Company: B.P.
Project: Archuleta County, CO NAD83
Site: Ross 2 Pad
Well: Ross 2

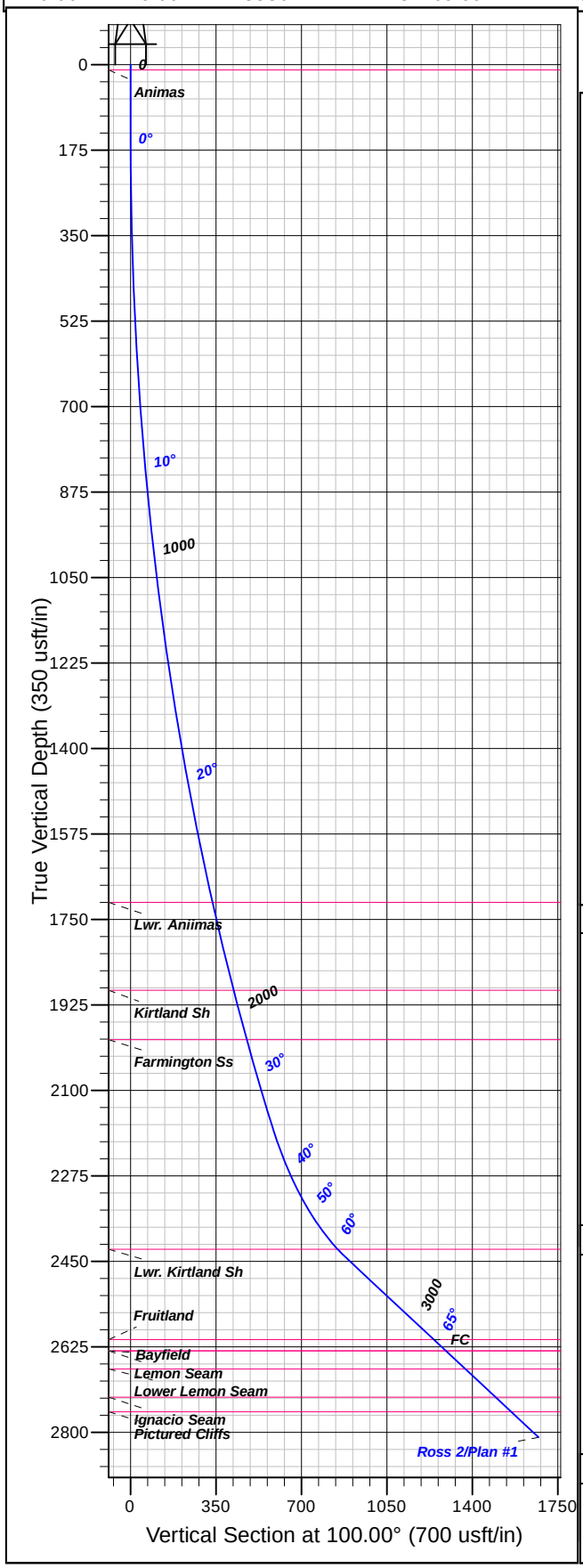
Well Details: Ross 2

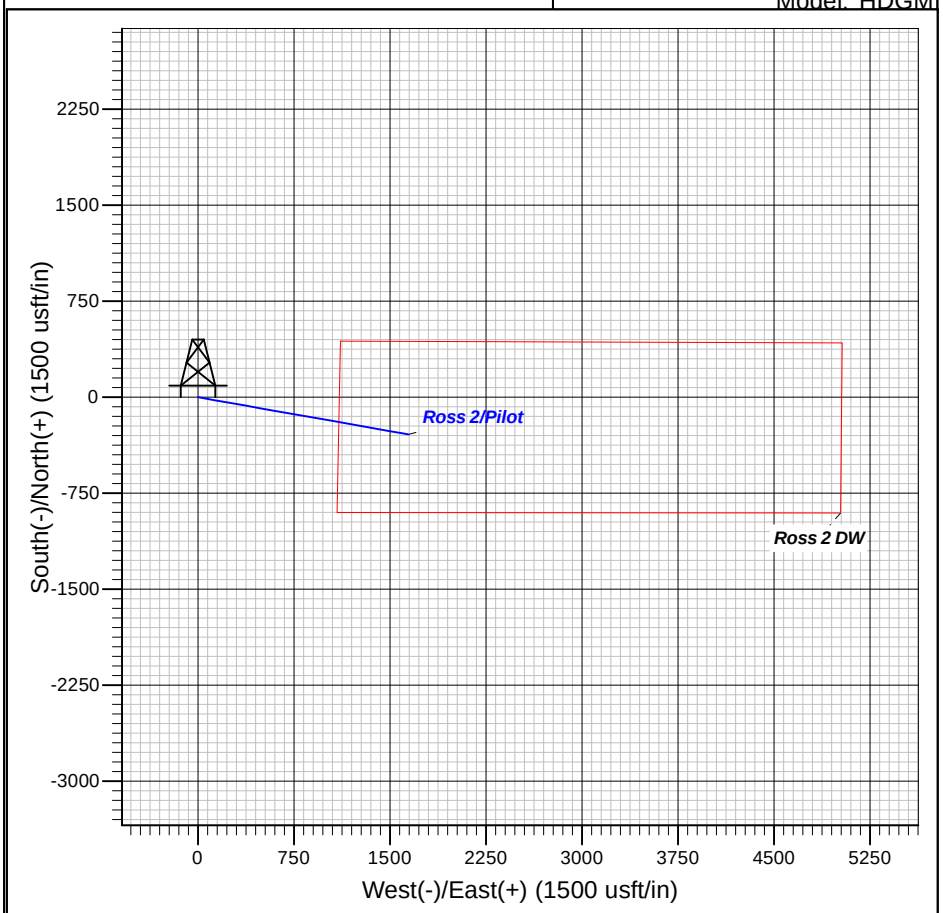
GL 6224.30' & RKB 11' @ 6235.30usft (Aztec 507)

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	1135307.11	2432469.60	37.0220437	-107.4439953	

Azimuths to Grid North
True North: 1.19°
Magnetic North: 10.26°

Magnetic Field
Strength: 50001.0snT
Dip Angle: 63.53°
Date: 4/27/2018
Model: HDGM





FORMATION TOP DETAILS

TVDPath	MDPath	Formation
11.00	11.00	Animas
1715.00	1762.47	Lwr. Aniimas
1895.00	1962.23	Kirtland Sh
1996.00	2076.66	Farmington Ss
2425.00	2654.14	Lwr. Kirtland Sh
2610.00	3089.31	Fruitland
2633.00	3143.73	Bayfield
2633.00	3143.73	Lemon Seam
2670.00	3231.28	Lower Lemon Seam
2728.00	3368.52	Ignacio Seam
2758.00	3439.50	Pictured Cliffs

Plan: Plan #1

11:02, May 01 2018
Created By: Janie Collins

PROJECT DETAILS: Archuleta County, CO NAD83

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: Colorado Southern Zone

System Datum: Mean Sea Level

CASING DETAILS

No casing data is available

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	150.00	0.00	0.00	150.00	0.00	0.00	0.00	0.00	0.00	
3	2283.33	32.00	100.00	2174.14	-100.79	571.60	1.50	100.00	580.41	
