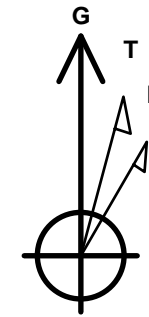


Company: NAG - MASTER  
 Project: SAN JUAN NORTH - BP  
 Site: SEC 27 - T33N - R07W  
 Well: PARRY E 4  
 Wellbore: 00  
 Design: PL-vA.2 AHT-1/12/2015

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: 1.28°  
 Magnetic North: 10.81°

Magnetic Field  
 Strength: 50490.7snT  
 Dip Angle: 63.71°  
 Date: 1/6/2015  
 Model: BGGM2014

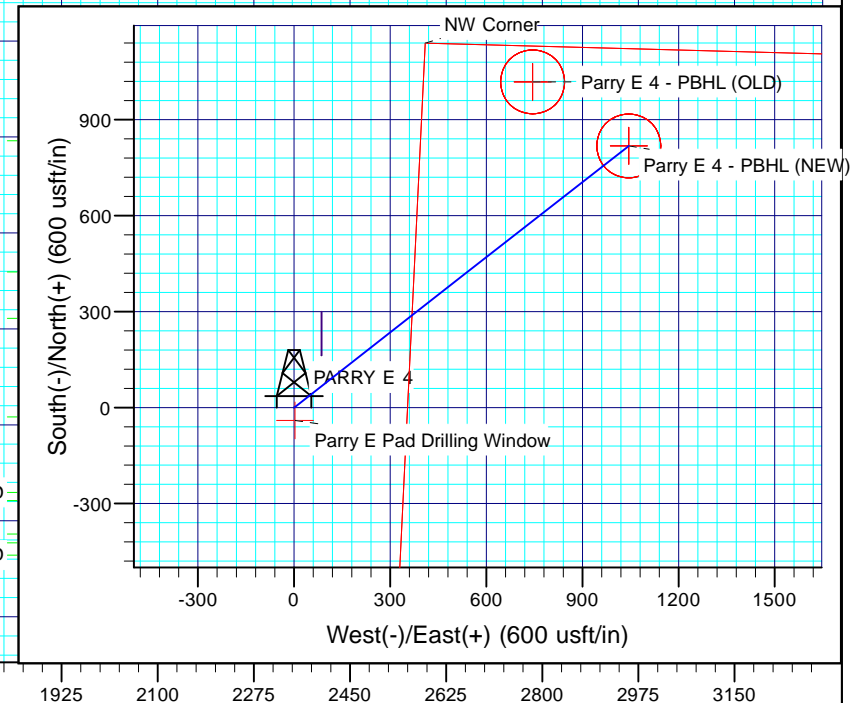
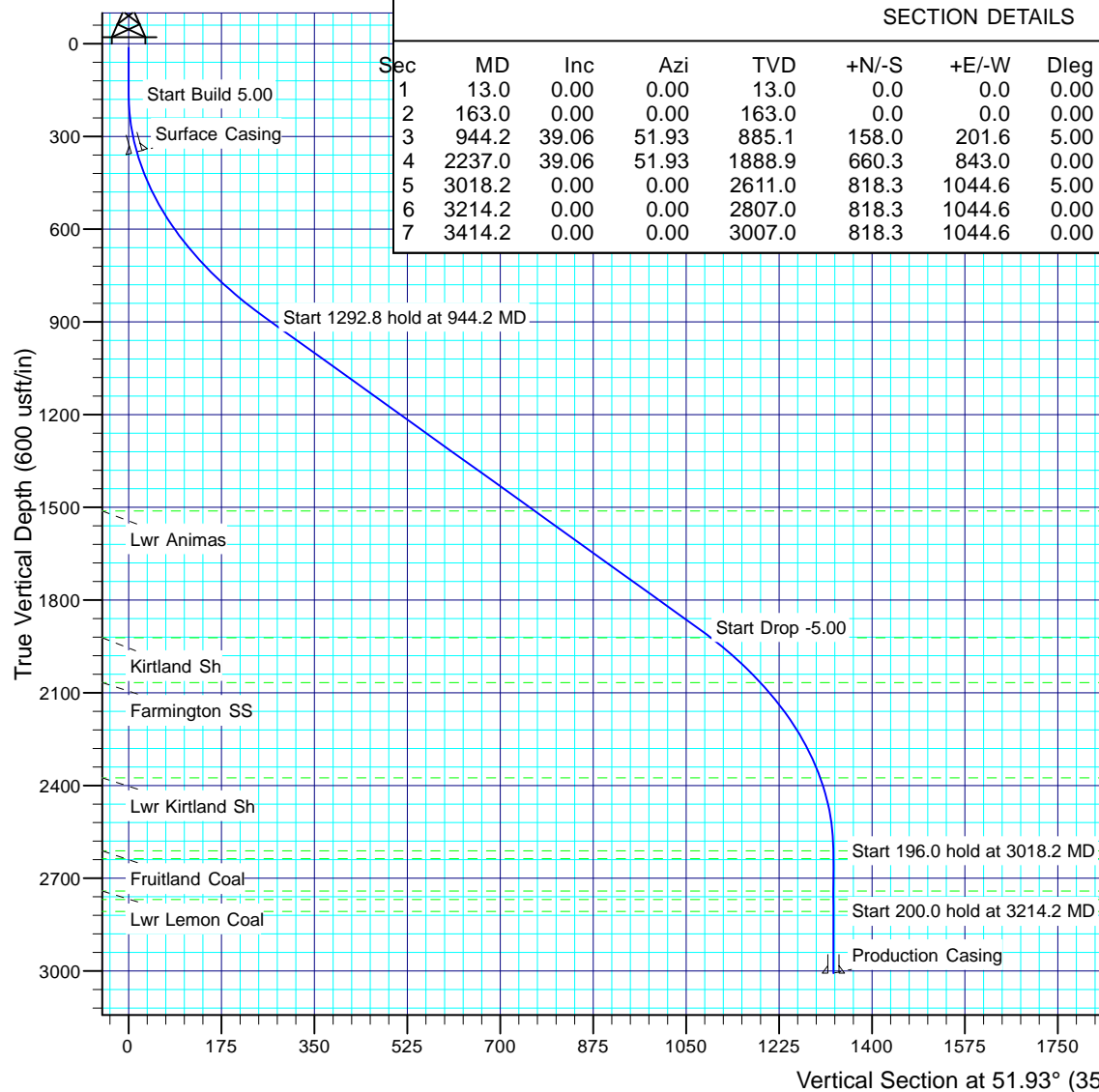
WELL DETAILS: PARRY E 4

