



Project: Mesa County, CO
 Site: Sup & Shep 25-11 Pad
 Well: Sup & Shep 0993-25-08W
 Wellbore: B-8
 Design: Design #1
 Latitude: 39.244824
 Longitude: -107.723428
 Ground Level: 8077.0
 well @ 8107.0usft (30' RKB)



SECTION DETAILS									
MD	Inc	Azi	TVD	+N-S	+E-W	Diag	TFace	Vsect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
480.0	0.50	0.00	480.0	0.0	0.0	0.00	0.00	0.0	Build 3.00"/100'
791.4	9.34	346.50	780.0	24.6	-5.9	3.00	346.50	25.3	EOB @ 9.34" Inc / 346.50" Azm
6661.2	9.34	346.50	6682.0	951.1	-228.3	0.00	0.00	978.1	Drop @ 3.00"/100'
6972.6	0.00	0.00	6892.0	975.7	-234.2	3.00	180.00	1003.6	EOD @ Vertical
8722.6	0.00	0.00	8642.0	975.7	-234.2	0.00	0.00	1003.6	TD @ 8722.6' MD / 8642.0' TVD

DESIGN TARGET DETAILS							
Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - SUP & SHEP 0993-25-08W	8642.0	975.7	-234.2	1522748.16	2370161.11	39.247503	-107.724255

