



SHELL E&P
MOFFAT COUNTY,
DRY SAGE 1-23
PLAN 2

DRY SAGE 1-23

Standard Planning Report

29 MAY, 2012



Project: MOFFAT COUNTY, CO
 Site: DRY SAGE 1-23
 Well: DRY SAGE 1-23
 Wellbore: DRY SAGE 1-23
 Design: Design #2
 Latitude: 40° 58' 40.970 N
 Longitude: 107° 27' 57.120 W
 GL: 6702.00
 KB: WELL @ 6717.00ft (Original Well Elev)
 RIG: Original Well Elev



Weatherford®

WELL DETAILS: DRY SAGE 1-23

+N/-S	+E/-W	Northing	Ground Level:	6702.00	Latitude	Longitude	Slot
0.00	0.00	1605175.13	2457199.06	40° 58' 40.970 N	107° 27' 57.120 W		

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Annotation
10174.78	0.00	0.00	10174.78	0.00	0.00	0.00	0.00	0.00	Start DLS 5.00 TFO 206.15
12014.78	92.00	206.15	11320.00	-1064.53	-522.63	5.00	206.15	1185.91	Start 3538.54 hold at 12014.78 MD
15553.32	92.00	206.15	11196.51	-4238.97	-2081.14	0.00	0.00	4722.29	TD at 15553.32

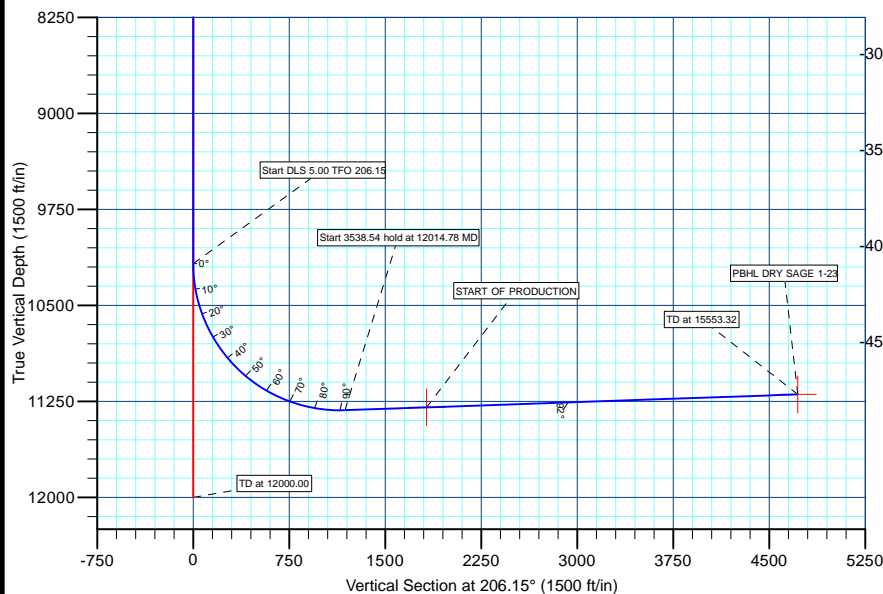
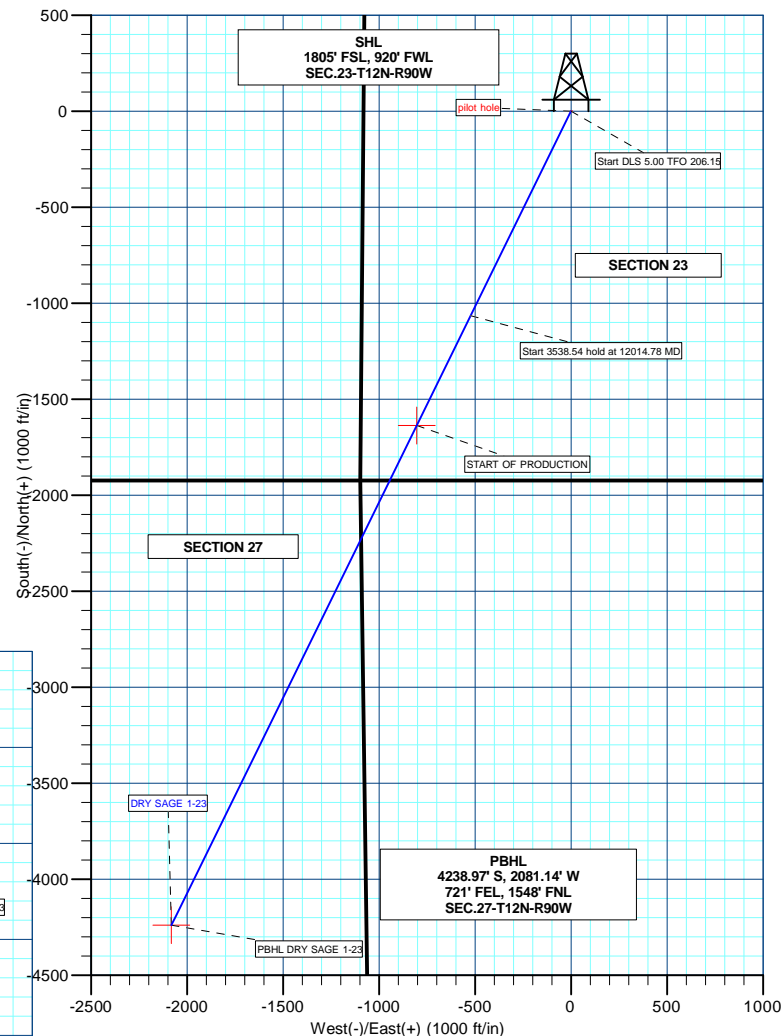
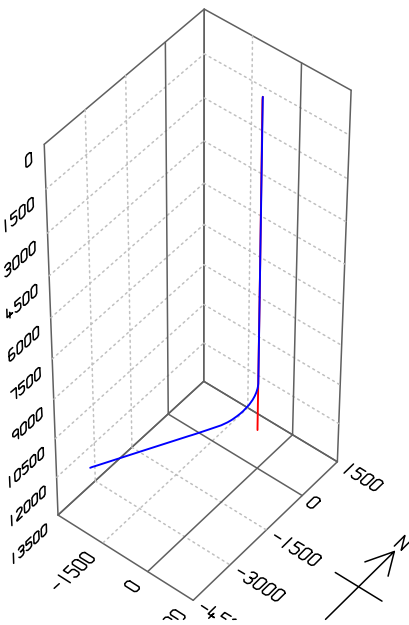
WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
PBHL DRY SAGE 1-23	11196.51	-4238.97	-2081.14	1600983.34	2455024.47	40° 57' 59.087 N	107° 28' 24.247 W	Point
START OF PRODUCTION	11297.73	-1636.94	-803.66	1603556.41	2456359.32	40° 58' 24.796 N	107° 28' 7.597 W	Point



