

47-059-02260H  
MOD

**Kinzer Drilling Company, LLC**  
Mingo County, WV (NAD-83)  
Logan Coal & Timber  
#2403

OH

Plan: Plan #2

## Standard Planning Report

09 November, 2016

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WV Department of  
Environmental Protection

12/02/2016

59 02260H

# Kinzer Drilling Company, LLC

Project: Mingo County, WV (NAD-83)  
 Site: Logan Coal & Timber  
 Well: #2403  
 Wellbore: OH  
 Design: Plan #2



### WELL DETAILS: #2403

Rig Name: RKB = 10' @ 1186.93usft						
Ground Level: 1176.93						
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	
0 00	0 00	208784.00	1655701.00	37° 34' 6.122 N	82° 4' 45.260 W	

### SECTION DETAILS

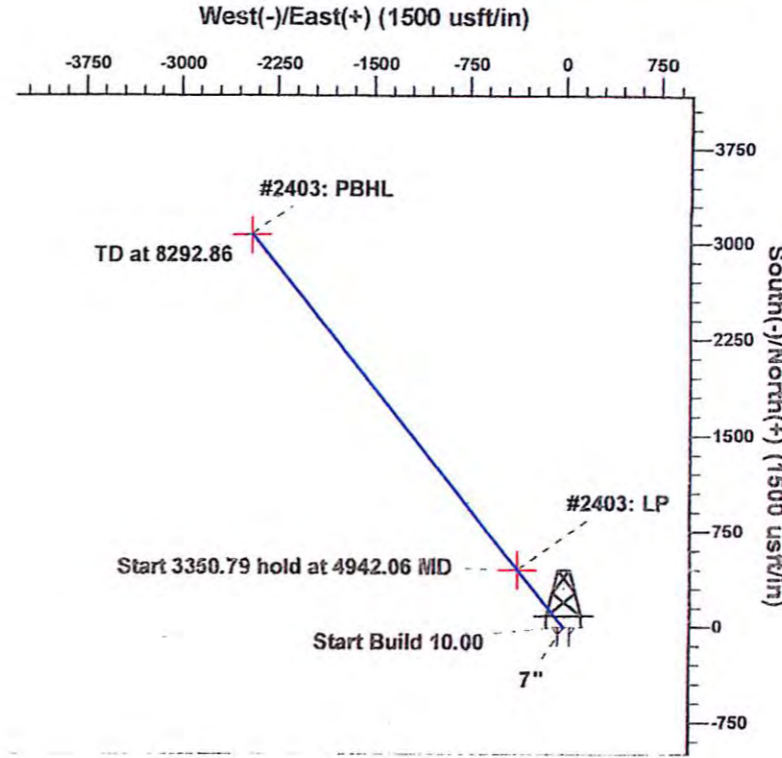
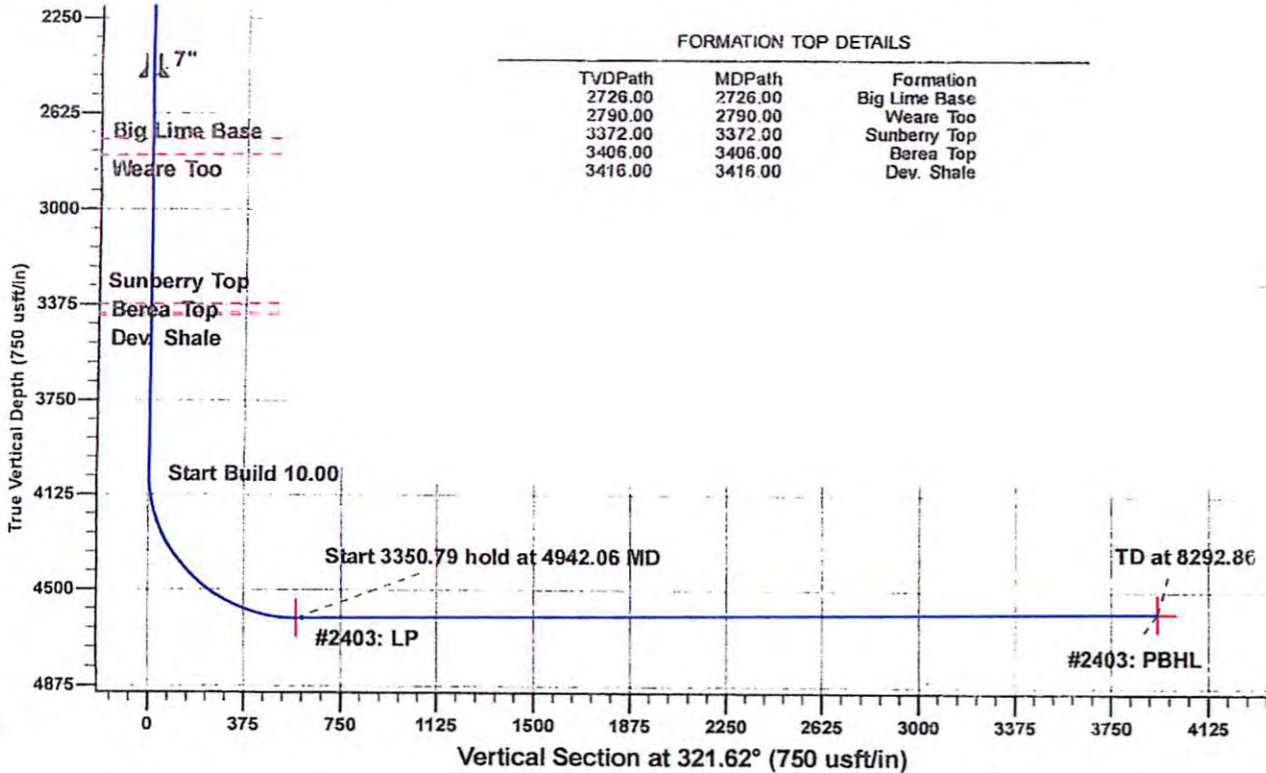
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	4037.06	0.00	0.00	4037.06	0.00	0.00	0.00	0.00	0.00	
3	4942.06	90.50	321.62	4610.00	453.08	-358.82	10.00	321.62	577.96	
4	8292.86	90.50	321.62	4580.76	3079.81	-2439.03	0.00	0.00	3928.62	#2403: PBHL

### DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
#2403 PBHL	4580.76	3079.81	-2439.03	211892.00	1653298.00	37° 34' 36.570 N	82° 5' 15.557 W	Point
#2403 LP	4610.00	453.08	-358.82	209241.23	1655347.48	37° 34' 10.602 N	82° 4' 49.716 W	Point

### FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2726.00	2726.00	Big Lime Base
2790.00	2790.00	Weare Too
3372.00	3372.00	Sunberry Top
3406.00	3406.00	Berea Top
3416.00	3416.00	Dev. Shale



### PROJECT DETAILS: Mingo County, WV (NAD-83)

Geodetic System: US State Plane 1983  
 Datum: North American Datum 1983  
 Ellipsoid: GRS 1980  
 Zone: West Virginia Southern Zone  
 System Datum: Mean Sea Level



Azimuths to True North  
 Magnetic North: -7.28°

Magnetic Field  
 Strength: 51230.7snT  
 Dip Angle: 65.42°  
 Date: 11/9/2016  
 Model: IGRF2015

Plan: Plan #2 (#2403/OH)

Created By: Matthew Max Date: 17:58 November 09 2016

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WV Department of  
 Environmental Protection

<b>Database:</b>	Single User DB Primary	<b>Local Co-ordinate Reference:</b>	Well #2403
<b>Company:</b>	Kinzer Drilling Company, LLC	<b>TVD Reference:</b>	RKB = 10' @ 1186.93usft
<b>Project:</b>	Mingo County, WV (NAD-83)	<b>MD Reference:</b>	RKB = 10' @ 1186.93usft
<b>Site:</b>	Logan Coal & Timber	<b>North Reference:</b>	True
<b>Well:</b>	#2403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #2		

<b>Project</b>	Mingo County, WV (NAD-83)		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	West Virginia Southern Zone		

<b>Site</b>	Logan Coal & Timber				
<b>Site Position:</b>		<b>Northing:</b>	208,784.00 usft	<b>Latitude:</b>	37° 34' 6.122 N
<b>From:</b>	Map	<b>Easting:</b>	1,655,701.00 usft	<b>Longitude:</b>	82° 4' 45.260 W
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	-0.67 °

<b>Well</b>	#2403					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	208,784.00 usft	<b>Latitude:</b>	37° 34' 6.122 N
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	1,655,701.00 usft	<b>Longitude:</b>	82° 4' 45.260 W
<b>Position Uncertainty</b>	0.00 usft		<b>Wellhead Elevation:</b>		<b>Ground Level:</b>	1,176.93 usft

<b>Wellbore</b>	OH				
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<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	11/9/2016	-7.28	65.42	51,231

<b>Design</b>	Plan #2				
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<b>Audit Notes:</b>					
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.00	
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	321.62	

