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COG Operating LLC

Eddy County

Caribou 19 Federal

Caribou 19 Federal Com #1H

Original Hole

Survey: MWD #1

Pathfinder X & Y Survey Report

15 March, 2010

PATHFINDER



Pathfinder
Pathfinder X & Y Survey Report



Company: COG Operating LLC
Project: Eddy County
Site: Caribou 19 Federal
Well: Caribou 19 Federal Com #1H
Wellbore: Original Hole
Design: Original Hole

Local Co-ordinate Reference: Well Caribou 19 Federal Com #1H
TVD Reference: Well1 @ 3576.00ft (18' KB Correction)
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Survey Calculation Method: Minimum Curvature
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Map System: US State Plane 1983
Geo Datum: North American Datum 1983
Map Zone: New Mexico Eastern Zone

System Datum: Mean Sea Level

Site: Caribou 19 Federal

Site Position:
From: Map
Position Uncertainty: 0.00 ft
Northing: 691,733.152 ft
Easting: 579,846.595 ft
Slot Radius: "
Latitude: 32° 54' 5.502 N
Longitude: 104° 12' 28.305 W
Grid Convergence: 0.07 °

Well: Caribou 19 Federal Com #1H

Well Position +N/-S 0.00 ft
+E/-W 0.00 ft
Position Uncertainty 0.00 ft
Northing: 691,733.152 ft
Easting: 579,846.595 ft
Wellhead Elevation: ft
Latitude: 32° 54' 5.502 N
Longitude: 104° 12' 28.305 W
Ground Level: 3,558.00 ft

Wellbore: Original Hole

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	02/19/2010	8.09	60.73	49,084

Design: Original Hole

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	276.52



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Survey Program	Date 03/15/2010				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
100.00	5,810.00	GYRO (Original Hole)	NS-GYRO-MS	North sensing gyrocompassing m/s	
5,880.00	10,780.00	MWD #1 (Original Hole)	MWD	MWD - Standard	

Survey	MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	Latitude	Longitude	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
	5,810.00	0.50	27.35	5,809.87	2,233.87	32° 54' 5.681 N104° 12' 28.519 W		20.15	0.00	691,751.21	579,828.38
	5,880.00	1.93	72.80	5,879.86	2,303.86	32° 54' 5.688 N104° 12' 28.504 W		18.96	2.31	691,751.83	579,829.64
