



30-005-29081

Mack Energy

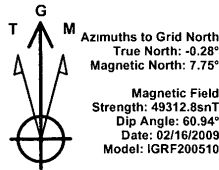
Chaves County
Tom State
Tom State #1
OH

Plan: Plan #1

Pathfinder X & Y Survey Report

16 February, 2009

PATHFINDER
ENERGY SERVICES



PATHFINDER

ENERGY SERVICES

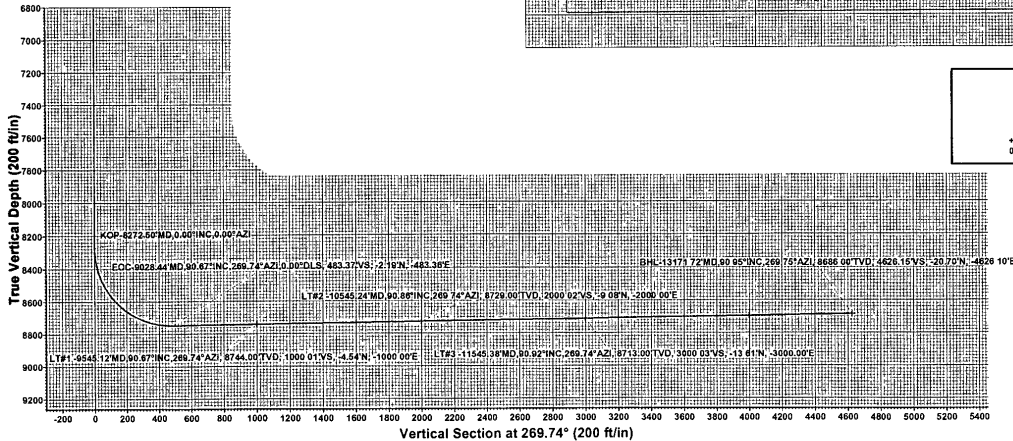
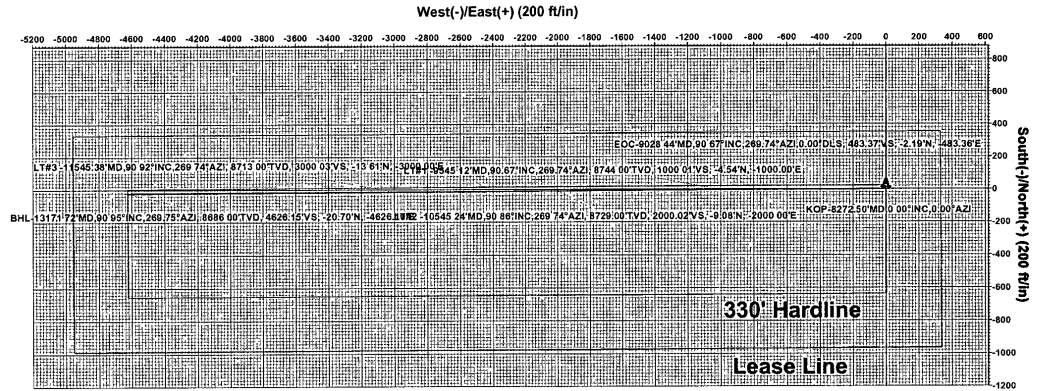
PROJECT DETAILS: Chaves County
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level
Local North: Grid

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N-S	+E-W	DLeg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	8272.50	0.00	0.00	8272.50	0.00	0.00	0.00	0.00	0.00	
3	9028.19	90.67	269.74	8750.00	-2.19	-483.11	12.00	269.74	483.12	
4	9097.68	90.66	269.74	8749.19	-2.51	-552.60	0.01	0.00	552.60	
5	9545.12	90.66	269.74	8744.00	-4.54	-1000.00	0.00	0.00	1000.01	LT#1 @ 1000'VS
6	9554.90	90.66	269.74	8743.87	-4.58	-1009.78	2.00	0.04	1009.79	
7	10545.24	90.66	269.74	8729.00	-9.08	-2000.00	0.00	0.00	2000.02	LT#2 @ 2000'VS
8	10548.08	90.62	269.74	8728.96	-9.06	-2002.82	2.00	0.58	2002.84	
9	11545.38	90.62	269.74	8713.00	-13.61	-3000.00	0.00	0.00	3000.03	LT#3 @ 3000'VS
10	11547.17	90.65	269.75	8712.87	-13.62	-3001.79	2.00	15.74	3001.83	
11	13171.72	90.65	269.75	8686.00	-20.70	-4626.10	0.00	0.00	4626.15	PBHL OH(TS#1)