Ground Level: 6639.5  
 +N/-S 0.0 +E/-W 0.0 Northing 1156386.28 Easting 2388755.87 Latitude 37° 4' 38.373 N Longitude 107° 35' 43.085

Created By: Ashley Henderson Troutman  
 Date: 21:28, January 26 2015

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	13.0	0.00	0.00	13.0	0.0	0.0	0.00	0.00	0.0	
2	163.0	0.00	0.00	163.0	0.0	0.0	0.00	0.00	0.0	
3	944.2	39.06	51.93	885.1	158.0	201.6	5.00	51.93	256.2	
4	2237.0	39.06	51.93	1888.9	660.3	843.0	0.00	0.00	1070.8	
5	3018.2	0.00	0.00	2611.0	818.3	1044.6	5.00	180.00	1327.0	Parry E 4 - Coal (NEW)
6	3214.2	0.00	0.00	2807.0	818.3	1044.6	0.00	0.00	1327.0	Parry E 4 - PC (NEW)
7	3414.2	0.00	0.00	3007.0	818.3	1044.6	0.00	0.00	1327.0	Parry E 4 - PBHL (NEW)



# **NAG - MASTER**

**SAN JUAN NORTH - BP**

**SEC 27 - T33N - R07W**

**PARRY E 4**

**00**

**Plan: PL-vA.2 AHT-1/12/2015**

## **Survey Report - Geographic**

**19 January, 2015**

## Survey Report - Geographic

<b>Company:</b>	NAG - MASTER	<b>Local Co-ordinate Reference:</b>	Well PARRY E 4
<b>Project:</b>	SAN JUAN NORTH - BP	<b>TVD Reference:</b>	RIG @ 6652.5usft (507)
<b>Site:</b>	SEC 27 - T33N - R07W	<b>MD Reference:</b>	RIG @ 6652.5usft (507)
<b>Well:</b>	PARRY E 4	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	00	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	PL-vA.2 AHT-1/12/2015	<b>Database:</b>	EDM R5K - NAG PROD - NAGP1

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

Site		SEC 27 - T33N - R07W			
Site Position:		Northing:	1,156,346.12 usft	Latitude:	37° 4' 37.977 N
From:	Map	Easting:	2,388,758.92 usft	Longitude:	107° 35' 43.036 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.29 °

Well	PARRY E 4		API No.			
Well Position	+N/-S	0.0 usft	Northing:	1,156,386.28 usft	Latitude:	37° 4' 38.373 N
	+E/-W	0.0 usft	Easting:	2,388,755.87 usft	Longitude:	107° 35' 43.085 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	6,639.5 usft

<b>Wellbore</b>	00	API no.			
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	BGGM2014	1/6/2015	9.52	63.71	50,491

<b>Design</b>	PL-vA.2 AHT-1/12/2015				
<b>Audit Notes:</b>					
<b>Version:</b>		<b>Phase:</b>	PROTOTYPE	<b>Tie On Depth:</b>	13.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	13.0	0.0	0.0	51.93	

<b>Survey Tool Program</b>	<b>Date:</b> 1/19/2015				
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
13.0	3,414.2	PL-vA.2 AHT-1/12/2015 (00)	MWD	MWD - Standard	

