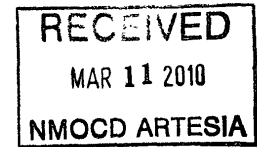


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Marbob

Eddy County
Shocker 20 Federal
#1H
OH



Survey: MWD #1

Pathfinder X & Y Survey Report

07 December, 2009

PATHFINDER

mr



Pathfinder Energy Services

Pathfinder X & Y Survey Report



Company: Marbob
Project: Eddy County
Site: Shocker 20 Federal
Well: #1H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #1H
TVD Reference: WELL @ 2995.00ft (22' KB Correction)
MD Reference: WELL @ 2995.00ft (22' KB Correction)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Midland Database

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

Site	Shocker 20 Federal		
Site Position:		Northing:	404,989.300 ft
From:	Map	Easting:	598,969.300 ft
Position Uncertainty:	0.00 ft	Slot Radius:	"
		Latitude:	32° 6' 46.902 N
		Longitude:	104° 0' 49.248 W
		Grid Convergence:	0.17 °

Well		#1H				
Well Position	+N/-S	0.00 ft	Northing:	404,989.300 ft	Latitude:	32° 6' 46.902 N
	+E/-W	0.00 ft	Easting:	598,969.300 ft	Longitude:	104° 0' 49.248 W
Position Uncertainty	0.00 ft	Wellhead Elevation:	ft	Ground Level:	2,973.00 ft	

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF200510	11/28/2009	7.95	60.06	48,687

Design	OH			
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	87.88



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Survey Program Date 12/07/2009

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
78.00	6,478.00	Gyro #1 (OH)	CB-GYRO-MS	Camera based gyro multishot
6,563.00	11,522.00	MWD #1 (OH)	MWD	MWD - Standard

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
6,478.00	0.38	233.02	6,476.86	3,481.86	-36.70	6.11	4.75	0.00	404,952.60	598,975.41
6,563.00	0.44	189.38	6,561.86	3,566.86	-37.19	5.84	4.46	0.36	404,952.11	598,975.14
6,595.00	2.46	80.57	6,593.85	3,598.85	-37.20	6.49	5.11	8.23	404,952.10	598,975.79
6,627.00	9.23	68.76	6,625.66	3,630.66	-36.16	9.57	8.22	21.38	404,953.14	598,978.87
6,658.00	15.04	76.99	6,655.96	3,660.96	-34.35	15.81	14.53	19.51	404,954.95	598,985.11
6,690.00	19.43	80.31	6,686.52	3,691.52	-32.52	25.11	23.88	14.05	404,956.78	598,994.41
6,722.00	21.81	86.53	6,716.47	3,721.47	-31.26	36.29	35.11	10.10	404,958.04	599,005.59
6,754.00	25.32	85.21	6,745.80	3,750.80	-30.33	49.04	47.89	11.09	404,958.97	599,018.34
6,785.00	27.26	85.70	6,773.59	3,778.59	-29.24	62.73	61.61	6.30	404,960.06	599,032.03
6,817.00	29.63	85.96	6,801.72	3,806.72	-28.14	77.93	76.84	7.42	404,961.16	599,047.23
6,849.00	32.01	84.59	6,829.20	3,834.20	-26.78	94.27	93.21	7.75	404,962.52	599,063.57
6,881.00	33.94	86.34	6,856.05	3,861.05	-25.41	111.63	110.61	6.73	404,963.89	599,080.93
6,913.00	37.11	87.36	6,882.09	3,887.09	-24.40	130.19	129.20	10.08	404,964.90	599,099.49
6,944.00	40.63	88.04	6,906.22	3,911.22	-23.62	149.63	148.65	11.44	404,965.68	599,118.93
6,976.00	44.23	87.46	6,929.83	3,934.83	-22.77	171.20	170.24	11.32	404,966.53	599,140.50
7,008.00	47.66	86.36	6,952.08	3,957.08	-21.52	194.16	193.23	11.00	404,967.78	599,163.46
7,040.00	51.00	85.92	6,972.93	3,977.93	-19.89	218.37	217.48	10.49	404,969.41	599,187.67
7,072.00	54.08	84.56	6,992.40	3,997.40	-17.77	243.68	242.85	10.20	404,971.53	599,212.98
7,103.00	57.33	84.49	7,009.86	4,014.86	-15.33	269.17	268.42	10.49	404,973.97	599,238.47
7,135.00	60.76	85.73	7,026.32	4,031.32	-13.00	296.51	295.82	11.22	404,976.30	599,265.81
7,167.00	65.60	85.54	7,040.75	4,045.75	-10.82	324.97	324.35	15.13	404,978.48	599,294.27



