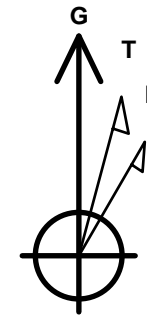


Company: NAG - MASTER
 Project: SAN JUAN NORTH - BP
 Site: SEC 10 - T33N - R08W
 Well: FORD H1
 Wellbore: OH
 Design: Plan #1

PROJECT DETAILS: SAN JUAN NORTH - BP

Geodetic System: US State Plane 1983
 Datum: North American Datum 1983
 Ellipsoid: GRS 1980
 Zone: Colorado Southern Zone
 System Datum: Mean Sea Level
 Local North: Grid



Azimuths to Grid North
 True North: 1.35°
 Magnetic North: 10.87°

Magnetic Field
 Strength: 50425.0snT
 Dip Angle: 63.71°
 Date: 8/6/2015
 Model: BGGM2014

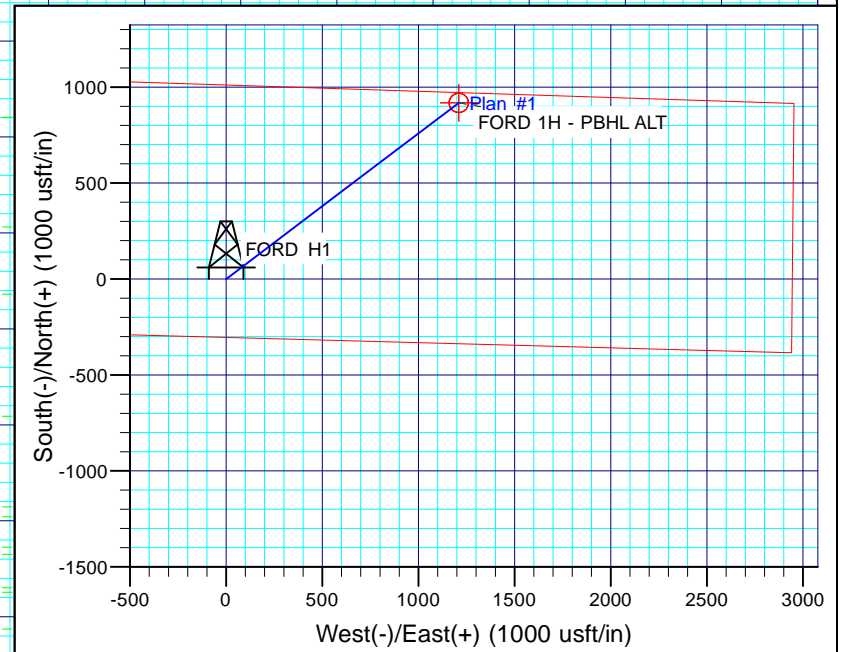
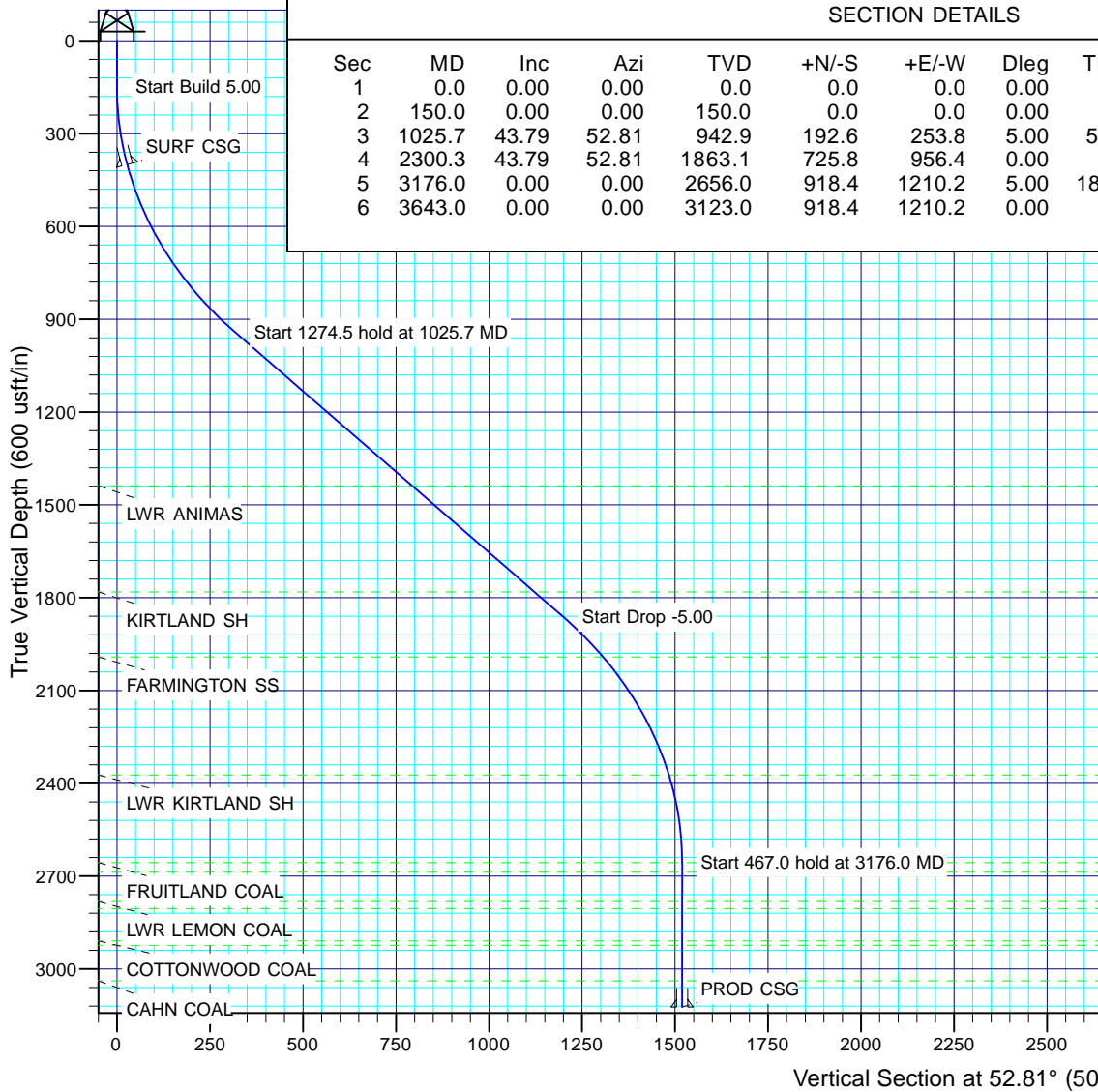
WELL DETAILS: FORD H1

