



Energen Resources

SJ BR: S29, T32N, R5W

Eul Canyon

Elk Horn #101S

Motherbore

30-039-09812

RCVD NOV 2 '07
OIL CONS. DIV.

Survey: EOW OH

DIST. 3

End of Well Survey

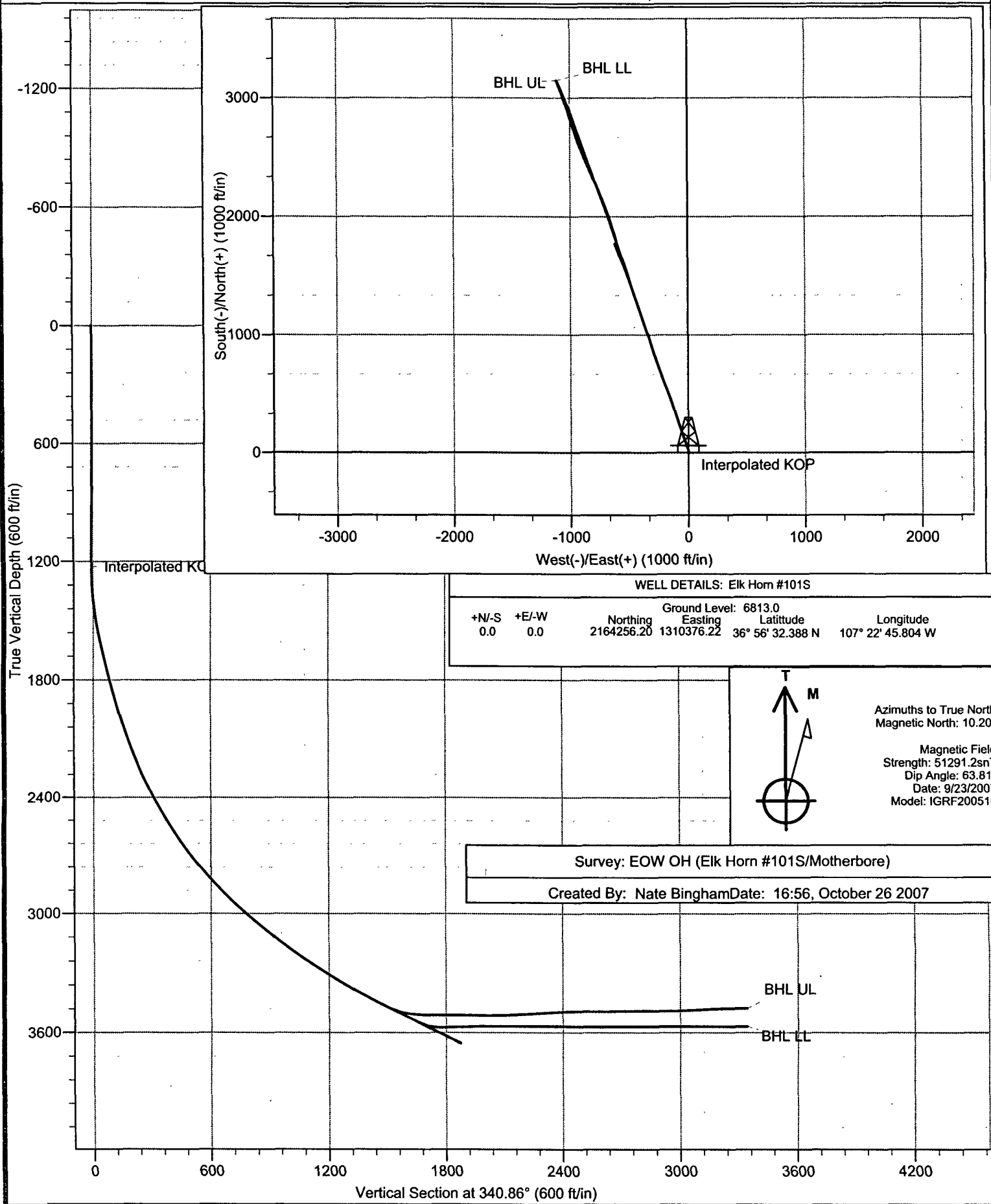
26 October, 2007

Surface 620/N 770/E Sec 32
BHL 1151/S 1387/E Sec 29
Md 4498 Tld 3652

PATHFINDER
ENERGY SERVICES

08

Survey: EOW OH (Elk Horn #101S/Motherbore)





Pathfinder Energy Services

End of Well Survey



Company: Energen Resources
 Project: SJ BR: S29, T32N, R5W
 Site: Eul Canyon
 Well: Elk Horn #101S
 Wellbore: Motherbore
 Design: Motherbore