WELLBORE TARGET DETAILS

Name	TVD	+N-S	+E-W	Shape
PBHL OH(TS#1)	8686.00	-20.70	-4626.10	Point
LT#4 @ 4000'VS	8697.00	-18.15	-4000.00	Point
LT#3 @ 3000'VS	8713.00	-13.61	-3000.00	Point
LT#2 @ 2000'VS	8729.00	-9.08	-2000.00	Point
LT#1 @ 1000'VS	8744.00	-4.54	-1000.00	Point



WELL DETAILS Tom State #1

Ground Elevation: 4410.00
RKB Elevation: WELL @ 4428.00ft (18' RKB)
Rig Name:

+N-S	+E-W	Northmg	Eastmg	Latitude	Longitude	Slot
0.00	0.00	730635.600	657750.520	33° 0' 27" 08.2 N	103° 49' 7.496 W	

Project: Chaves County
Site: Tom State
Well: Tom State #1
Wellbore: OH
Plan: Plan #1 (Tom State #1/OH)

Plan: Plan #1 (Tom State #1/OH)

Created By: Nate Bingham Date: 15.30, February 16 2009
Checked: Date:



Pathfinder X & Y Survey Report



Company:	Mack Energy	Local Co-ordinate Reference:	Well Tom State #1
Project:	Chaves County	TVD Reference:	WELL @ 4428.00ft (18' RKB)
Site:	Tom State	MD Reference:	WELL @ 4428.00ft (18' RKB)
Well:	Tom State #1	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	Midland Database

Project	Chaves County		
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		Tom State			
Site Position:		Northing:	730,635.600 ft	Latitude:	33° 0' 27.082 N
From:	Map	Easting:	657,750.500 ft	Longitude:	103° 49' 7.496 W
Position Uncertainty:	0.00 ft	Slot Radius:	"	Grid Convergence:	0.28 °

Well	Tom State #1					
Well Position	+N/-S	0.00 ft	Northing:	730,635.600 ft	Latitude:	33° 0' 27.082 N
	+E/-W	0.00 ft	Easting:	657,750.500 ft	Longitude:	103° 49' 7.496 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	4,410.00 ft

Wellbore	OH
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	02/16/2009	8.03	60.94	49,313

Design	Plan #1
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Audit Notes:					
Version:	Phase:	PLAN	Tie On Depth:	0.00	
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	269.74	

Survey Tool Program		Date 02/16/2009		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.00	13,171.72	Plan #1 (OH)	MWD	MWD - Standard



Pathfinder X & Y Survey Report

PATHFINDER
ENERGY SERVICES

Company:	Mack Energy	Local Co-ordinate Reference:	Well Tom State #1
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Site:	Tom State	MD Reference:	WELL @ 4428.00ft (18' RKB)
Well:	Tom State #1	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	Midland Database

Planned Survey											
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)	
0.00	0.00	0.00	0.00	-4,428.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
100.00	0.00	0.00	100.00	-4,328.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
200.00	0.00	0.00	200.00	-4,228.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
300.00	0.00	0.00	300.00	-4,128.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
400.00	0.00	0.00	400.00	-4,028.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
500.00	0.00	0.00	500.00	-3,928.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
600.00	0.00	0.00	600.00	-3,828.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
700.00	0.00	0.00	700.00	-3,728.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
800.00	0.00	0.00	800.00	-3,628.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
900.00	0.00	0.00	900.00	-3,528.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
1,000.00	0.00	0.00	1,000.00	-3,428.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
1,100.00	0.00	0.00	1,100.00	-3,328.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
1,200.00	0.00	0.00	1,200.00	-3,228.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
1,300.00	0.00	0.00	1,300.00	-3,128.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
1,400.00	0.00	0.00	1,400.00	-3,028.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
1,500.00	0.00	0.00	1,500.00	-2,928.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
1,600.00	0.00	0.00	1,600.00	-2,828.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
1,700.00	0.00	0.00	1,700.00	-2,728.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
1,800.00	0.00	0.00	1,800.00	-2,628.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
1,900.00	0.00	0.00	1,900.00	-2,528.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
2,000.00	0.00	0.00	2,000.00	-2,428.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
2,100.00	0.00	0.00	2,100.00	-2,328.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
2,200.00	0.00	0.00	2,200.00	-2,228.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
2,300.00	0.00	0.00	2,300.00	-2,128.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
2,400.00	0.00	0.00	2,400.00	-2,028.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
2,500.00	0.00	0.00	2,500.00	-1,928.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
2,600.00	0.00	0.00	2,600.00	-1,828.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	



