



SHELL E&P

MOFFAT COUNTY, CO

WOOD GULCH 1-36

WOOD GULCH 1-36

PLAN 3

WOOD GULCH 1-36

Standard Planning Report

2 April, 2012



Project: MOFFAT COUNTY, CO
Site: WOOD GULCH 1-36
Well: WOOD GULCH 1-36
Wellbore: WOOD GULCH 1-36
Design: Design #3
Latitude: 40° 16' 52.330 N
Longitude: 107° 39' 41.680 W
GL: 6569.20
KB: WELL @ 6581.70ft (Estimated KB)
RIG: Estimated KB



Weatherford®

WELL DETAILS: WOOD GULCH 1-36

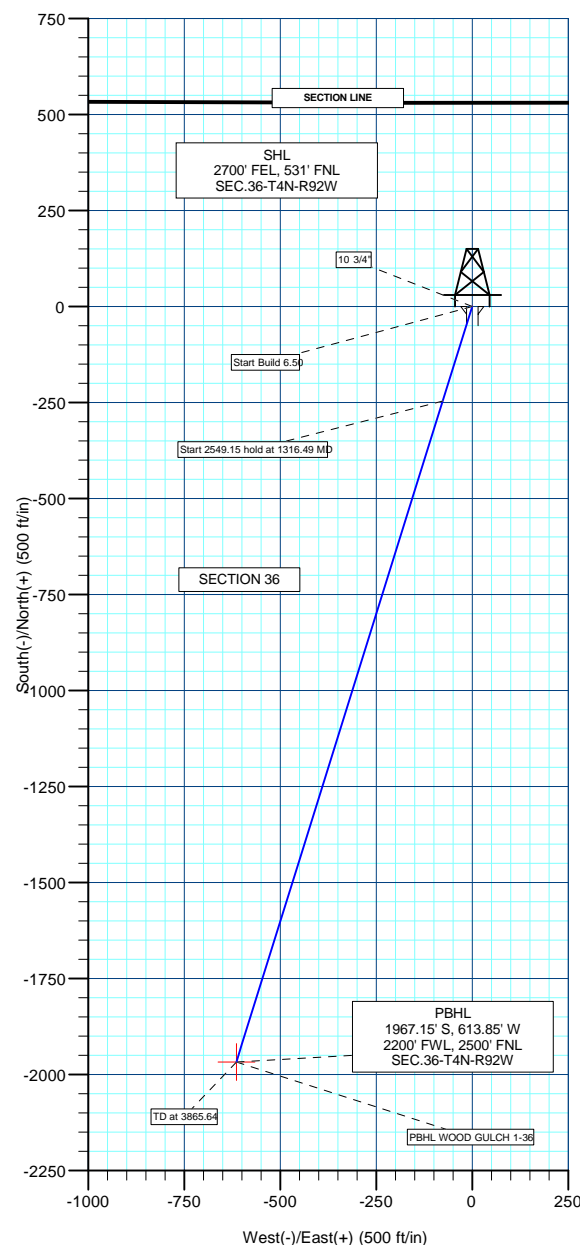
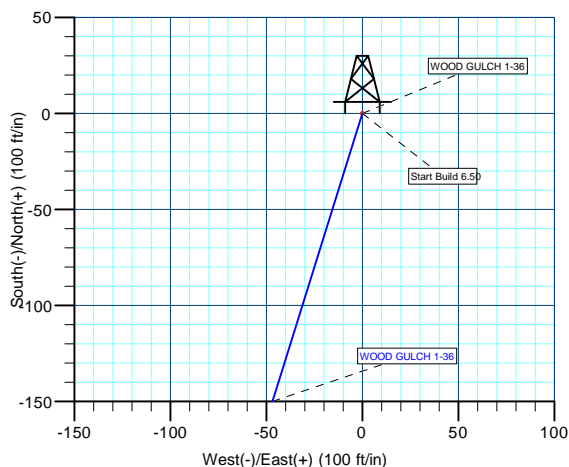
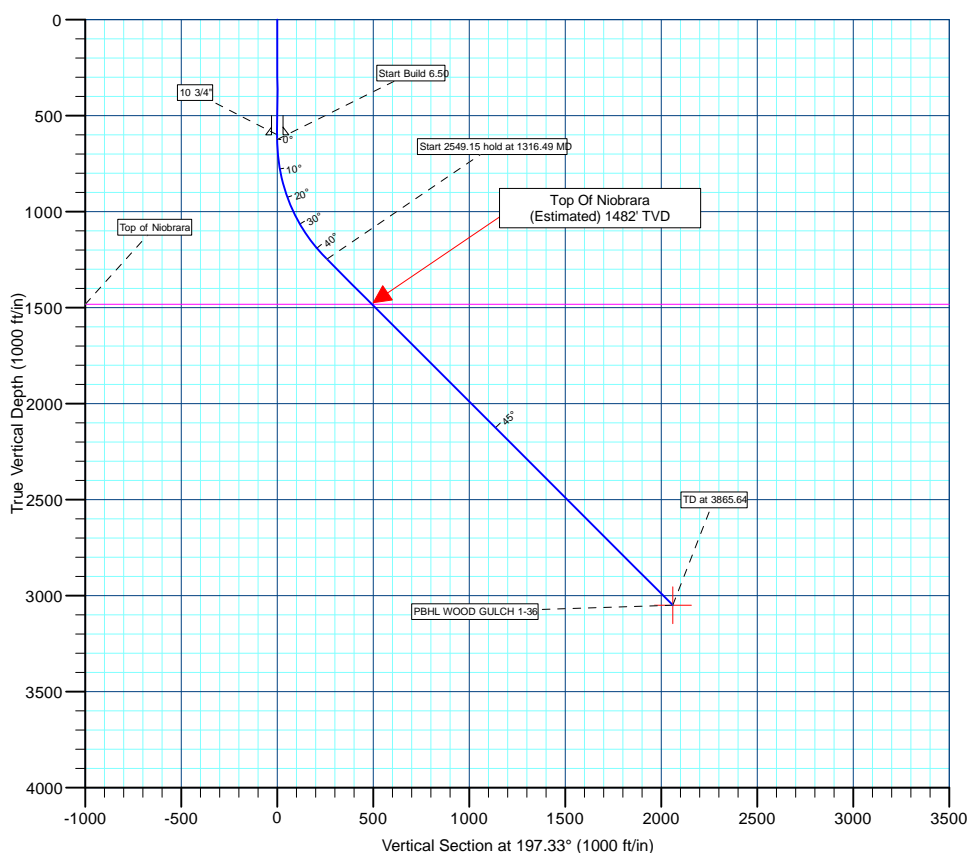
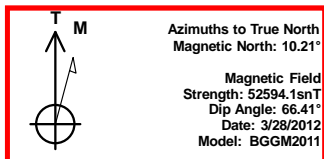
+N-S	+E-W	Northing	Ground Level:	6569.20	Latitude	Longitude	Slot
0.00	0.00	1352633.54	Easting	2396982.99	40° 16' 52.330 N	107° 39' 41.680 W	