	5,911.00	0.62	333.04	5,910.85	2,334.85	32° 54' 5.691 N104° 12' 28.499 W		18.58	6.85	691,752.14	579,830.06
	5,943.00	3.87	285.93	5,942.82	2,366.82	32° 54' 5.695 N104° 12' 28.512 W		19.74	10.87	691,752.59	579,828.95
	5,975.00	7.56	281.10	5,974.66	2,398.86	32° 54' 5.702 N104° 12' 28.548 W		22.91	11.62	691,753.29	579,825.84
	6,007.00	11.26	280.57	6,006.22	2,430.22	32° 54' 5.712 N104° 12' 28.608 W		28.12	11.57	691,754.27	579,820.70
	6,039.00	14.77	281.45	6,037.39	2,461.39	32° 54' 5.725 N104° 12' 28.691 W		35.30	10.99	691,755.65	579,813.63
	6,071.00	18.38	278.20	6,068.06	2,492.06	32° 54' 5.741 N104° 12' 28.797 W		44.41	11.64	691,757.18	579,804.64
	6,103.00	21.63	276.88	6,098.13	2,522.13	32° 54' 5.755 N104° 12' 28.924 W		55.36	10.25	691,758.61	579,793.79
	6,135.00	24.89	276.53	6,127.52	2,551.52	32° 54' 5.770 N104° 12' 29.071 W		67.99	10.20	691,760.08	579,781.24
	6,167.00	27.79	276.79	6,156.19	2,580.19	32° 54' 5.786 N104° 12' 29.237 W		82.19	9.07	691,761.73	579,767.14
	6,199.00	30.95	276.79	6,184.08	2,608.08	32° 54' 5.805 N104° 12' 29.419 W		97.88	9.87	691,763.58	579,751.55
	6,231.00	34.21	276.35	6,211.04	2,635.04	32° 54' 5.824 N104° 12' 29.620 W		115.11	10.21	691,765.55	579,734.44
	6,263.00	37.20	276.96	6,237.02	2,661.02	32° 54' 5.846 N104° 12' 29.838 W		133.78	9.41	691,767.72	579,715.89
	6,294.00	40.10	277.32	6,261.23	2,685.23	32° 54' 5.870 N104° 12' 30.063 W		153.14	9.38	691,770.13	579,696.68
	6,327.00	43.26	277.32	6,285.87	2,709.87	32° 54' 5.898 N104° 12' 30.318 W		175.08	9.58	691,772.92	579,674.92
	6,359.00	46.25	277.14	6,308.59	2,732.59	32° 54' 5.926 N104° 12' 30.580 W		197.61	9.35	691,775.76	579,652.57
	6,391.00	49.33	277.76	6,330.09	2,754.09	32° 54' 5.957 N104° 12' 30.856 W		221.30	9.73	691,778.83	579,629.07
	6,423.00	52.41	277.84	6,350.28	2,774.28	32° 54' 5.991 N104° 12' 31.144 W		246.12	9.63	691,782.20	579,604.48
	6,455.00	55.84	278.20	6,369.03	2,793.03	32° 54' 6.027 N104° 12' 31.445 W		272.03	10.76	691,785.82	579,578.81
	6,486.00	58.48	278.02	6,385.84	2,809.84	32° 54' 6.063 N104° 12' 31.748 W		298.07	8.53	691,789.50	579,553.03



