



Caza Petroleum

Lea County
Moore Cowbell "27" State
#1H
OH

Survey: MWD #3 Lat

Pathfinder X & Y Survey Report

15 January, 2010

RECEIVED

FEB 10 2010
HOBBSOCD

3rd Lateral Abandoned
SUR: P-27-12s-32e, 660/S & 990/E
BHL: O-27-12s-32e, 622/S & 2534/E
API # 30-025-39404

PATHFINDER



Pathfinder Energy Services
Pathfinder X & Y Survey Report



Company:	Caza Petroleum	Local Co-ordinate Reference:	Well #1H
Project:	Lea County	TVD Reference:	WELL @ 4361.50ft (26.5'KB Correction)
Site:	Moore Cowbell "27" State	MD Reference:	WELL @ 4361.50ft (26.5'KB Correction)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Midland Database

Project	Lea County
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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	Moore Cowbell "27" State
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Site Position:		Northing:	816,927.280 ft	Latitude:	33° 14' 38.943 N
From:	Map	Easting:	693,692.810 ft	Longitude:	103° 41' 59.313 W
Position Uncertainty:	0.00 ft	Slot Radius:	"	Grid Convergence:	0.35 °

Well	#1H
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Well Position	+N/-S	0.00 ft	Northing:	816,927.280 ft	Latitude:	33° 14' 38.943 N
	+E/-W	0.00 ft	Easting:	693,692.810 ft	Longitude:	103° 41' 59.313 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	4,335.00 ft

Wellbore	OH
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	11/30/2009	7.90	61.16	49,392

Design	OH
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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	269.60	



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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Midland Database

Survey Program	Date 01/15/2010			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
100.00	8,200.00	GYRO (OH)	CB-GYRO-MS	Camera based gyro multishot
8,364.00	9,494.00	MWD #1 (OH)	MWD	MWD - Standard

Survey											
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)	
8,200.00	1.21	90.20	8,197.67	3,836.17	-123.07	28.20	-27.34	0.00	816,804.21	693,721.01	
8,364.00	14.95	272.54	8,359.95	3,998.45	-122.13	8.67	-7.81	9.85	816,805.15	693,701.48	
8,395.00	20.14	271.90	8,389.50	4,028.00	-121.77	-0.67	1.52	16.75	816,805.51	693,692.14	
8,427.00	24.62	271.43	8,419.08	4,057.58	-121.42	-12.84	13.69	14.01	816,805.86	693,679.97	
8,458.00	29.28	270.17	8,446.71	4,085.21	-121.24	-26.89	27.73	15.14	816,806.04	693,665.92	
8,490.00	33.85	269.91	8,473.97	4,112.47	-121.23	-43.63	44.48	14.29	816,806.05	693,649.18	
8,521.00	37.81	270.19	8,499.10	4,137.60	-121.21	-61.78	62.62	12.79	816,806.07	693,631.03	
8,553.00	41.50	270.89	8,523.73	4,162.23	-121.02	-82.19	83.04	11.62	816,806.26	693,610.62	
8,584.00	44.93	270.75	8,546.32	4,184.82	-120.71	-103.42	104.26	11.07	816,806.57	693,589.39	
8,616.00	49.24	270.25	8,568.10	4,206.60	-120.51	-126.84	127.68	13.52	816,806.77	693,565.97	
8,647.00	50.74	271.93	8,588.03	4,226.53	-120.06	-150.58	151.42	6.37	816,807.22	693,542.23	
8,678.00	51.35	276.57	8,607.53	4,246.03	-118.27	-174.61	175.43	11.80	816,809.01	693,518.20	
8,709.00	53.73	276.85	8,626.38	4,264.88	-115.39	-199.05	199.85	7.71	816,811.89	693,493.76	
8,741.00	57.68	276.82	8,644.41	4,282.91	-112.25	-225.29	226.07	12.34	816,815.03	693,467.52	
8,773.00	61.38	276.22	8,660.63	4,299.13	-109.12	-252.69	253.44	11.67	816,818.16	693,440.12	
8,804.00	63.93	275.39	8,674.87	4,313.37	-106.33	-280.08	280.82	8.56	816,820.95	693,412.73	
8,836.00	65.51	275.73	8,688.54	4,327.04	-103.53	-308.88	309.59	5.03	816,823.75	693,383.93	
8,868.00	70.52	275.32	8,700.51	4,339.01	-100.68	-338.40	339.10	15.70	816,826.60	693,354.41	
8,898.00	75.45	275.19	8,709.29	4,347.79	-98.05	-366.96	367.64	16.44	816,829.23	693,325.85	
8,930.00	80.37	275.06	8,715.99	4,354.49	-95.26	-398.12	398.77	15.38	816,832.02	693,294.69	
8,962.00	85.38	274.96	8,719.96	4,358.46	-92.48	-429.74	430.37	15.66	816,834.80	693,263.07	