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N-S	+E-W	Latitude	Longitude	Shape
PBHL WOOD GULCH 1-36	3050.00	-1967.15	-613.85	40° 16' 32.890 N	107° 39' 49.600 W	Point

SECTION DETAILS

MD	Inc	Azi	TVD	+N-S	+E-W	DLeg	TFace	VSec	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
624.18	0.00	0.00	624.18	0.00	0.00	0.00	0.00	0.00	Start Build 6.50
1316.49	45.00	197.33	1247.48	-246.46	-76.91	6.50	197.33	258.18	Start 2549.15 hold at 1316.49 MD
3865.64	45.00	197.33	3050.00	-1967.15	-613.85	0.00	0.00	2060.70	TD at 3865.64



Plan: Design #3 (WOOD GULCH 1-36/WOOD GULCH 1-36)

Created By: TRACY WILLIAMS Date: 15:08, April 02 2012



SHELL E&P

MOFFAT COUNTY, CO

WOOD GULCH 1-36

WOOD GULCH 1-36

WOOD GULCH 1-36

Plan: Design #3

Standard Planning Report

02 April, 2012





Database:	EDM 2003.21 Single User Db	Local Co-ordinate Reference:	Well WOOD GULCH 1-36
Company:	SHELL E&P	TVD Reference:	WELL @ 6581.70ft (Estimated KB)
Project:	MOFFAT COUNTY, CO	MD Reference:	WELL @ 6581.70ft (Estimated KB)
Site:	WOOD GULCH 1-36	North Reference:	True
Well:	WOOD GULCH 1-36	Survey Calculation Method:	Minimum Curvature
Wellbore:	WOOD GULCH 1-36		
Design:	Design #3		