<b>Plan Sections</b>										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,037.06	0.00	0.00	4,037.06	0.00	0.00	0.00	0.00	0.00	0.00	
4,942.06	90.50	321.62	4,610.00	453.08	-358.82	10.00	10.00	0.00	321.62	
8,292.86	90.50	321.62	4,580.76	3,079.81	-2,439.03	0.00	0.00	0.00	0.00	#2403: PBHL

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 Site: Logan Coal & Timber  
 Well: #2403  
 Wellbore: OH  
 Design: Plan #2

Local Co-ordinate Reference: Well #2403  
 TVD Reference: RKB = 10' @ 1186.93usft  
 MD Reference: RKB = 10' @ 1186.93usft  
 North Reference: True  
 Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,726.00	0.00	0.00	2,726.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Big Lime Base</b>									
2,790.00	0.00	0.00	2,790.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Weare Top</b>									
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
3,372.00	0.00	0.00	3,372.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Sunberry Top</b>									
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00
3,406.00	0.00	0.00	3,406.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Berea Top</b>									
3,416.00	0.00	0.00	3,416.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Dev. Shale</b>									
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00
4,037.06	0.00	0.00	4,037.06	0.00	0.00	0.00	0.00	0.00	0.00
4,050.00	1.29	321.62	4,050.00	0.11	-0.09	0.15	10.00	10.00	0.00
4,100.00	6.29	321.62	4,099.87	2.71	-2.14	3.45	10.00	10.00	0.00