Local Co-ordinate Reference: Well Elk Horn #101S
 TVD Reference: WELL @ 6828.0ft (Rig Floor)
 MD Reference: WELL @ 6828.0ft (Rig Floor)
 North Reference: True
 Survey Calculation Method: Minimum Curvature
 Database: EDM 2003.16 Single User Db

Project SJ BR: S29, T32N, R5W

Map System: US State Plane 1983
Geo Datum: North American Datum 1983
Map Zone: New Mexico Central Zone
System Datum: Mean Sea Level

Site Eul Canyon

Site Position:
From: Lat/Long
Position Uncertainty: 0.0 ft
Northing: 2,164,256.20 ft
Easting: 1,310,376.22 ft
Slot Radius: "
Latitude: 36° 56' 32.388 N
Longitude: 107° 22' 45.804 W
Grid Convergence: -0.68 °

Well Elk Horn #101S

Well Position +N/-S 0.0 ft
 +E/-W 0.0 ft
Position Uncertainty 0.0 ft
Northing: 2,164,256.20 ft
Easting: 1,310,376.22 ft
Wellhead Elevation: 6,813.0 ft
Latitude: 36° 56' 32.388 N
Longitude: 107° 22' 45.804 W
Ground Level: 6,813.0 ft

Wellbore Motherbore

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	9/23/2007	10.20	63.81	51,291

Design Motherbore

Audit Notes:
Version: 1.0
Phase: ACTUAL
Tie On Depth: 0.0
Vertical Section:
Depth From (TVD) (ft)
+N/-S (ft)
+E/-W (ft)
Direction (°)
 0.0 0.0 0.0 340.86

Survey Program Date 10/25/2007

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
227.0	4,498.0	EOW OH (Motherbore)	Pathfinder	Pathfinder MWD

Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.0
227.0	0.07	254.36	227.0	0.0	-0.1	0.03	0.0
305.0	0.09	254.36	305.0	-0.1	-0.2	0.03	0.0
768.0	0.62	125.43	768.0	-1.6	1.5	0.15	-2.0
1,169.0	1.06	104.51	1,168.9	-3.8	6.8	0.13	-5.8
1,199.0	1.14	96.77	1,198.9	-3.9	7.4	0.56	-6.1
1,225.0	0.92	84.58	1,224.9	-3.9	7.8	1.19	-6.3
1,230.0	0.88	81.57	1,229.9	-3.9	7.9	1.24	-6.3
1,261.0	0.79	35.51	1,260.9	-3.7	8.3	2.12	-6.2
1,290.0	1.49	349.63	1,289.9	-3.2	8.3	3.79	-5.7
1,321.0	3.08	340.85	1,320.9	-2.0	8.0	5.24	-4.5
1,351.0	4.48	340.49	1,350.8	-0.1	7.3	4.67	-2.5