Azimuths to True North
 Magnetic North: 10.19°

Magnetic Field
 Strength: 52972.2snT
 Dip Angle: 67.00°
 Date: 5/22/2012
 Model: BGGM2011



Plan: Design #2 (DRY SAGE 1-23/DRY SAGE 1-23)

Created By: TRACY WILLIAMS Date: 10:23, May 29 2012



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MOFFAT COUNTY, CO

DRY SAGE 1-23

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Database:	EDM 2003.21 Single User Db	Local Co-ordinate Reference:	Well DRY SAGE 1-23
Company:	SHELL E&P	TVD Reference:	WELL @ 6717.00ft (Original Well Elev)
Project:	MOFFAT COUNTY, CO	MD Reference:	WELL @ 6717.00ft (Original Well Elev)
Site:	DRY SAGE 1-23	North Reference:	True
Well:	DRY SAGE 1-23	Survey Calculation Method:	Minimum Curvature
Wellbore:	DRY SAGE 1-23		
Design:	Design #2		

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		DRY SAGE 1-23			
Site Position:		Northing:	1,605,175.13 ft	Latitude:	40° 58' 40.970 N
From:	Lat/Long	Easting:	2,457,199.06 ft	Longitude:	107° 27' 57.120 W
Position Uncertainty:	0.00 ft	Slot Radius:	"	Grid Convergence:	-1.27 °

Well	DRY SAGE 1-23					
Well Position	+N/-S	0.00 ft	Northing:	1,605,175.13 ft	Latitude:	40° 58' 40.970 N
	+E/-W	0.00 ft	Easting:	2,457,199.06 ft	Longitude:	107° 27' 57.120 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	6,702.00 ft

Wellbore	DRY SAGE 1-23				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2011	5/22/2012	10.19	67.00	52,972

Design	Design #2			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	10,174.78
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	206.15

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
10,174.78	0.00	0.00	10,174.78	0.00	0.00	0.00	0.00	0.00	0.00	
12,014.78	92.00	206.15	11,320.00	-1,064.53	-522.63	5.00	5.00	-8.36	206.15	
15,553.32	92.00	206.15	11,196.51	-4,238.97	-2,081.14	0.00	0.00	0.00	0.00	PBHL DRY SAGE 1



