



Marbob

Lear State #2

Lear State #2

Lear State #2

Original hole

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OCT 23 2009
HOBBSCOCD

Survey: MWD #1

Pathfinder X & Y Survey Report

15 September, 2009

PATHFINDER



Pathfinder Energy Services
Pathfinder X & Y Survey Report



Company: Marbob
Project: Lear State #2
Site: Lear State #2
Well: Lear State #2
Wellbore: Original hole
Design: Original hole

Local Co-ordinate Reference: Well Lear State #2
TVD Reference: WELL @ 3692.00ft (15-Patriot #2)
MD Reference: WELL @ 3692.00ft (15-Patriot #2)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Midland Database

Project	Lear State #2		
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	Lear State #2		
Site Position:		Northing:	618,078.300 ft
From: Map		Easting:	666,775.800 ft
Position Uncertainty:	0.00 ft	Slot Radius:	"
		Latitude:	32° 41' 52.885 N
		Longitude:	103° 47' 28.298 W
		Grid Convergence:	0 29 °

Well		Lear State #2				
Well Position	+N/-S	0.00 ft	Northing:	618,078.300 ft	Latitude:	32° 41' 52.885 N
	+E/-W	0.00 ft	Easting:	666,775.800 ft	Longitude:	103° 47' 28.298 W
Position Uncertainty	0.00 ft		Wellhead Elevation:	ft	Ground Level:	3,677.00 ft

Wellbore	Original hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	08/23/2009	7.93	60.65	49,086

Design	Original hole			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(ft)	(ft)	(ft)	(°)
	0.00	0.00	0.00	93.47



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Survey Program		Date	09/15/2009		
From (ft)	To (ft)	Survey (Wellbore)		Tool Name	Description
100.00	8,730.00	GYRO (Original hole)		CB-GYRO-MS	Camera based gyro multishot
8,768.00	11,190.00	MWD #1 (Original hole)		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)
8,730.00	2.16	294.37	8,728.29	5,036.29	32.15	-98.63	-100.40	0.00	618,110.45	666,677.17
8,768.00	1.93	298.08	8,766.26	5,074.26	32.75	-99.85	-101.65	0.70	618,111.05	666,675.95
8,800.00	1.23	350.02	8,798.25	5,106.25	33.34	-100.39	-102.22	4.75	618,111.64	666,675.41
8,831.00	2.90	57.14	8,829.23	5,137.23	34.09	-99.78	-101.66	8.62	618,112.39	666,676.02
8,862.00	5.80	68.90	8,860.14	5,168.14	35.08	-97.66	-99.61	9.74	618,113.38	666,678.14
8,893.00	8.27	76.16	8,890.91	5,198.91	36.18	-94.04	-96.05	8.45	618,114.48	666,681.76
8,925.00	10.64	81.91	8,922.47	5,230.47	37.14	-88.88	-90.96	7.96	618,115.44	666,686.92
8,956.00	13.81	80.72	8,952.76	5,260.76	38.14	-82.39	-84.55	10.26	618,116.44	666,693.41
8,988.00	17.24	79.59	8,983.59	5,291.59	39.62	-73.95	-76.22	10.76	618,117.92	666,701.85
9,020.00	20.66	78.67	9,013.85	5,321.85	41.58	-63.75	-66.15	10.73	618,119.88	666,712.05
9,051.00	24.18	79.25	9,042.50	5,350.50	43.84	-52.15	-54.71	11.38	618,122.14	666,723.65
9,083.00	27.61	79.65	9,071.29	5,379.29	46.40	-38.41	-41.15	10.73	618,124.70	666,737.39
9,114.00	30.95	80.16	9,098.32	5,406.32	49.05	-23.49	-26.41	10.80	618,127.35	666,752.31
9,145.00	34.82	80.53	9,124.35	5,432.35	51.87	-6.90	-10.02	12.50	618,130.17	666,768.90
9,177.00	39.75	81.33	9,149.80	5,457.80	54.92	12.24	8.89	15.48	618,133.22	666,788.04
9,208.00	44.32	82.96	9,172.82	5,480.82	57.74	32.80	29.24	15.16	618,136.04	666,808.60
9,240.00	48.54	84.98	9,194.87	5,502.87	60.16	55.85	52.11	13.96	618,138.46	666,831.65
9,271.00	52.58	87.85	9,214.57	5,522.57	61.64	79.73	75.86	14.86	618,139.94	666,855.53
9,302.00	56.37	91.61	9,232.58	5,540.58	61.74	104.95	101.02	15.71	618,140.04	666,880.75
9,365.00	65.07	94.99	9,263.37	5,571.37	58.51	159.74	155.91	14.58	618,136.81	666,935.54
9,396.00	71.23	95.01	9,274.90	5,582.90	56.01	188.39	184.66	19.87	618,134.31	666,964.19