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Planning Report

<b>Database:</b>	Single User DB Primary	<b>Local Co-ordinate Reference:</b>	Well #2403
<b>Company:</b>	Kinzer Drilling Company, LLC	<b>TVD Reference:</b>	RKB = 10' @ 1186.93usft
<b>Project:</b>	Mingo County, WV (NAD-83)	<b>MD Reference:</b>	RKB = 10' @ 1186.93usft
<b>Site:</b>	Logan Coal & Timber	<b>North Reference:</b>	True
<b>Well:</b>	#2403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #2		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,150.00	11.29	321.62	4,149.27	8.70	-6.89	11.09	10.00	10.00	0.00
4,200.00	16.29	321.62	4,197.81	18.04	-14.29	23.01	10.00	10.00	0.00
4,250.00	21.29	321.62	4,245.13	30.66	-24.28	39.11	10.00	10.00	0.00
4,300.00	26.29	321.62	4,290.87	46.47	-36.80	59.28	10.00	10.00	0.00
4,350.00	31.29	321.62	4,334.67	65.35	-51.75	83.36	10.00	10.00	0.00
4,400.00	36.29	321.62	4,376.21	87.14	-69.01	111.16	10.00	10.00	0.00
4,450.00	41.29	321.62	4,415.17	111.69	-88.45	142.47	10.00	10.00	0.00
4,500.00	46.29	321.62	4,451.25	138.81	-109.93	177.06	10.00	10.00	0.00
4,550.00	51.29	321.62	4,484.18	168.29	-133.27	214.67	10.00	10.00	0.00
4,600.00	56.29	321.62	4,513.70	199.91	-158.31	255.00	10.00	10.00	0.00
4,650.00	61.29	321.62	4,539.60	233.42	-184.86	297.75	10.00	10.00	0.00
4,700.00	66.29	321.62	4,561.67	268.58	-212.70	342.60	10.00	10.00	0.00
4,750.00	71.29	321.62	4,579.76	305.11	-241.63	389.20	10.00	10.00	0.00
4,800.00	76.29	321.62	4,593.71	342.74	-271.43	437.20	10.00	10.00	0.00
4,850.00	81.29	321.62	4,603.42	381.17	-301.87	486.23	10.00	10.00	0.00
4,900.00	86.29	321.62	4,608.82	420.13	-332.72	535.92	10.00	10.00	0.00
4,942.06	90.50	321.62	4,610.00	453.08	-358.82	577.96	10.00	10.00	0.00
5,000.00	90.50	321.62	4,609.50	498.50	-394.78	635.89	0.00	0.00	0.00
5,100.00	90.50	321.62	4,608.62	576.89	-456.86	735.89	0.00	0.00	0.00
5,200.00	90.50	321.62	4,607.75	655.28	-518.95	835.88	0.00	0.00	0.00
5,300.00	90.50	321.62	4,606.88	733.67	-581.03	935.88	0.00	0.00	0.00
5,400.00	90.50	321.62	4,606.00	812.07	-643.11	1,035.88	0.00	0.00	0.00
5,500.00	90.50	321.62	4,605.13	890.46	-705.19	1,135.87	0.00	0.00	0.00
5,600.00	90.50	321.62	4,604.26	968.85	-767.27	1,235.87	0.00	0.00	0.00
5,700.00	90.50	321.62	4,603.39	1,047.24	-829.35	1,335.86	0.00	0.00	0.00
5,800.00	90.50	321.62	4,602.51	1,125.63	-891.43	1,435.86	0.00	0.00	0.00
5,900.00	90.50	321.62	4,601.64	1,204.02	-953.51	1,535.86	0.00	0.00	0.00
6,000.00	90.50	321.62	4,600.77	1,282.41	-1,015.60	1,635.85	0.00	0.00	0.00
6,100.00	90.50	321.62	4,599.90	1,360.80	-1,077.68	1,735.85	0.00	0.00	0.00
6,200.00	90.50	321.62	4,599.02	1,439.19	-1,139.76	1,835.85	0.00	0.00	0.00
6,300.00	90.50	321.62	4,598.15	1,517.59	-1,201.84	1,935.84	0.00	0.00	0.00
6,400.00	90.50	321.62	4,597.28	1,595.98	-1,263.92	2,035.84	0.00	0.00	0.00
6,500.00	90.50	321.62	4,596.41	1,674.37	-1,326.00	2,135.83	0.00	0.00	0.00
6,600.00	90.50	321.62	4,595.53	1,752.76	-1,388.08	2,235.83	0.00	0.00	0.00
6,700.00	90.50	321.62	4,594.66	1,831.15	-1,450.16	2,335.83	0.00	0.00	0.00
6,800.00	90.50	321.62	4,593.79	1,909.54	-1,512.24	2,435.82	0.00	0.00	0.00
6,900.00	90.50	321.62	4,592.91	1,987.93	-1,574.33	2,535.82	0.00	0.00	0.00
7,000.00	90.50	321.62	4,592.04	2,066.32	-1,636.41	2,635.81	0.00	0.00	0.00
7,100.00	90.50	321.62	4,591.17	2,144.71	-1,698.49	2,735.81	0.00	0.00	0.00
7,200.00	90.50	321.62	4,590.30	2,223.11	-1,760.57	2,835.81	0.00	0.00	0.00
7,300.00	90.50	321.62	4,589.42	2,301.50	-1,822.65	2,935.80	0.00	0.00	0.00
7,400.00	90.50	321.62	4,588.55	2,379.89	-1,884.73	3,035.80	0.00	0.00	0.00
7,500.00	90.50	321.62	4,587.68	2,458.28	-1,946.81	3,135.80	0.00	0.00	0.00
7,600.00	90.50	321.62	4,586.81	2,536.67	-2,008.89	3,235.79	0.00	0.00	0.00
7,700.00	90.50	321.62	4,585.93	2,615.06	-2,070.97	3,335.79	0.00	0.00	0.00
7,800.00	90.50	321.62	4,585.06	2,693.45	-2,133.06	3,435.78	0.00	0.00	0.00
7,900.00	90.50	321.62	4,584.19	2,771.84	-2,195.14	3,535.78	0.00	0.00	0.00
8,000.00	90.50	321.62	4,583.32	2,850.23	-2,257.22	3,635.78	0.00	0.00	0.00
8,100.00	90.50	321.62	4,582.44	2,928.63	-2,319.30	3,735.77	0.00	0.00	0.00
8,200.00	90.50	321.62	4,581.57	3,007.02	-2,381.38	3,835.77	0.00	0.00	0.00
8,292.86	90.50	321.62	4,580.76	3,079.81	-2,439.03	3,928.62	0.00	0.00	0.00

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 MD Reference: RKB = 10' @ 1186.93usft  
 North Reference: True  
 Survey Calculation Method: Minimum Curvature

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
#2403: PBHL - plan hits target center - Point	0.00	0.00	4,580.76	3,079.81	-2,439.03	211,892.00	1,653,298.00	37° 34' 36.570 N	82° 5' 15.557 W
#2403: LP - plan hits target center - Point	0.00	0.00	4,610.00	453.08	-358.82	209,241.24	1,655,347.48	37° 34' 10.602 N	82° 4' 49.716 W

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,484.00	2,484.00	7"	7	7-1/2

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,726.00	2,726.00	Big Lime Base		-0.50	322.39
2,790.00	2,790.00	Weare Too		-0.50	322.39
3,372.00	3,372.00	Sunberry Top		-0.50	322.39
3,406.00	3,406.00	Berea Top		-0.50	322.39
3,416.00	3,416.00	Dev. Shale		-0.50	322.39

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