Created By: Ashley Henderson Troutman
 Date: 12:52, August 06 2015

Ground Level: 6702.1
 +N/-S 0.0 +E/-W 0.0 Northing 1173140.32 Easting 2356283.14 Latitude 37° 7' 16.582 N Longitude 107° 42' 28"

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	150.0	0.00	0.00	150.0	0.0	0.0	0.00	0.00	0.0	
3	1025.7	43.79	52.81	942.9	192.6	253.8	5.00	52.81	318.6	
4	2300.3	43.79	52.81	1863.1	725.8	956.4	0.00	0.00	1200.6	
5	3176.0	0.00	0.00	2656.0	918.4	1210.2	5.00	180.00	1519.2	FORD 1H - BTV ALT
6	3643.0	0.00	0.00	3123.0	918.4	1210.2	0.00	0.00	1519.2	FORD 1H - PBHL ALT



NAG - MASTER

**SAN JUAN NORTH - BP
SEC 10 - T33N - R08W
FORD H1**

OH

Plan: Plan #1

Survey Report - Geographic

06 August, 2015

Survey Report - Geographic

Company: NAG - MASTER	Local Co-ordinate Reference: Well FORD H1
Project: SAN JUAN NORTH - BP	TVD Reference: RKB @ 6713.1usft (507)
Site: SEC 10 - T33N - R08W	MD Reference: RKB @ 6713.1usft (507)
Well: FORD H1	North Reference: Grid
Wellbore: OH	Survey Calculation Method: Minimum Curvature
Design: Plan #1	Database: EDM R5K - NAG PROD - NAGP1

Project SAN JUAN NORTH - BP, LA PLATA & ARCHULETA COUNTIES		
Map System: US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum: North American Datum 1983		Using Well Reference Point
Map Zone: Colorado Southern Zone		

Site SEC 10 - T33N - R08W			
Site Position:	Northing:	1,173,140.32 usft	Latitude: 37° 7' 16.582 N
From: Map	Easting:	2,356,283.14 usft	Longitude: 107° 42' 28.557 W
Position Uncertainty: 0.0 usft	Slot Radius: 13-3/16"		Grid Convergence: -1.35 °