Database:	EDM 2003.21 Single User Db	Local Co-ordinate Reference:	Well DRY SAGE 1-23
Company:	SHELL E&P	TVD Reference:	WELL @ 6717.00ft (Original Well Elev)
Project:	MOFFAT COUNTY, CO	MD Reference:	WELL @ 6717.00ft (Original Well Elev)
Site:	DRY SAGE 1-23	North Reference:	True
Well:	DRY SAGE 1-23	Survey Calculation Method:	Minimum Curvature
Wellbore:	DRY SAGE 1-23		
Design:	Design #2		

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
Start DLS 5.00 TFO 206.15									
10,174.78	0.00	0.00	10,174.78	0.00	0.00	0.00	0.00	0.00	0.00
10,200.00	1.26	206.15	10,200.00	-0.25	-0.12	0.28	5.00	5.00	0.00
10,300.00	6.26	206.15	10,299.75	-6.14	-3.01	6.83	5.00	5.00	0.00
10,400.00	11.26	206.15	10,398.55	-19.80	-9.72	22.06	5.00	5.00	0.00
10,500.00	16.26	206.15	10,495.65	-41.15	-20.20	45.84	5.00	5.00	0.00
10,600.00	21.26	206.15	10,590.31	-70.01	-34.37	77.99	5.00	5.00	0.00
10,700.00	26.26	206.15	10,681.80	-106.17	-52.12	118.27	5.00	5.00	0.00
10,800.00	31.26	206.15	10,769.44	-149.34	-73.32	166.37	5.00	5.00	0.00
10,900.00	36.26	206.15	10,852.55	-199.21	-97.80	221.93	5.00	5.00	0.00
11,000.00	41.26	206.15	10,930.50	-255.40	-125.39	284.52	5.00	5.00	0.00
11,100.00	46.26	206.15	11,002.70	-317.46	-155.86	353.66	5.00	5.00	0.00
11,200.00	51.26	206.15	11,068.60	-384.94	-188.99	428.83	5.00	5.00	0.00
11,300.00	56.26	206.15	11,127.70	-457.32	-224.52	509.46	5.00	5.00	0.00
11,400.00	61.26	206.15	11,179.54	-534.05	-262.19	594.94	5.00	5.00	0.00
11,500.00	66.26	206.15	11,223.74	-614.54	-301.71	684.60	5.00	5.00	0.00
11,600.00	71.26	206.15	11,259.95	-698.18	-342.77	777.78	5.00	5.00	0.00
11,700.00	76.26	206.15	11,287.91	-784.33	-385.07	873.76	5.00	5.00	0.00
11,800.00	81.26	206.15	11,307.39	-872.35	-428.28	971.81	5.00	5.00	0.00
11,900.00	86.26	206.15	11,318.26	-961.55	-472.08	1,071.19	5.00	5.00	0.00
12,000.00	91.26	206.15	11,320.42	-1,051.27	-516.12	1,171.13	5.00	5.00	0.00
Start 3538.54 hold at 12014.78 MD									
12,014.78	92.00	206.15	11,320.00	-1,064.53	-522.63	1,185.91	5.00	5.00	0.00
12,100.00	92.00	206.15	11,317.02	-1,140.98	-560.17	1,271.08	0.00	0.00	0.00
12,200.00	92.00	206.15	11,313.53	-1,230.69	-604.21	1,371.01	0.00	0.00	0.00
12,300.00	92.00	206.15	11,310.04	-1,320.40	-648.26	1,470.95	0.00	0.00	0.00
12,400.00	92.00	206.15	11,306.55	-1,410.11	-692.30	1,570.89	0.00	0.00	0.00
12,500.00	92.00	206.15	11,303.06	-1,499.83	-736.34	1,670.83	0.00	0.00	0.00
12,600.00	92.00	206.15	11,299.57	-1,589.54	-780.39	1,770.77	0.00	0.00	0.00
START OF PRODUCTION									
12,652.84	92.00	206.15	11,297.73	-1,636.94	-803.66	1,823.58	0.00	0.00	0.00
12,700.00	92.00	206.15	11,296.08	-1,679.25	-824.43	1,870.71	0.00	0.00	0.00
12,800.00	92.00	206.15	11,292.59	-1,768.96	-868.47	1,970.65	0.00	0.00	0.00
12,900.00	92.00	206.15	11,289.10	-1,858.67	-912.52	2,070.59	0.00	0.00	0.00
13,000.00	92.00	206.15	11,285.61	-1,948.38	-956.56	2,170.53	0.00	0.00	0.00
13,100.00	92.00	206.15	11,282.12	-2,038.09	-1,000.61	2,270.47	0.00	0.00	0.00
13,200.00	92.00	206.15	11,278.63	-2,127.80	-1,044.65	2,370.41	0.00	0.00	0.00
13,300.00	92.00	206.15	11,275.15	-2,217.51	-1,088.69	2,470.34	0.00	0.00	0.00
13,400.00	92.00	206.15	11,271.66	-2,307.22	-1,132.74	2,570.28	0.00	0.00	0.00
13,500.00	92.00	206.15	11,268.17	-2,396.93	-1,176.78	2,670.22	0.00	0.00	0.00
13,600.00	92.00	206.15	11,264.68	-2,486.64	-1,220.82	2,770.16	0.00	0.00	0.00
13,700.00	92.00	206.15	11,261.19	-2,576.35	-1,264.87	2,870.10	0.00	0.00	0.00
13,800.00	92.00	206.15	11,257.70	-2,666.06	-1,308.91	2,970.04	0.00	0.00	0.00
13,900.00	92.00	206.15	11,254.21	-2,755.77	-1,352.95	3,069.98	0.00	0.00	0.00
14,000.00	92.00	206.15	11,250.72	-2,845.48	-1,397.00	3,169.92	0.00	0.00	0.00
14,100.00	92.00	206.15	11,247.23	-2,935.19	-1,441.04	3,269.86	0.00	0.00	0.00
14,200.00	92.00	206.15	11,243.74	-3,024.90	-1,485.09	3,369.80	0.00	0.00	0.00
14,300.00	92.00	206.15	11,240.25	-3,114.61	-1,529.13	3,469.74	0.00	0.00	0.00
14,400.00	92.00	206.15	11,236.76	-3,204.33	-1,573.17	3,569.67	0.00	0.00	0.00
14,500.00	92.00	206.15	11,233.27	-3,294.04	-1,617.22	3,669.61	0.00	0.00	0.00
14,600.00	92.00	206.15	11,229.78	-3,383.75	-1,661.26	3,769.55	0.00	0.00	0.00
14,700.00	92.00	206.15	11,226.29	-3,473.46	-1,705.30	3,869.49	0.00	0.00	0.00



