597.00	9.67	262.40	3,584.81	-11.76	-141.09	-9.91	1.56	1.21	-6.17
3,691.00	9.58	261.87	3,677.49	-13.91	-156.66	-11.86	0.13	-0.10	-0.56
3,786.00	8.97	262.14	3,771.25	-16.04	-171.82	-13.79	0.64	-0.64	0.28
3,880.00	10.46	269.34	3,863.90	-17.14	-187.61	-14.68	2.04	1.59	7.66
3,974.00	9.94	272.07	3,956.41	-16.95	-204.25	-14.27	0.76	-0.55	2.90
4,069.00	10.55	268.64	4,049.90	-16.86	-221.14	-13.96	0.91	0.64	-3.61
4,163.00	10.46	268.20	4,142.32	-17.33	-238.27	-14.21	0.13	-0.10	-0.47
4,258.00	10.02	267.06	4,235.81	-18.02	-255.15	-14.68	0.51	-0.46	-1.20
4258'MD: Tie into Pilot Hole Surveys									
4,351.00	9.85	264.95	4,327.42	-19.14	-271.15	-15.59	0.43	-0.18	-2.27
4351'MD: Begin STK MWD Survey									
4,437.00	8.88	263.81	4,412.27	-20.50	-285.08	-16.77	1.15	-1.13	-1.33
4,469.00	8.62	263.37	4,443.90	-21.05	-289.92	-17.25	0.84	-0.81	-1.38



Survey Report

Company:	Steward Energy II, LLC	Local Co-ordinate Reference:	Well Heisenberg State 3H
Project:	Lea County, NM (NAD 83)	TVD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Site:	Heisenberg State 3H	MD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Well:	Heisenberg State 3H	North Reference:	Grid
Wellbore:	Heisenberg St.3H Lateral (STK)	Survey Calculation Method:	Minimum Curvature
Design:	Heisenberg St.3H Lateral (STK)	Database:	EDM 5000.14 Single User Db

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)
4,563.00	11.26	267.85	4,536.48	-22.20	-306.09	-18.19	2.92	2.81	4.77
4,657.00	12.93	272.42	4,628.39	-22.10	-325.77	-17.84	2.05	1.78	4.86
4,751.00	12.75	279.54	4,720.05	-19.94	-346.50	-15.40	1.69	-0.19	7.57
4,845.00	12.13	281.30	4,811.84	-16.29	-366.42	-11.49	0.77	-0.66	1.87
4,877.00	13.45	295.89	4,843.05	-14.00	-373.07	-9.12	10.87	4.13	45.59
4,908.00	15.83	309.51	4,873.05	-9.74	-379.57	-4.77	13.45	7.68	43.94
4,939.00	18.11	320.06	4,902.71	-3.35	-385.93	1.70	12.33	7.35	34.03
4,971.00	21.37	327.17	4,932.83	5.37	-392.29	10.50	12.64	10.19	22.22
5,002.00	24.45	329.99	4,961.38	15.67	-398.56	20.89	10.55	9.94	9.10
5,034.00	26.82	332.01	4,990.23	27.78	-405.26	33.08	7.89	7.41	6.31
5,065.00	28.84	333.15	5,017.64	40.63	-411.92	46.02	6.74	6.52	3.68
5,097.00	31.39	334.56	5,045.32	55.04	-418.99	60.52	8.27	7.97	4.41
5,128.00	34.21	336.75	5,071.38	70.34	-425.90	75.91	9.87	9.10	7.06
5,159.00	36.67	337.72	5,096.63	86.92	-432.85	92.58	8.14	7.94	3.13
5,191.00	39.04	338.51	5,121.90	105.14	-440.16	110.89	7.56	7.41	2.47
5,222.00	41.77	339.74	5,145.50	123.92	-447.32	129.76	9.17	8.81	3.97
5,254.00	44.05	341.68	5,168.94	144.48	-454.51	150.42	8.23	7.13	6.06
5,285.00	46.25	343.87	5,190.80	165.47	-461.01	171.49	8.69	7.10	7.06
5,316.00	48.10	346.07	5,211.87	187.43	-466.90	193.52	7.92	5.97	7.10
5,348.00	50.39	348.88	5,232.76	211.09	-472.14	217.25	9.77	7.16	8.78
5,379.00	53.02	350.03	5,251.97	235.00	-476.59	241.22	8.97	8.48	3.71
5,411.00	55.31	351.78	5,270.71	260.62	-480.68	266.89	8.42	7.16	5.47
5,442.00	58.21	353.01	5,287.70	286.31	-484.11	292.63	9.93	9.35	3.97
5,474.00	62.08	353.45	5,303.63	313.87	-487.38	320.22	12.15	12.09	1.38
5,505.00	66.04	353.63	5,317.18	341.56	-490.51	347.95	12.78	12.77	0.58
5,537.00	69.29	354.07	5,329.34	370.99	-493.68	377.42	10.24	10.16	1.38
5,568.00	71.23	354.42	5,339.81	400.02	-496.61	406.48	6.35	6.26	1.13
5,600.00	73.78	355.48	5,349.43	430.42	-499.29	436.91	8.57	7.97	3.31
5,631.00	78.35	356.35	5,356.90	460.42	-501.43	466.94	14.99	14.74	2.81
5,662.00	81.07	356.62	5,362.43	490.86	-503.30	497.41	8.82	8.77	0.87
5,694.00	83.54	357.06	5,366.72	522.52	-505.05	529.09	7.84	7.72	1.38
5,725.00	88.11	356.53	5,368.97	553.38	-506.78	559.97	14.84	14.74	-1.71
5,757.00	89.52	356.00	5,369.64	585.31	-508.86	591.92	4.71	4.41	-1.66
5,788.00	90.13	355.65	5,369.73	616.22	-511.12	622.86	2.27	1.97	-1.13
5,882.00	88.81	354.77	5,370.60	709.89	-518.97	716.62	1.69	-1.40	-0.94
5,977.00	88.72	356.97	5,372.65	804.61	-525.81	811.43	2.32	-0.09	2.32
6,072.00	91.10	359.08	5,372.80	899.55	-529.08	906.39	3.35	2.51	2.22
6,167.00	91.89	358.82	5,370.32	994.50	-530.82	1,001.36	0.88	0.83	-0.27
6,261.00	90.40	357.85	5,368.44	1,088.43	-533.55	1,095.33	1.89	-1.59	-1.03
6,354.00	90.75	358.64	5,367.51	1,181.39	-536.40	1,188.31	0.93	0.38	0.85
6,448.00	91.89	359.87	5,365.34	1,275.35	-537.62	1,282.28	1.78	1.21	1.31
6,542.00	90.57	0.31	5,363.32	1,369.32	-537.47	1,376.24	1.48	-1.40	0.47
6,636.00	90.92	359.52	5,362.10	1,463.32	-537.61	1,470.23	0.92	0.37	-0.84
6,730.00	91.71	358.99	5,359.94	1,557.28	-538.84	1,564.20	1.01	0.84	-0.56