Well FORD H1		API No	
Well Position	+N/-S 0.0 usft	Northing: 1,173,140.32 usft	Latitude: 37° 7' 16.582 N
	+E/-W 0.0 usft	Easting: 2,356,283.14 usft	Longitude: 107° 42' 28.557 W
Position Uncertainty	0.0 usft	Wellhead Elevation: usft	Ground Level: 6,702.1 usft

Wellbore OH		API no.			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2014	8/6/2015	9.52	63.71	50,425

Design Plan #1				
Audit Notes:				
Version:	Phase: PROTOTYPE	Tie On Depth: 0.0		
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	52.81

Survey Tool Program		Date: 8/6/2015		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	3,643.0	Plan #1 (OH)	MWD	MWD - Standard

Survey Report - Geographic

Company:	NAG - MASTER	Local Co-ordinate Reference:	Well FORD H1
Project:	SAN JUAN NORTH - BP	TVD Reference:	RKB @ 6713.1usft (507)
Site:	SEC 10 - T33N - R08W	MD Reference:	RKB @ 6713.1usft (507)
Well:	FORD H1	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	EDM R5K - NAG PROD - NAGP1

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.0	0.00	0.00	0.0	0.0	0.0	1,173,140.32	2,356,283.14	37° 7' 16.582 N	107° 42' 28.557 W	
100.0	0.00	0.00	100.0	0.0	0.0	1,173,140.32	2,356,283.14	37° 7' 16.582 N	107° 42' 28.557 W	
150.0	0.00	0.00	150.0	0.0	0.0	1,173,140.32	2,356,283.14	37° 7' 16.582 N	107° 42' 28.557 W	
200.0	2.50	52.81	200.0	0.7	0.9	1,173,140.98	2,356,284.01	37° 7' 16.589 N	107° 42' 28.547 W	
300.0	7.50	52.81	299.6	5.9	7.8	1,173,146.25	2,356,290.95	37° 7' 16.642 N	107° 42' 28.462 W	
400.0	12.50	52.81	398.0	16.4	21.6	1,173,156.74	2,356,304.78	37° 7' 16.749 N	107° 42' 28.295 W	
402.0	12.60	52.81	400.0	16.7	22.0	1,173,157.01	2,356,305.13	37° 7' 16.752 N	107° 42' 28.291 W	
SURF CSG										
500.0	17.50	52.81	494.6	32.1	42.2	1,173,172.38	2,356,325.39	37° 7' 16.909 N	107° 42' 28.045 W	
600.0	22.50	52.81	588.5	52.7	69.5	1,173,193.05	2,356,352.62	37° 7' 17.119 N	107° 42' 27.715 W	
700.0	27.50	52.81	679.1	78.3	103.1	1,173,218.59	2,356,386.28	37° 7' 17.380 N	107° 42' 27.307 W	
800.0	32.50	52.81	765.7	108.5	143.0	1,173,248.81	2,356,426.10	37° 7' 17.688 N	107° 42' 26.824 W	
900.0	37.50	52.81	847.6	143.2	188.6	1,173,283.47	2,356,471.77	37° 7' 18.041 N	107° 42' 26.270 W	
1,000.0	42.50	52.81	924.2	182.0	239.8	1,173,322.32	2,356,522.96	37° 7' 18.437 N	107° 42' 25.650 W	
1,025.7	43.79	52.81	942.9	192.6	253.8	1,173,332.95	2,356,536.97	37° 7' 18.545 N	107° 42' 25.480 W	
1,100.0	43.79	52.81	996.6	223.7	294.8	1,173,364.02	2,356,577.91	37° 7' 18.862 N	107° 42' 24.984 W	
1,200.0	43.79	52.81	1,068.8	265.5	349.9	1,173,405.85	2,356,633.03	37° 7' 19.288 N	107° 42' 24.316 W	
1,300.0	43.79	52.81	1,140.9	307.4	405.0	1,173,447.68	2,356,688.16	37° 7' 19.714 N	107° 42' 23.647 W	
1,400.0	43.79	52.81	1,213.1	349.2	460.1	1,173,489.51	2,356,743.28	37° 7' 20.141 N	107° 42' 22.979 W	
1,500.0	43.79	52.81	1,285.3	391.0	515.3	1,173,531.34	2,356,798.40	37° 7' 20.567 N	107° 42' 22.311 W	