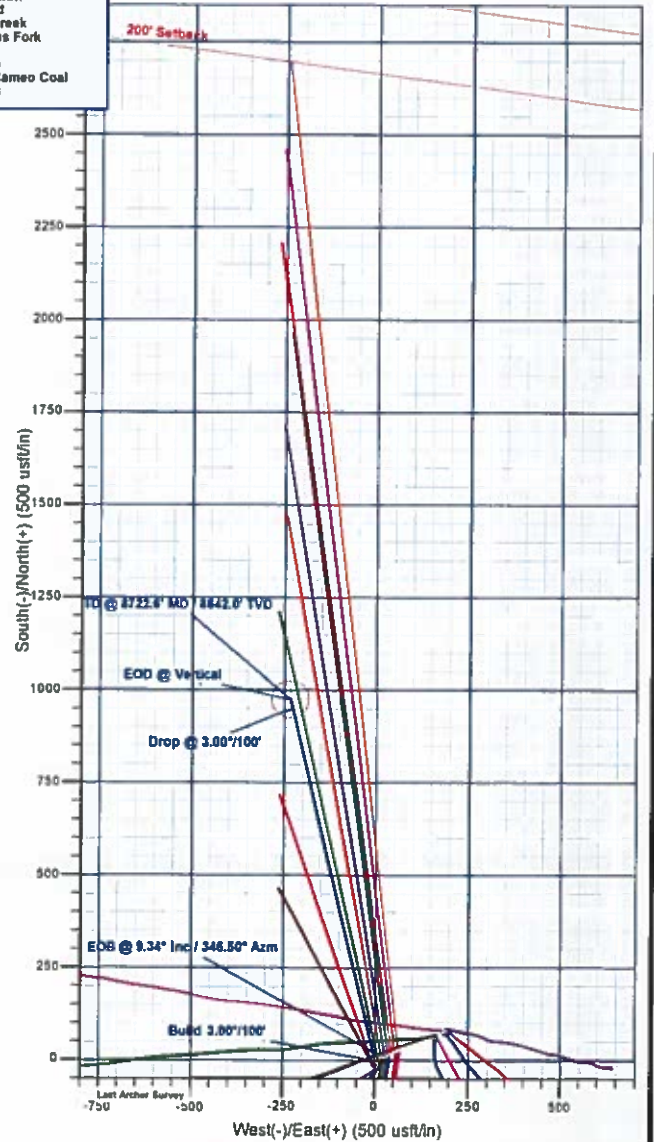
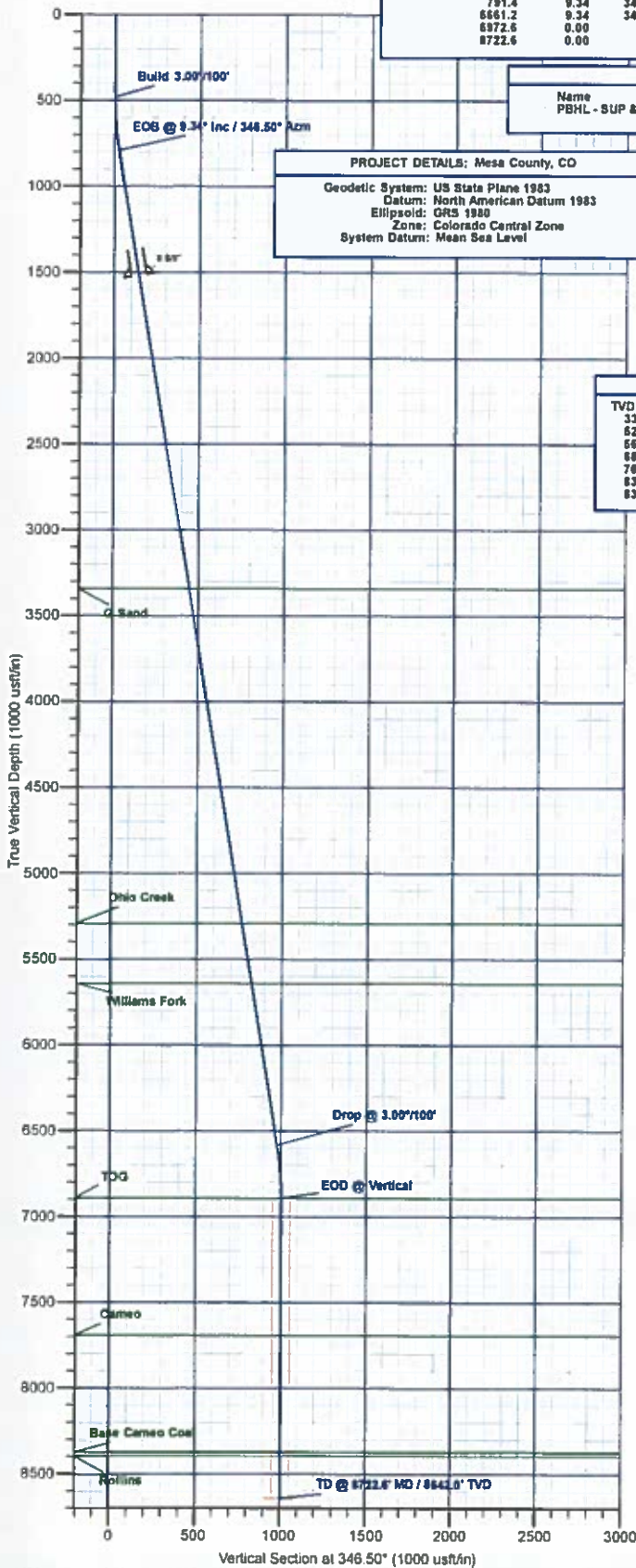
PROJECT DETAILS: Mesa County, CO
 Geodetic System: US State Plane 1983
 Datum: North American Datum 1983
 Ellipsoid: GRS 1980
 Zone: Colorado Central Zone
 System Datum: Mean Sea Level

WELL DETAILS: Sup & Shep 0993-25-08W					
+N-S	+E-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1621766.97	2370371.37	39.244824	-107.723428

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
3342.0	3377.7	G Sand
6292.0	6353.9	Ohio Creek
6642.0	6708.6	Williams Fork
6692.0	6972.6	TOG
7692.0	7772.6	Cameo
8372.0	8452.6	Base Cameo Coal
8392.0	8472.6	Rollins

REFERENCE INFORMATION
 Co-ordinate (N/E) Reference: Well Sup & Shep 0993-25-08W, True North
 Vertical (TVD) Reference: well @ 8107.0usft (30' RKB)
 Section (VS) Reference: Slot - (0.0N, 0.0E)
 Measured Depth Reference: well @ 8107.0usft (30' RKB)
 Calculation Method: Minimum Curvature





