

**Provide Signature Page for
Directional Survey**

*Submit Directional
Survey that goes
to total depth of
16010'*

**NM OIL CONSERVATION
ARTESIA DISTRICT**

JAN 03 2019

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Mack Energy

**Chaves County
Sec 36-T15S-R28E
Ajax State Com #1H**

30-005-64294

Wellbore #1

Survey: Survey #1

Standard Survey Report

04 September, 2018

Survey Report

Company:	Mack Energy	Local Co-ordinate Reference:	Well Ajax State Com #1H
Project:	Chaves County	TVD Reference:	KB=17.5 @ 3667.29usft
Site:	Sec 36-T15S-R28E	MD Reference:	KB=17.5 @ 3667.29usft
Well:	Ajax State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

Project	Chaves County		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site		Sec 36-T15S-R28E			
Site Position:		Northing:	719,521.18 usft	Latitude:	32.97771
From:	Map	Easting:	619,577.81 usft	Longitude:	-104.07819
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.14 °

Well	Ajax State Com #1H					
Well Position	+N/-S	0.00 usft	Northing:	719,521.18 usft	Latitude:	32.97771
	+E/-W	0.00 usft	Easting:	619,577.81 usft	Longitude:	-104.07819
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	3,649.79 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	8/14/2018	7.37	60.65	48,209

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	0.90	

Survey Program		Date	9/4/2018		
From	To	Survey (Wellbore)	Tool Name	Description	
(usft)	(usft)				
158.00	6,563.00	Survey #1 (Wellbore #1)	MWD	MWD - Standard	

Survey									
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Buld	Turn
Depth	(°)	(°)	Depth	(usft)	(usft)	Section	Rate	Rate	Rate
(usft)			(usft)			(usft)	(°/100usft)	(°/100usft)	(°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
158.00	0.40	112.00	158.00	-0.21	0.51	-0.20	0.25	0.25	0.00
1st MWD Survey									
358.00	1.54	91.52	357.97	-0.54	3.85	-0.48	0.59	0.57	-10.24
541.00	0.13	357.91	540.95	-0.40	6.30	-0.30	0.85	-0.77	-51.15
722.00	0.92	270.29	721.94	-0.18	4.84	-0.11	0.51	0.44	-48.41
907.00	1.14	265.28	906.91	-0.33	1.52	-0.30	0.13	0.12	-2.71
1,096.00	0.88	307.20	1,095.88	0.39	-1.51	0.37	0.40	-0.14	22.18
1,290.00	1.01	305.18	1,289.85	2.28	-4.10	2.22	0.07	0.07	-1.04
1,478.00	0.48	56.71	1,477.84	3.67	-4.79	3.59	0.67	-0.28	59.32
1,667.00	0.66	68.49	1,666.83	4.50	-3.12	4.45	0.11	0.10	6.23

Survey Report

Company: Mack Energy
 Project: Chaves County
 Site: Sec 36-T15S-R28E
 Well: Ajax State Com #1H
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well Ajax State Com #1H
 TVD Reference: KB=17.5 @ 3667.29usft
 MD Reference: KB=17.5 @ 3667.29usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM 5000.1