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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)
9,428.00	75.36	94.49	9,284.10	5,592.10	53.47	218.93	215.29	13.00	618,131.77	666,994.73
9,459.00	77.03	94.16	9,291.49	5,599.49	51.20	248.95	245.39	5.49	618,129.50	667,024.75
9,491.00	77.82	94.29	9,298.46	5,606.46	48.90	280.10	276.62	2.50	618,127.20	667,055.90
9,522.00	79.84	93.79	9,304.47	5,612.47	46.76	310.43	307.03	6.71	618,125.06	667,086.23
9,554.00	81.87	93.22	9,309.55	5,617.55	44.83	341.96	338.62	6.58	618,123.13	667,117.76
9,586.00	83.19	93.38	9,313.71	5,621.71	43.00	373.64	370.35	4.15	618,121.30	667,149.44
9,617.00	84.86	93.54	9,316.94	5,624.94	41.14	404.41	401.18	5.41	618,119.44	667,180.21
9,649.00	87.14	93.97	9,319.17	5,627.17	39.05	436.26	433.10	7.25	618,117.35	667,212.06
9,681.00	89.08	94.55	9,320.23	5,628.23	36.67	468.16	465.08	6.33	618,114.97	667,243.96
9,712.00	88.81	95.06	9,320.80	5,628.80	34.08	499.04	496.07	1.86	618,112.38	667,274.84
9,744.00	88.72	94.78	9,321.49	5,629.49	31.33	530.92	528.05	0.92	618,109.63	667,306.72
9,775.00	88.64	94.67	9,322.20	5,630.20	28.78	561.80	559.03	0.44	618,107.08	667,337.60
9,807.00	88.46	94.85	9,323.01	5,631.01	26.12	593.68	591.01	0.80	618,104.42	667,369.48
9,838.00	87.49	94.80	9,324.11	5,632.11	23.52	624.55	621.99	3.13	618,101.82	667,400.35
9,870.00	87.41	94.89	9,325.53	5,633.53	20.82	656.41	653.94	0.38	618,099.12	667,432.21
9,902.00	87.41	94.99	9,326.98	5,634.98	18.07	688.26	685.90	0.31	618,096.37	667,464.06
9,932.00	87.14	94.92	9,328.40	5,636.40	15.48	718.11	715.86	0.93	618,093.78	667,493.91
9,964.00	87.41	94.89	9,329.92	5,637.92	12.74	749.96	747.81	0.85	618,091.04	667,525.76
9,995.00	87.58	94.83	9,331.28	5,639.28	10.12	780.82	778.77	0.58	618,088.42	667,556.62
10,027.00	87.85	94.89	9,332.55	5,640.55	7.41	812.68	810.74	0.86	618,085.71	667,588.48
10,059.00	87.93	94.80	9,333.73	5,641.73	4.71	844.54	842.71	0.38	618,083.01	667,620.34
10,090.00	87.85	94.66	9,334.87	5,642.87	2.16	875.41	873.68	0.52	618,080.46	667,651.21
10,122.00	87.93	94.83	9,336.05	5,644.05	-0.49	907.28	905.65	0.59	618,077.81	667,683.08
10,153.00	87.67	94.48	9,337.24	5,645.24	-3.00	938.16	936.62	1.41	618,075.30	667,713.96
10,185.00	87.85	94.56	9,338.49	5,646.49	-5.52	970.03	968.59	0.62	618,072.78	667,745.83
10,216.00	88.20	94.76	9,339.56	5,647.56	-8.04	1,000.91	999.56	1.30	618,070.26	667,776.71
10,247.00	87.49	95.73	9,340.73	5,648.73	-10.87	1,031.76	1,030.53	3.88	618,067.43	667,807.56