Pathfinder Energy Services
End of Well Survey



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Local Co-ordinate Reference: Well Elk Horn #101S
TVD Reference: WELL @ 6828.0ft (Rig Floor)
MD Reference: WELL @ 6828.0ft (Rig Floor)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)
1,383.0	5.63	342.87	1,382.7	2.6	6.4	3.65	0.3
1,415.0	6.68	344.27	1,414.5	5.9	5.5	3.31	3.7
1,447.0	7.83	342.87	1,446.3	9.7	4.3	3.64	7.8
1,479.0	8.88	341.37	1,477.9	14.1	2.9	3.35	12.4
1,510.0	9.76	340.93	1,508.5	18.9	1.3	2.85	17.4
1,542.0	10.90	341.72	1,540.0	24.3	-0.6	3.59	23.2
1,572.0	11.78	342.25	1,569.4	29.9	-2.4	2.95	29.1
1,604.0	12.57	342.34	1,600.7	36.4	-4.4	2.47	35.8
1,635.0	13.28	341.55	1,630.9	43.0	-6.6	2.36	42.8
1,667.0	13.89	341.46	1,662.0	50.1	-9.0	1.91	50.3
1,697.0	13.98	339.70	1,691.1	56.9	-11.4	1.44	57.5
1,729.0	14.25	339.18	1,722.2	64.2	-14.1	0.93	65.3
1,761.0	14.60	339.88	1,753.2	71.7	-16.9	1.22	73.3
1,792.0	14.60	340.23	1,783.2	79.0	-19.6	0.28	81.1
1,823.0	14.86	340.76	1,813.1	86.5	-22.2	0.94	89.0
1,855.0	14.95	341.11	1,844.1	94.2	-24.9	0.40	97.2
1,886.0	15.39	340.32	1,874.0	101.9	-27.6	1.57	105.3
1,918.0	15.83	339.18	1,904.8	110.0	-30.5	1.68	113.9
1,949.0	16.53	339.09	1,934.6	118.0	-33.6	2.26	122.5
1,980.0	17.41	339.53	1,964.2	126.5	-36.8	2.87	131.6
2,011.0	18.29	340.05	1,993.7	135.4	-40.1	2.88	141.1
2,044.0	19.08	340.49	2,025.0	145.4	-43.7	2.43	151.7
2,075.0	19.61	340.49	2,054.2	155.1	-47.1	1.71	161.9
2,107.0	20.05	340.32	2,084.3	165.3	-50.7	1.39	172.8
2,139.0	20.58	340.32	2,114.4	175.7	-54.5	1.66	183.9
2,171.0	21.02	341.20	2,144.3	186.5	-58.2	1.69	195.3
2,202.0	21.72	341.20	2,173.1	197.2	-61.9	2.26	206.6
2,234.0	22.25	341.20	2,202.8	208.5	-65.7	1.66	218.5
2,266.0	22.77	341.11	2,232.4	220.1	-69.7	1.63	230.8
2,297.0	23.48	341.28	2,260.9	231.6	-73.6	2.30	243.0
2,328.0	24.45	341.72	2,289.2	243.6	-77.6	3.18	255.5
2,359.0	25.32	342.51	2,317.3	256.0	-81.6	3.00	268.6
2,391.0	25.94	341.46	2,346.2	269.1	-85.9	2.40	282.4
2,423.0	26.56	341.37	2,374.9	282.6	-90.4	1.94	296.6
2,454.0	27.26	341.72	2,402.5	295.9	-94.8	2.32	310.6
2,485.0	28.58	342.08	2,429.9	309.7	-99.3	4.29	325.1
2,516.0	29.99	342.60	2,457.0	324.1	-103.9	4.62	340.3
2,547.0	30.69	342.25	2,483.7	339.0	-108.7	2.33	355.9
2,579.0	30.69	341.11	2,511.2	354.5	-113.8	1.82	372.3
2,611.0	31.04	340.93	2,538.7	370.1	-119.1	1.13	388.7
2,642.0	31.92	341.28	2,565.1	385.4	-124.4	2.90	404.9
2,674.0	33.06	341.81	2,592.1	401.7	-129.8	3.67	422.1
2,705.0	34.38	341.99	2,617.9	418.0	-135.2	4.27	439.3
2,737.0	35.53	340.93	2,644.1	435.4	-141.0	4.06	457.6



Pathfinder Energy Services
End of Well Survey



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Wellbore: Motherbore
Design: Motherbore

Local Co-ordinate Reference: Well Elk Horn #101S
TVD Reference: WELL @ 6828.0ft (Rig Floor)
MD Reference: WELL @ 6828.0ft (Rig Floor)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Survey								
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)	
2,768.0	36.67	340.23	2,669.2	452.7	-147.1	3.91	475.9	
2,800.0	37.46	339.44	2,694.7	470.8	-153.7	2.88	495.1	
2,831.0	38.43	339.18	2,719.2	488.6	-160.5	3.17	514.2	
2,862.0	39.04	338.82	2,743.3	506.7	-167.4	2.10	533.6	
2,894.0	39.92	338.65	2,768.0	525.7	-174.8	2.77	553.9	
2,925.0	41.14	338.74	2,791.6	544.4	-182.1	3.94	574.0	
2,957.0	41.77	338.73	2,815.6	564.2	-189.8	1.97	595.2	
2,987.0	42.03	338.65	2,837.9	582.8	-197.1	0.88	615.2	
3,018.0	42.74	338.65	2,860.8	602.3	-204.7	2.29	636.1	
3,048.0	44.05	339.00	2,882.6	621.5	-212.1	4.44	656.7	
3,079.0	45.20	339.99	2,904.7	641.9	-219.8	4.34	678.5	
3,110.0	46.08	340.32	2,926.3	662.8	-227.3	2.94	700.6	
3,142.0	46.78	340.67	2,948.4	684.6	-235.0	2.33	723.8	
3,173.0	47.66	340.58	2,969.5	706.1	-242.6	2.85	746.6	
3,204.0	48.28	340.93	2,990.2	727.8	-250.2	2.17	769.6	
3,267.0	49.77	340.40	3,031.5	772.7	-265.9	2.45	817.2	
3,298.0	50.91	340.85	3,051.3	795.2	-273.8	3.84	841.0	
3,329.0	51.35	341.28	3,070.8	818.0	-281.7	1.78	865.2	
3,361.0	51.44	341.55	3,090.7	841.7	-289.6	0.72	890.2	
3,392.0	51.35	342.43	3,110.1	864.8	-297.1	2.24	914.4	
3,423.0	51.70	342.78	3,129.4	887.9	-304.4	1.43	938.7	
3,455.0	52.50	342.87	3,149.0	912.1	-311.8	2.51	963.9	
3,487.0	53.55	343.04	3,168.3	936.5	-319.3	3.31	989.4	
3,518.0	54.69	342.43	3,186.4	960.5	-326.8	4.01	1,014.5	
3,549.0	55.40	341.90	3,204.2	984.7	-334.6	2.68	1,039.9	
3,579.0	56.28	341.20	3,221.0	1,008.2	-342.4	3.51	1,064.8	
3,611.0	56.72	341.11	3,238.7	1,033.5	-351.0	1.39	1,091.4	
3,642.0	57.60	341.46	3,255.5	1,058.1	-359.4	2.99	1,117.5	
3,674.0	58.04	341.46	3,272.6	1,083.8	-368.0	1.37	1,144.6	
3,705.0	58.39	341.55	3,288.9	1,108.8	-376.4	1.16	1,170.9	
3,737.0	58.65	341.22	3,305.6	1,134.7	-385.1	1.20	1,198.2	
3,769.0	59.00	341.09	3,322.2	1,160.6	-393.9	1.15	1,225.6	
3,800.0	58.92	340.44	3,338.1	1,185.7	-402.7	1.81	1,252.2	
3,831.0	59.53	340.29	3,354.0	1,210.8	-411.6	2.01	1,278.8	
3,863.0	60.50	340.12	3,370.0	1,236.8	-421.0	3.07	1,306.5	
3,894.0	61.29	340.66	3,385.1	1,262.3	-430.1	2.97	1,333.6	
3,925.0	62.08	341.13	3,399.8	1,288.1	-439.0	2.88	1,360.9	
3,957.0	62.70	341.00	3,414.6	1,315.0	-448.2	1.97	1,389.2	
3,988.0	63.14	341.88	3,428.7	1,341.1	-457.0	2.90	1,416.8	
4,020.0	63.58	342.03	3,443.1	1,368.3	-465.9	1.44	1,445.4	
4,052.0	63.84	341.35	3,457.2	1,395.6	-474.9	2.07	1,474.1	
4,083.0	64.02	341.62	3,470.9	1,422.0	-483.7	0.97	1,502.0	
4,116.0	64.28	340.74	3,485.3	1,450.1	-493.3	2.53	1,531.7	
4,147.0	64.46	340.36	3,498.7	1,476.4	-502.6	1.25	1,559.6	