Pathfinder Energy Services
Pathfinder X & Y Survey Report



Company:	Caza Petroleum	Local Co-ordinate Reference:	Well #1H
Project:	Lea County	TVD Reference:	WELL @ 4361.50ft (26.5'KB Correction)
Site:	Moore Cowbell "27" State	MD Reference:	WELL @ 4361.50ft (26.5'KB Correction)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Midland Database

Survey										
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
8,986.00	88.77	275.51	8,721.18	4,359.68	-90.30	-453.60	454.22	14.31	816,836.98	693,239.21
9,018.00	88.43	279.27	8,721.96	4,360.46	-86.18	-485.32	485.91	11.79	816,841.10	693,207.49
9,050.00	88.94	283.09	8,722.70	4,361.20	-79.98	-516.70	517.25	12.04	816,847.30	693,176.11
9,081.00	90.28	282.61	8,722.91	4,361.41	-73.09	-546.92	547.42	4.59	816,854.19	693,145.89
9,113.00	91.17	280.66	8,722.50	4,361.00	-66.64	-578.26	578.71	6.70	816,860.64	693,114.55
9,145.00	90.56	278.92	8,722.02	4,360.52	-61.19	-609.79	610.20	5.76	816,866.09	693,083.02
9,177.00	91.23	278.14	8,721.52	4,360.02	-56.45	-641.43	641.81	3.21	816,870.83	693,051.38
9,208.00	90.50	276.47	8,721.05	4,359.55	-52.51	-672.18	672.53	5.88	816,874.77	693,020.63
9,240.00	89.66	274.43	8,721.01	4,359.51	-49.47	-704.03	704.36	6.89	816,877.81	692,988.78
9,272.00	89.66	273.67	8,721.20	4,359.70	-47.21	-735.95	736.26	2.37	816,880.07	692,956.86
9,304.00	89.78	273.53	8,721.35	4,359.85	-45.20	-767.89	768.18	0.58	816,882.08	692,924.92
9,335.00	89.11	272.81	8,721.65	4,360.15	-43.49	-798.84	799.12	3.17	816,883.79	692,893.97
9,367.00	87.59	272.15	8,722.58	4,361.08	-42.10	-830.79	831.07	5.18	816,885.18	692,862.02
9,399.00	86.81	269.72	8,724.14	4,362.64	-41.58	-862.75	863.02	7.97	816,885.70	692,830.06
9,430.00	88.04	271.23	8,725.53	4,364.03	-41.32	-893.71	893.98	6.28	816,885.96	692,799.10
9,462.00	88.32	270.72	8,726.55	4,365.05	-40.78	-925.69	925.95	1.82	816,886.50	692,767.12
9,494.00	88.88	270.61	8,727.33	4,365.83	-40.41	-957.68	957.94	1.78	816,886.87	692,735.13
9,525.00	88.21	270.48	8,728.12	4,366.62	-40.11	-988.67	988.92	2.20	816,887.17	692,704.14
9,557.00	88.21	270.53	8,729.12	4,367.62	-39.83	-1,020.65	1,020.91	0.16	816,887.45	692,672.16
9,589.00	88.32	270.49	8,730.09	4,368.59	-39.55	-1,052.64	1,052.89	0.37	816,887.73	692,640.17
9,620.00	88.26	270.96	8,731.01	4,369.51	-39.15	-1,083.62	1,083.87	1.53	816,888.13	692,609.19
9,652.00	88.32	271.00	8,731.97	4,370.47	-38.61	-1,115.60	1,115.84	0.23	816,888.67	692,577.21
9,684.00	88.09	271.07	8,732.97	4,371.47	-38.03	-1,147.58	1,147.82	0.75	816,889.25	692,545.23
9,715.00	87.20	270.98	8,734.24	4,372.74	-37.47	-1,178.55	1,178.78	2.89	816,889.81	692,514.26
9,747.00	87.20	270.63	8,735.81	4,374.31	-37.03	-1,210.51	1,210.74	1.09	816,890.25	692,482.30
9,779.00	87.26	270.43	8,737.35	4,375.85	-36.73	-1,242.47	1,242.69	0.65	816,890.55	692,450.34
9,811.00	87.20	270.64	8,738.90	4,377.40	-36.43	-1,274.43	1,274.65	0.68	816,890.85	692,418.38