Project	MOFFAT COUNTY, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site		WOOD GULCH 1-36			
Site Position:		Northing:	1,352,633.54 ft	Latitude:	40° 16' 52.330 N
From:	Lat/Long	Easting:	2,396,982.99 ft	Longitude:	107° 39' 41.680 W
Position Uncertainty:	0.00 ft	Slot Radius:	"	Grid Convergence:	-1.40 °

Well	WOOD GULCH 1-36					
Well Position	+N-S	0.00 ft	Northing:	1,352,633.54 ft	Latitude:	40° 16' 52.330 N
	+E-W	0.00 ft	Easting:	2,396,982.99 ft	Longitude:	107° 39' 41.680 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	6,569.20 ft

Wellbore	WOOD GULCH 1-36				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2011	3/28/2012	10.21	66.41	52,594

Design	Design #3			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	197.33

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
624.18	0.00	0.00	624.18	0.00	0.00	0.00	0.00	0.00	0.00	
1,316.49	45.00	197.33	1,247.48	-246.46	-76.91	6.50	6.50	0.00	197.33	
3,865.64	45.00	197.33	3,050.00	-1,967.15	-613.85	0.00	0.00	0.00	0.00	PBHL WOOD GULCH



Database:	EDM 2003.21 Single User Db	Local Co-ordinate Reference:	Well WOOD GULCH 1-36
Company:	SHELL E&P	TVD Reference:	WELL @ 6581.70ft (Estimated KB)
Project:	MOFFAT COUNTY, CO	MD Reference:	WELL @ 6581.70ft (Estimated KB)
Site:	WOOD GULCH 1-36	North Reference:	True
Well:	WOOD GULCH 1-36	Survey Calculation Method:	Minimum Curvature
Wellbore:	WOOD GULCH 1-36		
Design:	Design #3		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
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
10 3/4"									
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 6.50									
624.18	0.00	0.00	624.18	0.00	0.00	0.00	0.00	0.00	0.00
650.00	1.68	197.33	650.00	-0.36	-0.11	0.38	6.50	6.50	0.00
700.00	4.93	197.33	699.91	-3.11	-0.97	3.26	6.50	6.50	0.00
750.00	8.18	197.33	749.57	-8.56	-2.67	8.96	6.50	6.50	0.00
800.00	11.43	197.33	798.84	-16.68	-5.21	17.48	6.50	6.50	0.00
850.00	14.68	197.33	847.54	-27.46	-8.57	28.77	6.50	6.50	0.00
900.00	17.93	197.33	895.52	-40.86	-12.75	42.80	6.50	6.50	0.00
950.00	21.18	197.33	942.63	-56.83	-17.73	59.53	6.50	6.50	0.00
1,000.00	24.43	197.33	988.72	-75.33	-23.51	78.91	6.50	6.50	0.00
1,050.00	27.68	197.33	1,033.63	-96.29	-30.05	100.87	6.50	6.50	0.00
1,100.00	30.93	197.33	1,077.23	-119.65	-37.34	125.34	6.50	6.50	0.00
1,150.00	34.18	197.33	1,119.37	-145.33	-45.35	152.24	6.50	6.50	0.00
1,200.00	37.43	197.33	1,159.91	-173.24	-54.06	181.48	6.50	6.50	0.00
1,250.00	40.68	197.33	1,198.73	-203.31	-63.44	212.98	6.50	6.50	0.00
1,300.00	43.93	197.33	1,235.71	-235.43	-73.47	246.63	6.50	6.50	0.00
Start 2549.15 hold at 1316.49 MD									
1,316.49	45.00	197.33	1,247.48	-246.46	-76.91	258.18	6.50	6.50	0.00
1,400.00	45.00	197.33	1,306.53	-302.83	-94.50	317.23	0.00	0.00	0.00
1,500.00	45.00	197.33	1,377.24	-370.33	-115.56	387.94	0.00	0.00	0.00
1,600.00	45.00	197.33	1,447.95	-437.83	-136.62	458.65	0.00	0.00	0.00
Top of Niobrara									
1,648.15	45.00	197.33	1,482.00	-470.33	-146.77	492.70	0.00	0.00	0.00
1,700.00	45.00	197.33	1,518.66	-505.33	-157.69	529.36	0.00	0.00	0.00
1,800.00	45.00	197.33	1,589.37	-572.83	-178.75	600.07	0.00	0.00	0.00
1,900.00	45.00	197.33	1,660.08	-640.33	-199.81	670.78	0.00	0.00	0.00
2,000.00	45.00	197.33	1,730.79	-707.83	-220.88	741.49	0.00	0.00	0.00
2,100.00	45.00	197.33	1,801.50	-775.33	-241.94	812.20	0.00	0.00	0.00
2,200.00	45.00	197.33	1,872.21	-842.83	-263.00	882.92	0.00	0.00	0.00
2,300.00	45.00	197.33	1,942.92	-910.33	-284.07	953.63	0.00	0.00	0.00
2,400.00	45.00	197.33	2,013.63	-977.83	-305.13	1,024.34	0.00	0.00	0.00
2,500.00	45.00	197.33	2,084.35	-1,045.34	-326.20	1,095.05	0.00	0.00	0.00
2,600.00	45.00	197.33	2,155.06	-1,112.84	-347.26	1,165.76	0.00	0.00	0.00
2,700.00	45.00	197.33	2,225.77	-1,180.34	-368.32	1,236.47	0.00	0.00	0.00
2,800.00	45.00	197.33	2,296.48	-1,247.84	-389.39	1,307.18	0.00	0.00	0.00
2,900.00	45.00	197.33	2,367.19	-1,315.34	-410.45	1,377.89	0.00	0.00	0.00
3,000.00	45.00	197.33	2,437.90	-1,382.84	-431.51	1,448.60	0.00	0.00	0.00
3,100.00	45.00	197.33	2,508.61	-1,450.34	-452.58	1,519.31	0.00	0.00	0.00
3,200.00	45.00	197.33	2,579.32	-1,517.84	-473.64	1,590.02	0.00	0.00	0.00
3,300.00	45.00	197.33	2,650.03	-1,585.34	-494.70	1,660.73	0.00	0.00	0.00
3,400.00	45.00	197.33	2,720.74	-1,652.84	-515.77	1,731.44	0.00	0.00	0.00
3,500.00	45.00	197.33	2,791.45	-1,720.34	-536.83	1,802.15	0.00	0.00	0.00
3,600.00	45.00	197.33	2,862.16	-1,787.84	-557.89	1,872.86	0.00	0.00	0.00
3,700.00	45.00	197.33	2,932.87	-1,855.34	-578.96	1,943.58	0.00	0.00	0.00
3,800.00	45.00	197.33	3,003.58	-1,922.84	-600.02	2,014.29	0.00	0.00	0.00
TD at 3865.64 - PBHL WOOD GULCH 1-36									