Laramie Energy, LLC

Mesa County, CO

Sup & Shep 25-11 Pad

Sup & Shep 0993-25-08W

B-8

Plan: Design #1

QES Well Planning Report

04 March, 2018





Well Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Well Sup & Shep 0993-25-08W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 8107.0usft (30' RKB)
Project:	Mesa County, CO	MD Reference:	well @ 8107.0usft (30' RKB)
Site:	Sup & Shep 25-11 Pad	North Reference:	True
Well:	Sup & Shep 0993-25-08W	Survey Calculation Method:	Minimum Curvature
Wellbore:	B-8		
Design:	Design #1		

Project	Mesa County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site		Sup & Shep 25-11 Pad			
Site Position:		Northing:	1,521,749.72 usft	Latitude:	39.244779
From:	Lat/Long	Easting:	2,370,406.93 usft	Longitude:	-107.723301
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.40

Well	Sup & Shep 0993-25-08W					
Well Position	+N/-S	16.4 usft	Northing:	1,521,766.98 usft	Latitude:	39.244824
	+E/-W	-36.0 usft	Easting:	2,370,371.37 usft	Longitude:	-107.723428
Position Uncertainty		0.0 usft	Wellhead Elevation:		Ground Level:	8,077.0 usft

Wellbore	B-8				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/2/2018	9.49	65.42	51,350.83759585

Design	Design #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	346.50

Plan Sections										
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
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
480.0	0.00	0.00	480.0	0.0	0.0	0.00	0.00	0.00	0.00	
791.4	9.34	346.50	790.0	24.6	-5.9	3.00	3.00	0.00	346.50	
6,661.2	9.34	346.50	6,582.0	951.1	-228.3	0.00	0.00	0.00	0.00	
6,972.6	0.00	0.00	6,892.0	975.7	-234.2	3.00	-3.00	0.00	180.00	
8,722.6	0.00	0.00	8,642.0	975.7	-234.2	0.00	0.00	0.00	0.00	PBHL - SUP & SHEP



Well Planning Report



Database: EDM 5000.1 Single User Db
 Company: Laramie Energy, LLC
 Project: Mesa County, CO
 Site: Sup & Shep 25-11 Pad
 Well: Sup & Shep 0993-25-08W
 Wellbore: B-8
 Design: Design #1

Local Co-ordinate Reference:
 TVD Reference:
 MD Reference:
 North Reference:
 Survey Calculation Method:

Well Sup & Shep 0993-25-08W
 well @ 8107.0usft (30' RKB)
 well @ 8107.0usft (30' RKB)
 True
 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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
Build 3.00°/100'									
480.0	0.00	0.00	480.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.60	346.50	500.0	0.1	0.0	0.1	3.00	3.00	0.00
600.0	3.60	346.50	599.9	3.7	-0.9	3.8	3.00	3.00	0.00
700.0	6.60	346.50	699.5	12.3	-3.0	12.7	3.00	3.00	0.00
EOB @ 9.34° Inc / 346.50° Azm									
791.4	9.34	346.50	790.0	24.6	-5.9	25.3	3.00	3.00	0.00
800.0	9.34	346.50	798.5	26.0	-6.2	26.7	0.00	0.00	0.00
900.0	9.34	346.50	897.2	41.8	-10.0	43.0	0.00	0.00	0.00
1,000.0	9.34	346.50	995.9	57.6	-13.8	59.2	0.00	0.00	0.00
1,100.0	9.34	346.50	1,094.5	73.3	-17.6	75.4	0.00	0.00	0.00
1,200.0	9.34	346.50	1,193.2	89.1	-21.4	91.7	0.00	0.00	0.00
1,300.0	9.34	346.50	1,291.9	104.9	-25.2	107.9	0.00	0.00	0.00
1,400.0	9.34	346.50	1,390.6	120.7	-29.0	124.1	0.00	0.00	0.00
1,500.0	9.34	346.50	1,489.2	136.5	-32.8	140.4	0.00	0.00	0.00
8 5/8"									
1,530.0	9.34	346.50	1,518.8	141.2	-33.9	145.2	0.00	0.00	0.00
1,600.0	9.34	346.50	1,587.9	152.3	-36.5	156.6	0.00	0.00	0.00
1,700.0	9.34	346.50	1,686.6	168.0	-40.3	172.8	0.00	0.00	0.00
1,800.0	9.34	346.50	1,785.2	183.8	-44.1	189.0	0.00	0.00	0.00
1,900.0	9.34	346.50	1,883.9	199.6	-47.9	205.3	0.00	0.00	0.00
2,000.0	9.34	346.50	1,982.6	215.4	-51.7	221.5	0.00	0.00	0.00
2,100.0	9.34	346.50	2,081.3	231.2	-55.5	237.7	0.00	0.00	0.00
2,200.0	9.34	346.50	2,179.9	247.0	-59.3	254.0	0.00	0.00	0.00
2,300.0	9.34	346.50	2,278.6	262.7	-63.1	270.2	0.00	0.00	0.00
2,400.0	9.34	346.50	2,377.3	278.5	-66.9	286.4	0.00	0.00	0.00
2,500.0	9.34	346.50	2,476.0	294.3	-70.6	302.7	0.00	0.00	0.00
2,600.0	9.34	346.50	2,574.6	310.1	-74.4	318.9	0.00	0.00	0.00
2,700.0	9.34	346.50	2,673.3	325.9	-78.2	335.1	0.00	0.00	0.00
2,800.0	9.34	346.50	2,772.0	341.7	-82.0	351.4	0.00	0.00	0.00
2,900.0	9.34	346.50	2,870.7	357.5	-85.8	367.6	0.00	0.00	0.00
3,000.0	9.34	346.50	2,969.3	373.2	-89.6	383.8	0.00	0.00	0.00
3,100.0	9.34	346.50	3,068.0	389.0	-93.4	400.1	0.00	0.00	0.00
3,200.0	9.34	346.50	3,166.7	404.8	-97.2	416.3	0.00	0.00	0.00
3,300.0	9.34	346.50	3,265.4	420.6	-101.0	432.5	0.00	0.00	0.00
G Sand									
3,377.7	9.34	346.50	3,342.0	432.8	-103.9	445.1	0.00	0.00	0.00
3,400.0	9.34	346.50	3,364.0	436.4	-104.7	448.8	0.00	0.00	0.00
3,500.0	9.34	346.50	3,462.7	452.2	-108.5	465.0	0.00	0.00	0.00
3,600.0	9.34	346.50	3,561.4	467.9	-112.3	481.2	0.00	0.00	0.00
3,700.0	9.34	346.50	3,660.0	483.7	-116.1	497.5	0.00	0.00	0.00
3,800.0	9.34	346.50	3,758.7	499.5	-119.9	513.7	0.00	0.00	0.00
3,900.0	9.34	346.50	3,857.4	515.3	-123.7	529.9	0.00	0.00	0.00
4,000.0	9.34	346.50	3,956.1	531.1	-127.5	546.2	0.00	0.00	0.00
4,100.0	9.34	346.50	4,054.7	546.9	-131.3	562.4	0.00	0.00	0.00
4,200.0	9.34	346.50	4,153.4	562.6	-135.0	578.6	0.00	0.00	0.00
4,300.0	9.34	346.50	4,252.1	578.4	-138.8	594.9	0.00	0.00	0.00
4,400.0	9.34	346.50	4,350.8	594.2	-142.6	611.1	0.00	0.00	0.00
4,500.0	9.34	346.50	4,449.4	610.0	-146.4	627.3	0.00	0.00	0.00