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Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
7,199.00	70.43	84.04	7,052.73	4,057.73	-8.12	354.51	353.97	15.71	404,981.18	599,323.81
7,230.00	75.10	84.31	7,061.91	4,066.91	-5.12	383.96	383.51	15.09	404,984.18	599,353.26
7,261.00	77.56	88.63	7,069.24	4,074.24	-3.27	414.01	413.61	15.69	404,986.03	599,383.31
7,293.00	81.60	90.47	7,075.03	4,080.03	-3.03	445.48	445.06	13.83	404,986.27	599,414.78
7,325.00	81.69	90.65	7,079.68	4,084.68	-3.34	477.14	476.69	0.62	404,985.96	599,446.44
7,357.00	83.27	90.28	7,083.86	4,088.86	-3.59	508.86	508.38	5.07	404,985.71	599,478.16
7,388.00	83.27	89.63	7,087.50	4,092.50	-3.57	539.65	539.14	2.08	404,985.73	599,508.95
7,420.00	85.03	88.25	7,090.76	4,095.76	-2.98	571.47	570.97	6.98	404,986.32	599,540.77
7,452.00	86.88	86.52	7,093.02	4,098.02	-1.52	603.36	602.89	7.91	404,987.78	599,572.66
7,484.00	86.97	84.99	7,094.73	4,099.73	0.84	635.22	634.82	4.78	404,990.14	599,604.52
7,516.00	86.79	84.82	7,096.47	4,101.47	3.68	667.05	666.73	0.77	404,992.98	599,636.35
7,547.00	89.34	85.14	7,097.52	4,102.52	6.39	697.91	697.67	8.29	404,995.69	599,667.21
7,578.00	92.15	84.87	7,097.12	4,102.12	9.09	728.78	728.62	9.11	404,998.39	599,698.08
7,674.00	94.35	85.23	7,091.68	4,096.68	17.36	824.27	824.34	2.32	405,006.66	599,793.57
7,769.00	92.24	85.90	7,086.22	4,091.22	24.69	918.82	919.10	2.33	405,013.99	599,888.12
7,864.00	91.45	86.35	7,083.16	4,088.16	31.11	1,013.55	1,014.01	0.96	405,020.41	599,982.85
7,959.00	89.78	87.72	7,082.14	4,087.14	36.02	1,108.41	1,108.99	2.27	405,025.32	600,077.71
8,054.00	88.46	87.27	7,083.60	4,088.60	40.17	1,203.31	1,203.97	1.47	405,029.47	600,172.61
8,150.00	91.80	88.43	7,083.38	4,088.38	43.78	1,299.23	1,299.96	3.68	405,033.08	600,268.53
8,245.00	91.19	88.02	7,080.90	4,085.90	46.72	1,394.15	1,394.92	0.77	405,036.02	600,363.45
8,340.00	90.66	85.98	7,079.37	4,084.37	51.69	1,489.00	1,489.89	2.22	405,040.99	600,458.30
8,435.00	91.28	86.99	7,077.76	4,082.76	57.51	1,583.81	1,584.85	1.25	405,046.81	600,553.11
8,531.00	90.66	86.37	7,076.13	4,081.13	63.07	1,679.63	1,680.81	0.91	405,052.37	600,648.93
8,626.00	90.75	87.64	7,074.96	4,079.96	68.03	1,774.49	1,775.79	1.34	405,057.33	600,743.79
8,721.00	89.16	88.04	7,075.04	4,080.04	71.61	1,869.42	1,870.79	1.73	405,060.91	600,838.72
8,816.00	89.34	86.84	7,076.28	4,081.28	75.86	1,964.32	1,965.78	1.28	405,065.16	600,933.62
8,912.00	89.08	88.29	7,077.61	4,082.61	79.93	2,060.22	2,061.76	1.53	405,069.23	601,029.52