Database:	EDM 2003.21 Single User Db	Local Co-ordinate Reference:	Well WOOD GULCH 1-36
Company:	SHELL E&P	TVD Reference:	WELL @ 6581.70ft (Estimated KB)
Project:	MOFFAT COUNTY, CO	MD Reference:	WELL @ 6581.70ft (Estimated KB)
Site:	WOOD GULCH 1-36	North Reference:	True
Well:	WOOD GULCH 1-36	Survey Calculation Method:	Minimum Curvature
Wellbore:	WOOD GULCH 1-36		
Design:	Design #3		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
3,865.64	45.00	197.33	3,050.00	-1,967.15	-613.85	2,060.70	0.00	0.00	0.00

Design 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 WOOD GULCH	0.00	0.00	3,050.00	-1,967.15	-613.85	1,350,681.93	2,396,321.38	40° 16' 32.890 N	107° 39' 49.600 W
- plan hits target center									
- Point									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
600.00	600.00	10 3/4"	10-3/4	12-1/4	

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,648.15	1,482.00	Top of Niobrara		0.00	0.00

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment
624.18	624.18	0.00	0.00	Start Build 6.50
1,316.49	1,247.48	-246.46	-76.91	Start 2549.15 hold at 1316.49 MD
3,865.64	3,050.00	-1,967.15	-613.85	TD at 3865.64

Wood Gulch 1-36 (Wood Gulch Unit)