Well Planning Report



Database: EDM 5000.1 Single User Db
 Company: Laramie Energy, LLC
 Project: Mesa County, CO
 Site: Sup & Shep 25-11 Pad
 Well: Sup & Shep 0993-25-08W
 Wellbore: B-8
 Design: Design #1

Local Co-ordinate Reference:
 TVD Reference:
 MD Reference:
 North Reference:
 Survey Calculation Method:

Well Sup & Shep 0993-25-08W
 well @ 8107.0usft (30' RKB)
 well @ 8107.0usft (30' RKB)
 True
 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)
4,600.0	9.34	346.50	4,548.1	625.8	-150.2	643.6	0.00	0.00	0.00
4,700.0	9.34	346.50	4,646.8	641.6	-154.0	659.8	0.00	0.00	0.00
4,800.0	9.34	346.50	4,745.5	657.3	-157.8	676.0	0.00	0.00	0.00
4,900.0	9.34	346.50	4,844.1	673.1	-161.6	692.2	0.00	0.00	0.00
5,000.0	9.34	346.50	4,942.8	688.9	-165.4	708.5	0.00	0.00	0.00
5,100.0	9.34	346.50	5,041.5	704.7	-169.1	724.7	0.00	0.00	0.00
5,200.0	9.34	346.50	5,140.2	720.5	-172.9	740.9	0.00	0.00	0.00
5,300.0	9.34	346.50	5,238.8	736.3	-176.7	757.2	0.00	0.00	0.00
Ohio Creek									
5,353.9	9.34	346.50	5,292.0	744.8	-178.8	765.9	0.00	0.00	0.00
5,400.0	9.34	346.50	5,337.5	752.0	-180.5	773.4	0.00	0.00	0.00
5,500.0	9.34	346.50	5,436.2	767.8	-184.3	789.6	0.00	0.00	0.00
5,600.0	9.34	346.50	5,534.8	783.6	-188.1	805.9	0.00	0.00	0.00
5,700.0	9.34	346.50	5,633.5	799.4	-191.9	822.1	0.00	0.00	0.00
Williams Fork									
5,708.6	9.34	346.50	5,642.0	800.8	-192.2	823.5	0.00	0.00	0.00
5,800.0	9.34	346.50	5,732.2	815.2	-195.7	838.3	0.00	0.00	0.00
5,900.0	9.34	346.50	5,830.9	831.0	-199.5	854.6	0.00	0.00	0.00
6,000.0	9.34	346.50	5,929.5	846.8	-203.2	870.8	0.00	0.00	0.00
6,100.0	9.34	346.50	6,028.2	862.5	-207.0	887.0	0.00	0.00	0.00
6,200.0	9.34	346.50	6,126.9	878.3	-210.8	903.3	0.00	0.00	0.00
6,300.0	9.34	346.50	6,225.6	894.1	-214.6	919.5	0.00	0.00	0.00
6,400.0	9.34	346.50	6,324.2	909.9	-218.4	935.7	0.00	0.00	0.00
6,500.0	9.34	346.50	6,422.9	925.7	-222.2	952.0	0.00	0.00	0.00
6,600.0	9.34	346.50	6,521.6	941.5	-226.0	968.2	0.00	0.00	0.00
Drop @ 3.00°/100'									
6,661.2	9.34	346.50	6,582.0	951.1	-228.3	978.1	0.00	0.00	0.00
6,700.0	8.18	346.50	6,620.3	956.9	-229.7	984.0	3.00	-3.00	0.00
6,800.0	5.18	346.50	6,719.6	968.2	-232.4	995.7	3.00	-3.00	0.00
6,900.0	2.18	346.50	6,819.4	974.4	-233.9	1,002.1	3.00	-3.00	0.00
EOD @ Vertical - TOG									
6,972.6	0.00	0.00	6,892.0	975.7	-234.2	1,003.5	3.00	-3.00	0.00
7,000.0	0.00	0.00	6,919.4	975.7	-234.2	1,003.5	0.00	0.00	0.00
7,100.0	0.00	0.00	7,019.4	975.7	-234.2	1,003.5	0.00	0.00	0.00
7,200.0	0.00	0.00	7,119.4	975.7	-234.2	1,003.5	0.00	0.00	0.00
7,300.0	0.00	0.00	7,219.4	975.7	-234.2	1,003.5	0.00	0.00	0.00
7,400.0	0.00	0.00	7,319.4	975.7	-234.2	1,003.5	0.00	0.00	0.00
7,500.0	0.00	0.00	7,419.4	975.7	-234.2	1,003.5	0.00	0.00	0.00
7,600.0	0.00	0.00	7,519.4	975.7	-234.2	1,003.5	0.00	0.00	0.00
7,700.0	0.00	0.00	7,619.4	975.7	-234.2	1,003.5	0.00	0.00	0.00
Cameo									
7,772.6	0.00	0.00	7,692.0	975.7	-234.2	1,003.5	0.00	0.00	0.00
7,800.0	0.00	0.00	7,719.4	975.7	-234.2	1,003.5	0.00	0.00	0.00
7,900.0	0.00	0.00	7,819.4	975.7	-234.2	1,003.5	0.00	0.00	0.00
8,000.0	0.00	0.00	7,919.4	975.7	-234.2	1,003.5	0.00	0.00	0.00
8,100.0	0.00	0.00	8,019.4	975.7	-234.2	1,003.5	0.00	0.00	0.00
8,200.0	0.00	0.00	8,119.4	975.7	-234.2	1,003.5	0.00	0.00	0.00
8,300.0	0.00	0.00	8,219.4	975.7	-234.2	1,003.5	0.00	0.00	0.00
8,400.0	0.00	0.00	8,319.4	975.7	-234.2	1,003.5	0.00	0.00	0.00
Base Cameo Coal									
8,452.6	0.00	0.00	8,372.0	975.7	-234.2	1,003.5	0.00	0.00	0.00
Rollins									
8,472.6	0.00	0.00	8,392.0	975.7	-234.2	1,003.5	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Sup & Shep 0993-25-08W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 8107.0usft (30' RKB)
Project:	Mesa County, CO	MD Reference:	well @ 8107.0usft (30' RKB)
Site:	Sup & Shep 25-11 Pad	North Reference:	True
Well:	Sup & Shep 0993-25-08W	Survey Calculation Method:	Minimum Curvature
Wellbore:	B-8		
Design:	Design #1		