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6,518.00	61.29	277.40	6,401.90	2,825.90	32° 54' 6.100 N104° 12' 32.069 W		325.74	8.94	691,793.21	579,525.60
6,550.00	63.93	276.44	6,416.62	2,840.62	32° 54' 6.135 N104° 12' 32.400 W		354.15	8.67	691,796.63	579,497.40
6,582.00	66.65	276.09	6,429.99	2,853.99	32° 54' 6.166 N104° 12' 32.739 W		383.21	8.56	691,799.80	579,468.50
6,614.00	69.20	276.35	6,442.02	2,866.02	32° 54' 6.198 N104° 12' 33.085 W		412.87	8.00	691,803.01	579,439.03
6,646.00	71.75	277.49	6,452.71	2,876.71	32° 54' 6.235 N104° 12' 33.436 W		443.02	8.65	691,806.65	579,409.09
6,678.00	74.57	278.11	6,461.98	2,885.98	32° 54' 6.276 N104° 12' 33.792 W		473.64	9.01	691,810.80	579,378.75
6,710.00	78.52	278.20	6,469.43	2,893.43	32° 54' 6.320 N104° 12' 34.153 W		504.74	12.35	691,815.22	579,347.95
6,742.00	82.83	278.28	6,474.61	2,898.61	32° 54' 6.365 N104° 12' 34.519 W		536.30	13.47	691,819.74	579,316.70
6,774.00	85.91	279.25	6,477.75	2,901.75	32° 54' 6.414 N104° 12' 34.888 W		568.11	10.09	691,824.60	579,285.23
6,806.00	88.90	279.69	6,479.20	2,903.20	32° 54' 6.466 N104° 12' 35.258 W		600.04	9.44	691,829.85	579,253.71
6,838.00	89.87	279.69	6,479.54	2,903.54	32° 54' 6.520 N104° 12' 35.628 W		631.98	3.03	691,835.24	579,222.16
6,870.00	90.31	279.60	6,479.49	2,903.49	32° 54' 6.573 N104° 12' 35.998 W		663.94	1.40	691,840.60	579,190.62
6,902.00	90.48	279.08	6,479.27	2,903.27	32° 54' 6.625 N104° 12' 36.368 W		695.90	1.71	691,845.79	579,159.04
6,938.00	90.31	278.87	6,479.02	2,903.02	32° 54' 6.681 N104° 12' 36.785 W		731.86	0.75	691,851.41	579,123.48
6,970.00	90.66	278.63	6,478.75	2,902.75	32° 54' 6.730 N104° 12' 37.156 W		763.84	1.33	691,856.28	579,091.86
7,002.00	91.19	277.40	6,478.23	2,902.23	32° 54' 6.774 N104° 12' 37.528 W		795.82	4.18	691,860.74	579,060.17
7,034.00	91.89	276.14	6,477.37	2,901.37	32° 54' 6.812 N104° 12' 37.900 W		827.81	4.50	691,864.51	579,028.41
7,066.00	91.71	275.85	6,476.37	2,900.37	32° 54' 6.845 N104° 12' 38.273 W		859.79	1.07	691,867.85	578,996.60
7,098.00	91.10	275.33	6,475.59	2,899.59	32° 54' 6.876 N104° 12' 38.647 W		891.78	2.50	691,870.97	578,964.76
7,130.00	91.28	274.94	6,474.92	2,898.92	32° 54' 6.905 N104° 12' 39.020 W		923.76	1.34	691,873.83	578,932.90
7,162.00	90.92	274.58	6,474.31	2,898.31	32° 54' 6.932 N104° 12' 39.394 W		955.74	1.59	691,876.49	578,901.01
7,194.00	90.66	275.00	6,473.86	2,897.86	32° 54' 6.959 N104° 12' 39.768 W		987.72	1.54	691,879.16	578,869.13
7,225.00	90.75	274.97	6,473.48	2,897.48	32° 54' 6.986 N104° 12' 40.130 W		1,018.71	0.31	691,881.85	578,838.25
7,257.00	90.66	275.01	6,473.09	2,897.09	32° 54' 7.013 N104° 12' 40.504 W		1,050.69	0.31	691,884.63	578,806.37
7,289.00	90.66	275.01	6,472.72	2,896.72	32° 54' 7.041 N104° 12' 40.878 W		1,082.68	0.00	691,887.43	578,774.50
7,321.00	90.84	275.66	6,472.30	2,896.30	32° 54' 7.071 N104° 12' 41.252 W		1,114.67	2.11	691,890.40	578,742.64
7,353.00	91.01	275.60	6,471.79	2,895.79	32° 54' 7.103 N104° 12' 41.625 W		1,146.66	0.56	691,893.54	578,710.80