Pathfinder X & Y Survey Report



Company:	Mack Energy	Local Co-ordinate Reference:	Well Tom State #1
Project:	Chaves County	TVD Reference:	WELL @ 4428.00ft (18' RKB)
Site:	Tom State	MD Reference:	WELL @ 4428.00ft (18' RKB)
Well:	Tom State #1	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	Midland Database

Planned Survey										
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
2,700.00	0.00	0.00	2,700.00	-1,728.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
2,800.00	0.00	0.00	2,800.00	-1,628.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
2,900.00	0.00	0.00	2,900.00	-1,528.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
3,000.00	0.00	0.00	3,000.00	-1,428.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
3,100.00	0.00	0.00	3,100.00	-1,328.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
3,200.00	0.00	0.00	3,200.00	-1,228.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
3,300.00	0.00	0.00	3,300.00	-1,128.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
3,400.00	0.00	0.00	3,400.00	-1,028.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
3,500.00	0.00	0.00	3,500.00	-928.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
3,600.00	0.00	0.00	3,600.00	-828.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
3,700.00	0.00	0.00	3,700.00	-728.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
3,800.00	0.00	0.00	3,800.00	-628.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
3,900.00	0.00	0.00	3,900.00	-528.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
4,000.00	0.00	0.00	4,000.00	-428.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
4,100.00	0.00	0.00	4,100.00	-328.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
4,200.00	0.00	0.00	4,200.00	-228.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
4,300.00	0.00	0.00	4,300.00	-128.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
4,400.00	0.00	0.00	4,400.00	-28.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
4,500.00	0.00	0.00	4,500.00	72.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
4,600.00	0.00	0.00	4,600.00	172.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
4,700.00	0.00	0.00	4,700.00	272.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
4,800.00	0.00	0.00	4,800.00	372.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
4,900.00	0.00	0.00	4,900.00	472.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
5,000.00	0.00	0.00	5,000.00	572.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
5,100.00	0.00	0.00	5,100.00	672.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
5,200.00	0.00	0.00	5,200.00	772.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
5,300.00	0.00	0.00	5,300.00	872.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50



Pathfinder X & Y Survey Report



Company:	Mack Energy	Local Co-ordinate Reference:	Well Tom State #1
Project:	Chaves County	TVD Reference:	WELL @ 4428.00ft (18' RKB)
Site:	Tom State	MD Reference:	WELL @ 4428.00ft (18' RKB)
Well:	Tom State #1	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	Midland Database

Planned Survey											
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)	
5,400.00	0.00	0.00	5,400.00	972.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
5,500.00	0.00	0.00	5,500.00	1,072.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
5,600.00	0.00	0.00	5,600.00	1,172.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
5,700.00	0.00	0.00	5,700.00	1,272.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
5,800.00	0.00	0.00	5,800.00	1,372.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
5,900.00	0.00	0.00	5,900.00	1,472.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
6,000.00	0.00	0.00	6,000.00	1,572.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
6,100.00	0.00	0.00	6,100.00	1,672.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
6,200.00	0.00	0.00	6,200.00	1,772.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
6,300.00	0.00	0.00	6,300.00	1,872.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
6,400.00	0.00	0.00	6,400.00	1,972.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
6,500.00	0.00	0.00	6,500.00	2,072.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
6,600.00	0.00	0.00	6,600.00	2,172.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
6,700.00	0.00	0.00	6,700.00	2,272.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
6,800.00	0.00	0.00	6,800.00	2,372.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
6,900.00	0.00	0.00	6,900.00	2,472.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
7,000.00	0.00	0.00	7,000.00	2,572.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
7,100.00	0.00	0.00	7,100.00	2,672.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
7,200.00	0.00	0.00	7,200.00	2,772.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
7,300.00	0.00	0.00	7,300.00	2,872.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
7,400.00	0.00	0.00	7,400.00	2,972.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
7,500.00	0.00	0.00	7,500.00	3,072.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
7,600.00	0.00	0.00	7,600.00	3,172.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
7,700.00	0.00	0.00	7,700.00	3,272.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
7,800.00	0.00	0.00	7,800.00	3,372.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
7,900.00	0.00	0.00	7,900.00	3,472.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	
8,000.00	0.00	0.00	8,000.00	3,572.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50	