# Survey Report - Geographic

<b>Company:</b>	NAG - MASTER	<b>Local Co-ordinate Reference:</b>	Well PARRY E 4
<b>Project:</b>	SAN JUAN NORTH - BP	<b>TVD Reference:</b>	RIG @ 6652.5usft (507)
<b>Site:</b>	SEC 27 - T33N - R07W	<b>MD Reference:</b>	RIG @ 6652.5usft (507)
<b>Well:</b>	PARRY E 4	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	00	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	PL-vA.2 AHT-1/12/2015	<b>Database:</b>	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	
13.0	0.00	0.00	13.0	0.0	0.0	1,156,386.28	2,388,755.87	37° 4' 38.373 N	107° 35' 43.085 W	
100.0	0.00	0.00	100.0	0.0	0.0	1,156,386.28	2,388,755.87	37° 4' 38.373 N	107° 35' 43.085 W	
163.0	0.00	0.00	163.0	0.0	0.0	1,156,386.28	2,388,755.87	37° 4' 38.373 N	107° 35' 43.085 W	
200.0	1.85	51.93	200.0	0.4	0.5	1,156,386.65	2,388,756.34	37° 4' 38.377 N	107° 35' 43.079 W	
300.0	6.85	51.93	299.7	5.0	6.4	1,156,391.32	2,388,762.31	37° 4' 38.425 N	107° 35' 43.007 W	
350.8	9.39	51.93	350.0	9.5	12.1	1,156,395.75	2,388,767.96	37° 4' 38.470 N	107° 35' 42.939 W	
Surface Casing										
400.0	11.85	51.93	398.3	15.1	19.2	1,156,401.34	2,388,775.09	37° 4' 38.527 N	107° 35' 42.852 W	
500.0	16.85	51.93	495.2	30.3	38.7	1,156,416.62	2,388,794.60	37° 4' 38.682 N	107° 35' 42.616 W	
600.0	21.85	51.93	589.5	50.8	64.8	1,156,437.05	2,388,820.67	37° 4' 38.890 N	107° 35' 42.300 W	
700.0	26.85	51.93	680.6	76.2	97.3	1,156,462.46	2,388,853.12	37° 4' 39.148 N	107° 35' 41.907 W	
800.0	31.85	51.93	767.7	106.4	135.8	1,156,492.68	2,388,891.69	37° 4' 39.455 N	107° 35' 41.439 W	
900.0	36.85	51.93	850.2	141.2	180.2	1,156,527.46	2,388,936.10	37° 4' 39.809 N	107° 35' 40.901 W	
944.2	39.06	51.93	885.1	158.0	201.6	1,156,544.24	2,388,957.52	37° 4' 39.980 N	107° 35' 40.641 W	
1,000.0	39.06	51.93	928.4	179.6	229.3	1,156,565.91	2,388,985.18	37° 4' 40.200 N	107° 35' 40.306 W	
1,100.0	39.06	51.93	1,006.1	218.5	278.9	1,156,604.77	2,389,034.79	37° 4' 40.595 N	107° 35' 39.705 W	
1,200.0	39.06	51.93	1,083.7	257.4	328.5	1,156,643.63	2,389,084.39	37° 4' 40.990 N	107° 35' 39.104 W	
1,300.0	39.06	51.93	1,161.3	296.2	378.1	1,156,682.49	2,389,134.00	37° 4' 41.385 N	107° 35' 38.502 W	
1,400.0	39.06	51.93	1,239.0	335.1	427.7	1,156,721.35	2,389,183.61	37° 4' 41.780 N	107° 35' 37.901 W	
1,500.0	39.06	51.93	1,316.6	373.9	477.3	1,156,760.22	2,389,233.22	37° 4' 42.175 N	107° 35' 37.300 W	
1,600.0	39.06	51.93	1,394.3	412.8	527.0	1,156,799.08	2,389,282.82	37° 4' 42.571 N	107° 35' 36.699 W	
1,700.0	39.06	51.93	1,471.9	451.7	576.6	1,156,837.94	2,389,332.43	37° 4' 42.966 N	107° 35' 36.097 W	