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)
8,500.0	0.00	0.00	8,419.4	975.7	-234.2	1,003.5	0.00	0.00	0.00
8,600.0	0.00	0.00	8,519.4	975.7	-234.2	1,003.5	0.00	0.00	0.00
8,700.0	0.00	0.00	8,619.4	975.7	-234.2	1,003.5	0.00	0.00	0.00
TD @ 8722.6' MD / 8642.0' TVD									
8,722.6	0.00	0.00	8,642.0	975.7	-234.2	1,003.5	0.00	0.00	0.00

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
PBHL - SUP & SHEP 09 - plan hits target center - Circle (radius 50.0)	0.00	0.00	8,642.0	975.7	-234.2	1,522,748.16	2,370,161.12	39.247503	-107.724255

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,518.8	8 5/8"	8-5/8	11

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,377.7	3,342.0	G Sand			
5,353.9	5,292.0	Ohio Creek			
5,708.6	5,642.0	Williams Fork			
6,972.6	6,892.0	TOG			
7,772.6	7,692.0	Cameo			
8,452.6	8,372.0	Base Cameo Coal			
8,472.6	8,392.0	Rollins			

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
480.0	480.0	0.0	0.0	Build 3.00°/100'
791.4	790.0	24.6	-5.9	EOB @ 9.34° Inc / 346.50° Azm
6,661.2	6,582.0	951.1	-228.3	Drop @ 3.00°/100'
6,972.6	6,892.0	975.7	-234.2	EOD @ Vertical
8,722.6	8,642.0	975.7	-234.2	TD @ 8722.6' MD / 8642.0' TVD