Pathfinder X & Y Survey Report



Company:	Mack Energy	Local Co-ordinate Reference:	Well Tom State #1
Project:	Chaves County	TVD Reference:	WELL @ 4428.00ft (18' RKB)
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Planned Survey										
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
8,100.00	0.00	0.00	8,100.00	3,672.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
8,200.00	0.00	0.00	8,200.00	3,772.00	0.00	0.00	0.00	0.00	730,635.60	657,750.50
8,272.50	0.00	0.00	8,272.50	3,844.50	0.00	0.00	0.00	0.00	730,635.60	657,750.50
KOP-8272.50*MD,0.00*INC,0.00*AZI										
8,275.00	0.30	269.74	8,275.00	3,847.00	0.00	-0.01	0.01	12.00	730,635.60	657,750.49
8,300.00	3.30	269.74	8,299.98	3,871.98	0.00	-0.79	0.79	12.00	730,635.60	657,749.71
8,325.00	6.30	269.74	8,324.89	3,896.89	-0.01	-2.88	2.88	12.00	730,635.59	657,747.62
8,350.00	9.30	269.74	8,349.66	3,921.66	-0.03	-6.27	6.28	12.00	730,635.57	657,744.23
8,375.00	12.30	269.74	8,374.21	3,946.21	-0.05	-10.96	10.96	12.00	730,635.55	657,739.54
8,400.00	15.30	269.74	8,398.49	3,970.49	-0.08	-16.92	16.92	12.00	730,635.52	657,733.58
8,425.00	18.30	269.74	8,422.42	3,994.42	-0.11	-24.14	24.14	12.00	730,635.49	657,726.36
8,450.00	21.30	269.74	8,445.94	4,017.94	-0.15	-32.61	32.61	12.00	730,635.45	657,717.89
8,475.00	24.30	269.74	8,468.99	4,040.99	-0.19	-42.30	42.30	12.00	730,635.41	657,708.20
8,500.00	27.30	269.74	8,491.49	4,063.49	-0.24	-53.17	53.17	12.00	730,635.36	657,697.33
8,525.00	30.30	269.74	8,513.40	4,085.40	-0.30	-65.21	65.21	12.00	730,635.30	657,685.29
8,550.00	33.30	269.74	8,534.64	4,106.64	-0.36	-78.38	78.39	12.00	730,635.24	657,672.12
8,575.00	36.29	269.74	8,555.17	4,127.17	-0.42	-92.65	92.65	12.00	730,635.18	657,657.85
8,600.00	39.29	269.74	8,574.92	4,146.92	-0.49	-107.97	107.97	12.00	730,635.11	657,642.53
8,625.00	42.29	269.74	8,593.85	4,165.85	-0.56	-124.30	124.30	12.00	730,635.04	657,626.20
8,650.00	45.29	269.74	8,611.89	4,183.89	-0.64	-141.60	141.60	12.00	730,634.96	657,608.90
8,675.00	48.29	269.74	8,629.01	4,201.01	-0.73	-159.82	159.82	12.00	730,634.87	657,590.68
8,700.00	51.29	269.74	8,645.14	4,217.14	-0.81	-178.91	178.91	12.00	730,634.79	657,571.59
8,725.00	54.29	269.74	8,660.26	4,232.26	-0.90	-198.82	198.82	12.00	730,634.70	657,551.68
8,750.00	57.29	269.74	8,674.31	4,246.31	-1.00	-219.49	219.49	12.00	730,634.60	657,531.01
8,775.00	60.29	269.74	8,687.26	4,259.26	-1.09	-240.87	240.87	12.00	730,634.51	657,509.63
8,800.00	63.29	269.74	8,699.08	4,271.08	-1.19	-262.90	262.90	12.00	730,634.41	657,487.60
8,825.00	66.29	269.74	8,709.73	4,281.73	-1.30	-285.51	285.52	12.00	730,634.30	657,464.99



Pathfinder X & Y Survey Report



Company:	Mack Energy	Local Co-ordinate Reference:	Well Tom State #1
Project:	Chaves County	TVD Reference:	WELL @ 4428.00R (18' RKB)
Site:	Tom State	MD Reference:	WELL @ 4428.00R (18' RKB)
Well:	Tom State #1	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	Midland Database