1,600.0	43.79	52.81	1,357.5	432.9	570.4	1,173,573.18	2,356,853.52	37° 7' 20.994 N	107° 42' 21.643 W	
1,700.0	43.79	52.81	1,429.7	474.7	625.5	1,173,615.01	2,356,908.64	37° 7' 21.420 N	107° 42' 20.975 W	
1,711.6	43.79	52.81	1,438.1	479.5	631.9	1,173,619.86	2,356,915.04	37° 7' 21.469 N	107° 42' 20.897 W	
LWR ANIMAS										
1,800.0	43.79	52.81	1,501.9	516.5	680.6	1,173,656.84	2,356,963.76	37° 7' 21.846 N	107° 42' 20.307 W	
1,900.0	43.79	52.81	1,574.1	558.3	735.7	1,173,698.67	2,357,018.88	37° 7' 22.273 N	107° 42' 19.638 W	
2,000.0	43.79	52.81	1,646.3	600.2	790.9	1,173,740.50	2,357,074.00	37° 7' 22.699 N	107° 42' 18.970 W	
2,100.0	43.79	52.81	1,718.5	642.0	846.0	1,173,782.33	2,357,129.12	37° 7' 23.125 N	107° 42' 18.302 W	
2,186.7	43.79	52.81	1,781.1	678.3	893.8	1,173,818.61	2,357,176.93	37° 7' 23.495 N	107° 42' 17.722 W	
KIRTLAND SH										
2,200.0	43.79	52.81	1,790.7	683.8	901.1	1,173,824.16	2,357,184.25	37° 7' 23.552 N	107° 42' 17.634 W	
2,300.0	43.79	52.81	1,862.9	725.7	956.2	1,173,865.99	2,357,239.37	37° 7' 23.978 N	107° 42' 16.966 W	
2,300.3	43.79	52.81	1,863.1	725.8	956.4	1,173,866.10	2,357,239.51	37° 7' 23.979 N	107° 42' 16.964 W	
2,400.0	38.80	52.81	1,938.0	765.6	1,008.8	1,173,905.88	2,357,291.92	37° 7' 24.384 N	107° 42' 16.328 W	
2,466.6	35.47	52.81	1,991.1	789.9	1,040.8	1,173,930.19	2,357,323.97	37° 7' 24.632 N	107° 42' 15.940 W	
FARMINGTON SS										
2,500.0	33.80	52.81	2,018.5	801.3	1,055.9	1,173,941.65	2,357,339.07	37° 7' 24.749 N	107° 42' 15.757 W	
2,600.0	28.80	52.81	2,104.0	832.7	1,097.3	1,173,973.05	2,357,380.44	37° 7' 25.069 N	107° 42' 15.255 W	
2,700.0	23.80	52.81	2,193.6	859.5	1,132.6	1,173,999.82	2,357,415.72	37° 7' 25.342 N	107° 42' 14.828 W	
2,800.0	18.80	52.81	2,286.7	881.5	1,161.5	1,174,021.78	2,357,444.65	37° 7' 25.566 N	107° 42' 14.477 W	
2,890.1	14.29	52.81	2,373.1	897.0	1,181.9	1,174,037.29	2,357,465.09	37° 7' 25.724 N	107° 42' 14.229 W	
LWR KIRTLAND SH										
2,900.0	13.80	52.81	2,382.7	898.4	1,183.9	1,174,038.74	2,357,466.99	37° 7' 25.738 N	107° 42' 14.206 W	
3,000.0	8.80	52.81	2,480.7	910.3	1,199.5	1,174,050.58	2,357,482.60	37° 7' 25.859 N	107° 42' 14.017 W	
3,100.0	3.80	52.81	2,580.1	916.9	1,208.2	1,174,057.21	2,357,491.33	37° 7' 25.927 N	107° 42' 13.911 W	
3,176.0	0.00	0.00	2,656.0	918.4	1,210.2	1,174,058.73	2,357,493.34	37° 7' 25.942 N	107° 42' 13.887 W	
3,176.1	0.00	0.00	2,656.1	918.4	1,210.2	1,174,058.73	2,357,493.34	37° 7' 25.942 N	107° 42' 13.887 W	
FRUITLAND COAL										
3,200.0	0.00	0.00	2,680.0	918.4	1,210.2	1,174,058.73	2,357,493.34	37° 7' 25.942 N	107° 42' 13.887 W	
3,207.1	0.00	0.00	2,687.1	918.4	1,210.2	1,174,058.73	2,357,493.34	37° 7' 25.942 N	107° 42' 13.887 W	
LEMON COAL										
3,300.0	0.00	0.00	2,780.0	918.4	1,210.2	1,174,058.73	2,357,493.34	37° 7' 25.942 N	107° 42' 13.887 W	
3,302.1	0.00	0.00	2,782.1	918.4	1,210.2	1,174,058.73	2,357,493.34	37° 7' 25.942 N	107° 42' 13.887 W	
LWR LEMON COAL										