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7,385.00	91.10	275.59	6,471.20	2,895.20	32° 54' 7.134 N104° 12' 41.999 W		1,178.65	0.28	691,896.66	578,678.96
7,417.00	90.75	275.43	6,470.68	2,894.68	32° 54' 7.165 N104° 12' 42.372 W		1,210.65	1.20	691,899.73	578,647.11
7,449.00	90.84	274.84	6,470.24	2,894.24	32° 54' 7.193 N104° 12' 42.746 W		1,242.63	1.86	691,902.60	578,615.24
7,481.00	90.84	274.38	6,469.77	2,893.77	32° 54' 7.219 N104° 12' 43.120 W		1,274.61	1.44	691,905.17	578,583.35
7,513.00	90.92	274.35	6,469.28	2,893.28	32° 54' 7.244 N104° 12' 43.494 W		1,306.58	0.27	691,907.60	578,551.44
7,545.00	90.92	274.22	6,468.76	2,892.76	32° 54' 7.268 N104° 12' 43.868 W		1,338.56	0.41	691,910.00	578,519.54
7,577.00	90.92	274.11	6,468.25	2,892.25	32° 54' 7.291 N104° 12' 44.243 W		1,370.53	0.34	691,912.32	578,487.62
7,609.00	90.92	273.99	6,467.73	2,891.73	32° 54' 7.314 N104° 12' 44.617 W		1,402.49	0.37	691,914.58	578,455.71
7,641.00	91.10	274.19	6,467.17	2,891.17	32° 54' 7.337 N104° 12' 44.991 W		1,434.46	0.84	691,916.86	578,423.80
7,673.00	91.19	274.12	6,466.53	2,890.53	32° 54' 7.360 N104° 12' 45.366 W		1,466.42	0.36	691,919.18	578,391.89
7,705.00	91.01	274.31	6,465.92	2,889.92	32° 54' 7.384 N104° 12' 45.740 W		1,498.39	0.82	691,921.53	578,359.98
7,736.00	90.40	274.15	6,465.53	2,889.53	32° 54' 7.407 N104° 12' 46.102 W		1,529.36	2.03	691,923.82	578,329.07
7,768.00	89.69	273.92	6,465.51	2,889.51	32° 54' 7.429 N104° 12' 46.477 W		1,561.33	2.33	691,926.07	578,297.14
7,800.00	89.60	273.82	6,465.71	2,889.71	32° 54' 7.451 N104° 12' 46.851 W		1,593.30	0.42	691,928.23	578,265.22
7,832.00	89.43	273.64	6,465.98	2,889.98	32° 54' 7.472 N104° 12' 47.226 W		1,625.26	0.77	691,930.31	578,233.29
7,864.00	89.52	273.85	6,466.27	2,890.27	32° 54' 7.493 N104° 12' 47.600 W		1,657.22	0.71	691,932.40	578,201.36
7,896.00	90.22	274.45	6,466.34	2,890.34	32° 54' 7.516 N104° 12' 47.975 W		1,689.19	2.88	691,934.72	578,169.44
7,928.00	90.92	274.33	6,466.03	2,890.03	32° 54' 7.541 N104° 12' 48.349 W		1,721.17	2.22	691,937.17	578,137.54
7,960.00	90.48	274.24	6,465.64	2,889.64	32° 54' 7.565 N104° 12' 48.723 W		1,753.14	1.40	691,939.56	578,105.63
7,992.00	90.04	274.39	6,465.49	2,889.49	32° 54' 7.589 N104° 12' 49.097 W		1,785.12	1.45	691,941.96	578,073.72
8,024.00	90.13	274.60	6,465.44	2,889.44	32° 54' 7.614 N104° 12' 49.471 W		1,817.10	0.71	691,944.47	578,041.82
8,056.00	90.66	275.85	6,465.22	2,889.22	32° 54' 7.643 N104° 12' 49.845 W		1,849.09	4.24	691,947.39	578,009.95
8,088.00	90.92	277.25	6,464.78	2,888.78	32° 54' 7.680 N104° 12' 50.218 W		1,881.09	4.45	691,951.04	577,978.17
8,120.00	91.28	278.56	6,464.17	2,888.17	32° 54' 7.724 N104° 12' 50.590 W		1,913.07	4.24	691,955.44	577,946.48
8,152.00	90.57	279.25	6,463.65	2,887.65	32° 54' 7.773 N104° 12' 50.960 W		1,945.04	3.09	691,960.39	577,914.87
8,184.00	90.92	279.48	6,463.23	2,887.23	32° 54' 7.825 N104° 12' 51.331 W		1,977.00	1.31	691,965.60	577,883.30
8,216.00	91.28	279.61	6,462.62	2,886.62	32° 54' 7.878 N104° 12' 51.701 W		2,008.94	1.20	691,970.90	577,851.74