Survey Report

Company:	Steward Energy II, LLC	Local Co-ordinate Reference:	Well Heisenberg State 3H
Project:	Lea County, NM (NAD 83)	TVD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Site:	Heisenberg State 3H	MD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Well:	Heisenberg State 3H	North Reference:	Grid
Wellbore:	Heisenberg St.3H Lateral (STK)	Survey Calculation Method:	Minimum Curvature
Design:	Heisenberg St.3H Lateral (STK)	Database:	EDM 5000.14 Single User Db

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)
6,838.00	91.10	0.13	5,357.30	1,665.24	-539.66	1,672.17	1.20	-0.56	1.06
6,932.00	91.45	0.22	5,355.20	1,759.22	-539.38	1,766.13	0.38	0.37	0.10
7,026.00	89.60	0.75	5,354.34	1,853.21	-538.58	1,860.10	2.05	-1.97	0.56
7,121.00	88.99	0.92	5,355.51	1,948.19	-537.20	1,955.06	0.67	-0.64	0.18
7,215.00	89.43	0.48	5,356.81	2,042.17	-536.05	2,049.02	0.66	0.47	-0.47
7,309.00	90.22	359.17	5,357.09	2,136.17	-536.34	2,143.01	1.63	0.84	-1.39
7,403.00	90.84	359.08	5,356.23	2,230.16	-537.77	2,237.00	0.67	0.66	-0.10
7,498.00	89.34	359.34	5,356.08	2,325.14	-539.08	2,332.00	1.60	-1.58	0.27
7,591.00	90.13	359.69	5,356.51	2,418.14	-539.87	2,425.00	0.93	0.85	0.38
7,687.00	90.31	359.87	5,356.14	2,514.14	-540.24	2,520.99	0.27	0.19	0.19
7,781.00	90.13	359.69	5,355.78	2,608.14	-540.60	2,614.99	0.27	-0.19	-0.19
7,875.00	91.01	359.34	5,354.84	2,702.13	-541.39	2,708.98	1.01	0.94	-0.37
7,970.00	90.40	358.82	5,353.67	2,797.11	-542.92	2,803.97	0.84	-0.64	-0.55
8,055.72	90.47	358.74	5,353.02	2,882.80	-544.75	2,889.69	0.13	0.09	-0.10
8056' MD: Section Crossing									
8,064.00	90.48	358.73	5,352.95	2,891.08	-544.93	2,897.97	0.13	0.09	-0.10
8,158.00	90.31	358.64	5,352.30	2,985.05	-547.09	2,991.96	0.20	-0.18	-0.10
8,252.00	90.92	358.55	5,351.29	3,079.02	-549.39	3,085.95	0.66	0.65	-0.10
8,345.00	90.84	358.29	5,349.87	3,171.97	-551.95	3,178.93	0.29	-0.09	-0.28
8,436.00	91.01	358.38	5,348.40	3,262.92	-554.60	3,269.90	0.21	0.19	0.10
8,527.00	90.66	359.25	5,347.07	3,353.89	-556.48	3,360.89	1.03	-0.38	0.96
8,619.00	90.04	358.38	5,346.51	3,445.87	-558.38	3,452.88	1.16	-0.67	-0.95
8,711.00	89.87	359.52	5,346.58	3,537.85	-560.07	3,544.88	1.25	-0.18	1.24
8,803.00	90.75	1.80	5,346.08	3,629.84	-559.01	3,636.85	2.66	0.96	2.48
8,895.00	90.92	1.80	5,344.74	3,721.78	-556.12	3,728.74	0.18	0.18	0.00
8,986.00	90.48	1.63	5,343.63	3,812.74	-553.40	3,819.65	0.52	-0.48	-0.19
9,077.00	90.66	1.98	5,342.72	3,903.69	-550.53	3,910.56	0.43	0.20	0.38
9,167.00	90.75	3.12	5,341.62	3,993.59	-546.53	4,000.40	1.27	0.10	1.27
9,259.00	89.60	1.89	5,341.34	4,085.50	-542.51	4,092.25	1.83	-1.25	-1.34
9,354.00	89.96	1.54	5,341.70	4,180.45	-539.66	4,187.16	0.53	0.38	-0.37
9,448.00	90.04	1.45	5,341.70	4,274.42	-537.21	4,281.09	0.13	0.09	-0.10
9,542.00	89.87	1.10	5,341.78	4,368.40	-535.12	4,375.03	0.41	-0.18	-0.37
9,637.00	90.92	1.72	5,341.12	4,463.37	-532.78	4,469.96	1.28	1.11	0.65
9,731.00	90.40	1.72	5,340.04	4,557.32	-529.96	4,563.86	0.55	-0.55	0.00
9,825.00	89.60	0.92	5,340.04	4,651.29	-527.79	4,657.80	1.20	-0.85	-0.85
9,919.00	90.31	359.96	5,340.11	4,745.29	-527.07	4,751.78	1.27	0.76	-1.02
10,014.00	91.10	358.90	5,338.94	4,840.27	-528.02	4,846.77	1.39	0.83	-1.12
10,109.00	90.48	357.76	5,337.63	4,935.22	-530.79	4,941.75	1.37	-0.65	-1.20
10,203.00	90.13	357.67	5,337.13	5,029.14	-534.53	5,035.71	0.38	-0.37	-0.10
10,297.00	90.57	357.94	5,336.56	5,123.07	-538.13	5,129.68	0.55	0.47	0.29
10,392.00	91.45	358.20	5,334.88	5,218.00	-541.33	5,224.64	0.97	0.93	0.27
10,486.00	91.36	357.06	5,332.58	5,311.89	-545.22	5,318.58	1.22	-0.10	-1.21
10,581.00	91.89	357.41	5,329.88	5,406.74	-549.80	5,413.48	0.67	0.56	0.37