1,751.6	39.06	51.93	1,512.0	471.7	602.2	1,156,857.99	2,389,358.03	37° 4' 43.170 N	107° 35' 35.787 W	
Lwr Animas										
1,800.0	39.06	51.93	1,549.6	490.5	626.2	1,156,876.80	2,389,382.04	37° 4' 43.361 N	107° 35' 35.496 W	
1,900.0	39.06	51.93	1,627.2	529.4	675.8	1,156,915.66	2,389,431.65	37° 4' 43.756 N	107° 35' 34.895 W	
2,000.0	39.06	51.93	1,704.9	568.2	725.4	1,156,954.52	2,389,481.25	37° 4' 44.151 N	107° 35' 34.294 W	
2,100.0	39.06	51.93	1,782.5	607.1	775.0	1,156,993.38	2,389,530.86	37° 4' 44.546 N	107° 35' 33.692 W	
2,200.0	39.06	51.93	1,860.2	646.0	824.6	1,157,032.24	2,389,580.47	37° 4' 44.941 N	107° 35' 33.091 W	
2,237.0	39.06	51.93	1,888.9	660.3	843.0	1,157,046.62	2,389,598.82	37° 4' 45.087 N	107° 35' 32.869 W	
2,279.0	36.96	51.93	1,922.0	676.3	863.3	1,157,062.58	2,389,619.20	37° 4' 45.250 N	107° 35' 32.622 W	
Kirtland Sh										
2,300.0	35.91	51.93	1,938.9	684.0	873.1	1,157,070.26	2,389,629.00	37° 4' 45.328 N	107° 35' 32.503 W	
2,400.0	30.91	51.93	2,022.3	717.9	916.5	1,157,104.21	2,389,672.34	37° 4' 45.673 N	107° 35' 31.978 W	
2,451.4	28.34	51.93	2,067.0	733.6	936.5	1,157,119.87	2,389,692.34	37° 4' 45.832 N	107° 35' 31.735 W	
Farmington SS										
2,500.0	25.91	51.93	2,110.2	747.3	953.9	1,157,133.54	2,389,709.78	37° 4' 45.971 N	107° 35' 31.524 W	
2,600.0	20.91	51.93	2,202.0	771.8	985.2	1,157,158.03	2,389,741.05	37° 4' 46.220 N	107° 35' 31.145 W	
2,700.0	15.91	51.93	2,296.8	791.2	1,010.0	1,157,177.50	2,389,765.91	37° 4' 46.418 N	107° 35' 30.844 W	
2,780.5	11.89	51.93	2,375.0	803.2	1,025.3	1,157,189.43	2,389,781.13	37° 4' 46.539 N	107° 35' 30.659 W	
Lwr Kirtland Sh										
2,800.0	10.91	51.93	2,394.1	805.5	1,028.3	1,157,191.80	2,389,784.16	37° 4' 46.563 N	107° 35' 30.622 W	
2,900.0	5.91	51.93	2,493.0	814.5	1,039.8	1,157,200.82	2,389,795.67	37° 4' 46.655 N	107° 35' 30.483 W	
3,000.0	0.91	51.93	2,592.8	818.2	1,044.5	1,157,204.49	2,389,800.36	37° 4' 46.692 N	107° 35' 30.426 W	
3,018.2	0.00	0.00	2,611.0	818.3	1,044.6	1,157,204.58	2,389,800.47	37° 4' 46.693 N	107° 35' 30.425 W	
Fruitland Coal										
3,044.2	0.00	0.00	2,637.0	818.3	1,044.6	1,157,204.58	2,389,800.47	37° 4' 46.693 N	107° 35' 30.425 W	
Lemon Coal										
3,100.0	0.00	0.00	2,692.8	818.3	1,044.6	1,157,204.58	2,389,800.47	37° 4' 46.693 N	107° 35' 30.425 W	
3,148.2	0.00	0.00	2,741.0	818.3	1,044.6	1,157,204.58	2,389,800.47	37° 4' 46.693 N	107° 35' 30.425 W	
Lwr Lemon Coal										
3,176.2	0.00	0.00	2,769.0	818.3	1,044.6	1,157,204.58	2,389,800.47	37° 4' 46.693 N	107° 35' 30.425 W	
Ignacio Coal										
3,200.0	0.00	0.00	2,792.8	818.3	1,044.6	1,157,204.58	2,389,800.47	37° 4' 46.693 N	107° 35' 30.425 W	