4	2695.83	65.00	100.00	2443.71	-153.70	871.66	8.00	0.00	885.11	
5	3563.00	65.00	100.00	2810.19	-290.17	1645.64	0.00	0.00	1671.03	

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Ross 2 Pilot Top	2610.00	-231.03	1149.59	1135076.08	2433619.19	37.0214749	-107.4400422	Point

- plan misses target center by 40.50usft at 3026.35usft MD (2583.39 TVD, -205.71 N, 1166.65 E)

B.P.

Archuleta County, CO NAD83
Ross 2 Pad
Ross 2

Pilot

Plan: Plan #1

Standard Planning Report

01 May, 2018

Scientific Drilling

www.scientificdrilling.com

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well Ross 2
Company:	B.P.	**TVD Reference:**	GL 6224.30' & RKB 11' @ 6235.30usft (Aztec 507)
Project:	Archuleta County, CO NAD83	**MD Reference:**	GL 6224.30' & RKB 11' @ 6235.30usft (Aztec 507)
Site:	Ross 2 Pad	**North Reference:**	Grid
Well:	Ross 2	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Pilot		
Design:	Plan #1		

Project Archuleta County, CO NAD83

Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Southern Zone		

Site Ross 2 Pad

Site Position:		**Northing:**	1,135,307.11 usft	**Latitude:**	37.0220436
From:	Map	**Easting:**	2,432,469.60 usft	**Longitude:**	-107.4439953
Position Uncertainty:	0.00 usft	**Slot Radius:**	13.20 in	**Grid Convergence:**	-1.19 °