Survey Report

Company:	Steward Energy II, LLC	Local Co-ordinate Reference:	Well Heisenberg State 3H
Project:	Lea County, NM (NAD 83)	TVD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Site:	Heisenberg State 3H	MD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Well:	Heisenberg State 3H	North Reference:	Grid
Wellbore:	Heisenberg St.3H Lateral (STK)	Survey Calculation Method:	Minimum Curvature
Design:	Heisenberg St.3H Lateral (STK)	Database:	EDM 5000.14 Single User Db

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)
10,675.00	91.80	357.50	5,326.86	5,500.60	-553.97	5,507.38	0.14	-0.10	0.10
10,770.00	91.63	358.29	5,324.01	5,595.50	-557.46	5,602.31	0.85	-0.18	0.83
10,864.00	91.63	358.82	5,321.34	5,689.43	-559.83	5,696.27	0.56	0.00	0.56
10,958.00	89.96	358.90	5,320.04	5,783.40	-561.70	5,790.25	1.78	-1.78	0.09
11,052.00	89.52	358.90	5,320.46	5,877.38	-563.50	5,884.25	0.47	-0.47	0.00
11,147.00	90.22	358.55	5,320.68	5,972.35	-565.62	5,979.25	0.82	0.74	-0.37
11,241.00	89.78	357.76	5,320.68	6,066.30	-568.64	6,073.23	0.96	-0.47	-0.84
11,335.00	90.57	357.50	5,320.39	6,160.22	-572.53	6,167.19	0.88	0.84	-0.28
11,429.00	90.75	357.85	5,319.31	6,254.14	-576.34	6,261.15	0.42	0.19	0.37
11,523.00	90.22	357.94	5,318.51	6,348.07	-579.80	6,355.12	0.57	-0.56	0.10
11,618.00	90.57	357.85	5,317.86	6,443.00	-583.29	6,450.09	0.38	0.37	-0.09
11,712.00	90.57	357.41	5,316.92	6,536.92	-587.17	6,544.04	0.47	0.00	-0.47
11,806.00	90.40	356.79	5,316.13	6,630.79	-591.93	6,637.97	0.68	-0.18	-0.66
11,900.00	91.01	358.08	5,314.97	6,724.69	-596.13	6,731.92	1.52	0.65	1.37
11,995.00	91.19	359.08	5,313.15	6,819.64	-598.49	6,826.89	1.07	0.19	1.05
12,089.00	91.36	359.08	5,311.06	6,913.61	-600.00	6,920.87	0.18	0.18	0.00
12,183.00	90.92	359.34	5,309.19	7,007.58	-601.29	7,014.85	0.54	-0.47	0.28
12,277.00	91.19	359.43	5,307.45	7,101.56	-602.30	7,108.83	0.30	0.29	0.10
12,371.00	90.84	358.82	5,305.79	7,195.53	-603.74	7,202.82	0.75	-0.37	-0.65
12,465.00	89.34	359.69	5,305.64	7,289.52	-604.96	7,296.81	1.84	-1.60	0.93
12,560.00	89.43	0.40	5,306.66	7,384.51	-604.88	7,391.80	0.75	0.09	0.75
12,654.00	90.75	359.61	5,306.51	7,478.51	-604.88	7,485.79	1.64	1.40	-0.84
12,748.00	91.28	359.87	5,304.85	7,572.50	-605.30	7,579.77	0.63	0.56	0.28
12,841.00	90.84	0.40	5,303.13	7,665.48	-605.08	7,672.74	0.74	-0.47	0.57
12,936.00	90.66	0.05	5,301.88	7,760.47	-604.71	7,767.72	0.41	-0.19	-0.37
13,028.74	90.84	0.31	5,300.67	7,853.20	-604.42	7,860.44	0.34	0.19	0.28
13029'MD: Hardline Crossing FNL									
13,030.00	90.84	0.31	5,300.65	7,854.46	-604.42	7,861.70	0.34	0.19	0.28
13,089.00	90.92	0.05	5,299.75	7,913.45	-604.23	7,920.68	0.46	0.14	-0.44
13089'MD: Survey Depth									
13,156.00	90.92	0.05	5,298.67	7,980.44	-604.17	7,987.67	0.00	0.00	0.00
13156'MD: Projection to Total Depth - BHL 200' FNL - 2000' FEL									