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8,248.00	91.01	279.46	6,461.98	2,885.98	32° 54' 7.931 N104° 12' 52.071 W		2,040.89	0.97	691,976.20	577,820.19
8,280.00	90.92	279.25	6,461.44	2,885.44	32° 54' 7.982 N104° 12' 52.441 W		2,072.85	0.71	691,981.40	577,788.62
8,311.00	92.15	279.00	6,460.61	2,884.61	32° 54' 8.031 N104° 12' 52.800 W		2,103.81	4.05	691,986.32	577,758.03
8,344.00	92.07	278.91	6,459.40	2,883.40	32° 54' 8.083 N104° 12' 53.182 W		2,136.75	0.36	691,991.45	577,725.45
8,376.00	91.54	278.94	6,458.39	2,882.39	32° 54' 8.132 N104° 12' 53.552 W		2,168.71	1.66	691,996.41	577,693.85
8,407.00	91.71	279.12	6,457.51	2,881.51	32° 54' 8.181 N104° 12' 53.911 W		2,199.67	0.80	692,001.27	577,663.25
8,439.00	91.80	279.32	6,456.53	2,880.53	32° 54' 8.232 N104° 12' 54.281 W		2,231.62	0.69	692,006.40	577,631.68
8,471.00	91.89	278.97	6,455.50	2,879.50	32° 54' 8.282 N104° 12' 54.652 W		2,263.57	1.13	692,011.48	577,600.10
8,503.00	91.71	278.89	6,454.49	2,878.49	32° 54' 8.332 N104° 12' 55.022 W		2,295.52	0.62	692,016.45	577,568.51
8,535.00	91.54	278.59	6,453.59	2,877.59	32° 54' 8.380 N104° 12' 55.393 W		2,327.49	1.08	692,021.31	577,536.89
8,567.00	91.28	278.09	6,452.80	2,876.80	32° 54' 8.426 N104° 12' 55.764 W		2,359.46	1.76	692,025.95	577,505.24
8,599.00	91.36	277.82	6,452.06	2,876.06	32° 54' 8.471 N104° 12' 56.136 W		2,391.44	0.88	692,030.38	577,473.56
8,631.00	91.28	277.05	6,451.32	2,875.32	32° 54' 8.512 N104° 12' 56.508 W		2,423.43	2.42	692,034.51	577,441.83
8,663.00	90.48	276.59	6,450.83	2,874.83	32° 54' 8.550 N104° 12' 56.880 W		2,455.42	2.88	692,038.31	577,410.06
8,695.00	90.48	275.99	6,450.56	2,874.56	32° 54' 8.585 N104° 12' 57.254 W		2,487.42	1.87	692,041.82	577,378.26
8,727.00	90.66	275.73	6,450.25	2,874.25	32° 54' 8.618 N104° 12' 57.627 W		2,519.42	0.99	692,045.09	577,346.43
8,759.00	90.66	275.35	6,449.88	2,873.88	32° 54' 8.648 N104° 12' 58.000 W		2,551.41	1.19	692,048.18	577,314.58
8,791.00	90.75	274.97	6,449.48	2,873.48	32° 54' 8.677 N104° 12' 58.374 W		2,583.40	1.22	692,051.05	577,282.71
8,823.00	90.75	275.09	6,449.06	2,873.06	32° 54' 8.705 N104° 12' 58.748 W		2,615.39	0.37	692,053.86	577,250.84
8,855.00	90.57	275.28	6,448.70	2,872.70	32° 54' 8.734 N104° 12' 59.122 W		2,647.38	0.82	692,056.75	577,218.97
8,887.00	90.75	275.10	6,448.33	2,872.33	32° 54' 8.763 N104° 12' 59.495 W		2,679.37	0.80	692,059.65	577,187.10
8,919.00	90.92	275.04	6,447.86	2,871.86	32° 54' 8.792 N104° 12' 59.869 W		2,711.35	0.56	692,062.47	577,155.23
8,951.00	90.84	275.19	6,447.37	2,871.37	32° 54' 8.820 N 104° 13' 0.243 W		2,743.34	0.53	692,065.33	577,123.36
8,983.00	90.48	275.40	6,447.00	2,871.00	32° 54' 8.850 N 104° 13' 0.617 W		2,775.33	1.30	692,068.28	577,091.50
9,015.00	90.22	275.51	6,446.81	2,870.81	32° 54' 8.880 N 104° 13' 0.990 W		2,807.32	0.88	692,071.32	577,059.65
9,047.00	89.60	275.93	6,446.86	2,870.86	32° 54' 8.912 N 104° 13' 1.364 W		2,839.32	2.34	692,074.51	577,027.81
9,079.00	89.08	276.19	6,447.22	2,871.22	32° 54' 8.946 N 104° 13' 1.737 W		2,871.32	1.82	692,077.89	576,995.99