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)
1,856.00	0.09	228.19	1,855.83	4.80	-2.22	4.77	0.39	-0.30	84.50
2,046.00	0.18	344.91	2,045.83	4.99	-2.41	4.95	0.12	0.05	61.43
2,235.00	0.35	341.30	2,234.83	5.82	-2.67	5.78	0.09	0.09	-1.91
2,377.00	2.33	0.46	2,376.78	9.12	-2.78	9.08	1.41	1.39	13.49
2,425.00	7.30	2.57	2,424.60	13.15	-2.64	13.10	10.36	10.35	4.40
2,520.00	15.43	2.04	2,517.66	31.84	-1.92	31.80	8.56	8.56	-0.56
2,614.00	20.35	3.45	2,607.09	60.67	-0.49	60.65	5.25	5.23	1.50
2,707.00	26.73	358.53	2,692.31	97.76	-0.05	97.74	7.17	6.86	-5.29
2,801.00	32.92	358.44	2,773.82	144.47	-1.29	144.43	6.59	6.59	-0.10
2,896.00	39.96	1.17	2,850.20	200.85	-1.37	200.80	7.60	7.41	2.87
2,989.00	49.01	1.87	2,916.48	265.92	0.39	265.90	9.75	9.73	0.75
3,052.00	54.59	2.04	2,955.43	315.38	2.08	315.38	8.86	8.86	0.27
3,064.00	54.99	2.13	2,962.35	325.18	2.44	325.18	3.39	3.33	0.75
3,084.00	55.52	2.13	2,973.74	341.61	3.05	341.61	2.65	2.65	0.00
3,100.00	55.78	2.13	2,982.77	354.81	3.54	354.82	1.63	1.63	0.00
3,115.00	56.00	2.22	2,991.18	367.22	4.01	367.23	1.55	1.47	0.60
3,131.00	56.18	2.04	3,000.11	380.49	4.50	380.51	1.46	1.13	-1.13
3,147.00	56.62	1.96	3,008.96	393.80	4.97	393.83	2.78	2.75	-0.50
3,157.00	57.23	1.52	3,014.42	402.18	5.22	402.21	7.13	6.10	-4.40
3,178.00	59.25	0.73	3,025.48	420.03	5.57	420.07	10.14	9.62	-3.76
3,273.00	70.33	0.46	3,065.88	505.84	6.45	505.88	11.67	11.66	-0.28
3,368.00	79.43	0.99	3,090.63	597.45	7.62	597.50	9.59	9.58	0.56
3,463.00	88.66	0.37	3,100.48	691.83	8.74	691.88	9.74	9.72	-0.65
3,506.50	89.88	0.14	3,101.03	735.32	8.93	735.37	2.85	2.80	-0.54
Cross Section Line 3506.5 MD/3101.03 TVD 735.32 N 8.93 E N: 720256.5 E: 619586.7									
3,560.00	91.38	359.85	3,100.44	788.82	8.92	788.86	2.85	2.80	-0.54
3,653.00	89.63	359.32	3,099.62	881.81	8.25	881.83	1.97	-1.88	-0.57
3,748.00	90.46	0.55	3,099.55	976.81	8.14	976.81	1.56	0.87	1.29
3,841.00	91.78	1.17	3,097.73	1,069.78	9.54	1,069.79	1.57	1.42	0.67
3,936.00	90.81	1.69	3,095.58	1,164.72	11.91	1,164.76	1.16	-1.02	0.55
4,030.00	91.43	2.22	3,093.75	1,258.65	15.11	1,258.73	0.87	0.66	0.56
4,125.00	90.20	1.08	3,092.39	1,353.59	17.85	1,353.71	1.77	-1.29	-1.20
4,220.00	91.25	1.52	3,091.19	1,448.56	20.00	1,448.70	1.20	1.11	0.46
4,315.00	90.11	0.64	3,090.06	1,543.54	21.79	1,543.69	1.52	-1.20	-0.93
4,410.00	90.81	0.81	3,089.30	1,638.52	23.00	1,638.68	0.76	0.74	0.18
4,504.00	90.20	1.34	3,088.47	1,732.50	24.76	1,732.68	0.86	-0.65	0.56
4,599.00	90.59	1.25	3,087.82	1,827.48	26.91	1,827.67	0.42	0.41	-0.09
4,694.00	91.30	1.61	3,086.25	1,922.43	29.28	1,922.66	0.84	0.75	0.38
4,788.00	90.55	0.99	3,084.73	2,016.40	31.41	2,016.64	1.04	-0.80	-0.66
4,882.00	89.80	1.61	3,084.45	2,110.37	33.54	2,110.64	1.04	-0.80	0.66
4,976.00	90.51	1.87	3,084.19	2,204.33	36.40	2,204.62	0.80	0.76	0.28
5,070.00	89.49	0.81	3,084.19	2,298.30	38.59	2,298.62	1.56	-1.09	-1.13
5,164.00	90.37	1.34	3,084.31	2,392.28	40.36	2,392.62	1.09	0.94	0.56

Survey Report

Company: Mack Energy
Project: Chaves County
Site: Sec 36-T15S-R28E
Well: Ajax State Com #1H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Ajax State Com #1H
TVD Reference: KB=17.5 @ 3667.29usft
MD Reference: KB=17.5 @ 3667.29usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

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)
5,284.00	91.30	1.87	3,082.56	2,512.22	43.72	2,512.59	0.89	0.78	0.44
5,378.00	92.13	0.81	3,079.75	2,606.15	45.92	2,606.55	1.43	0.88	-1.13
5,473.00	91.08	0.73	3,077.09	2,701.10	47.19	2,701.51	1.11	-1.11	-0.08
5,568.00	90.20	0.20	3,076.02	2,796.09	47.96	2,796.50	1.08	-0.93	-0.56
5,662.00	91.08	0.55	3,074.97	2,890.08	48.58	2,890.49	1.01	0.94	0.37
5,757.00	90.42	0.20	3,073.73	2,985.07	49.20	2,985.47	0.79	-0.69	-0.37
5,851.00	89.85	0.02	3,073.51	3,079.07	49.38	3,079.47	0.64	-0.61	-0.19
5,946.00	90.51	359.85	3,073.21	3,174.07	49.27	3,174.45	0.72	0.69	-0.18
6,040.00	91.16	0.37	3,071.84	3,268.06	49.45	3,268.43	0.89	0.69	0.55
6,133.00	90.68	0.02	3,070.35	3,361.04	49.77	3,361.41	0.64	-0.52	-0.38
6,228.00	89.58	0.20	3,070.13	3,456.04	49.95	3,456.40	1.17	-1.16	0.19
6,322.00	90.20	0.64	3,070.31	3,550.04	50.64	3,550.40	0.81	0.66	0.47
6,416.00	91.08	0.90	3,069.26	3,644.02	51.90	3,644.39	0.98	0.94	0.28
6,513.00	92.40	1.31	3,066.32	3,740.96	53.77	3,741.34	1.42	1.36	0.42
Last MWD Survey 6513 MD/3066.32 TVD 3740.96 N 53.77 E N: 723262.1 E: 619631.5									
6,563.00	92.40	1.31	3,064.22	3,790.90	54.92	3,791.30	0.00	0.00	0.00
PTB 6563 MD/3064.22 TVD 3790.9 N 54.92 E N: 723312.0 E: 619632.7									

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
158.00	158.00	-0.21	0.51	1st MWD Survey
3,506.50	3,101.03	735.32	8.93	Cross Section Line 3506.5 MD/3101.03 TVD 735.32 N 8.93 E N: 720256.5 E: 6
6,513.00	3,066.32	3,740.96	53.77	Last MWD Survey 6513 MD/3066.32 TVD 3740.96 N 53.77 E N: 723262.1 E: 6
6,563.00	3,064.22	3,790.90	54.92	PTB 6563 MD/3064.22 TVD 3790.9 N 54.92 E N: 723312.0 E: 619632.7

Checked By: _____ Approved By: _____ Date: _____