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10,279.00	87.41	95.71	9,342.15	5,650.15	-14.06	1,063.57	1,062.47	0.26	618,064.24	667,839.37
10,310.00	87.41	95.71	9,343.55	5,651.55	-17.14	1,094.38	1,093.41	0.00	618,061.16	667,870.18
10,341.00	87.58	95.76	9,344.91	5,652.91	-20.23	1,125.20	1,124.36	0.57	618,058.07	667,901.00
10,373.00	87.76	95.80	9,346.21	5,654.21	-23.45	1,157.01	1,156.31	0.58	618,054.85	667,932.81
10,404.00	87.76	95.46	9,347.42	5,655.42	-26.49	1,187.84	1,187.26	1.10	618,051.81	667,963.64
10,436.00	87.85	95.59	9,348.64	5,656.64	-29.57	1,219.66	1,219.22	0.49	618,048.73	667,995.46
10,468.00	87.05	95.46	9,350.07	5,658.07	-32.65	1,251.48	1,251.17	2.53	618,045.65	668,027.28
10,500.00	87.67	95.66	9,351.54	5,659.54	-35.75	1,283.30	1,283.11	2.04	618,042.55	668,059.10
10,532.00	88.11	95.43	9,352.72	5,660.72	-38.84	1,315.13	1,315.07	1.55	618,039.46	668,090.93
10,563.00	88.29	95.39	9,353.69	5,661.69	-41.76	1,345.98	1,346.03	0.59	618,036.54	668,121.78
10,593.00	88.29	95.14	9,354.59	5,662.59	-44.51	1,375.84	1,376.01	0.83	618,033.79	668,151.64
10,625.00	88.64	95.00	9,355.45	5,663.45	-47.34	1,407.70	1,407.98	1.18	618,030.96	668,183.50
10,656.00	89.43	95.14	9,355.97	5,663.97	-50.08	1,438.57	1,438.97	2.59	618,028.22	668,214.37
10,687.00	90.40	95.39	9,356.01	5,664.01	-52.92	1,469.44	1,469.95	3.23	618,025.38	668,245.24
10,718.00	90.48	95.68	9,355.78	5,663.78	-55.91	1,500.30	1,500.93	0.97	618,022.39	668,276.10
10,750.00	90.66	95.71	9,355.46	5,663.46	-59.08	1,532.14	1,532.90	0.57	618,019.22	668,307.94
10,781.00	90.75	95.41	9,355.08	5,663.08	-62.09	1,562.99	1,563.88	1.01	618,016.21	668,338.79
10,812.00	90.92	95.11	9,354.62	5,662.62	-64.93	1,593.85	1,594.86	1.11	618,013.37	668,369.65
10,844.00	90.92	95.11	9,354.11	5,662.11	-67.78	1,625.72	1,626.84	0.00	618,010.52	668,401.52
10,875.00	91.10	95.05	9,353.56	5,661.56	-70.52	1,656.60	1,657.83	0.61	618,007.78	668,432.40
10,906.00	90.31	95.02	9,353.18	5,661.18	-73.24	1,687.47	1,688.81	2.55	618,005.06	668,463.27
10,938.00	90.04	94.73	9,353.09	5,661.09	-75.96	1,719.36	1,720.80	1.24	618,002.34	668,495.16
10,969.00	89.96	94.82	9,353.09	5,661.09	-78.54	1,750.25	1,751.80	0.39	617,999.76	668,526.05
11,000.00	89.69	94.61	9,353.18	5,661.18	-81.09	1,781.15	1,782.79	1.10	617,997.21	668,556.95
11,031.00	89.87	94.67	9,353.30	5,661.30	-83.60	1,812.04	1,813.78	0.61	617,994.70	668,587.84
11,063.00	90.40	95.06	9,353.22	5,661.22	-86.31	1,843.93	1,845.77	2.06	617,991.99	668,619.73
11,094.00	90.48	95.21	9,352.99	5,660.99	-89.09	1,874.80	1,876.76	0.55	617,989.21	668,650.60



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Survey

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11,111.00	89.60	95.67	9,352.97	5,660.97	-90.70	1,891.73	1,893.75	5.84	617,987.60	668,667.53
11,190.00	89.60	95.67	9,353.52	5,661.52	-98.51	1,970.34	1,972.69	0.00	617,979.79	668,746.14

Proj To Bit-11190.00°MD,89.60°INC,95.67°AZI, 9353.52°TVD, 1972.69°VS, -98.51°N, 1970.34°E - PBHL

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	0.00	0.00	9,320.00	-120.00	1,980.00	617,958.300	668,755.800	32° 41' 51.597 N	103° 47' 5.135 W
- survey misses by 40.98ft at 11190.00ft MD (9353.52 TVD, -98.51 N, 1970.34 E)									
- Point									

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
11,190.00	9,353.52	-98.51	1,970.34	Proj To Bit-11190.00°MD,89.60°INC,95.67°AZI, 9353.52°TVD, 1972.69°

Checked By: _____ Approved By: _____ Date: _____

Surf: 500' FGL, 1650' FWL
EOL: 401' FGL, 1660' FEL