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Survey												
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)		
9,007.00	88.37	88.36	7,079.72	4,084.72	82.71	2,155.15	2,156.74	0.75	405,072.01	601,124.45		
9,103.00	89.16	87.59	7,081.79	4,086.79	86.10	2,251.07	2,252.71	1.15	405,075.40	601,220.37		
9,198.00	90.92	89.13	7,081.72	4,086.72	88.82	2,346.02	2,347.70	2.46	405,078.12	601,315.32		
9,293.00	91.89	88.02	7,079.39	4,084.39	91.18	2,440.96	2,442.67	1.55	405,080.48	601,410.26		
9,389.00	93.30	88.02	7,075.05	4,080.05	94.50	2,536.81	2,538.56	1.47	405,083.80	601,506.11		
9,484.00	91.89	89.02	7,070.75	4,075.75	96.95	2,631.67	2,633.46	1.82	405,086.25	601,600.97		
9,579.00	91.45	88.70	7,067.98	4,072.98	98.84	2,726.61	2,728.40	0.57	405,088.14	601,695.91		
9,674.00	89.69	88.50	7,067.03	4,072.03	101.16	2,821.58	2,823.39	1.86	405,090.46	601,790.88		
9,770.00	90.31	88.45	7,067.03	4,072.03	103.71	2,917.54	2,919.38	0.65	405,093.01	601,886.84		
9,865.00	91.80	89.39	7,065.28	4,070.28	105.50	3,012.50	3,014.35	1.85	405,094.80	601,981.80		
9,961.00	90.66	89.86	7,063.22	4,068.22	106.13	3,108.48	3,110.28	1.28	405,095.43	602,077.78		
10,056.00	86.88	88.47	7,065.26	4,070.26	107.51	3,203.43	3,205.21	4.24	405,096.81	602,172.73		
10,151.00	88.02	89.92	7,069.49	4,074.49	108.85	3,298.32	3,300.09	1.94	405,098.15	602,267.62		
10,247.00	86.70	90.08	7,073.91	4,078.91	108.85	3,394.22	3,395.92	1.39	405,098.15	602,363.52		
10,342.00	86.61	89.05	7,079.45	4,084.45	109.57	3,489.05	3,490.71	1.09	405,098.87	602,458.35		
10,437.00	87.32	88.87	7,084.48	4,089.48	111.29	3,583.90	3,585.56	0.77	405,100.59	602,553.20		
10,533.00	89.16	87.69	7,087.43	4,092.43	114.17	3,679.81	3,681.51	2.28	405,103.47	602,649.11		
10,628.00	89.16	86.44	7,088.82	4,093.82	119.03	3,774.67	3,776.49	1.32	405,108.33	602,743.97		
10,724.00	89.96	86.58	7,089.56	4,094.56	124.88	3,870.49	3,872.46	0.85	405,114.18	602,839.79		
10,819.00	89.16	85.74	7,090.29	4,095.29	131.24	3,965.27	3,967.41	1.22	405,120.54	602,934.57		
10,915.00	88.90	85.38	7,091.92	4,096.92	138.67	4,060.97	4,063.32	0.46	405,127.97	603,030.27		
11,007.00	90.48	84.39	7,092.41	4,097.41	146.87	4,152.60	4,155.19	2.03	405,136.17	603,121.90		
11,101.00	90.92	83.79	7,091.27	4,096.27	156.55	4,246.09	4,248.97	0.79	405,145.85	603,215.39		
11,196.00	91.28	83.61	7,089.44	4,094.44	166.97	4,340.50	4,343.70	0.42	405,156.27	603,309.80		
11,290.00	91.10	81.63	7,087.49	4,092.49	179.04	4,433.69	4,437.28	2.11	405,168.34	603,402.99		
11,385.00	90.92	83.51	7,085.81	4,090.81	191.32	4,527.88	4,531.86	1.99	405,180.62	603,497.18		
11,449.00	90.84	82.73	7,084.83	4,089.83	198.99	4,591.41	4,595.63	1.23	405,188.29	603,560.71		



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11,519.69	90.84	82.73	7,083.80	4,088.80	207.93	4,661.52	4,666.02	0.00	405,197.23	603,630.82	
PBHL#1H											
11,522.00	90.84	82.73	7,083.76	4,088.76	208.23	4,663.81	4,668.32	0.00	405,197.53	603,633.11	

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
PBHL#1H	0.00	0.00	7,080.00	172.40	4,666.00	405,161.700	603,635.300	32° 6' 48.468 N	103° 59' 54.989 W
- survey misses by 36.02ft at 11519.69ft MD (7083.80 TVD, 207.93 N, 4661.52 E)									
- Point									

Checked By: _____ Approved By: _____ Date: _____

Surf: 1750' F9L, 330' FWL
EOL: 1958' F9L, 286' FEL