Planned Survey										
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100R)	Northing (ft)	Easting (ft)
8,850.00	69.29	269.74	8,719.18	4,291.18	-1.40	-308.66	308.66	12.00	730,634.20	657,441.84
8,875.00	72.29	269.74	8,727.40	4,299.40	-1.51	-332.26	332.27	12.00	730,634.09	657,418.24
8,900.00	75.29	269.74	8,734.38	4,306.38	-1.62	-356.27	356.27	12.00	730,633.98	657,394.23
8,925.00	78.29	269.74	8,740.09	4,312.09	-1.73	-380.60	380.60	12.00	730,633.87	657,369.90
8,950.00	81.29	269.74	8,744.52	4,316.52	-1.84	-405.20	405.21	12.00	730,633.76	657,345.30
8,975.00	84.29	269.74	8,747.66	4,319.66	-1.95	-430.00	430.00	12.00	730,633.65	657,320.50
9,000.00	87.29	269.74	8,749.50	4,321.50	-2.06	-454.93	454.93	12.00	730,633.54	657,295.57
9,025.00	90.29	269.74	8,750.03	4,322.03	-2.18	-479.92	479.93	12.00	730,633.42	657,270.58
9,028.19	90.67	269.74	8,750.00	4,322.00	-2.19	-483.11	483.12	12.00	730,633.41	657,267.39
9,028.44	90.67	269.74	8,750.00	4,322.00	-2.19	-483.36	483.36	0.00	730,633.41	657,267.14
EOC-9028.44°MD,90.67°INC,269.74°AZI,0.00°DLS,483.37°VS,-2.19°N,-483.36°E										
9,097.68	90.66	269.74	8,749.19	4,321.19	-2.51	-552.60	552.60	0.01	730,633.09	657,197.90
9,100.00	90.66	269.74	8,749.16	4,321.16	-2.52	-554.92	554.92	0.00	730,633.08	657,195.58
9,200.00	90.66	269.74	8,748.00	4,320.00	-2.97	-654.91	654.91	0.00	730,632.63	657,095.59
9,300.00	90.66	269.74	8,746.84	4,318.84	-3.43	-754.90	754.91	0.00	730,632.17	656,995.60
9,400.00	90.66	269.74	8,745.68	4,317.68	-3.88	-854.89	854.90	0.00	730,631.72	656,895.61
9,500.00	90.66	269.74	8,744.52	4,316.52	-4.34	-954.88	954.89	0.00	730,631.26	656,795.62
9,545.12	90.66	269.74	8,744.00	4,316.00	-4.54	-1,000.00	1,000.01	0.00	730,631.06	656,750.50
LT#1 -9545.12°MD,90.67°INC,269.74°AZI,8744.00°TVD,1000.01°VS,-4.54°N,-1000.00°E - LT#1 @ 1000°VS										
9,554.90	90.86	269.74	8,743.87	4,315.87	-4.58	-1,009.78	1,009.79	2.00	730,631.02	656,740.72
9,600.00	90.86	269.74	8,743.19	4,315.19	-4.79	-1,054.87	1,054.89	0.00	730,630.81	656,695.63
9,700.00	90.86	269.74	8,741.69	4,313.69	-5.24	-1,154.86	1,154.87	0.00	730,630.36	656,595.64
9,800.00	90.86	269.74	8,740.19	4,312.19	-5.70	-1,254.85	1,254.86	0.00	730,629.90	656,495.65
9,900.00	90.86	269.74	8,738.69	4,310.69	-6.15	-1,354.84	1,354.85	0.00	730,629.45	656,395.66
10,000.00	90.86	269.74	8,737.19	4,309.19	-6.60	-1,454.83	1,454.84	0.00	730,629.00	656,295.67
10,100.00	90.86	269.74	8,735.69	4,307.69	-7.06	-1,554.81	1,554.83	0.00	730,628.54	656,195.69
10,200.00	90.86	269.74	8,734.18	4,306.18	-7.51	-1,654.80	1,654.82	0.00	730,628.09	656,095.70



Pathfinder X & Y Survey Report



Company:	Mack Energy	Local Co-ordinate Reference:	Well Tom State #1
Project:	Chaves County	TVD Reference:	WELL @ 4428.00ft (18' RKB)
Site:	Tom State	MD Reference:	WELL @ 4428.00ft (18' RKB)
Well:	Tom State #1	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	Midland Database