Survey Report

Company: Steward Energy II, LLC
Project: Lea County, NM (NAD 83)
Site: Heisenberg State 3H
Well: Heisenberg State 3H
Wellbore: Heisenberg St.3H Lateral (STK)
Design: Heisenberg St.3H Lateral (STK)

Local Co-ordinate Reference: Well Heisenberg State 3H
TVD Reference: GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
MD Reference: GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.14 Single User Db

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
4,258.00	4,235.81	-18.02	-255.15	4258'MD: Tie into Pilot Hole Surveys
4,351.00	4,327.42	-19.14	-271.15	4351'MD: Begin STK MWD Survey
8,055.72	5,353.02	2,882.80	-544.75	8056'MD: Section Crossing
13,028.74	5,300.67	7,853.20	-604.42	13029'MD: Hardline Crossing FNL
13,089.00	5,299.75	7,913.45	-604.23	13089'MD: Survey Depth
13,156.00	5,298.67	7,980.44	-604.17	13156'MD: Projection to Total Depth
13,156.00	5,298.67	7,980.44	-604.17	BHL 200' FNL - 2000' FEL

Checked By: _____ Approved By: _____ Date: _____



Steward Energy II, LLC

Lea County, NM (NAD 83)

Heisenberg State 3H

Heisenberg State 3H

Heisenberg St.3H Lateral (STK)

Design: Heisenberg St.3H Lateral (STK)

Survey Report - Geographic

27 May, 2017



Survey Report - Geographic

Company:	Steward Energy II, LLC	Local Co-ordinate Reference:	Well Heisenberg State 3H
Project:	Lea County, NM (NAD 83)	TVD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Site:	Heisenberg State 3H	MD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Well:	Heisenberg State 3H	North Reference:	Grid
Wellbore:	Heisenberg St.3H Lateral (STK)	Survey Calculation Method:	Minimum Curvature
Design:	Heisenberg St.3H Lateral (STK)	Database:	EDM 5000.14 Single User Db

Project	Lea County, NM (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Heisenberg State 3H				
Site Position:		Northing:	778,187.60 usft	Latitude:	33.133°N
From:	Map	Easting:	924,712.70 usft	Longitude:	103.081°W
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	0.68 °

Well	Heisenberg State 3H					
Well Position	+N/-S	0.00 ft	Northing:	778,187.60 usft	Latitude:	33.133°N
	+E/-W	0.00 ft	Easting:	924,712.70 usft	Longitude:	103.081°W
Position Uncertainty	0.00 ft		Wellhead Elevation:	ft	Ground Level:	3,800.00 ft

Wellbore	Heisenberg St.3H Lateral (STK)				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	5/8/2017	6.80	60.97	48,536.01308269

Design	Heisenberg St.3H Lateral (STK)				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	4,258.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	359.25	

Survey Program	Date 5/27/2017				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
97.76	2,362.00	VES Gyro Corrected to NAD 83 (Pilot Hole)	CB_Film_GMS	Camera Based Film Gyro Multi-Shot	
2,435.00	4,258.00	DrilTech MWD (Pilot Hole)	MWD	MWD - Standard	
4,351.00	13,156.00	Driltech MWD - STK (Heisenberg St.3H Lateral)	MWD	MWD - Standard	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	778,187.60	924,712.70	33.133°N	103.081°W	
97.76	0.60	23.99	97.76	0.47	0.21	778,188.07	924,712.91	33.133°N	103.081°W	
192.12	0.40	75.15	192.12	1.00	0.73	778,188.60	924,713.43	33.133°N	103.081°W	
286.48	0.63	115.87	286.47	0.86	1.51	778,188.46	924,714.21	33.133°N	103.081°W	
380.84	0.27	165.82	380.83	0.42	2.03	778,188.02	924,714.73	33.133°N	103.081°W	
475.20	0.50	47.66	475.19	0.48	2.39	778,188.08	924,715.09	33.133°N	103.081°W	
569.56	0.68	93.94	569.54	0.72	3.26	778,188.32	924,715.96	33.133°N	103.081°W	
663.92	0.67	97.46	663.90	0.61	4.36	778,188.21	924,717.06	33.133°N	103.081°W	
758.28	0.72	116.49	758.25	0.27	5.44	778,187.87	924,718.14	33.133°N	103.081°W	
852.64	0.76	132.76	852.60	-0.42	6.43	778,187.18	924,719.13	33.133°N	103.081°W	