Pathfinder Energy Services
End of Well Survey



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Wellbore: Motherbore
Design: Motherbore

Local Co-ordinate Reference: Well Elk Horn #101S
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North Reference: True
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Database: EDM 2003.16 Single User Db

Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)
4,160.0	64.17	339.74	3,504.3	1,487.4	-506.6	4.84	1,571.3
4,179.0	63.75	338.84	3,512.6	1,503.4	-512.6	4.80	1,588.4
4,205.0	63.82	338.95	3,524.1	1,525.2	-521.0	0.47	1,611.7
4,211.0	63.84	338.98	3,526.8	1,530.2	-523.0	0.56	1,617.1
4,241.0	63.75	338.20	3,540.0	1,555.3	-532.8	2.35	1,644.0
4,272.0	63.31	338.46	3,553.8	1,581.0	-543.1	1.61	1,671.7
4,303.0	63.14	338.62	3,567.8	1,606.8	-553.2	0.72	1,699.3
4,334.0	63.49	338.60	3,581.7	1,632.6	-563.3	1.13	1,727.0
4,366.0	64.19	339.09	3,595.8	1,659.4	-573.6	2.58	1,755.7
4,385.0	64.72	338.71	3,604.0	1,675.4	-579.8	3.32	1,772.9
4,498.0	64.72	338.71	3,652.3	1,770.6	-616.9	0.00	1,875.0

Targets

Target Name

- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- Shape									
KOP	0.00	0.00	1,225.0	0.0	0.0	2,164,256.20	1,310,376.22	36° 56' 32.388 N	107° 22' 45.804 W
- survey misses by 8.8ft at 1224.9ft MD (1224.9 TVD, -3.9 N, 7.8 E)									
- Point									
Drill Window	0.00	0.00	0.0	0.0	0.0	2,164,256.20	1,310,376.22	36° 56' 32.388 N	107° 22' 45.804 W
- survey hits target									
- Rectangle (sides W1,970.0 H1,307.6 D0.0)									
Build Curve	0.00	0.00	3,400.0	1,284.0	-445.6	2,165,545.39	1,309,945.87	36° 56' 45.083 N	107° 22' 51.293 W
- survey misses by 7.6ft at 3923.6ft MD (3399.1 TVD, 1286.9 N, -438.6 E)									
- Point									
PBHL OH	0.00	0.00	3,694.6	1,854.7	-643.7	2,166,118.40	1,309,754.54	36° 56' 50.726 N	107° 22' 53.733 W
- survey misses by 97.9ft at 4498.0ft MD (3652.3 TVD, 1770.6 N, -616.9 E)									
- Point									

Checked By: _____ Approved By: _____ Date: _____