Pathfinder
Pathfinder X & Y Survey Report



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North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Midland Database

Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	Latitude	Longitude	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
9,106.00	89.16	276.53	6,447.64	2,871.64	32° 54' 8.976 N	104° 13' 2.052 W	2,898.31	1.29	692,080.88	576,969.16
9,138.00	89.87	276.26	6,447.91	2,871.91	32° 54' 9.011 N	104° 13' 2.425 W	2,930.31	2.37	692,084.44	576,937.36
9,170.00	90.66	276.26	6,447.76	2,871.76	32° 54' 9.046 N	104° 13' 2.798 W	2,962.31	2.47	692,087.93	576,905.55
9,202.00	90.92	275.91	6,447.32	2,871.32	32° 54' 9.080 N	104° 13' 3.171 W	2,994.31	1.36	692,091.32	576,873.73
9,234.00	90.75	275.21	6,446.85	2,870.85	32° 54' 9.111 N	104° 13' 3.544 W	3,026.30	2.25	692,094.42	576,841.89
9,266.00	90.04	275.30	6,446.63	2,870.63	32° 54' 9.141 N	104° 13' 3.918 W	3,058.29	2.24	692,097.35	576,810.02
9,298.00	90.48	275.47	6,446.49	2,870.49	32° 54' 9.171 N	104° 13' 4.292 W	3,090.28	1.47	692,100.36	576,778.16
9,330.00	91.10	275.21	6,446.05	2,870.05	32° 54' 9.200 N	104° 13' 4.665 W	3,122.27	2.10	692,103.34	576,746.30
9,361.00	91.98	275.30	6,445.21	2,869.21	32° 54' 9.229 N	104° 13' 5.027 W	3,153.25	2.85	692,106.17	576,715.45
9,393.00	92.51	275.38	6,443.96	2,867.96	32° 54' 9.259 N	104° 13' 5.401 W	3,185.22	1.67	692,109.15	576,683.61
9,425.00	91.71	276.35	6,442.78	2,866.78	32° 54' 9.291 N	104° 13' 5.774 W	3,217.20	3.93	692,112.42	576,651.80
9,457.00	91.28	276.44	6,441.95	2,865.95	32° 54' 9.327 N	104° 13' 6.147 W	3,249.19	1.37	692,115.98	576,620.01
9,489.00	90.04	276.00	6,441.58	2,865.58	32° 54' 9.362 N	104° 13' 6.520 W	3,281.18	4.11	692,119.45	576,588.20
9,521.00	89.16	276.00	6,441.80	2,865.80	32° 54' 9.395 N	104° 13' 6.893 W	3,313.18	2.75	692,122.79	576,556.38
9,553.00	88.37	276.00	6,442.49	2,866.49	32° 54' 9.428 N	104° 13' 7.266 W	3,345.17	2.47	692,126.14	576,524.56
9,585.00	87.05	276.26	6,443.77	2,867.77	32° 54' 9.463 N	104° 13' 7.639 W	3,377.14	4.20	692,129.55	576,492.77
9,617.00	86.27	276.53	6,445.64	2,869.64	32° 54' 9.498 N	104° 13' 8.011 W	3,409.09	2.58	692,133.11	576,461.02
9,649.00	86.09	276.26	6,447.77	2,871.77	32° 54' 9.534 N	104° 13' 8.383 W	3,441.02	1.01	692,136.66	576,429.29
9,681.00	86.79	275.91	6,449.75	2,873.75	32° 54' 9.567 N	104° 13' 8.756 W	3,472.96	2.44	692,140.05	576,397.53
9,713.00	87.76	275.82	6,451.28	2,875.28	32° 54' 9.600 N	104° 13' 9.129 W	3,504.92	3.04	692,143.32	576,365.74
9,745.00	89.25	275.56	6,452.11	2,876.11	32° 54' 9.632 N	104° 13' 9.502 W	3,536.90	4.73	692,146.49	576,333.91
9,777.00	90.40	275.65	6,452.21	2,876.21	32° 54' 9.663 N	104° 13' 9.876 W	3,568.90	3.60	692,149.61	576,302.06
9,809.00	91.71	275.30	6,451.62	2,875.62	32° 54' 9.694 N	104° 13' 10.249 W	3,600.89	4.24	692,152.67	576,270.21
9,840.00	91.98	274.94	6,450.62	2,874.62	32° 54' 9.721 N	104° 13' 10.611 W	3,631.86	1.45	692,155.43	576,239.35
9,872.00	91.36	274.42	6,449.69	2,873.69	32° 54' 9.748 N	104° 13' 10.985 W	3,663.83	2.53	692,158.04	576,207.47
9,904.00	90.57	274.68	6,449.15	2,873.15	32° 54' 9.773 N	104° 13' 11.359 W	3,695.81	2.60	692,160.58	576,175.58
9,936.00	89.52	274.59	6,449.12	2,873.12	32° 54' 9.799 N	104° 13' 11.733 W	3,727.79	3.29	692,163.16	576,143.68



Pathfinder
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Survey Calculation Method: Minimum Curvature
Database: Midland Database