Database:	EDM 2003.21 Single User Db	Local Co-ordinate Reference:	Well DRY SAGE 1-23
Company:	SHELL E&P	TVD Reference:	WELL @ 6717.00ft (Original Well Elev)
Project:	MOFFAT COUNTY, CO	MD Reference:	WELL @ 6717.00ft (Original Well Elev)
Site:	DRY SAGE 1-23	North Reference:	True
Well:	DRY SAGE 1-23	Survey Calculation Method:	Minimum Curvature
Wellbore:	DRY SAGE 1-23		
Design:	Design #2		

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)
14,800.00	92.00	206.15	11,222.80	-3,563.17	-1,749.35	3,969.43	0.00	0.00	0.00
14,900.00	92.00	206.15	11,219.31	-3,652.88	-1,793.39	4,069.37	0.00	0.00	0.00
15,000.00	92.00	206.15	11,215.82	-3,742.59	-1,837.43	4,169.31	0.00	0.00	0.00
15,100.00	92.00	206.15	11,212.33	-3,832.30	-1,881.48	4,269.25	0.00	0.00	0.00
15,200.00	92.00	206.15	11,208.84	-3,922.01	-1,925.52	4,369.19	0.00	0.00	0.00
15,300.00	92.00	206.15	11,205.35	-4,011.72	-1,969.57	4,469.13	0.00	0.00	0.00
15,400.00	92.00	206.15	11,201.86	-4,101.43	-2,013.61	4,569.07	0.00	0.00	0.00
15,500.00	92.00	206.15	11,198.37	-4,191.14	-2,057.65	4,669.00	0.00	0.00	0.00
TD at 15553.32 - PBHL DRY SAGE 1-23									
15,553.32	92.00	206.15	11,196.51	-4,238.97	-2,081.14	4,722.29	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 DRY SAGE 1-2	0.00	0.00	11,196.51	-4,238.97	-2,081.14	1,600,983.34	2,455,024.47	40° 57' 59.087 N	107° 28' 24.247 W
- plan hits target center									
- Point									
START OF PRODUCTION	0.00	0.00	11,297.73	-1,636.94	-803.66	1,603,556.41	2,456,359.32	40° 58' 24.796 N	107° 28' 7.597 W
- plan hits target center									
- Point									

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
10,174.78	10,174.78	0.00	0.00	Start DLS 5.00 TFO 206.15
12,014.78	11,320.00	-1,064.53	-522.63	Start 3538.54 hold at 12014.78 MD
15,553.32	11,196.51	-4,238.97	-2,081.14	TD at 15553.32