## Survey Report - Geographic

<b>Company:</b>	NAG - MASTER	<b>Local Co-ordinate Reference:</b>	Well PARRY E 4
<b>Project:</b>	SAN JUAN NORTH - BP	<b>TVD Reference:</b>	RIG @ 6652.5usft (507)
<b>Site:</b>	SEC 27 - T33N - R07W	<b>MD Reference:</b>	RIG @ 6652.5usft (507)
<b>Well:</b>	PARRY E 4	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	00	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	PL-vA.2 AHT-1/12/2015	<b>Database:</b>	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
3,214.2	0.00	0.00	2,807.0	818.3	1,044.6	1,157,204.58	2,389,800.47	37° 4' 46.693 N	107° 35' 30.425 W
<b>Pictured Cliffs</b>									
3,300.0	0.00	0.00	2,892.8	818.3	1,044.6	1,157,204.58	2,389,800.47	37° 4' 46.693 N	107° 35' 30.425 W
3,400.0	0.00	0.00	2,992.8	818.3	1,044.6	1,157,204.58	2,389,800.47	37° 4' 46.693 N	107° 35' 30.425 W
3,414.2	0.00	0.00	3,007.0	818.3	1,044.6	1,157,204.58	2,389,800.47	37° 4' 46.693 N	107° 35' 30.425 W
<b>Production Casing</b>									