Well Ross 2

Well Position	**+N/-S**	0.00 usft	**Northing:**	1,135,307.11 usft	**Latitude:**	37.0220436
	+E/-W	0.00 usft	**Easting:**	2,432,469.60 usft	**Longitude:**	-107.4439953
Position Uncertainty		0.00 usft	**Wellhead Elevation:**	0.00 usft	**Ground Level:**	6,224.30 usft

Wellbore Pilot

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	4/27/2018	9.07	63.53	50,001

Design Plan #1

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	0.00

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	100.00

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
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
150.00	0.00	0.00	150.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,283.33	32.00	100.00	2,174.14	-100.79	571.60	1.50	1.50	0.00	100.00	
2,695.83	65.00	100.00	2,443.71	-153.70	871.66	8.00	8.00	0.00	0.00	
3,563.00	65.00	100.00	2,810.19	-290.17	1,645.64	0.00	0.00	0.00	0.00	

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well Ross 2
Company:	B.P.	**TVD Reference:**	GL 6224.30' & RKB 11' @ 6235.30usft (Aztec 507)
Project:	Archuleta County, CO NAD83	**MD Reference:**	GL 6224.30' & RKB 11' @ 6235.30usft (Aztec 507)
Site:	Ross 2 Pad	**North Reference:**	Grid
Well:	Ross 2	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Pilot		
Design:	Plan #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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11.00	0.00	0.00	11.00	0.00	0.00	0.00	0.00	0.00	0.00
Animas									
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
150.00	0.00	0.00	150.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.75	100.00	200.00	-0.06	0.32	0.33	1.50	1.50	0.00
300.00	2.25	100.00	299.96	-0.51	2.90	2.94	1.50	1.50	0.00
400.00	3.75	100.00	399.82	-1.42	8.05	8.18	1.50	1.50	0.00
500.00	5.25	100.00	499.51	-2.78	15.78	16.02	1.50	1.50	0.00
600.00	6.75	100.00	598.96	-4.60	26.07	26.48	1.50	1.50	0.00
700.00	8.25	100.00	698.10	-6.86	38.93	39.53	1.50	1.50	0.00
800.00	9.75	100.00	796.87	-9.58	54.33	55.17	1.50	1.50	0.00
900.00	11.25	100.00	895.19	-12.74	72.28	73.39	1.50	1.50	0.00
1,000.00	12.75	100.00	993.00	-16.36	92.75	94.19	1.50	1.50	0.00
1,100.00	14.25	100.00	1,090.24	-20.41	115.74	117.53	1.50	1.50	0.00
1,200.00	15.75	100.00	1,186.83	-24.90	141.23	143.41	1.50	1.50	0.00
1,300.00	17.25	100.00	1,282.71	-29.83	169.20	171.81	1.50	1.50	0.00
1,400.00	18.75	100.00	1,377.81	-35.20	199.63	202.71	1.50	1.50	0.00
1,500.00	20.25	100.00	1,472.07	-41.00	232.50	236.09	1.50	1.50	0.00
1,600.00	21.75	100.00	1,565.43	-47.22	267.80	271.93	1.50	1.50	0.00
1,700.00	23.25	100.00	1,657.81	-53.86	305.48	310.19	1.50	1.50	0.00
1,762.47	24.19	100.00	1,715.00	-58.23	330.23	335.32	1.50	1.50	0.00
Lwr. Aniimas									
1,800.00	24.75	100.00	1,749.16	-60.93	345.54	350.87	1.50	1.50	0.00
1,900.00	26.25	100.00	1,839.42	-68.40	387.93	393.92	1.50	1.50	0.00
1,962.23	27.18	100.00	1,895.00	-73.26	415.48	421.89	1.50	1.50	0.00
Kirtland Sh									
2,000.00	27.75	100.00	1,928.52	-76.29	432.64	439.31	1.50	1.50	0.00
2,076.66	28.90	100.00	1,996.00	-82.60	468.46	475.69	1.50	1.50	0.00
Farmington Ss									
2,100.00	29.25	100.00	2,016.40	-84.57	479.63	487.03	1.50	1.50	0.00
2,200.00	30.75	100.00	2,103.00	-93.25	528.87	537.03	1.50	1.50	0.00
2,283.33	32.00	100.00	2,174.14	-100.79	571.60	580.41	1.50	1.50	0.00
2,300.00	33.33	100.00	2,188.17	-102.35	580.45	589.41	8.00	8.00	0.00
2,400.00	41.33	100.00	2,267.62	-112.87	640.13	650.01	8.00	8.00	0.00
2,500.00	49.33	100.00	2,337.86	-125.21	710.11	721.07	8.00	8.00	0.00
2,600.00	57.33	100.00	2,397.53	-139.13	789.04	801.22	8.00	8.00	0.00
2,654.14	61.66	100.00	2,425.00	-147.23	834.97	847.85	8.00	8.00	0.00
Lwr. Kirtland Sh									
2,695.83	65.00	100.00	2,443.71	-153.70	871.66	885.11	8.00	8.00	0.00
2,700.00	65.00	100.00	2,445.47	-154.35	875.38	888.88	0.00	0.00	0.00
2,800.00	65.00	100.00	2,487.73	-170.09	964.63	979.51	0.00	0.00	0.00
2,900.00	65.00	100.00	2,530.00	-185.83	1,053.89	1,070.14	0.00	0.00	0.00
3,000.00	65.00	100.00	2,572.26	-201.57	1,143.14	1,160.77	0.00	0.00	0.00
3,026.35	65.00	100.00	2,583.39	-205.71	1,166.65	1,184.65	0.00	0.00	0.00
Ross 2 Pilot Top									
3,089.31	65.00	100.00	2,610.00	-215.62	1,222.85	1,241.71	0.00	0.00	0.00
FC - Fruitland									
3,100.00	65.00	100.00	2,614.52	-217.30	1,232.39	1,251.40	0.00	0.00	0.00
3,143.73	65.00	100.00	2,633.00	-224.19	1,271.42	1,291.04	0.00	0.00	0.00
Bayfield - Lemon Seam									