Survey Report - Geographic

Company:	Steward Energy II, LLC	Local Co-ordinate Reference:	Well Heisenberg State 3H
Project:	Lea County, NM (NAD 83)	TVD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Site:	Heisenberg State 3H	MD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Well:	Heisenberg State 3H	North Reference:	Grid
Wellbore:	Heisenberg St.3H Lateral (STK)	Survey Calculation Method:	Minimum Curvature
Design:	Heisenberg St.3H Lateral (STK)	Database:	EDM 5000.14 Single User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
947.00	0.51	152.26	946.96	-1.21	7.08	778,186.39	924,719.78	33.133°N	103.081°W
1,041.36	0.50	186.98	1,041.31	-1.99	7.23	778,185.61	924,719.93	33.133°N	103.081°W
1,135.72	0.54	257.27	1,135.67	-2.50	6.75	778,185.10	924,719.45	33.133°N	103.081°W
1,230.08	0.47	283.19	1,230.03	-2.51	5.93	778,185.09	924,718.64	33.133°N	103.081°W
1,324.44	0.74	328.11	1,324.38	-1.90	5.24	778,185.69	924,717.94	33.133°N	103.081°W
1,418.80	0.85	34.29	1,418.73	-0.81	5.31	778,186.79	924,718.01	33.133°N	103.081°W
1,513.16	1.25	70.95	1,513.08	0.11	6.68	778,187.70	924,719.38	33.133°N	103.081°W
1,607.52	0.84	80.92	1,607.42	0.55	8.33	778,188.15	924,721.03	33.133°N	103.081°W
1,701.88	0.97	124.59	1,701.77	0.21	9.67	778,187.81	924,722.37	33.133°N	103.081°W
1,796.24	0.95	80.36	1,796.12	-0.11	11.10	778,187.48	924,723.80	33.133°N	103.081°W
1,890.60	0.87	108.97	1,890.47	-0.22	12.55	778,187.38	924,725.25	33.133°N	103.081°W
1,984.96	0.89	127.25	1,984.82	-0.89	13.81	778,186.70	924,726.51	33.133°N	103.081°W
2,079.32	0.92	180.00	2,079.17	-2.09	14.39	778,185.50	924,727.09	33.133°N	103.081°W
2,173.68	1.25	198.19	2,173.51	-3.83	14.07	778,183.77	924,726.77	33.133°N	103.081°W
2,268.04	1.77	185.58	2,267.84	-6.26	13.61	778,181.34	924,726.31	33.133°N	103.081°W
2,362.00	1.28	213.05	2,361.77	-8.58	12.90	778,179.02	924,725.60	33.133°N	103.081°W
2,435.00	0.88	205.80	2,434.75	-9.77	12.21	778,177.83	924,724.91	33.133°N	103.081°W
2,466.00	0.70	217.05	2,465.75	-10.14	11.99	778,177.46	924,724.69	33.133°N	103.081°W
2,561.00	1.49	261.26	2,560.73	-10.79	10.42	778,176.81	924,723.12	33.133°N	103.081°W
2,655.00	4.13	274.70	2,654.61	-10.69	5.84	778,176.90	924,718.54	33.133°N	103.081°W
2,749.00	6.95	269.25	2,748.16	-10.49	-3.23	778,177.11	924,709.48	33.133°N	103.081°W
2,843.00	8.88	271.80	2,841.27	-10.34	-16.16	778,177.26	924,696.54	33.133°N	103.081°W
2,937.00	10.11	269.87	2,933.98	-10.13	-31.67	778,177.47	924,681.03	33.133°N	103.081°W
3,031.00	10.02	270.22	3,026.53	-10.12	-48.10	778,177.48	924,664.61	33.133°N	103.081°W
3,126.00	9.58	271.89	3,120.14	-9.82	-64.26	778,177.77	924,648.44	33.133°N	103.081°W
3,220.00	9.94	268.29	3,212.78	-9.81	-80.19	778,177.79	924,632.51	33.133°N	103.081°W
3,314.00	9.58	269.90	3,305.42	-10.06	-96.12	778,177.53	924,616.58	33.133°N	103.081°W
3,409.00	9.32	269.25	3,399.13	-10.18	-111.72	778,177.42	924,600.98	33.133°N	103.081°W
3,503.00	8.53	268.20	3,491.99	-10.50	-126.30	778,177.10	924,586.41	33.133°N	103.081°W
3,597.00	9.67	262.40	3,584.81	-11.76	-141.09	778,175.84	924,571.61	33.133°N	103.081°W
3,691.00	9.58	261.87	3,677.49	-13.91	-156.66	778,173.69	924,556.04	33.133°N	103.081°W
3,786.00	8.97	262.14	3,771.25	-16.04	-171.82	778,171.56	924,540.88	33.133°N	103.082°W
3,880.00	10.46	269.34	3,863.90	-17.14	-187.61	778,170.46	924,525.09	33.133°N	103.082°W
3,974.00	9.94	272.07	3,956.41	-16.95	-204.25	778,170.65	924,508.45	33.133°N	103.082°W
4,069.00	10.55	268.64	4,049.90	-16.86	-221.14	778,170.74	924,491.56	33.133°N	103.082°W
4,163.00	10.46	268.20	4,142.32	-17.33	-238.27	778,170.27	924,474.43	33.133°N	103.082°W
4,258.00	10.02	267.06	4,235.81	-18.02	-255.15	778,169.57	924,457.55	33.133°N	103.082°W
4258°MD: Tie into Pilot Hole Surveys									
4,351.00	9.85	264.95	4,327.42	-19.14	-271.15	778,168.46	924,441.55	33.133°N	103.082°W
4351°MD: Begin STK MWD Survey									
4,437.00	8.88	263.81	4,412.27	-20.50	-285.08	778,167.10	924,427.62	33.133°N	103.082°W
4,469.00	8.62	263.37	4,443.90	-21.05	-289.92	778,166.55	924,422.79	33.133°N	103.082°W
4,563.00	11.26	267.85	4,536.48	-22.20	-306.09	778,165.39	924,406.61	33.133°N	103.082°W
4,657.00	12.93	272.42	4,628.39	-22.10	-325.77	778,165.49	924,386.93	33.133°N	103.082°W
4,751.00	12.75	279.54	4,720.05	-19.94	-346.50	778,167.66	924,366.20	33.133°N	103.082°W
4,845.00	12.13	281.30	4,811.84	-16.29	-366.42	778,171.31	924,346.28	33.133°N	103.082°W
4,877.00	13.45	295.89	4,843.05	-14.00	-373.07	778,173.60	924,339.64	33.133°N	103.082°W
4,908.00	15.83	309.51	4,873.05	-9.74	-379.57	778,177.86	924,333.13	33.133°N	103.082°W
4,939.00	18.11	320.06	4,902.71	-3.35	-385.93	778,184.25	924,326.77	33.133°N	103.082°W
4,971.00	21.37	327.17	4,932.83	5.37	-392.29	778,192.96	924,320.41	33.133°N	103.082°W
5,002.00	24.45	329.99	4,961.38	15.67	-398.56	778,203.27	924,314.14	33.133°N	103.082°W
5,034.00	26.82	332.01	4,990.23	27.78	-405.26	778,215.38	924,307.44	33.133°N	103.082°W
5,065.00	28.84	333.15	5,017.64	40.63	-411.92	778,228.23	924,300.78	33.133°N	103.082°W
5,097.00	31.39	334.56	5,045.32	55.04	-418.99	778,242.64	924,293.71	33.133°N	103.082°W
5,128.00	34.21	336.75	5,071.38	70.34	-425.90	778,257.94	924,286.80	33.133°N	103.082°W