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Site:	Moore Cowbell "27" State	MD Reference:	WELL @ 4361.50ft (26.5'KB Correction)
Well:	#1H	North Reference:	Gnd
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Midland Database

Survey										
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
9,842.00	87.03	269.94	8,740.46	4,378.96	-36.27	-1,305.39	1,305.61	2.32	816,891.01	692,387.42
9,874.00	86.92	270.69	8,742.15	4,380.65	-36.10	-1,337.34	1,337.56	2.37	816,891.18	692,355.47
9,906.00	86.53	269.79	8,743.98	4,382.48	-35.97	-1,369.29	1,369.51	3.06	816,891.31	692,323.52
9,933.00	86.35	269.65	8,745.65	4,384.15	-36.10	-1,396.24	1,396.46	0.84	816,891.18	692,296.57
9,965.00	86.44	269.12	8,747.66	4,386.16	-36.44	-1,428.17	1,428.39	1.68	816,890.84	692,264.64
9,997.00	86.70	269.62	8,749.58	4,388.08	-36.79	-1,460.11	1,460.34	1.76	816,890.49	692,232.70
10,081.00	86.70	269.62	8,754.41	4,392.91	-37.35	-1,543.97	1,544.20	0.00	816,889.93	692,148.84

Proj to Bit @ 10081' MD



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Site:	Moore Cowbell "27" State	MD Reference:	WELL @ 4361.50ft (26.5'KB Correction)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Midland Database

Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
TGT1@1960°VS(MC#	0.00	0.00	8,716.50	-76.37	-1,960.00	816,850.910	691,732.810	33° 14' 38.304 N	103° 42' 22.396 W
- survey misses target center by 419.57ft at 10081.00ft MD (8754.41 TVD, -37.35 N, -1543.97 E)									
- Point									
TGT1Dlateral	0.00	0.00	8,741.50	-75.65	-1,960.00	816,851.630	691,732.810	33° 14' 38.311 N	103° 42' 22.396 W
- survey misses target center by 417.99ft at 10081.00ft MD (8754.41 TVD, -37.35 N, -1543.97 E)									
- Point									
PBHL(DLAT)	0.00	0.00	8,720.45	-27.95	-3,970.30	816,899.330	689,722.510	33° 14' 38.902 N	103° 42' 46.062 W
- survey misses target center by 2426.58ft at 10081.00ft MD (8754.41 TVD, -37.35 N, -1543.97 E)									
- Point									
TGT0(MC#1H)	0.00	0.00	8,678.50	-2.79	-400.00	816,924.490	693,292.810	33° 14' 38.939 N	103° 42' 4.023 W
- survey misses target center by 99.73ft at 8935.22ft MD (8716.83 TVD, -94.80 N, -403.25 E)									
- Point									
PBHL(MC#1H)	0.00	0.00	8,741.00	-27.95	-3,970.30	816,899.330	689,722.510	33° 14' 38.902 N	103° 42' 46.062 W
- survey misses target center by 2426.38ft at 10081.00ft MD (8754.41 TVD, -37.35 N, -1543.97 E)									
- Point									

Survey Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(ft)	(ft)	+N/-S (ft)	+E/-W (ft)	
10,081.00	8,754.41	-37.35	-1,543.97	Proj to Bit @ 10081' MD

Checked By: _____ Approved By: _____ Date: _____