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well Ross 2
Company:	B.P.	**TVD Reference:**	GL 6224.30' & RKB 11' @ 6235.30usft (Aztec 507)
Project:	Archuleta County, CO NAD83	**MD Reference:**	GL 6224.30' & RKB 11' @ 6235.30usft (Aztec 507)
Site:	Ross 2 Pad	**North Reference:**	Grid
Well:	Ross 2	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Pilot		
Design:	Plan #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)
3,200.00	65.00	100.00	2,656.78	-233.04	1,321.65	1,342.04	0.00	0.00	0.00
3,231.28	65.00	100.00	2,670.00	-237.96	1,349.56	1,370.38	0.00	0.00	0.00
Lower Lemon Seam									
3,300.00	65.00	100.00	2,699.04	-248.78	1,410.90	1,432.67	0.00	0.00	0.00
3,368.52	65.00	100.00	2,728.00	-259.56	1,472.06	1,494.77	0.00	0.00	0.00
Ignacio Seam									
3,400.00	65.00	100.00	2,741.30	-264.52	1,500.15	1,523.30	0.00	0.00	0.00
3,439.50	65.00	100.00	2,758.00	-270.73	1,535.41	1,559.10	0.00	0.00	0.00
Pictured Cliffs									
3,500.00	65.00	100.00	2,783.57	-280.26	1,589.41	1,613.93	0.00	0.00	0.00
3,563.00	65.00	100.00	2,810.19	-290.17	1,645.64	1,671.03	0.00	0.00	0.00
Ross 2 Lat 2 BHL - Ross 2 Lat 1 BHL									

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
Ross 2 Pilot Top	0.00	360.00	2,610.00	-231.03	1,149.59	1,135,076.08	2,433,619.19	37.0214749	-107.4400423
- plan misses target center by 40.50usft at 3026.35usft MD (2583.39 TVD, -205.71 N, 1166.65 E)									
- Point									

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
11.00	11.00	Animas		0.00	0.00
1,762.47	1,715.00	Lwr. Aniimas		0.00	0.00
1,962.23	1,895.00	Kirtland Sh		0.00	0.00
2,076.66	1,996.00	Farmington Ss		0.00	0.00
2,654.14	2,425.00	Lwr. Kirtland Sh		0.00	0.00
3,089.31	2,610.00	Fruitland		0.00	0.00
3,143.73	2,633.00	Bayfield		0.00	0.00
3,143.73	2,633.00	Lemon Seam		0.00	0.00
3,231.28	2,670.00	Lower Lemon Seam		0.00	0.00
3,368.52	2,728.00	Ignacio Seam		0.00	0.00
3,439.50	2,758.00	Pictured Cliffs		0.00	0.00

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
3,089.31	2,610.00	-215.62	1,222.85	FC