Wellbore Diagram

Updated: 3/28/2012
Location: Section 36 Township 4N Range 92W Moffat County, Colorado
Unit: Wood Gulch
API Number: Pending Elevation: 6571' GL - Ungraded
Target Zone: Niobrara Shale

Surface Section

Hole: 13-1/2"
Depth: 600' MD
Casing: 10-3/4" 40.5# J-55, ST&C
Cement Top: Surface
Mud Weight: 8.4 ppg water / water-based mud

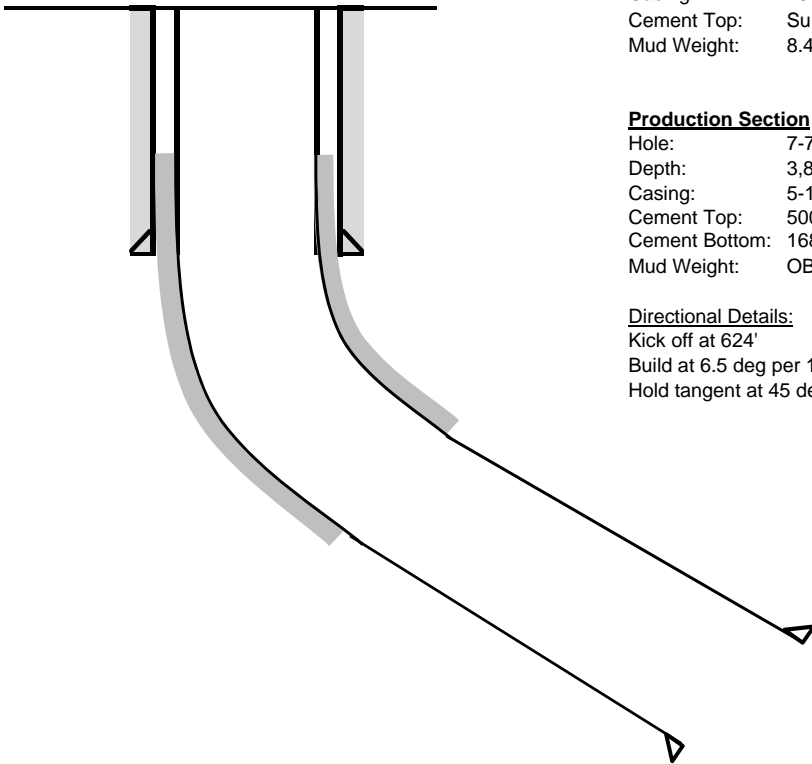
Production Section

Hole: 7-7/8"
Depth: 3,866' MD / 3,050' TVD
Casing: 5-1/2", 17# N-80 H511
Cement Top: 500' MD / 500' TVD
Cement Bottom: 1680' MD / 1500' TVD
Mud Weight: OBM + N2

stage tool and packer will be used to cement above 1500' TVD only

Directional Details:

Kick off at 624'
Build at 6.5 deg per 100' to 45 degrees
Hold tangent at 45 degrees to TD



Drilling and Completion Plan – Slant Hole

This well is a slant well having a surface casing and a production casing, with a tangent angle of 45 degrees through the objective section. See attached directional plan for well.

The surface hole will be 13-1/2" with a 10-3/4" casing string cemented from the bottom to the surface. The production hole section will be 7-7/8" hole with 5-1/2" 17# N-80 Hydril 511 casing. Depths of casing strings are detailed on Form 2. All casing will be new, range 3 casing.

After setting 10-3/4" surface casing on this well, a slant well will be drilled penetrating the Niobrara, into the underlying Carlisle formation.

Production casing will be run from surface to TD. Casing across the Niobrara objective interval will be pre-slotted or pre-perforated. As a contingency, if drilling with casing is used, production casing will be perforated once landed in the well.

The production casing will be run with a packer and stage tool, such that all portions of production casing shallower than objective section are isolated by packer. The stage tool will be used to allow circulation and cementing of the shallow portion of the production casing, leaving only the lower slotted casing portion in communication with the objective interval.

Artificial lift will consist of a sucker rod and pump jack system. The tubing will be run and anchored above the producing interval. The sucker rods will be run with the pump set near the end of the tubing. All tubing and sucker rod equipment will be run with a BOP package and a kill weight completion fluid system. The well will be initially swabbed for fluid clean up and flow testing. Frac'ing or additional reservoir stimulation methods are not anticipated to be necessary.