Survey Report - Geographic

Company:	Steward Energy II, LLC	Local Co-ordinate Reference:	Well Heisenberg State 3H
Project:	Lea County, NM (NAD 83)	TVD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Site:	Heisenberg State 3H	MD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Well:	Heisenberg State 3H	North Reference:	Grid
Wellbore:	Heisenberg St.3H Lateral (STK)	Survey Calculation Method:	Minimum Curvature
Design:	Heisenberg St.3H Lateral (STK)	Database:	EDM 5000.14 Single User Db

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
5,159.00	36.67	337.72	5,096.63	86.92	-432.85	778,274.52	924,279.85	33.133°N	103.082°W	
5,191.00	39.04	338.51	5,121.90	105.14	-440.16	778,292.74	924,272.54	33.133°N	103.082°W	
5,222.00	41.77	339.74	5,145.50	123.92	-447.32	778,311.51	924,265.38	33.133°N	103.082°W	
5,254.00	44.05	341.68	5,168.94	144.48	-454.51	778,332.08	924,258.19	33.133°N	103.082°W	
5,285.00	46.25	343.87	5,190.80	165.47	-461.01	778,353.07	924,251.70	33.133°N	103.082°W	
5,316.00	48.10	346.07	5,211.87	187.43	-466.90	778,375.02	924,245.81	33.133°N	103.083°W	
5,348.00	50.39	348.88	5,232.76	211.09	-472.14	778,398.68	924,240.56	33.134°N	103.083°W	
5,379.00	53.02	350.03	5,251.97	235.00	-476.59	778,422.60	924,236.11	33.134°N	103.083°W	
5,411.00	55.31	351.78	5,270.71	260.62	-480.68	778,448.21	924,232.02	33.134°N	103.083°W	
5,442.00	58.21	353.01	5,287.70	286.31	-484.11	778,473.91	924,228.59	33.134°N	103.083°W	
5,474.00	62.08	353.45	5,303.63	313.87	-487.38	778,501.47	924,225.32	33.134°N	103.083°W	
5,505.00	66.04	353.63	5,317.18	341.56	-490.51	778,529.16	924,222.19	33.134°N	103.083°W	
5,537.00	69.29	354.07	5,329.34	370.99	-493.68	778,558.58	924,219.02	33.134°N	103.083°W	
5,568.00	71.23	354.42	5,339.81	400.02	-496.61	778,587.61	924,216.09	33.134°N	103.083°W	
5,600.00	73.78	355.48	5,349.43	430.42	-499.29	778,618.01	924,213.41	33.134°N	103.083°W	
5,631.00	78.35	356.35	5,356.90	460.42	-501.43	778,648.02	924,211.27	33.134°N	103.083°W	
5,662.00	81.07	356.62	5,362.43	490.86	-503.30	778,678.46	924,209.40	33.134°N	103.083°W	
5,694.00	83.54	357.06	5,366.72	522.52	-505.05	778,710.12	924,207.65	33.134°N	103.083°W	
5,725.00	88.11	356.53	5,368.97	553.38	-506.78	778,740.98	924,205.92	33.134°N	103.083°W	
5,757.00	89.52	356.00	5,369.64	585.31	-508.86	778,772.90	924,203.84	33.135°N	103.083°W	
5,788.00	90.13	355.65	5,369.73	616.22	-511.12	778,803.82	924,201.58	33.135°N	103.083°W	
5,882.00	88.81	354.77	5,370.60	709.89	-518.97	778,897.49	924,193.73	33.135°N	103.083°W	
5,977.00	88.72	356.97	5,372.65	804.61	-525.81	778,992.21	924,186.89	33.135°N	103.083°W	
6,072.00	91.10	359.08	5,372.80	899.55	-529.08	779,087.14	924,183.62	33.135°N	103.083°W	
6,167.00	91.89	358.82	5,370.32	994.50	-530.82	779,182.09	924,181.88	33.136°N	103.083°W	
6,261.00	90.40	357.85	5,368.44	1,088.43	-533.55	779,276.03	924,179.15	33.136°N	103.083°W	
6,354.00	90.75	358.64	5,367.51	1,181.39	-536.40	779,368.98	924,176.30	33.136°N	103.083°W	
6,448.00	91.89	359.87	5,365.34	1,275.35	-537.62	779,462.94	924,175.08	33.136°N	103.083°W	
6,542.00	90.57	0.31	5,363.32	1,369.32	-537.47	779,556.92	924,175.23	33.137°N	103.083°W	
6,636.00	90.92	359.52	5,362.10	1,463.32	-537.61	779,650.91	924,175.09	33.137°N	103.083°W	
6,730.00	91.71	358.99	5,359.94	1,557.28	-538.84	779,744.88	924,173.87	33.137°N	103.083°W	
6,838.00	91.10	0.13	5,357.30	1,665.24	-539.66	779,852.84	924,173.04	33.138°N	103.083°W	
6,932.00	91.45	0.22	5,355.20	1,759.22	-539.38	779,946.81	924,173.32	33.138°N	103.083°W	
7,026.00	89.60	0.75	5,354.34	1,853.21	-538.58	780,040.80	924,174.12	33.138°N	103.083°W	
7,121.00	88.99	0.92	5,355.51	1,948.19	-537.20	780,135.78	924,175.50	33.138°N	103.083°W	
7,215.00	89.43	0.48	5,356.81	2,042.17	-536.05	780,229.77	924,176.65	33.139°N	103.083°W	
7,309.00	90.22	359.17	5,357.09	2,136.17	-536.34	780,323.76	924,176.37	33.139°N	103.083°W	
7,403.00	90.84	359.08	5,356.23	2,230.16	-537.77	780,417.75	924,174.93	33.139°N	103.083°W	
7,498.00	89.34	359.34	5,356.08	2,325.14	-539.08	780,512.74	924,173.62	33.139°N	103.083°W	
7,591.00	90.13	359.69	5,356.51	2,418.14	-539.87	780,605.73	924,172.83	33.140°N	103.083°W	
7,687.00	90.31	359.87	5,356.14	2,514.14	-540.24	780,701.73	924,172.46	33.140°N	103.083°W	
7,781.00	90.13	359.69	5,355.78	2,608.14	-540.60	780,795.73	924,172.10	33.140°N	103.083°W	
7,875.00	91.01	359.34	5,354.84	2,702.13	-541.39	780,889.72	924,171.31	33.140°N	103.083°W	
7,970.00	90.40	358.82	5,353.67	2,797.11	-542.92	780,984.70	924,169.78	33.141°N	103.083°W	
8,055.72	90.47	358.74	5,353.02	2,882.80	-544.75	781,070.40	924,167.96	33.141°N	103.083°W	
8056'MD: Section Crossing										
8,064.00	90.48	358.73	5,352.95	2,891.08	-544.93	781,078.67	924,167.77	33.141°N	103.083°W	
8,158.00	90.31	358.64	5,352.30	2,985.05	-547.09	781,172.65	924,165.62	33.141°N	103.083°W	
8,252.00	90.92	358.55	5,351.29	3,079.02	-549.39	781,266.61	924,163.31	33.141°N	103.083°W	
8,345.00	90.84	358.29	5,349.87	3,171.97	-551.95	781,359.57	924,160.75	33.142°N	103.083°W	
8,436.00	91.01	358.38	5,348.40	3,262.92	-554.60	781,450.51	924,158.10	33.142°N	103.083°W	
8,527.00	90.66	359.25	5,347.07	3,353.89	-556.48	781,541.48	924,156.22	33.142°N	103.083°W	
8,619.00	90.04	358.38	5,346.51	3,445.87	-558.38	781,633.46	924,154.32	33.142°N	103.083°W	
8,711.00	89.87	359.52	5,346.58	3,537.85	-560.07	781,725.44	924,152.63	33.143°N	103.083°W	
8,803.00	90.75	1.80	5,346.08	3,629.84	-559.01	781,817.43	924,153.69	33.143°N	103.083°W	