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	Latitude	Longitude	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
9,968.00	89.08	274.86	6,449.52	2,873.52	32° 54' 9.825 N104° 13' 12.107 W		3,759.77	1.61	692,165.80	576,111.80
10,000.00	89.08	274.07	6,450.03	2,874.03	32° 54' 9.850 N104° 13' 12.481 W		3,791.75	2.47	692,168.29	576,079.90
10,032.00	88.20	274.50	6,450.79	2,874.79	32° 54' 9.874 N104° 13' 12.855 W		3,823.71	3.06	692,170.68	576,048.00
10,064.00	88.72	274.24	6,451.65	2,875.65	32° 54' 9.899 N104° 13' 13.229 W		3,855.68	1.82	692,173.12	576,016.10
10,096.00	90.04	274.07	6,451.99	2,875.99	32° 54' 9.922 N104° 13' 13.604 W		3,887.65	4.16	692,175.44	575,984.19
10,128.00	91.19	273.36	6,451.65	2,875.65	32° 54' 9.943 N104° 13' 13.978 W		3,919.61	4.22	692,177.51	575,952.26
10,159.00	92.42	273.27	6,450.67	2,874.67	32° 54' 9.961 N104° 13' 14.341 W		3,950.54	3.98	692,179.30	575,921.33
10,191.00	93.74	273.36	6,448.96	2,872.96	32° 54' 9.980 N104° 13' 14.715 W		3,982.45	4.13	692,181.15	575,889.43
10,223.00	94.09	273.10	6,446.77	2,870.77	32° 54' 9.998 N104° 13' 15.089 W		4,014.32	1.36	692,182.95	575,857.55
10,255.00	93.21	273.89	6,444.73	2,868.73	32° 54' 10.017 N104° 13' 15.463 W		4,046.21	3.69	692,184.90	575,825.68
10,286.00	92.15	274.24	6,443.28	2,867.28	32° 54' 10.039 N104° 13' 15.825 W		4,077.15	3.60	692,187.09	575,794.79
10,319.00	91.10	274.59	6,442.35	2,866.35	32° 54' 10.065 N104° 13' 16.211 W		4,110.11	3.35	692,189.63	575,761.90
10,351.00	90.57	275.12	6,441.88	2,865.88	32° 54' 10.092 N104° 13' 16.585 W		4,142.09	2.34	692,192.34	575,730.02
10,383.00	90.57	275.30	6,441.56	2,865.56	32° 54' 10.121 N104° 13' 16.959 W		4,174.08	0.56	692,195.24	575,698.15
10,414.00	90.13	275.82	6,441.37	2,865.37	32° 54' 10.151 N104° 13' 17.321 W		4,205.08	2.20	692,198.25	575,667.30
10,446.00	90.48	276.09	6,441.20	2,865.20	32° 54' 10.184 N104° 13' 17.694 W		4,237.07	1.38	692,201.57	575,635.47
10,478.00	91.01	276.44	6,440.79	2,864.79	32° 54' 10.219 N104° 13' 18.067 W		4,269.07	1.98	692,205.06	575,603.67
10,510.00	91.36	276.17	6,440.13	2,864.13	32° 54' 10.254 N104° 13' 18.440 W		4,301.06	1.38	692,208.57	575,571.87
10,542.00	90.13	276.70	6,439.71	2,863.71	32° 54' 10.290 N104° 13' 18.813 W		4,333.06	4.19	692,212.16	575,540.07
10,574.00	88.64	277.05	6,440.05	2,864.05	32° 54' 10.328 N104° 13' 19.185 W		4,365.06	4.78	692,215.99	575,508.30
10,606.00	87.93	277.84	6,441.01	2,865.01	32° 54' 10.370 N104° 13' 19.557 W		4,397.04	3.32	692,220.13	575,476.59
10,638.00	88.46	277.76	6,442.02	2,866.02	32° 54' 10.413 N104° 13' 19.929 W		4,429.01	1.67	692,224.47	575,444.90
10,670.00	89.16	277.40	6,442.68	2,866.68	32° 54' 10.455 N104° 13' 20.301 W		4,461.00	2.46	692,228.69	575,413.19
10,702.00	89.60	277.49	6,443.03	2,867.03	32° 54' 10.496 N104° 13' 20.673 W		4,493.00	1.40	692,232.84	575,381.46
10,708.00	89.69	277.58	6,443.07	2,867.07	32° 54' 10.504 N104° 13' 20.743 W		4,498.99	2.12	692,233.63	575,375.51
10,780.00	89.69	277.58	6,443.46	2,867.46	32° 54' 10.599 N104° 13' 21.580 W		4,570.98	0.00	692,243.12	575,304.14

BHL-10780.00°MD,89.69°INC,277.58°AZI, 6443.46°TVD, 4570.98°VS, 509.97°N, -4542.45°E



Pathfinder
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Survey Calculation Method: Minimum Curvature
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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
PBHL			0.00	0.00	6,448.05	519.18	-4,547.73	692,252.327	575,298.869	32° 54' 10.690 N	104° 13' 21.641 W
- survey misses target center by 11.56ft at 10780.00ft MD (6443.46 TVD, 509.97 N, -4542.45 E)											
- Point											

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N-S (ft)	+E-W (ft)	
10,780.00	6,443.46	509.97	-4,542.45	BHL-10780.00°MD,89.69°INC,277 58°AZI, 6443.46°TVD, 4570 98°VS, 5

Checked By: _____ Approved By: _____ Date: _____