Planned Survey										
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	EW (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
10,300.00	90.86	269.74	8,732.68	4,304.68	-7.97	-1,754.79	1,754.81	0.00	730,627.63	655,995.71
10,400.00	90.86	269.74	8,731.18	4,303.18	-8.42	-1,854.78	1,854.80	0.00	730,627.18	655,895.72
10,500.00	90.86	269.74	8,729.68	4,301.68	-8.87	-1,954.76	1,954.78	0.00	730,626.73	655,795.74
10,545.24	90.86	269.74	8,729.00	4,301.00	-9.08	-2,000.00	2,000.02	0.00	730,626.52	655,750.50
LT#2 -10545.24' MD, 90.86° INC, 269.74° AZI, 8729.00' TVD, 2000.02' VS, -9.08° N, -2000.00° E - LT#2 @ 2000' VS										
10,548.06	90.92	269.74	8,728.96	4,300.96	-9.09	-2,002.82	2,002.84	2.00	730,626.51	655,747.68
10,600.00	90.92	269.74	8,728.13	4,300.13	-9.33	-2,054.75	2,054.77	0.00	730,626.27	655,695.75
10,700.00	90.92	269.74	8,726.53	4,298.53	-9.78	-2,154.74	2,154.76	0.00	730,625.82	655,595.76
10,800.00	90.92	269.74	8,724.93	4,296.93	-10.23	-2,254.72	2,254.75	0.00	730,625.37	655,495.78
10,900.00	90.92	269.74	8,723.33	4,295.33	-10.69	-2,354.71	2,354.73	0.00	730,624.91	655,395.79
11,000.00	90.92	269.74	8,721.73	4,293.73	-11.14	-2,454.70	2,454.72	0.00	730,624.46	655,295.80
11,100.00	90.92	269.74	8,720.13	4,292.13	-11.59	-2,554.68	2,554.71	0.00	730,624.01	655,195.82
11,200.00	90.92	269.74	8,718.53	4,290.53	-12.05	-2,654.67	2,654.69	0.00	730,623.55	655,095.83
11,300.00	90.92	269.74	8,716.93	4,288.93	-12.50	-2,754.65	2,754.68	0.00	730,623.10	654,995.85
11,400.00	90.92	269.74	8,715.33	4,287.33	-12.95	-2,854.64	2,854.67	0.00	730,622.65	654,895.86
11,500.00	90.92	269.74	8,713.73	4,285.73	-13.40	-2,954.63	2,954.66	0.00	730,622.20	654,795.87
11,545.38	90.92	269.74	8,713.00	4,285.00	-13.61	-3,000.00	3,000.03	0.00	730,621.99	654,750.50
LT#3 -11545.38' MD, 90.92° INC, 269.74° AZI, 8713.00' TVD, 3000.03' VS, -13.61° N, -3000.00° E - LT#3 @ 3000' VS										
11,547.17	90.95	269.75	8,712.97	4,284.97	-13.62	-3,001.79	3,001.83	2.00	730,621.98	654,748.71
11,600.00	90.95	269.75	8,712.09	4,284.09	-13.85	-3,054.61	3,054.64	0.00	730,621.75	654,695.89
11,700.00	90.95	269.75	8,710.43	4,282.43	-14.28	-3,154.60	3,154.63	0.00	730,621.32	654,595.90
11,800.00	90.95	269.75	8,708.77	4,280.77	-14.72	-3,254.58	3,254.62	0.00	730,620.88	654,495.92
11,900.00	90.95	269.75	8,707.11	4,279.11	-15.16	-3,354.57	3,354.60	0.00	730,620.44	654,395.93
12,000.00	90.95	269.75	8,705.45	4,277.45	-15.59	-3,454.55	3,454.59	0.00	730,620.01	654,295.95
12,100.00	90.95	269.75	8,703.79	4,275.79	-16.03	-3,554.54	3,554.57	0.00	730,619.57	654,195.96
12,200.00	90.95	269.75	8,702.13	4,274.13	-16.46	-3,654.52	3,654.56	0.00	730,619.14	654,095.98
12,300.00	90.95	269.75	8,700.47	4,272.47	-16.90	-3,754.51	3,754.55	0.00	730,618.70	653,995.99