Survey Report - Geographic

Company:	Steward Energy II, LLC	Local Co-ordinate Reference:	Well Heisenberg State 3H
Project:	Lea County, NM (NAD 83)	TVD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Site:	Heisenberg State 3H	MD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Well:	Heisenberg State 3H	North Reference:	Grid
Wellbore:	Heisenberg St.3H Lateral (STK)	Survey Calculation Method:	Minimum Curvature
Design:	Heisenberg St.3H Lateral (STK)	Database:	EDM 5000.14 Single User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
8,895.00	90.92	1.80	5,344.74	3,721.78	-556.12	781,909.37	924,156.58	33.143°N	103.083°W
8,986.00	90.48	1.63	5,343.63	3,812.74	-553.40	782,000.33	924,159.31	33.143°N	103.083°W
9,077.00	90.66	1.98	5,342.72	3,903.69	-550.53	782,091.28	924,162.17	33.144°N	103.083°W
9,167.00	90.75	3.12	5,341.62	3,993.59	-546.53	782,181.18	924,166.18	33.144°N	103.083°W
9,259.00	89.60	1.89	5,341.34	4,085.50	-542.51	782,273.09	924,170.20	33.144°N	103.083°W
9,354.00	89.96	1.54	5,341.70	4,180.45	-539.66	782,368.04	924,173.04	33.144°N	103.083°W
9,448.00	90.04	1.45	5,341.70	4,274.42	-537.21	782,462.01	924,175.49	33.145°N	103.083°W
9,542.00	89.87	1.10	5,341.78	4,368.40	-535.12	782,555.99	924,177.58	33.145°N	103.083°W
9,637.00	90.92	1.72	5,341.12	4,463.37	-532.78	782,650.95	924,179.92	33.145°N	103.083°W
9,731.00	90.40	1.72	5,340.04	4,557.32	-529.96	782,744.91	924,182.74	33.145°N	103.083°W
9,825.00	89.60	0.92	5,340.04	4,651.29	-527.79	782,838.88	924,184.91	33.146°N	103.083°W
9,919.00	90.31	359.96	5,340.11	4,745.29	-527.07	782,932.87	924,185.63	33.146°N	103.083°W
10,014.00	91.10	358.90	5,338.94	4,840.27	-528.02	783,027.86	924,184.68	33.146°N	103.083°W
10,109.00	90.48	357.76	5,337.63	4,935.22	-530.79	783,122.81	924,181.92	33.146°N	103.083°W
10,203.00	90.13	357.67	5,337.13	5,029.14	-534.53	783,216.73	924,178.17	33.147°N	103.083°W
10,297.00	90.57	357.94	5,336.56	5,123.07	-538.13	783,310.66	924,174.57	33.147°N	103.083°W
10,392.00	91.45	358.20	5,334.88	5,218.00	-541.33	783,405.59	924,171.37	33.147°N	103.083°W
10,486.00	91.36	357.06	5,332.58	5,311.89	-545.22	783,499.48	924,167.48	33.148°N	103.083°W
10,581.00	91.89	357.41	5,329.88	5,406.74	-549.80	783,594.33	924,162.90	33.148°N	103.083°W
10,675.00	91.80	357.50	5,326.86	5,500.60	-553.97	783,688.19	924,158.73	33.148°N	103.083°W
10,770.00	91.63	358.29	5,324.01	5,595.50	-557.46	783,783.08	924,155.24	33.148°N	103.083°W
10,864.00	91.63	358.82	5,321.34	5,689.43	-559.83	783,877.01	924,152.87	33.149°N	103.083°W
10,958.00	89.96	358.90	5,320.04	5,783.40	-561.70	783,970.98	924,151.00	33.149°N	103.083°W
11,052.00	89.52	358.90	5,320.46	5,877.38	-563.50	784,064.96	924,149.20	33.149°N	103.083°W
11,147.00	90.22	358.55	5,320.68	5,972.35	-565.62	784,159.94	924,147.08	33.149°N	103.083°W
11,241.00	89.78	357.76	5,320.68	6,066.30	-568.64	784,253.89	924,144.06	33.150°N	103.083°W
11,335.00	90.57	357.50	5,320.39	6,160.22	-572.53	784,347.81	924,140.17	33.150°N	103.083°W
11,429.00	90.75	357.85	5,319.31	6,254.14	-576.34	784,441.72	924,136.36	33.150°N	103.083°W