Survey Report - Geographic

Company:	NAG - MASTER	Local Co-ordinate Reference:	Well FORD H1
Project:	SAN JUAN NORTH - BP	TVD Reference:	RKB @ 6713.1usft (507)
Site:	SEC 10 - T33N - R08W	MD Reference:	RKB @ 6713.1usft (507)
Well:	FORD H1	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	EDM R5K - NAG PROD - NAGP1

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
3,325.1	0.00	0.00	2,805.1	918.4	1,210.2	1,174,058.73	2,357,493.34	37° 7' 25.942 N	107° 42' 13.887 W
IGNACIO COAL									
3,400.0	0.00	0.00	2,880.0	918.4	1,210.2	1,174,058.73	2,357,493.34	37° 7' 25.942 N	107° 42' 13.887 W
3,429.1	0.00	0.00	2,909.1	918.4	1,210.2	1,174,058.73	2,357,493.34	37° 7' 25.942 N	107° 42' 13.887 W
COTTONWOOD COAL									
3,443.1	0.00	0.00	2,923.1	918.4	1,210.2	1,174,058.73	2,357,493.34	37° 7' 25.942 N	107° 42' 13.887 W
PICTURED CLIFFS									
3,500.0	0.00	0.00	2,980.0	918.4	1,210.2	1,174,058.73	2,357,493.34	37° 7' 25.942 N	107° 42' 13.887 W
3,558.1	0.00	0.00	3,038.1	918.4	1,210.2	1,174,058.73	2,357,493.34	37° 7' 25.942 N	107° 42' 13.887 W
CAHN COAL									
3,600.0	0.00	0.00	3,080.0	918.4	1,210.2	1,174,058.73	2,357,493.34	37° 7' 25.942 N	107° 42' 13.887 W
3,643.0	0.00	0.00	3,123.0	918.4	1,210.2	1,174,058.73	2,357,493.34	37° 7' 25.942 N	107° 42' 13.887 W
PROD CSG									

Survey Report - Geographic

Company: NAG - MASTER	Local Co-ordinate Reference: Well FORD H1
Project: SAN JUAN NORTH - BP	TVD Reference: RKB @ 6713.1usft (507)
Site: SEC 10 - T33N - R08W	MD Reference: RKB @ 6713.1usft (507)
Well: FORD H1	North Reference: Grid
Wellbore: OH	Survey Calculation Method: Minimum Curvature
Design: Plan #1	Database: EDM R5K - NAG PROD - NAGP1

Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
FORD 1H - BTV ALT - plan hits target center - Circle (radius 50.0)	0.00	360.00	2,656.0	918.4	1,210.2	1,174,058.73	2,357,493.34	37° 7' 25.942 N	107° 42' 13.887 W
FORD 1H - PBHL AL1 - plan hits target center - Circle (radius 50.0)	0.00	360.00	3,123.0	918.4	1,210.2	1,174,058.73	2,357,493.34	37° 7' 25.942 N	107° 42' 13.887 W

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
402.0	400.0	SURF CSG	8-5/8	12-1/4	
3,643.0	3,123.0	PROD CSG	5-1/2	7-7/8	

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,711.6	1,438.1	LWR ANIMAS		0.00		
2,186.7	1,781.1	KIRTLAND SH		0.00		
2,466.6	1,991.1	FARMINGTON SS		0.00		
2,890.1	2,373.1	LWR KIRTLAND SH		0.00		
3,176.1	2,656.1	FRUITLAND COAL		0.00		
3,207.1	2,687.1	LEMON COAL		0.00		
3,302.1	2,782.1	LWR LEMON COAL		0.00		
3,325.1	2,805.1	IGNACIO COAL		0.00		
3,429.1	2,909.1	COTTONWOOD COAL		0.00		
3,443.1	2,923.1	PICTURED CLIFFS		0.00		
3,558.1	3,038.1	CAHN COAL		0.00		

Checked By: _____	Approved By: _____	Date: _____
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