Dry Sage 1-23		Proposed Schematic		30-May-12	
Field: Wildcat County: Moffat Township: Sec: 23, Twp: 12N, Rng: 90W Rig: TBD Permit API: 0		AFE / Network #: 0 Shell Working Interest: 100% AFE Drilling Cost: \$0 Plan Days: 0		LAT: 40.978047 LONG: -107.465867 Ground Elevation: 6704.1 ft (surveyed) RKB to Ground: 28 ft RKB Elevation: 6732.1 ft	
Objectives: Drill Surface and Intermediate into top of Niobrara Drill Lateral to total MD without losses					
30" Hole drilled to 90 20" pipe (0.25") set @ 90 Cement to surface		NOTES		OFFSET DATA	
12-1/4" Hole drilled to 2800 9-5/8" 36# J-55 STC @ 2800 Cement to surface		Notify COGCC AND BLM according to NW CO Notifications Test BOPs to 10000 psi Test 9-5/8" csg to 1500 psi for 30 min Test 7" csg to 3000 psi for 30 min			
8-1/2" Hole drilled to 10000 7" 29# P-110 LTC @ 10000 Cement to 6000'.					
FORMATION TVD TOP		BITS AND BHAS		DRILLING PARAMETERS	
Lance 0		Surface: 12-1/4" bit, 8" 1.5" motor, PWD SUB, NMDC, MWD, NMDC, 5" HWDP to surface Intermediate: 9-7/8" bit, 6.75" 1.83" motor, (6.75" 1.5" w/ 9-3/4" stab motor) PWD SUB, NMDC, MWD, NMDC, 11x HWDP, 5" jars, 3x HWDP, 4" DP to surface Pilot/Production: 6" bit, 4.75" 1.83" motor (1.5" w/5-7/8" stab), PWD SUB, NMDC, MWD, NMDC, 4" DP to Surface		Surface: WOB and GPM: Maximum RPM: 45 Intermediate: WOB: 9-15 Klbs Flow: 350 GPM Rotation: less than 45 RPM Production: WOB: 5-10Klbs Flow: See below Rotation: 30-50 RPM	
Lewis 2,430				Surface: Intermediate:	
Mesaverde 2,800				Production: OBM	
Mancos 6,410					
Buck Peak 10,300				Final completion design TBD based on formation evaluation	
Tow Creek 11,250					
Carlile 11,900					
Frontier 12,160		Heel at 11,320' TVD / 12,015' MD Toe at 11,197' TVD / 15,553' MD		6" Hole Drilled to 15,553' MD 4-1/2" 13.5# P-110 LTC-M Top of liner at 9,800' MD	
Logging Program		CASING		Cement	
Surface: Mudlogging Intermediate: LWD - Resistivity and gamma <					

Dry Sage 1-23

Shell Exploration and Production Company

Surface Location: Section 23, T12N - R90W, 1805' FSL, 920' FWL

Bottomhole Location:
Moffat County, Colorado

Drilling and completions plan summary/directional plan

This well is a horizontal well with a pilot hole. See attached directional plan for well.

The surface hole will be 12-1/4" drilled hole size with a 9-5/8" casing string cemented from the bottom to the surface.

Intermediate hole will be 8-1/2" drilled hole size with a 7" 29 lb/ft P-110 casing. Intermediate casing will be set just above the top of the Tow Creek (top of Niobrara). It will be cemented back to 5,000' MD / TVD.

Below the intermediate casing point, a vertical pilot hole will be drilled to 12,000', or 100' into the Carlile formation. The pilot hole will be evaluated to determine petrophysical and geological properties of the target interval. After evaluation is complete, the pilot hole will be plugged back with cement and/or an open-hole plug back to intermediate casing point, and the lateral wellbore will be sidetracked off cement or plug.

The lateral production hole section will be 6" drilled hole size with 4-1/2" 13.5 lb/ft P-110 LTC casing run as a liner. All casing will be new, range 3 casing.

Producing zone is limited to the trajectory southwest of the "producing zone" denoted on well plan.

Because of the exploratory nature of this well, a final decision about completion design through the productive interval will be made as a result of subsurface evaluation program associated with pilot hole and lateral wellbore.

Final completion design will involve a decision whether or not well will be hydraulically fractured and method of annular isolation.

When required by declining production, artificial lift will consist of a sucker rod and pump jack system. The tubing will be run into the producing interval with the pump set near the end of the tubing. All tubing and sucker rod equipment will be installed with appropriate well control measures.