11,523.00	90.22	357.94	5,318.51	6,348.07	-579.80	784,535.66	924,132.91	33.150°N	103.083°W
11,618.00	90.57	357.85	5,317.86	6,443.00	-583.29	784,630.59	924,129.42	33.151°N	103.083°W
11,712.00	90.57	357.41	5,316.92	6,536.92	-587.17	784,724.50	924,125.53	33.151°N	103.083°W
11,806.00	90.40	356.79	5,316.13	6,630.79	-591.93	784,818.38	924,120.77	33.151°N	103.083°W
11,900.00	91.01	358.08	5,314.97	6,724.69	-596.13	784,912.27	924,116.57	33.151°N	103.083°W
11,995.00	91.19	359.08	5,313.15	6,819.64	-598.49	785,007.23	924,114.21	33.152°N	103.083°W
12,089.00	91.36	359.08	5,311.06	6,913.61	-600.00	785,101.19	924,112.70	33.152°N	103.083°W
12,183.00	90.92	359.34	5,309.19	7,007.58	-601.29	785,195.16	924,111.41	33.152°N	103.083°W
12,277.00	91.19	359.43	5,307.45	7,101.56	-602.30	785,289.14	924,110.40	33.152°N	103.083°W
12,371.00	90.84	358.82	5,305.79	7,195.53	-603.74	785,383.12	924,108.97	33.153°N	103.083°W
12,465.00	89.34	359.69	5,305.64	7,289.52	-604.96	785,477.10	924,107.74	33.153°N	103.083°W
12,560.00	89.43	0.40	5,306.66	7,384.51	-604.88	785,572.10	924,107.82	33.153°N	103.083°W
12,654.00	90.75	359.61	5,306.51	7,478.51	-604.88	785,666.09	924,107.83	33.153°N	103.083°W
12,748.00	91.28	359.87	5,304.85	7,572.50	-605.30	785,760.08	924,107.40	33.154°N	103.083°W
12,841.00	90.84	0.40	5,303.13	7,666.48	-605.08	785,853.06	924,107.62	33.154°N	103.083°W
12,936.00	90.66	0.05	5,301.88	7,760.47	-604.71	785,948.05	924,107.99	33.154°N	103.083°W
13,028.74	90.84	0.31	5,300.67	7,853.20	-604.42	786,040.78	924,108.28	33.155°N	103.083°W
13029'MD: Hardline Crossing FNL									
13,030.00	90.84	0.31	5,300.65	7,854.46	-604.42	786,042.04	924,108.29	33.155°N	103.083°W
13,089.00	90.92	0.05	5,299.75	7,913.45	-604.23	786,101.04	924,108.47	33.155°N	103.083°W
13089'MD: Survey Depth									
13,156.00	90.92	0.05	5,298.67	7,980.44	-604.17	786,168.03	924,108.53	33.155°N	103.083°W
13156'MD: Projection to Total Depth - BHL 200' FNL - 2000' FEL									



Survey Report - Geographic

Company:	Steward Energy II, LLC	Local Co-ordinate Reference:	Well Heisenberg State 3H
Project:	Lea County, NM (NAD 83)	TVD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Site:	Heisenberg State 3H	MD Reference:	GL 3800' + 18.5' RK @ 3818.50ft (McVay 5)
Well:	Heisenberg State 3H	North Reference:	Grid
Wellbore:	Heisenberg St.3H Lateral (STK)	Survey Calculation Method:	Minimum Curvature
Design:	Heisenberg St.3H Lateral (STK)	Database:	EDM 5000.14 Single User Db

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
4,258.00	4,235.81	-18.02	-255.15	4258'MD: Tie into Pilot Hole Surveys
4,351.00	4,327.42	-19.14	-271.15	4351'MD: Begin STK MWD Survey
8,055.72	5,353.02	2,882.80	-544.75	8056'MD: Section Crossing
13,028.74	5,300.67	7,853.20	-604.42	13029'MD: Hardline Crossing FNL
13,089.00	5,299.75	7,913.45	-604.23	13089'MD: Survey Depth
13,156.00	5,298.67	7,980.44	-604.17	13156'MD: Projection to Total Depth
13,156.00	5,298.67	7,980.44	-604.17	BHL 200' FNL - 2000' FEL

Checked By: _____ Approved By: _____ Date: _____