Pathfinder X & Y Survey Report



Company:	Mack Energy	Local Co-ordinate Reference:	Well Tom State #1
Project:	Chaves County	TVD Reference:	WELL @ 4428.00ft (18' RKB)
Site:	Tom State	MD Reference:	WELL @ 4428.00ft (18' RKB)
Well:	Tom State #1	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	Midland Database

Planned Survey										
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
12,400.00	90.95	269.75	8,698.81	4,270.81	-17.34	-3,854.49	3,854.53	0.00	730,618.26	653,896.01
12,500.00	90.95	269.75	8,697.15	4,269.15	-17.77	-3,954.48	3,954.52	0.00	730,617.83	653,796.02
12,545.52	90.95	269.75	8,696.40	4,268.40	-17.97	-3,999.99	4,000.03	0.00	730,617.63	653,750.51
LT#4 @ 4000'VS										
12,600.00	90.95	269.75	8,695.49	4,267.49	-18.21	-4,054.46	4,054.51	0.00	730,617.39	653,696.04
12,700.00	90.95	269.75	8,693.83	4,265.83	-18.64	-4,154.45	4,154.49	0.00	730,616.96	653,596.05
12,800.00	90.95	269.75	8,692.17	4,264.17	-19.08	-4,254.43	4,254.48	0.00	730,616.52	653,496.07
12,900.00	90.95	269.75	8,690.51	4,262.51	-19.52	-4,354.42	4,354.46	0.00	730,616.08	653,396.08
13,000.00	90.95	269.75	8,688.85	4,260.85	-19.95	-4,454.41	4,454.45	0.00	730,615.65	653,296.09
13,100.00	90.95	269.75	8,687.19	4,259.19	-20.39	-4,554.39	4,554.44	0.00	730,615.21	653,196.11
13,171.72	90.95	269.75	8,686.00	4,258.00	-20.70	-4,626.10	4,626.15	0.00	730,614.90	653,124.40
PBHL OH(TS#1)										



Pathfinder X & Y Survey Report



Company:	Mack Energy	Local Co-ordinate Reference:	Well Tom State #1
Project:	Chaves County	TVD Reference:	WELL @ 4428.00ft (18' RKB)
Site:	Tom State	MD Reference:	WELL @ 4428.00ft (18' RKB)
Well:	Tom State #1	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	Midland Database

Targets									
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
LT#4 @ 4000'VS - plan hits target - Point	0.00	0.00	8,697.00	-18.15	-4,000.00	730,617.450	653,750.500	33° 0' 27.094 N	103° 49' 54.468 W
PBHL OH(TS#1) - plan hits target - Point	0.00	0.00	8,686.00	-20.70	-4,626.10	730,614.900	653,124.400	33° 0' 27.098 N	103° 50' 1.820 W
LT#2 @ 2000'VS - plan hits target - Point	0.00	0.00	8,729.00	-9.08	-2,000.00	730,626.520	655,750.500	33° 0' 27.088 N	103° 49' 30.982 W
LT#1 @ 1000'VS - plan hits target - Point	0.00	0.00	8,744.00	-4.54	-1,000.00	730,631.060	656,750.500	33° 0' 27.085 N	103° 49' 19.239 W
LT#3 @ 3000'VS - plan hits target - Point	0.00	0.00	8,713.00	-13.61	-3,000.00	730,621.990	654,750.500	33° 0' 27.091 N	103° 49' 42.725 W

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
8,272.50	8,272.50	0.00	0.00	KOP-8272.50°MD,0.00°INC,0.00°AZI
9,028.44	8,750.00	-2.19	-483.36	EOC-9028.44°MD,90.67°INC,269.74°AZI,0.00°DLS, 483.37°VS, -2.19°N
9,545.12	8,744.00	-4.54	-1,000.00	LT#1 -9545.12°MD,90.67°INC,269.74°AZI, 8744.00°TVD, 1000.01°VS, -
10,545.24	8,729.00	-4.58	-1,009.51	LT#2 -10545.24°MD,90.86°INC,269.74°AZI, 8729.00°TVD, 2000.02°VS,
11,545.38	8,713.00	-9.08	-2,000.00	LT#3 -11545.38°MD,90.92°INC,269.74°AZI, 8713.00°TVD, 3000.03°VS,
13,171.72	8,686.00	-9.09	-2,002.82	BHL-13171.72°MD,90.95°INC,269.75°AZI, 8686.00°TVD, 4626.15°VS, -;

Checked By: _____	Approved By: _____	Date: _____
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