## Survey Report - Geographic

<b>Company:</b>	NAG - MASTER	<b>Local Co-ordinate Reference:</b>	Well PARRY E 4
<b>Project:</b>	SAN JUAN NORTH - BP	<b>TVD Reference:</b>	RIG @ 6652.5usft (507)
<b>Site:</b>	SEC 27 - T33N - R07W	<b>MD Reference:</b>	RIG @ 6652.5usft (507)
<b>Well:</b>	PARRY E 4	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	00	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	PL-vA.2 AHT-1/12/2015	<b>Database:</b>	EDM R5K - NAG PROD - NAGP1

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
Parry E 4 - PC (OLD) - plan misses target center by 360.6usft at 3229.2usft MD (2822.0 TVD, 818.3 N, 1044.6 E) - Circle (radius 100.0)	0.00	360.00	2,822.0	1,018.4	744.6	1,157,404.64	2,389,500.46	37° 4' 48.604 N	107° 35' 34.181 W
Parry E 4 - Coal (OLD) - plan misses target center by 360.6usft at 3033.2usft MD (2626.0 TVD, 818.3 N, 1044.6 E) - Circle (radius 100.0)	0.00	360.00	2,626.0	1,018.4	744.6	1,157,404.64	2,389,500.46	37° 4' 48.604 N	107° 35' 34.181 W
Parry E 4 - PBHL (NEW) - plan hits target center - Circle (radius 100.0)	0.00	360.00	3,007.0	818.3	1,044.6	1,157,204.58	2,389,800.47	37° 4' 46.693 N	107° 35' 30.425 W
Parry E Pad Drilling Win - plan misses target center by 40.3usft at 13.5usft MD (13.5 TVD, 0.0 N, 0.0 E) - Polygon	0.00	360.00	13.5	-40.2	3.0	1,156,346.12	2,388,758.92	37° 4' 37.977 N	107° 35' 43.036 W
NW Corner			13.5	1,179.5	406.2	1,157,525.62	2,389,165.12		
NE Corner			13.5	1,144.4	1,725.8	1,157,490.52	2,390,484.72		
SE Corner			13.5	-2,689.5	1,539.3	1,153,656.62	2,390,298.22		
SW Corner			13.5	-2,697.1	219.3	1,153,649.02	2,388,978.22		
Parry E 4 - Coal (NEW) - plan hits target center - Circle (radius 100.0)	0.00	360.00	2,611.0	818.3	1,044.6	1,157,204.58	2,389,800.47	37° 4' 46.693 N	107° 35' 30.425 W
Parry E 4 - PC (NEW) - plan hits target center - Circle (radius 100.0)	0.00	360.00	2,807.0	818.3	1,044.6	1,157,204.58	2,389,800.47	37° 4' 46.693 N	107° 35' 30.425 W
Parry E 4 - PBHL (OLD) - plan misses target center by 360.9usft at 3414.2usft MD (3007.0 TVD, 818.3 N, 1044.6 E) - Circle (radius 100.0)	0.00	360.00	3,022.0	1,018.4	744.6	1,157,404.64	2,389,500.46	37° 4' 48.604 N	107° 35' 34.181 W

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
350.8	350.0	Surface Casing	12-1/4	12-1/4	
3,414.2	3,007.0	Production Casing	5-1/2	7-7/8	

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,751.6	1,512.0	Lwr Animas		0.00		
2,279.0	1,922.0	Kirtland Sh		0.00		
2,451.4	2,067.0	Farmington SS		0.00		
2,780.5	2,375.0	Lwr Kirtland Sh		0.00		
3,018.2	2,611.0	Fruitland Coal		0.00		
3,044.2	2,637.0	Lemon Coal		0.00		
3,148.2	2,741.0	Lwr Lemon Coal		0.00		
3,176.2	2,769.0	Ignacio Coal		0.00		
3,214.2	2,807.0	Pictured Cliffs		0.00		

Checked By: _____	Approved By: _____	Date: _____
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